THE USE OF RATIO CONCEPTUAL COST ESTIMATION FOR PETROCHEMICAL CONSTRUCTION PROJECTS IN SOUTH AFRICA

by

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"It is the mark of an educated mind to rest satisfied with the degree of precision which the nature of the subject admits and not to seek exactness where only an approximation is possible"

- Aristotle

SYNOPSIS

The fast pace in which construction projects are being executed and the fact that almost all green field projects in the petrochemical industry are constructed by means of "fast-track" methodologies, has the effect that financial management becomes increasingly difficult. The congested construction program together with the increased emphasis on accurate financial reporting, created an opportunity to improve forecasting methods without spending too much time on such exercises.

In my personal capacity, I found the current typical procedure of allowing for additional scope of work, inadequate. The time allocated to come up with estimated costs for new scope / additional scope does not allow for comprehensive measurements to conduct detailed estimates. The only alternative was therefore to find other means of obtaining fairly accurate estimated costs for proposed new scopes of work.

Construction time will not be increased to allow for exercises like these, in fact, future construction periods will rather decrease, which will lead to a compounding effect of the problem. To me the only solution is to employ an estimating method that has proofed itself in the industry over many years. The quickest estimating methods are the conceptual estimates of which ratio conceptual estimating will probably take the least time. The downside of this form of estimating is that it is also not as accurate as detailed estimates, but if it is based on good historical data, one can get good results that will be more than adequate for this purpose.

My discussions with clients and other professionals in the field over the past couple of years reiterated the urgency of an improved financial forecasting procedure, especially when dealing with larger additions to the scope of work. Should ratio conceptual estimating be used, it must be clearly understood that this form of estimating is very dependable on the accuracy of the database on which it is based. A significant effort should be instilled in deriving at a good quality database. This takes a lot of time and it will not come cheap, but the benefit of this investment will be realized in future projects and will increase as the number of newly finished projects are added to the database.

OPSOMMING

Die vinnige tempo waarteen konstruksie projekte uitgevoer word en die feit dat feitlik alle nuwe projekte in die petro-chemiese industrie gebou word deur gebruik te maak van versnelde metodes; het die effek dat finansiële bestuur al hoe moeiliker raak. Die beperkte tyd in die konstruksie program saam met die toenemende fokus op akkurate finansiële verslaggewing, skep ´n geleentheid om die vooruitskattingsmetodes aan te pas sonder dat daar teveel tyd daaraan spandeer word.

Die huidige tipiese metode vir die toelating vir addisionele werk is ontoereikend. Die beperkte tyd vir die toelating vir addisionele kostes vir nuwe werk laat nie toe vir uitgebreide meetwerk nie. Die enigste alternatief was om kosteberamings met redelike akkuraatheid te ontwikkel.

Konstruksietyd sal nie verleng word om toe te laat vir meer akkurate kosteberamings nie; inteendeel, toekomstige konstruksie periodes sal eerder verkort, wat sal lei tot ´n ontoereikende proses. ´n Moontlike oplossing is om gebruik te maak van ´n beproefde kosteberamingsmetode wat bewys het om betroubaar te wees in die industrie oor etlike jare. Die vinnigste kosteberamingsmetodes is die verkorte metodes waarvan die metode gebaseer op wiskundige verhoudings, sekerlik die minste tyd sal neem. Die nadeel van hierdie vorm van kosteberaming is dat dit minder akkuraat is as gedetailleerde metodes, maar goeie resultate kan verkry word indien dit gebaseer is op ´n goeie databasis.

Onderhoude met kliënte en ander professionele persone in die bedryf gedurende die afgelope paar het die dringendheid van ´n verbeterde finansiële vooruitskattingsprosedure; veral in die geval van groot toevoegings tot die projek, beklemtoon. Die ontwikkeling van ´n databasis sal baie tyd in beslag neem en duur wees, maar die voordeel daarvan sal in die toekoms ervaar word. Hoe meer data van voltooide projekte tot die databasis toegevoeg word, hoe akkurater sal die inligting wees wat onttrek word.

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DECLARATION

I, Willem Petrus Smith, herewith declare that this thesis for the degree PHILOSOPHIAE DOCTOR, represents my own independent work and that I have not previously submitted the same work for a qualification at / in another University / Faculty. I also hereby cede copyright of this thesis to the University of the Free State.

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CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

1.0 INTRODUCTION

Systematic capital cost engineering and capital cost estimating have developed into a specialist activity (Hollmann, 2007b: 8), although Brook (2004: 66) indicates that the core essentials of estimating have remained the same since the first half of the twentieth century. Estimating has been described as both an art and a science. This distinction is mainly due to the constant studies of costs and trends (Hughes, 1991: 3), analysing the results, and recording it (Zastrozny, 1974: 4). Cost estimation is the foundation for economic analysis in construction (Newman, Eschenbach & Lavelle, 2004: 38). Once sufficient data has been collected and processed it should be converted into methods and systems that then become suitable tools for producing realistic capital cost budgets.

Costing of certain elements is an essential part of construction (Newman, *et al.*, 2004: 38). It can take on several forms and can be used for several purposes (Cesarone, 2007: 37). Cost determination or cost estimating should form part of any construction project (Brook, 2004: 66). From the initial stages to the very end, costing can assist management in various forms (Azhar, Ahmed & Caballero, n.d.: 1).

Realistic estimates are essential (Dysert, 2004: 9.1). An over-estimate may cause a promising proposition to be abandoned whereas an under-estimate may result in financial losses. There are many benefits derived from the use of estimates apart from being able to predict the probable cost of capital projects (Black, 1984: 59; Humphreys, 1984: 52).

First and foremost it is used as a basis for economic studies (Humphreys, 1984: 52) to determine the profitability of the manufacturing of a proposed product (Clark & Lorenzoni, 1985: 24). Once an economic study has proved favourable and it has been decided to proceed with the actual construction, the estimate gains even more in importance.

Eventually the estimate becomes a tool for manpower planning, time scheduling, and finance planning (Hollmann, 2007b: 8). By making cost comparisons possible the estimate also assists the decision-making authority in accepting or rejecting tenders from contractors. During the actual construction period the estimate becomes a powerful implement in the application of cost control and financial forecasting (Dysert, 2004: 9.1).

The orderly execution of a capital project will, apart from effecting many savings, facilitate the introduction of an efficient cost feedback system and eventually provide a proper cost history (Tompkins, 1985: 4); both of which are essential to the preparation and improvement of future estimates (Dysert, 2004: 9.8).

The capturing of actual cost on completion of a project is the beginning of a cost history (Bent, 1982: 13), which if properly utilised becomes the main source of information for the development of efficient short cut estimating methods (Zastrozny, 1974: 4). An essential requirement is the early establishment of records covering as wide a range as possible of materials, equipment and labour costs (Zastrozny, 1974: 4). These must be brought up to date regularly and extended as new information becomes available (Dysert, 2004: 9.5).

A cost feedback system must be in place (Bent, 1982: 13-14). This system should collect all actual cost data and interrelationships between various types of data must be established (Black, 1984: 59). Dysert and Pickett (2005: 30) indicate that this will allow the determination of reliable factors for the use in ratio conceptual cost estimating. On completion of a project the total actual cost must similarly be incorporated in the costing data. This cost history, if properly utilised, becomes the main source of information for the development of efficient short cut estimating methods (Kwak & Watson, 2005: 1430).

The most important single requirement for obtaining a reasonably accurate estimate is the information supplied to the estimator by other parties. Liu and Zhu (2007: 91) point out that detailed information is seldom available at the estimate stage. The estimator should therefore work closely with the engineering team to be included in all decisions on the design. Zastrozny (1974: 4) states that the best estimate information originates from engineers that worked in closely with the estimating group over long periods.

The importance of cost history cannot be overemphasized, however, there are also other factors which can have an effect on the accuracy of an estimate. The time value of money (escalation) (Opfer, 2004: 7.3; Humphreys, 1984: 159) and competency of staff members (Molenaar, 2005: 343) also have a significant effect on the accuracy of estimates. Cost is the value of an activity or asset (Postula, 2004: 1.1). Cost estimating is not an exact science and allowances within the estimate are often based on assumptions (Azhar, *et al.*, n.d.:1). The estimator must, however, always be able to explain his rationale in his decision-making and why he chose to make certain assumptions.

The use of cost estimating principles can be a handy tool in financial forecasting (Dysert, 2004: 9.32). Dysert and Pickett (2005: 30) and Kwak and Watson (2005: 1430) state that in the beginning of the project when there are various unknown factors or non-definitive designs, conceptual cost estimating can be applied to determine more accurate estimated final costs. As the project progresses and designs become more definitive, conceptual cost estimating can be used to test measurements and allowances (Clark & Lorenzoni, 1985: 31). There are always a number of additions on any project. The cost for these additions can in most cases also be calculated by using conceptual cost estimating.

2.0 TITLE

Ratio conceptual cost estimating in South African petrochemical construction projects.

3.0 PROBLEM STATEMENT

Over the years cost control has evolved into a fine art and a specialist practice. Organisations have cost control systems in place during the construction phase and have good estimating methods when tendering for new work.

One of the tools that have been developed to assist management in decision-making is the financial review (financial forecast). In essence, this is a basic estimate of what the final cost on a particular project will be. This forecast is adjusted as the project nears completion and should eventually equal the final account value.

During the course of any project there will, however, be additions and omissions to the scope of work. The client might require more scope or improved design on existing scope, or might decide to omit certain scope. The organisation employed by the client to construct the project might also become aware of certain changes to the scope of work. These changes will necessitate updates to the Estimated Final Cost (EFC).

It appears that these changes are in most cases influenced by a gut feel of what the cost will be, rather than a more scientific approach. One way of improving this form of forecasting is to employ known estimating methods which are well tested. Ratio Conceptual Cost Estimating (RCE) is one such method. This method is a quick form of estimating based on historical data. The incorporation of such a method will improve the way in which financial forecasting is done.

4.0 PRIMARY OBJECTIVE

The primary objective of this study is to prove the effectiveness of Ratio Conceptual Cost Estimating (RCE) in the South African petrochemical construction industry.

5.0 SECONDARY OBJECTIVE

Should the Primary Objective be accomplished, the researcher might be able to proof the value of Ratio Conceptual Cost Estimating (RCE) during the construction phase of the project as well, i.e. the financial forecast.

6.0 HYPOTHESIS

6.1 Primary hypothesis

It is possible to apply Ratio Conceptual Cost Estimating (RCE) in the South African petrochemical construction industry.

6.2 Secondary hypothesis

The use of Ratio Conceptual Cost Estimating (RCE) in the construction of South African petrochemical projects will lead to improved cost forecasting.

7.0 RESTRICTIONS

The design, development, and ultimately the construction of a petrochemical plant is a complex process that expands on a multi-disciplinary level, which in itself makes it difficult to complete a design before the plant is 100% constructed. Minor changes will occur throughout the development of the plant, and especially when the new plant needs to tie into the current factory grid, there will be unknowns to the engineers that will only be realised once the physical work gets done on site. These initial unknowns might influence pipe sizes, cable sizes, material types, etc. It is because of this reason, as well as the fact that brown field work never stands in correlation to the brown field work on the next project, that all costs relating to work of this type has been omitted from this study.

The material cost of items such as piping and piping equipment as well as mechanical equipment fluctuate to such an extent that to include these materials and equipment in the ratio conceptual cost estimating process will be dangerous. This is not really the case in countries where many similar and often identical plants are constructed, but in Southern Africa there are a limited number of new plants erected. This limited source of information makes it risky to include the volatile cost of piping material and mechanical equipment and therefore the cost of these materials have been omitted from this study.

Petrochemical plants are constructed by the private sector and because of the highly competitive nature of the industry most details pertaining to any given plant are treated as confidential. Obtaining information/data is therefore problematic and in most cases databases and procedures will evolve as the estimator’s level of experience increases.

8.0 DEFINITIONS

- **Profit**: Profit is the amount included in a contractor's price to compensate the contractor for undertaking the risks associated with the project and to provide a return on investment, (Kraus', 2007: EST.18.2).
- **Cost**: Cost is an outflow of a resource, whether in cash, as a payable, a rendered service, or a trade or barter that is consciously made with expectation of benefit to the organisation: goods, property, or service required, (Stenzel & Stenzel, 2003: 2).
- **Cost control**: Cost control is a process to hold expenditures within budget by monitoring and appraisal of the cost performance, (Azhar, Ahmed and Caballero, n.d.: 1).
- **Direct cost**: A direct cost is any cost that can be identified specifically with a final cost objective, (Norfleet, 2007: EST.12.1).
- **Indirect costs**: Indirect costs are those resources that need to be expended to support the activity, but which are also associated with other activities, (Eldenburg & Wolcott, 2005: 38).
- **Overhead cost**: This is a form of indirect cost in its broadest sense in that it cannot be assigned to a specific contract without some method of allocation, (Enshassi, Aziz & Karriri, 2008: 36).
- **Cost management**: Cost management is the use of cost accounting systems and methods to guide current and future operations towards specified objectives; the analysis and interpretation of cost data is critical to the decision-making process, (Stenzel & Stenzel, 2003: 3).
- **Cost trending**: Trending is a project cost and schedule control technique used continuously through all stages of a project to illustrate deviations from the control budget or project schedule, (Tompkins, 1985: 20).
- **Productivity**: Productivity is the ratio of some measurable unit of output to some unit of input. Productivity is therefore a measure of efficiency, or the amount of work that the employees complete during each working day, (Carrell, Kuzmits & Elbert, 1989: 74).
- **Performance**: Performance is the realising of goals,agreed upon or set by the individual for himself, and meeting his own expectations or those of other

people, such as managers or colleagues, to whom a product is delivered or to whom a service is rendered, (Coetsee, 2002: 7).

- **Rework**: Rework is the process by which an item is made to conform to the original requirement by completion or correction, (Ashford, 1992: 12).
- **Work breakdown structure (WBS)**: A work breakdown structure (WBS) is a deliverables-orientated decomposition of the project. It is not the activities needed to create the project deliverables; it is the outcome that the activities create, (Phillips, 2005).
- **Work package**: A work package is a well-defined scope of work that terminates in a deliverable product(s) or completion of a service. Each package may vary in size, but each must be a measurable and controllable unit of work to be performed, (Humphreys, 1991: 471).
- **Estimate**: An estimate is a prediction of quantities, cost and/or resources required by the scope of an asset investment option, activity or project. As a prediction, an estimate must address risks and uncertainties, (Dysert, 2004: 9.27).
- **Database**: A collection of actual historical project data with special emphasis on quantities and cost data; normalised into useful compatible data and expressed as ratios of each other, (Pickett & Elliot, 2007: EST.02.1).
- **Inflation**: Inflation may be defined as an increase in the general price level for goods and services occurring over a relatively brief period of time, (Faig & Jerez, 2006: 3).
- **Escalation**: Escalation is the effect between the interplay of changes, real or anticipated, in input costs, perceptions of risk, and perceptions of the competition. Escalation occurs due to changes in price levels driven by underlying economic conditions, (Hollmann and Dysert, 2008: EST.08.1).
- **Contingency**: Contingency is defined as the amount to be added to the competitive base estimate, prepared realistically for the known scope assuming typical site/market conditions/oversights/unknowns, and is free of excessive allowances and mark-ups as per historical experience so that the final project cost estimate has an equal chance of falling above/below the actual cost or the initial quantifiable estimate, (Skitmore & Ng, 2002: 457).

- **Estimated final cost**: An estimated final cost is a collection of historical, current and estimated future costs on a project, (Shirley and Banks, 2007: EST.11.1).
- **Cost forecasting**: Cost forecasting is the process in which estimated values are put to future costs on a project to predict the end value of the project, (Brigham, Gapenski & Daves, 1999: 243).
- **Scope of work**: Total work to be accomplished and administrative requirements associated with a contract as described within the contract documents, which may include the general conditions, special conditions, specifications, drawings and addenda, (Humphreys, 1991: 367).

9.0 RESEARCH METHODOLOGY

Leedy (1980: 119) describes various approaches to the methodology of a thesis. These approaches were studied in order to identify the correct methodology to be used in order to support the problem statement and the sub-problems to the research being addressed.

According to Leedy (1980: 119), the historical method of research is the means by which the researcher deals with the latent meaning of history. The object of the historical method, therefore, is to provide a means through which the researcher may deal with problems that arise from the events that happened in times past and to interpret what might otherwise be considered merely as the happenstance of blind fortune.

Leedy and Ormond (2001: 70) state that the literature review describes theoretical perspectives and previous research findings related to the problem at hand. Its function is to “look again” at what others have done in areas that are similar, though not necessarily identical, to one’s own area of investigation. A researcher should know the literature relating to the topic very well.

The research methodology for this study comprises of:

- A literature survey analysing historical information that has led to the development and implementation of the model.

- Reporting on data gathered from 45 historical projects as well as the normalisation of such data to be expressed as ratios in a database.
- Comparing the normalised data against actual data gathered from 10 completed projects.

9.1 Literature review

The investigation into the problem and sub-problems leads to an extensive literature review. Historical tendencies relating to important aspects surrounding the study and opinions from other related sciences have been thoroughly investigated. The following sources have been consulted:

- Books
- Journal and newspaper articles
- Theses
- Electronic data in the form of articles
- Conference papers

The literature review forms an integrated part of the study since the concept of Ratio Conceptual Cost Estimating (RCE) and financial forecasting primarily has a theoretical build-up. A proper theoretical pre-study therefore was unavoidable.

Although there is sufficient literature on RCE and financial forecasting in general, no literature could be found that deals specifically with the implementation of RCE in financial forecasting to enhance the accuracy and presentation of the financial reporting procedure.

9.2 Data collection

Data from several historical projects was collected and analysed. This data includes actual historical quantities and rates from previous projects upon final agreement. The details of the projects could not be revealed due to secrecy agreements. This data was normalised to make the data compatible with other data. It was then transferred to a database in the form of quantity ratios and rate ratios. These ratios were then employed

by multiplying them with some project base information to determine the quantities and rates of projects or portions of projects with incomplete design and specifications.

10.0 STRUCTURE OF THE THESIS

The structure of the thesis is illustrated in Figure 1.1. After this introductory chapter, the influences on construction cost and the process of construction estimating is investigated. Chapters 2 and 3 describe both these concepts. The methodology of Ratio Conceptual Cost Estimating (RCE) is described in Chapter 4. Chapter 5 describes the establishment of an estimating database and what is necessary to make such a database an invaluable tool when conducting a RCE. Chapter 6 describes the reasons why inflation occurs and the effect thereof on the construction industry. The ultimate effect of inflation on construction is construction price escalation and this phenomenon also is discussed in this chapter. Chapter 7 explains the importance of time in construction and how time can influence the construction schedule. Chapter 8 deals with the practical application of RCE in the petrochemical industry in South Africa and also describes the development of a model to be used in RCE. The conclusion and recommendations is presented in Chapter 9.

Several addendums provide details on estimates and financial forecasts. They are:

Addendum A – Estimating checklist for capital projects
Addendum B – Estimate summary worksheet
Addendum C – Typical work unit sheet
Addendum D – Database for 45 historical projects
Addendum E – Typical financial forecast summary
Addendum F – Summary of Ratio Conceptual Cost Estimate (RCE)
Addendum G - Database for statistically adjusted ratios and RCE's for ten target projects
Addendum H - A typical scope definition breakdown of a portion of a specific project
Addendum I – Estimate stakeholder scope agreement

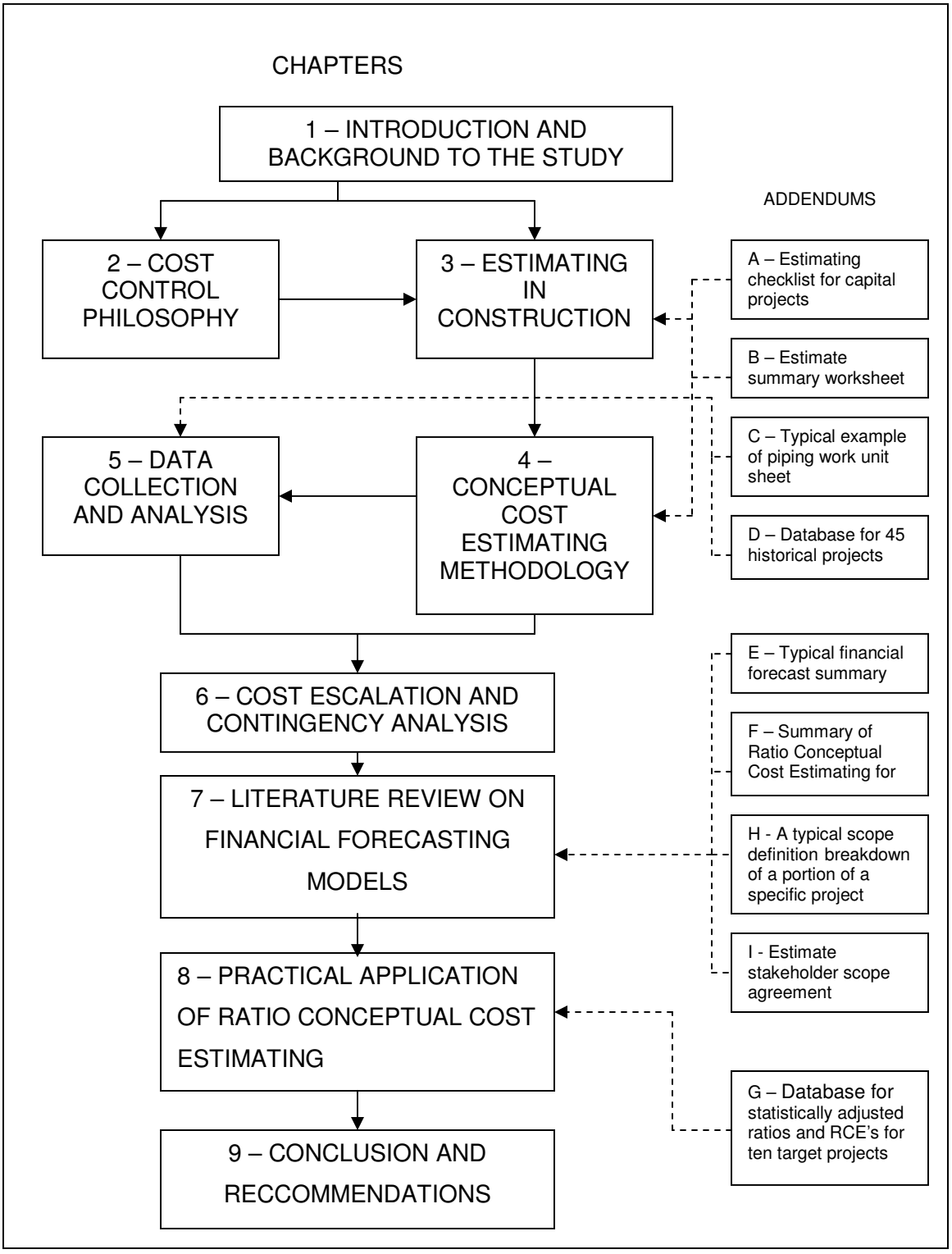


Figure 1.1 Structure of the thesis

The content of each chapter will be described in more detail:

Chapter 2 defines cost control philosophy. This process is started by briefly mentioning some historically significant projects and then connecting modern cost control to lessons learned from these historical projects. The concept of profit is discussed and how different cost types can influence the profit margin of any construction endeavor. These costs are broken down into several sub-divisions such as direct and indirect costs, which in turn are divided into other groups such as material and labour. Secondary aspects such as productivity and its effects are mentioned. Lastly, engineering is discussed to emphasise the importance thereof in making the project a success.

Chapter 3 describes the process of cost estimating in construction with special emphasis on estimating in the engineering field, and more specifically, the petrochemical field. The requirements and aids to estimating are discussed and special emphasis is placed on the importance of scope definition. Different types of estimates are discussed and the influences on estimate accuracy are highlighted. The chapter concludes with the final review process of estimates.

Chapter 4 highlights the methodology of conceptual cost estimating in the engineering industry. The different types of conceptual cost estimating are mentioned with special emphasis on Ratio Conceptual Cost Estimating (RCE). Different ways of improving this form of cost estimating are discussed.

Chapter 5 reiterates the importance of a properly developed cost database. The requirements of such a database as well as the process of data collection are mentioned. The necessary data adjustments (data normalisation) are discussed, as well as the implementation of the normalised data. Lastly, the structure of the database is set out with descriptions of the main cost-bearing activities in a typical petrochemical development.

Chapter 6 portrays the effects of cost escalation and why it needs to be included in future project costs. It also covers risk management, the effects of proper risk management as well as the process or methodology of risk management. Inflation has a strong influence on cost escalation and is therefore discussed. Reasons as to why

inflation occurs and how to address it are mentioned. The use of cost indices, to apply escalation as well as the general management of escalation, are outlined. The reasons as to why it is necessary to include contingency in an estimate, misuse of the contingency, and management thereof are discussed

Chapter 7 elaborates on the impact of time on the construction schedule and how time can affect costs on the project. The financial forecasting process is set out in this chapter and is enhanced by cash flow analysis.

Chapter 8 discusses the practical application of Ratio Conceptual Cost Estimating (RCE) in the petrochemical industry, based on a developed database.

Chapter 9 provides the conclusion and recommendations of the study.

CHAPTER 2

COST CONTROL PHILOSOPHY

1.0 INTRODUCTION

When building a plant, cost control means regulating expenditures within the authorised budget while providing a plant of the desired quality within the time limit specified (Aoieong, Tang & Ahmed, 2002: 182). According to Agrawal (2007: 68), the plant should be capable of producing a quality product at the specified design capacity. Cost control cannot end with analysis and prediction of capital costs. The philosophy of cost control should be threaded through the plant's design and construction. Cheng and Li (2004: 793) state that costs should be controlled during the design, procurement and construction phases.

Economic progress depicts the construction of factories and plants and these must be constructed with cost control as a barometer of the plant's success (Reinschmidt & Trejo, 2006: 761). Pena-Mora and Park (2001: 445) point out that most heavy industries and petrochemical construction projects are now built by what is termed "fast track" methods. Design, procurement and construction are done with significant overlap, often appearing to happen simultaneously. Fast track methodology is necessary because of rapidly developing technology and expanding markets. As the design of certain portions of the plant gets agreed, procurement on long lead items can start (Reinschmidt & Trejo, 2006: 761). The speed of construction places even more emphasis on cost control throughout the construction phase.

Viljoen (2008: EVM.SO4.1) points out that to properly control the costs involved in building a process plant, as with any other construction project, several cost components should be managed in such a way that management will know timeously of any changes that may cause the project to steer away from the target, which will be to finish in time and within budget.

The purpose of this chapter is to investigate the theory of cost control and what influences costs on a project, what influences profit and how these influences can be managed to allow for an increased profit? Profit forecasting begins with individual forecasting of actual project cost performance relative to the allotted project budget and

ends with cumulative forecasts of corporate profit (Kumar, Nottestad & Macklin, 2007: 141).

According to Walsh, Sawhney and Brown (2005: 162), to understand the application of profit and how it should be applied one must understand the concepts of cost and how cost influences the success of the project. Total cost is determined by the cost of the resources that are expended to complete the activity or produce an asset. Resources utilised are categorised as material, labour, plant and indirect costs. Money and time are often considered to be resources, but they only implement and/or constrain the use of the physical resources (Postula, 2004: 1.1). Several types of cost have been identified and are discussed in this chapter.

The process by which costs are determined and arranged to be presented is referred to as pricing. Several tools exist whereby the pricing of a project can be evaluated to allow management to apply certain cost factors that will influence the total price of the project. Economic ratios and concepts guide the costing of the project and can be used to forecast the estimated final cost of the project (Roztocki & Needy, 1999: 20).

Ferreira and Rogerson (1999: 407) indicate that the main components of costing on a project are material, plant, labour and indirect costs. It is therefore necessary to spend some time on these aspects to identify the milieu in which they are priced and what influence they have on the outcome of the project. The use of different types of material, the handling thereof, and the way they are procured play a role in the costing of this component which forms the largest part of the total project cost (Gibson, Wang, Cho & Pappas, 2006: 37). With the worldwide focus on the “human factor”, the influence of labour cost on a project and the ultimate feasibility of the project, labour cannot be overlooked. With labour comes productivity (Berg & Hinze, 2005: 829). Increased levels of skills can lead to more cost-effective construction which will increase the profit margin.

The starting point of all the above-mentioned influences on cost is the initial design of the plant (Farkas & Uys, 2004b:). Several engineering factors influence the cost of a project. Globalisation, life-cycle costing, computer aided design, standardisation, etc. are but a few. Hamaker and Compomation (2005: 29) state that good engineering will lead to improved processes as well as improved methods of construction.

2.0 PROJECT COST CONTROL

2.1 Historical perspective: Projects of historical significance

Cost control is based on cost estimates of a certain scope of work executed according to a certain plan of action (Louw, 2002: 213). Proper cost control will highlight any changes in cost and will provide the managers of the project with the task of dealing with these changes. Throughout history, mankind has had a great deal of experience executing projects of all kinds, but has not always been successful in learning from old projects. To gain some perspective, some historical projects will have to be studied.

If one considers some well-known historical projects it is astonishing to find how well certain projects were planned and controlled even in those early days. The Eiffel Tower (which will be discussed later in this study) for example weighs 6300 t and was constructed over a period of little more than two years and in a time where modern construction equipment was not available. According to Van Niekerk (2008: personal interview), many contractors have difficulty in completing much smaller projects in the same time frame with modern equipment. It is therefore important for the student of cost control to be aware of what was achieved in the past so as to work towards real progress and not stagnate in the drive towards more cost-effective projects.

2.1.1 Ancient Rome

Morton (1966: 15) describes how Marcus Agrippa probably became the greatest fountaineer in history. Agrippa and his lifelong friend, Octavian, were both in their early thirties when they defeated Julius Caesar. They found Rome in a deplorable state. Agrippa and Octavian both started working on the re-instatement of the infrastructure. Their first act was to dismiss the contractors who had mismanaged Rome's water supply for centuries. Having cleared the sewers and repaired the aqueducts, Agrippa built a new aqueduct (Aqua Julia), and erected 500 fountains and 700 basins and pools for public use, and all this in one year of construction. According to Morton (1966: 16), Agrippa applied stern planning and control methods during this time.

At the time of the first Gothic sack of Rome in AD 410 the 11 aqueducts totaling 494 km of which approximately 85% were underground were feeding 1212 public fountains, 11 great imperial thermae, and 926 public baths. All traces of this triumph of hydraulic engineering vanished during the barbarian invasions.

2.1.2 St Paul's Cathedral, London

Anonymous, (2010a: np) indicated that in 1668 Wren was invited to submit designs for a new St Paul's Cathedral after the previous one was badly damaged in the Great Fire. He produced the first model, the Great Model, and the Warrant Design. Both were rejected by the church authorities so he decided not to submit any further new designs, but a Surveyor General to the King's Works told him to go ahead "as ordered by His Majesty", (Downes, 1990: 23). The foundation stone was laid on 21 June 1675 and work continued until 1708. The cost of the cathedral was 736 752 pounds sterling. Wren was paid 200 pounds sterling a year during the cathedral's construction. The dimensions are: length overall 152 m, height to the summit of the transepts 74 m, internal diameter of the dome 34 m. The project took 40 years to complete. Mathews and Atkins (1957: 67) point to evidence of cost control during this project even though the schedule was not of great concern.

2.1.3 The Palace at Versailles

Blunt (1980: 35) pointed out that the Palace at Versailles was built to house 1000 nobles and 4000 of their servants, and another 5000 servants in the palace annexes. By 1685, 36 000 workmen with 6000 horses were engaged on the palace site under the direction of Mansart, Le Brun and Le Nôtre. Such numbers may be grasped when it is realised that the installation of 1400 fountains necessitated the diversion of the river Bièvre and 16 000 hectares of land being drained, (Berger, 1985: 112). One hundred statues were commissioned by Le Brun for the gardens alone. Construction lasted 25 years which, considering the size of the scope and the time in which it was done, is notable, (Littell, 2001:78). Baillie (1967: 169) refers to the emphasis on planning during this project which is one of the most important ingredients of cost control.

2.1.4 The Eiffel Tower, Paris

Barthes (1979: 7) indicated that in 1885 a wrought iron bridge over the Truyère River, designed by Alexandre Gustave Eiffel, was opened. This bridge was the highest arched bridge in the world. It was 122 m high and 564 m long and was supported by five truss work piers and a great parabolic arch with a 165 m chord. The deflection of the loaded arch was 8 mm, exactly as Eiffel had predicted. The bridge took five years to build (Barr, 1992: 32).

The contract to engineer, design, fabricate and construct a 300 m tower with a wrought iron structural mass of 6 300 t standing on a base of 125 m x 125 m was awarded to Eiffel & Co. on 8 January 1887. Eiffel had two years and a few months to construct the tallest tower ever conceived. He received a subsidy of $300 000 in three installments, the final upon completion. Less than one fifth of the project cost was covered by the subsidy. Eiffel had to make up the remaining $1,3 million from franchise rights he obtained on all the restaurants, café's, etc. over the next 20 years – if the tower was a success. The previous projects mentioned here were all considered to be public sector projects, funded by the tax payers or the church. The Eiffel Tower, however, was a commercial venture which had to be well planned to succeed, (Barthes, 1979: 101).

The tower was one of the first examples of large scale industrialised construction. All calculations had to be accurate to 0,1 mm. Eiffel's greatest difficulty came from the tower's odd angles. The elements were not repetitive as was the case with many of his bridges. Every piece had to be designed separately, taking into account the variable inclination of columns and braces along every meter of the tower's height. Each of the 2,5 million rivet holes were drawn in on the shop drawings, (Lavedan, 1979: 28). The rest were placed on the site. Finished pieces of iron were delivered by horse drawn drays from Eiffel's shops in Levallois-Peret, about 5 km away. They produced 400 t of girders and trusses a month, which were hoisted into position by steam-powered cranes. It reigned as the world's tallest structure for more than 40 years, until New York's Chrysler Building opened in 1930.

2.1.5 The Sasol Two and Three Projects

According to Louw (2002: 11), managing the engineering, procurement and construction of the vast Sasol Two and Three Oil-From-Coal Projects which were built at Secunda in South Africa presented a once-in-a-lifetime challenge. Resources had to be mustered from all over the world and formidable engineering and logistical problems solved to get a large diversity of high-technological plant and equipment on site. The construction of the plants on adjacent sites in a remarkably short time and within a tight budget, using a construction labour force with a combined peak number of 26 000 persons, was a remarkable feat.

In December 1974 the Sasol Two Project was announced. The decision to build a large oil-from-coal project was precipitated mainly by the 1973 oil crisis, which made oil-from-coal a viable proposition. The overall Sasol Two Project was completed in five and a

half years, including four years construction. In June 1980 terms, the Sasol Two Project cost R2,8 billion, (Pienaar: 1990: 22).

At the time that the Sasol Two Project was built, it was amongst the largest grass roots projects ever undertaken in the world. The plant was designed to convert roughly 13 million tons of coal per annum into gasoline, diesel, liquefied petroleum gas, jet fuel and a large range of by-products. This meant that a plant had to be engineered, designed, procured, constructed and commissioned which would produce roughly about ten times more liquid fuel from coal than the existing plant in Sasolburg (which was based on the Fischer-Tropsch Process) was producing.

Although Sasol was committed to using only proven processes, the scaled-up size of some of the proposed plants and equipment was astounding. For example, an oxygen plant had to be built capable of producing 12 000 tons of pure oxygen per day for gasifying the coal and for methane reforming. For each of the six oxygen units, each rated at just more than 2000 tons of 98,5% pure oxygen per day, this would in turn entail designing air-compressor motor sets rated at 35MW each and oxygen compressor motor sets rated at 12MV each, necessitating a completely new electricity supply philosophy with 132kV underground cables and dedicated 132kV/11kV transformers at each of the large drive motors.

In February 1979, following the Iranian Revolution, the Sasol Three Project was announced, as a duplicate of the Sasol Two Project. Profiting from the completed engineering and from the experience gained on the Sasol Two Project, that was 60% completed by that time, the Sasol Three Project was completed in three and a half years including a construction period of three years. Table 2.1 provides some statistics of the Sasol Two Project.

Process units	32
Major mechanical plant equipment items	6 100
Valves	100 000
Pipes, valves and fittings	1 250 000 t
Pipe spools fabricated and installed	33 000
Earthworks	7.5 million m^3
Piles	30 000
Concrete	400 000 m^3

Reinforcing steel	23 000 t
Structural steel	30 000 t
Concrete hyperbolic process cooling towers (2)	Base 108m height 156m
Cooling water circulation	180 000 m^3/h
Power station smokestack, with four smoke stacks housed in a concrete windshield	250m tall
Construction man hours	130 million

Table 2.1: Some statistics from the Sasol Two Project
Source: Louw, 2002: 13

The Sasol Two Project was announced in December 1974 and the first profit was made in December 1980. The Sasol Three Project was announced in February 1979 and the first profit was made during the first six months of operation.

The above-mentioned projects all have some historical significance and are all great engineering marvels. In all of these projects, proper budgeting and planning took place, instigating the success of the projects and illustrating the importance of cost control. Wellington (1887: 33) made the following observation on project economics:

> *"It would be well if engineering were less thought of, and even defined, as the art of constructing. In a certain important sense it is rather the art of not constructing; or, to define it rudely but not inaptly, it is the art of doing that well with one dollar which any bungler can do with two after a fashion."*

Goldman (1920: 15) made the statement:

> *"It seems peculiar and is indeed very unfortunate that so many authors in their engineering books give no, or very little, consideration to costs, in spite of the fact that the primary duty of the engineer is to consider costs in order to obtain real economy – to get the most possible number of dollars and cents; to get the best financial efficiency."*

De Puyfontaine (1972: 55) commented that in an early observation on expert advice and project cost in 1812, Louis Michel Thibault, pioneer engineer, architect and land surveyor at the Cape (South Africa), wrote:

> *"The Burgher Raaden under the various Dutch Governments have always been entrusted with public works and, as in all countries, they have employed labourers instead of availing themselves of the services of architects. Faulty, ridiculous and doubly expensive work has resulted…"*

Proper cost control and planning on any construction project is therefore not a "nice to have", but a necessity. It is clear from previous discussions in this chapter how important these aspects are when considering some projects of historical significance. Engaging people with a sound knowledge of cost control on a project will therefore be the first step in ensuring a fair profit margin.

2.2 Introduction to project profit forecasting

Construction, like any other business, is profit driven. A construction company which consistently enters into contracts with the aim to not make a profit will not succeed. Although there might be special circumstances where acquiring a profit will not be the main objective of the business, it remains the main reason why people are in construction. Kraus' (2007a: EST.18.2) definition of what profit entails is probably the most well-balanced:

> "*Profit is the amount included in a contractor's price to compensate the contractor for undertaking the risks associated with the project and to provide a return on investment."*

The management of a company first admits that the company has a cost control problem when consecutive projects consistently experience cost overruns (Patterson, 2006: IT.05.1). Lewis and Spencer (2007: OWN.03.1) and Hughes (1991: 1) indicate that isolated cases of cost overruns usually are justified and normally do not cause changes in whatever project cost control philosophy the company may follow. Searching for the reasons why cost overruns occur might not be a simple task (Lucas, 2007: OWN.05.1). Harris and DiCiesare (2007: CDR.17.3) and Postula (2004: 1.1)

show that in most cases the problem of consistent cost overruns can only be addressed by procedural change.

Muscianesi (2003: 2), Lukas (2006: EST.03.1), Harbuck (2007: EST.16.1) and Musgrove (2007: EST.19.1) indicate that in the beginning of a project, cost is the first concern. The estimator needs costs to complete his estimate and to submit a competitive price into the market (Schottlander, 2007: EST.06.1; Shirley & Banks, 2007: EST.11.1). He is therefore selling his project price to his management (Postula, 2004: 1.1). In many cases, after this sale, costs drops to a much lower position on the project priority list. Other project commodities such as schedule (Aslaksen & Vigerust, 2007: RISK.02.1), safety (Tuffs, 2008: 13), constructability (Lam, Chan, Wong & Wong, 2007: 36), etc. then take precedence.

According to Scott (2006: New York Times, 16 June) and Hill (2006: 347), in a highly competitive bidding market and especially in an economic construction recession, project pricing is forced down by market conditions. This and the current tendency of larger employers in South Africa to award contracts on a “lump sum” basis, shifts the importance of cost from the employer to the contractor (Van Niekerk, 2008: personal communication). This makes it even more important to understand cost and why it is important to control costs on any project (Lucas, 2007: OWN.05.1; Patterson, 2006: IT.05.1).

Profit forecasting begins with individual forecasting of actual project cost performance relative to the allotted project budget and ends with cumulative forecasts of corporate profit (Kumar *et al*., 2007: 141). These forecasts involve two categories: projects in progress and potential projects. The focus of this study will be on projects in progress. Based on these profit forecasts management can plan financial distribution (Aslaksen & Vigerust, 2007: RISK.02.1), making financial forecasting one of the most important managerial functions in an organisation (Sanders, 2007: 18).

Profit forecasting (DiMonica, 2006: 10; Tague & Morrison, 2007: 12) begins at project level. Fayek, Revay, Rowan and Mousseau (2006: 16) state that the project manager, with the assistance of the rest of the project team, forecasts future project expenditure. Sanders (2007: 16) and Struts and Griffis (2005a: 621) agree with these findings. More information can be found in Chapters 4, 5 and 7 of this study on the methodology of forecasting. The historical project expenditures and predicted expenditures are compared (Kraus, 2007a: EST.18.1; Shirley & Banks, 2007: EST.11.2) to the project

budget, resulting in a predicted project cost overrun or under run. These predictions for each project are accumulated in the predicted or forecasted project cost overrun or under run (Harris & DiCiesare, 2007: CRD.17.2). More information can be found in Chapters 4, 5 and 7 of this study on the methodology of forecasting.

Webb (2003a: 111) states that the importance of financial forecasting cannot be overstressed. Stenzel and Stenzel (2003: 181) show that team members might think that they are only responsible for one figure in the total forecast and therefore ignore the importance of their contribution to the total forecast. Refer to Chapter 7. Kenley (2003: 4) and Stenzel and Stenzel (2003: 183) refer to another ill-conceived approach - that of being very conservative in the forecasts, thinking that this will lead to a cost under run, which will result in a saving which is better than overspending. Adopting these attitudes will lead to continuous inaccuracy and will only compound the forecasting problem (Eldenburg & Wolcott, 2005: 10).

2.3 Regaining control over project costs

Stenzel and Stenzel (2003: 2) define cost as follows:

> "*Cost is an outflow of a resource, whether in cash, as a payable, a rendered service, or a trade or barter that is consciously made with expectation of benefit to the organisation: goods, property, or service required."*

Cost control on the other hand is defined by Azhar, Ahmed and Caballero, (n.d.: 1) as follows:

> *"Cost control is a process to hold expenditures within budget by monitoring and appraisal of the cost performance."*

Understanding the definition of cost control is the first step towards establishing a proper cost control programme (Stenzel & Stenzel, 2003: 37-38). An effective programme consists of an integrated system of work flow which directs daily design and construction efforts (Kraus, 2007a: EST.18.1). These paths incorporate the efforts of all project functions, thereby providing the following control features:

- A system of checks and balances.

- Easy access to current project data.
- Easy comparison of project progress with current expenditures.
- Minimisation of cost overruns through early detection and redirection.

According to Azhar *et al.,* (n.d.: 1) and Establishing a Cost Control System (2008: online), a company project cost control programme is actually a work flow procedure in itself. This procedure can be as well-defined as possible but if it is not well communicated between the different departments or disciplines within the organisation, good cost control will not be realised (Al-Jibouri, 2003: 143). Figure 2.1 indicates the basic communications affecting cost control.

To ensure that project costs are important employee concerns, management should first initiate a company project cost control programme. This programme should include the contribution of each department or project function. The task of enforcing a project cost control programme lies with management (Ciccarelli, 2003: CDR.12.1). Such a project cost control programme is manifested in a work flow procedure rather than a list of historical budget and cost data. It should be a well-balanced system, not too simplified but also not over-controlled which might be very costly. Azhar *et al.,* (n.d.: 1) illustrate in Figure 2.2 how such a system can function.

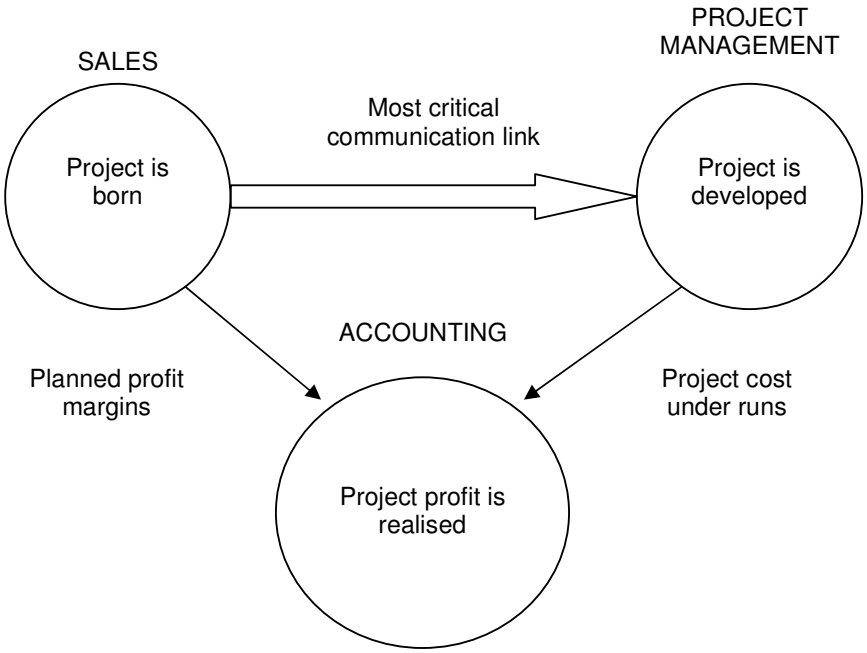


Figure 2.1: Basic corporate communications affecting cost control

Source: Tompkins, 1985: 7

Figure 2.2 describes the basic framework to develop an integrated cost estimation and control system. The methodology for developing such a system begins with a requirement analysis. Azhar *et al.,* (n.d.: 2-3) state that requirements are broken down into a coding system, cost estimation and control processes, and input and output formats.

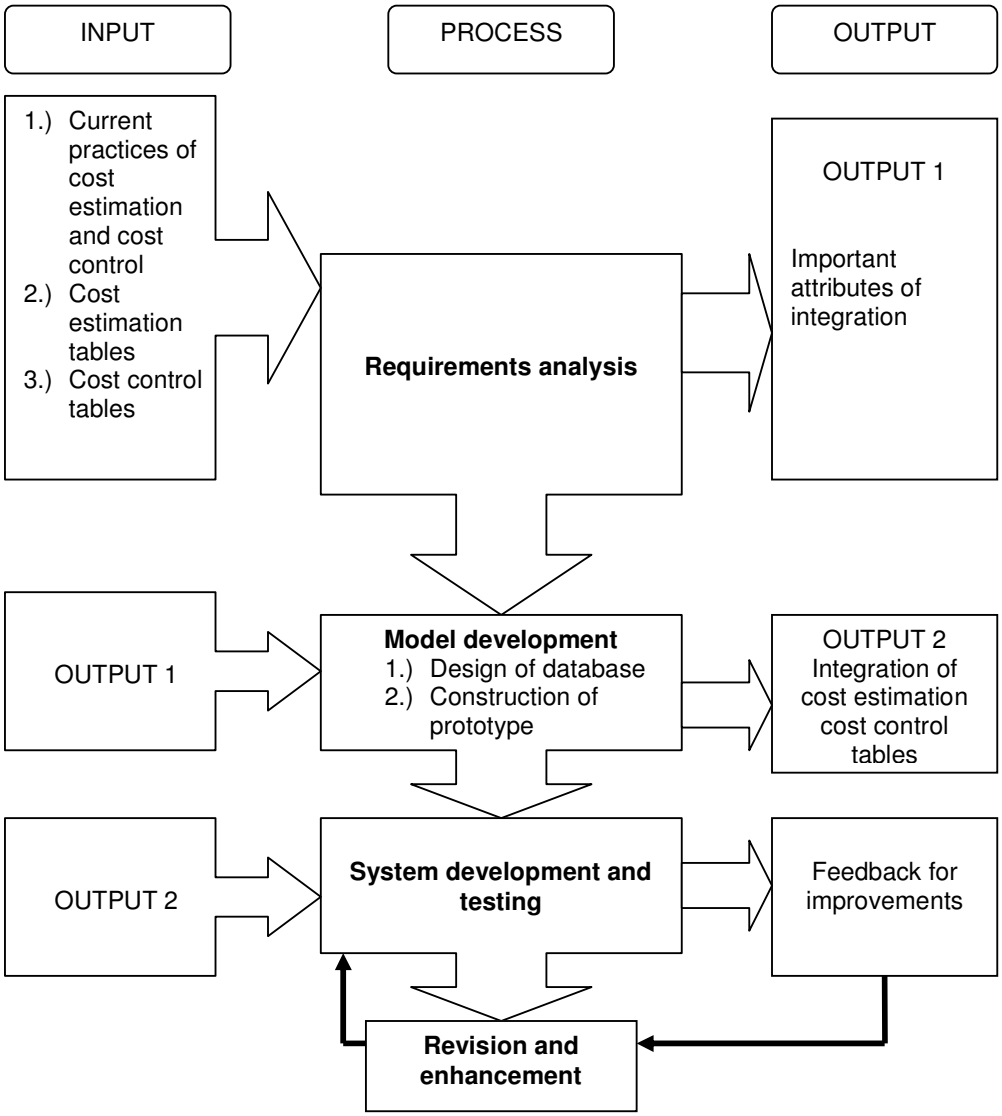


Figure 2.2: Basic framework to develop an integrated cost estimation and control system

Source: Azhar *et al.,* n.d.: 5)

Once the requirements have been analysed a model can be developed. Azhar *et al.,* (n.d.: 3) stress the importance of automatic transfer of estimation data to the control part. Keeping this in mind the first step of model development can be taken, which is

establishing data flow diagrams. Based on the data flow diagrams a cost control model can be developed.

3.0 CONCEPTS OF COST

Cost is the value of an activity or an asset (Azhar, *et al,* n.d.: 1). Stenzel and Stenzel (2003: 2) also refer to cost. Their findings are structured earlier in this chapter. Generally this value is determined by the cost of the resources that are expended to complete the activity or produce the asset. Resources utilised are categorised as material, labour, plant and indirect costs. Money and time are often considered to be resources but they only implement and/or constrain the use of the physical resources (Postula, 2004: 1.1).

The final activity or asset produced depends on the budget and the time allocated to the project (Slight-Gibney, Grenci & Blackwell, 2004: 287). Gardiner and Stewart (2000: 251) indicate the importance of time in construction. They further state that by studying the plethora of evidence in final reporting on completed projects, it can be seen that conservatively speaking almost 50% of all projects show cost overruns. Gardiner and Stewart (2000: 252) further allude to the role of Net Present Value (NPV) and how this tool can assist in acknowledging the importance of time and budget in a construction project. Further detail on NPV can be found later in this chapter. Dunlap (1991: New York Times, 8 April) indicates the effect of timing in construction when considering economic cycles.

The material content (Dobler, Burt & Lee, 1990: 242) of an asset is not just the physical composition of the asset. Thomas, Riley and Messner (2005: 808) agree with these findings. The value of the asset might also include for items such as scrap material (waste), manufacturing parts, consumables (such as formwork), expendable safety equipment and transport (Ashworth, 1992: 8; Wainwright & Wood, 1991: 18). The labour content of a price is not only the direct labour utilised to complete a certain task, but it also includes the engineer's design, the foreman supervising the work, etc.. (Brock & Palmer, 1986: 106). The indirect cost refers to the resources needed to support the specific activity (Brock & Palmer, 1986: 123). This includes all indirect costs such as head office overheads, management, etc. (Eldenburg & Wolcott, 2005: 39). A final aspect of the costing structure is the profit that management adds on top of the total of the direct and indirect costs (Harris & DiCiesare, 2007: CDR.17.1; Paek, 2000: 40). Profit is determined by market conditions.

Further it is important to structure the cost elements within the material, labour, plant and indirect resources to understand how they influence the total cost of the activity. Eldenburg and Wolcott (2005: 38) indicate that this will also lead to a better understanding of how these costs can be controlled. This structuring directs the cost elements into four main structures: direct costs, indirect costs (Norfleet, 2007: EST.12.1), fixed costs, and/or variable costs (Eldenburg & Wolcott, 2005: 38-39; Stenzel & Stenzel, 2003: 74). In practice some costs may fall into more than one category.

3.1 Direct cost

Norfleet (2007: EST.12.1) defines direct cost as any cost that can be identified specifically with a final cost objective, such as a contract, project or job. In construction, direct costs do not represent all costs that can be identified specifically to a job. Generally, direct costs are limited only to the actual costs of construction craft, labour, material, equipment and sub-contracts. These costs are often referred to as “hard costs” and are integral to the installed or constructed component.

Eldenburg and Wolcott (2005: 38) and Norfleet (2007: EST.12.1) further describe direct costs as resources that are expended solely to complete an activity. Direct cost is any cost that is specifically identified with a particular final cost objective, but not necessarily limited to items that are incorporated in the end product as material or labour. These costs therefore include all direct labour and material costs to complete a specific activity. Factors such as poor productivity (Boyle, 2007: CDR.02.1 and Whiteside, 2006: EST.08.1) will be reflected in the labour cost as an indirect factor. Waste on material, for instance, will be included in this cost but any recoverable portion must be deducted since this will save on the total project cost.

3.2 Indirect cost

Indirect costs are those resources that need to be expended to support the activity, but which are also associated with other activities (Eldenburg & Wolcott, 2005: 38). In other words, it is any cost that is not directly associated with a single final objective, but with more than one objective. Norfleet (2007: EST.12.1), however, indicates that there must be a relational requirement between indirect cost and the function base it supports. There must be a distinct relationship between the two in order to constitute an appropriate allocation of the indirect cost. Norfleet illustrates his statement by means of

this example: there is an unquestionable relationship between a base wage rate and social security taxes. As the base rate increases, so does the tax attributed to that rate. Indirect costs are allocated to an activity based upon some direct cost element. An indirect rate is calculated based upon the casual and beneficial relationship between the indirect cost, or group of costs, being allocated and the base to which the rate will be applied.

Indirect costs can also be described as “overhead costs” or “burden costs”. These costs include, amongst others, items such as administrative costs, providing and maintaining equipment, expenses for utilities, taxes, etc.

3.2.1 Overhead cost

This form of cost is believed by various authors (Enshassi, Aziz & Karriri, 2008: 36 and Ibbs & Nguyen, 2008: 30) to be a form of indirect cost and by some (Norfleet, 2007: EST.12.2) to be synonymous with indirect cost in its broadest sense in that it cannot be assigned to a specific contract without some method of allocation. Any group of homogeneous costs can be combined into a specifically designated overhead category and allocated across various contracts using some established methodology. Norfleet (2007: EST.12.2) stated some of the more common overhead categories:

- Labour overhead – This represents the cost associated with payroll expenses other than a person’s base wage rate. Labour overheads can also include the labour cost of employees supporting multiple contracts whose time must be allocated in some fashion. Certain other costs such as training can also be allocated to this group.
- Specialised labour overheads – The most common form of specialised labour overheads can be found in engineering, manufacturing and material handling.
- Fringe benefits – A component of labour overheads addressing only the payroll expenses that are levied upon or otherwise associated to employee wages are fringe benefits. Examples of these include payroll taxes, unemployment taxes, health insurance, etc.
- Field office overheads – In construction, field office overheads consist of the indirect costs that are located at and assigned to a particular project but are not part of the installed or constructed project.

- Home office overheads – Home office overhead, in construction, is the indirect cost assigned to the home office and associated with the overall cost of doing business.

3.2.2 Burden cost

Cascio (1982: 99) indicates that “burden” is the term loosely used to describe the application of some form of indirect cost such as an overhead to a direct cost such as labour. This form of cost is most often used to indicate the allocation of labour overhead to a base wage rate and does not mean inclusion of all indirect costs. That is, unless the term is further described as a “fully burdened labour rate”. In that case it is assumed that all allocable indirect costs have been included and the only question remaining is whether profit or fee has been applied. A “fully burdened labour rate” is also referred to as a “wrap rate”.

3.3 Fixed cost

Eldenburg and Wolcott (2005: 41) refer to fixed cost as cost that must be provided for irrespective of what the volume of work is. Fixed costs are therefore not influenced by small changes in factors such as productivity, sales and services provided. These costs can be direct or indirect costs. Tools or equipment to perform a certain task is, for example, a fixed cost. If these tools are used on more than one activity it will be an indirect fixed cost.

3.4 Variable cost

As opposed to fixed cost, variable cost is based upon volumes and can also either be a direct or indirect cost. Utilities used to perform certain tasks can, for example, be an indirect variable cost. According to Eldenburg and Wolcott, (2005: 41), variable cost changes proportionately with changes in activity levels.

4.0 COST ACCOUNTING AND COST MANAGEMENT

Cost accounting is the historical reporting of disbursements, costs and expenditure on a project (Humphreys, 1984: 40). Historical data can provide a sound basis of forecasting and budgeting for future projects. Refer to Chapter 5 for more information on historical cost data and the use thereof.

Accounting systems focus and assign control responsibilities for some combination of profitability, revenue, investment or cost activities. In other words, accounting systems identify individuals or segments called responsibility centres (Stenzel & Stenzel, 2003: 60). Therefore, organisations that hold the responsibility centres accountable for safeguarding assets and contributing to profitability, by definition, employ an accounting system structure called responsibility accounting.

Any accounting system should include three basic steps: recording, classifying and summarising cost data. Each business should have its own approach to classifying and summarising costs (Stenzel & Stenzel, 2003: 2). This methodology is called the "code of accounts". Another approach to classifying costs is the use of a Work Breakdown Structure (WBS) (Zhao, 2006: RISK.05.1). Not only does a WBS provide a framework for planning and controlling the resources needed to perform the technical objectives, it also facilitates a summary of project data regarding the cost and schedule performance (Zou & Lee, 2006: CSC.13.1).

Regardless of how cost elements are classified and grouped, it is important that this is done in a manner that is consistent with the way in which future work is estimated and budgeted (Humphreys, 1984: 40). Historical cost records represent the way a company is conducting its business. These documents can be analysed to determine whether improvements have been made and how costs may trend in future.

The net effect of cost management is increased profit (Stenzel & Stenzel, 2003: 2). Profitability, variously interpreted as net income, equity value and return on investment is a results-focused indicator watched more carefully than any other performance measurement category. At the core, profit only has two components – revenue and cost. Stenzel and Stenzel (2003: 3) describe cost management as follows:

> *"Cost management is the use of cost accounting systems and methods to guide current and future operations toward specified objectives; the analysis and interpretation of cost data is critical to the decision-making process."*

Cost elements and cost structure can be displayed in various ways to management (Eldenburg & Wolcott, 2005: 6). Chapter 7 can be consulted for the development of a cost forecasting model for presentation to management. Lewis and Spencer (2007: OWN.03.1) and Lucas (2007: OWN.05.1) describe four basic methods on how cost

information is applied to cost management. These are cost estimating, cost trending, cost forecasting and life-cycle costing. The methodology of these methods will be discussed in more detail in the following chapters, but a basic description of each method in this chapter will add to the overall understanding of cost control philosophy.

4.1 Cost estimating

According to Clark and Lorenzoni (1985: 5), the prediction of quantities and costs involved to complete an activity are referred to as estimating, Clark and Lorenzoni (1985: 5) also state that the estimate should contain a step-by-step plan as to how the project team feel or predict the project will be executed. In case of the design, a flow diagram and equipment list should be produced. These documents predict the final design after engineering. The estimator makes use of this information and translates it into a monetary value by applying unit costs to the quantities (Chuong, 2007: EST.07.1). In doing this the estimator is forecasting the final cost to procure the material and to install it on site (Lukas, 2006: EST.03.1). The timing of the purchase should also be predicted to allow for the necessary escalation. Refer to Chapter 6 for more information on escalation. Planning (Harbuck, 2007: EST.16.1) and scheduling (Hollmann, 2007b:8; Stratton, 2007: EVM.04.1) therefore become important costing factors as well. The most important considerations when performing an estimate are:

- A well-defined scope.
- A cost element structure.
- Historical cost data.

The methodology of estimating varies depending on what the purpose of the estimate is (Clark & Lorenzoni, 1985: 5). More detail on estimating can be found in Chapters 3 and 4.

4.2 Cost trending

Cost trends are established from historical cost data (Clark & Lorenzoni, 1985: 268). Tompkins (1985: 20) describes trending as follows:

> *"Trending is a project cost and schedule control technique used continuously through all stages of a project to illustrate deviations from the control budget or project schedule."*

Tompkins (1985: 20) reports that trending offers management the opportunity to make project decisions in advance of commitments. Management questions might focus on how expenditures are trending relative to the physical progress or accomplishments. Cost trending can be a helpful tool for management to make certain decisions regarding the management of the project (Bent, 1982: 125).

4.3 Cost forecasting

The main focus of this study is the improvement of the financial forecasting methodology. Tompkins (1985: 18) describes forecasts as predictions of the cost at completion for the cost elements in progress. Kenley (2003: 37) comments as follows on the importance of financial forecasting:

> *"The success of a company depends on the ability of the management to foresee and to prepare for the future. A contractor can use cash flow forecast techniques to improve his financial position and remove the financial risk which threatens so many construction companies."*

Kenley (2003: 37) describes the importance of why it is necessary to do cash flow forecasts. It is important to look at the complete cost spectrum and to include direct and indirect costs. Kenley (2003: 37) states that the most important reasons for forecasting are firstly, the availability of funds and secondly, the possibility of loss in interest. Ashworth (2004: 352) extends the reasons for forecasting and adds cost estimating, final account predictions and whole-life costing to the list. Ashworth (2004: 403) also states that although financial forecasting is important one should also be aware of future changes to technology, policy-making, labour, etc. All of these factors will have an influence on the future cost of a project.

The purpose of the forecast will be to determine the expenditure to date by making use of project cost data and adding to this the estimated cost to complete the remaining portion of work or scope not completed (Clark & Lorenzoni, 1985: 196). It is in this latter part of forecasting (estimating the value of the portion to complete) where the focus of the study lies.

4.4 Life-cycle costing

Zhang, Novick, Hadavi & Krizek (2008: 25) indicated that designed life of a structure ultimately has an effect on the cost of such a structure. Flanagan and Norman (1983: 2) and Sterner (2000: 387) indicate that life-cycle costing is associated with an asset and extends the cost management information beyond the acquisition of the asset to the use and disposal of the asset. Asset acquisition consists of the design phase and the construction phase. Generally, cost elements are segregated into these phases because design costs are often recovered over more than one asset (Sterner, 2000: 387; Life Cycle Costing, 2008a). The design and development of a new aeroplane is amortised over the production. The design of a housing project is recovered through sales of the houses built (Life cycle cost analysis, 2008c: online).

A life-cycle approach, that is an approach that takes explicit account of the life-cycle costs of assets, is essential to decision-making in four main ways (Flanagan, Kendell, Norman & Robinson, 2001: 53; Flanagan & Norman, 1983: 2):

- It identifies the total cost commitment undertaken in the acquisition of any asset, rather than merely concentrating on the initial capital costs (Lewis & Spencer, 2007: OWN.03.4).
- It facilitates an effective choice between alternative methods of achieving a stated objective. For example, choosing between two machines to perform a particular production process. It takes full account of the probability that the various options are likely to exhibit somewhat different patterns of capital and running costs, and provides a set of techniques for expressing those costs in consistent and comparable terms.
- A life-cycle approach is a management tool that details the current operating costs such as machinery, individual construction elements or complete construction systems.
- Life-cycle costing also identifies those areas in which operating costs might be reduced, either by a change in operating procedures or changing the relevant system.

Life-cycle costing techniques can be applied in any area of economic decision-making (Mearig, Coffee & Morgan, 1999: 2); but they are particularly relevant to the proper identification and evaluation of the costs of durable assets. As a result they are especially relevant in the construction industry (Flanagan & Norman, 1983: 2). Whether

complete structures or individual elements are considered, a decision is being made to acquire assets that are intended to last and to be used for a number of years (Flanagan & Jewell, 2005: 1; King, 2008: online). These assets will commit the owner not only to initial costs, but also to subsequent running costs, and also to periodic repair and replacement costs. Equally important, decisions made at the initial design stage invariably effect future running costs and the economic use of the structure or plant. More recent sources refer to whole-life appraisal (Flanagan & Jewell, 2005: 2; Life Cycle Costing, 2008b: online).

5.0 PRICING

Pricing can be described as the process by which the cost of a project is established. It refers to a set of tools and techniques which can be used in the costing process. Some of these tools would include pricing strategies, sales and revenues, return on investment, return on sales and break-even analysis.

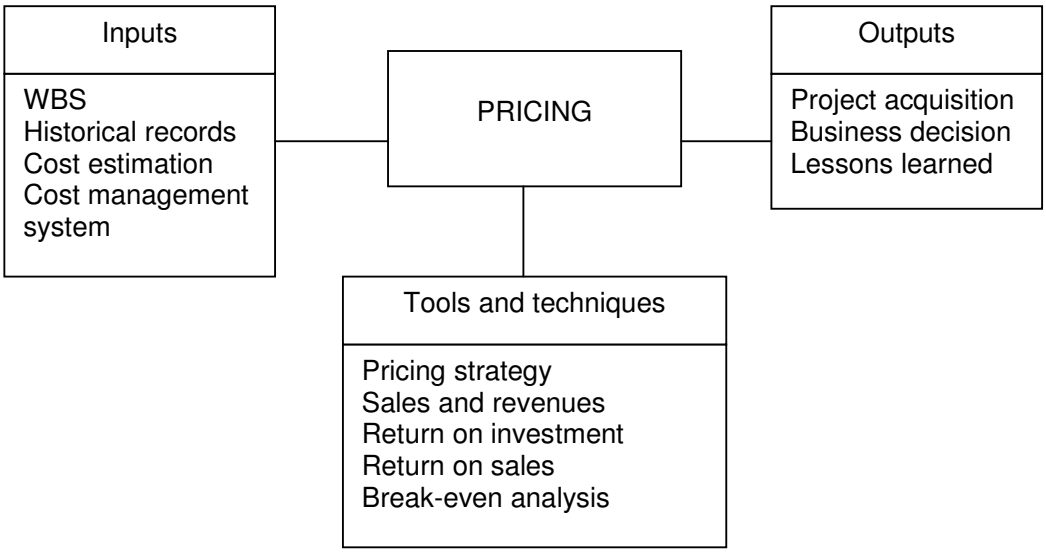


Figure 2.3: Analysis of the pricing process

Source: Singh, 2004: 2. 2

The process of pricing is illustrated in Figure 2.3. The inputs will be the documents which will include items such as WBS (work breakdown structure) (Pickett & Elliott, 2007: EST02.1), historical records (Melamed, Skokan, Zenkowich & Kocher, 2007: RISK.06.1), cost estimation and cost management system. The tools and techniques are the mechanisms applied to the inputs to produce the outputs and include pricing

strategies, sales and revenues, return on investment (ROI), return on sales (ROS) and break-even analysis (Webb, 2003a:36; Peters, Timmerhaus & West, 2003: 328).

Xu and Tiong (2001: 77) point out that normally the pricing strategy in construction will involve the cost plus mode where all direct and indirect costs are calculated and a fee or profit is added to this value. This can in a way be seen as the traditional pricing strategy. Xu and Tiong (2001: 77) mention front-end loading and back-end loading as earlier forms of cash-flow manipulation. In these strategies the price of work that is expected to happen earlier or later in the contract are raised or lowered and thus influence the cash-flow (Chen, 2007: PM.02.1). Claim loading can also occur when specific items have been identified as items that will form part of extras to the contract. The unit rates for the items are then increased with a net result of a higher total price for the same additional scope.

5.1 Pricing scenarios

Essentially there are two scenarios in pricing strategy which frequently occur (Van Niekerk, 2008: personal communication). Both Type I and Type II are specific situations but with different business objectives. Type I situation is to price the work in such a way that should the firm win the tender, it will be able to conduct the work in such a way that a reasonable profit is retained. Type II pricing procedure is similar to Type I but with the variable or irregular market conditions. The firm might be desperate for work to retain its valuable resources or it might try to enter a new market.

5.2 Economic ratios and tools

The expenditure for a business is normally easier to predict than the earnings. Some economic ratios exist to assist management in predicting the earnings of the business. As previously mentioned, they are ROI, ROS and break-even analysis. Some inputs or resources are necessary to make the business successful:

- Natural resources: The material used to manufacture a product as well as the buildings and structures to assist in the production process can be referred to as natural resources.
- Capital: The assets through which business are done or the cash that makes it happen is known as capital (Peters *et al*., 2003: 268).

- People: By many considered to be the most important asset of a business. The abilities of the people employed by the firm are vital to the success of the business.

These inputs or resources provide the background to the economic ratios. All ratios must be taken in context and should be reviewed on a monthly basis to identify trends. The following ratios are commonly used.

5.2.1 Return on investment (ROI)

Return on investment is one of several approaches to building a financial business case (Webb, 2003a: 36). Management evaluates the investment potential by comparing the magnitude and timing of expected gains to the investment costs. This approach can be used to make "go/no-go" decisions on asset requirements or the implementation of programmes.

Basically two types of return-on-investment calculations exist. Simple and complex return on investment calculations can be described as follows:

Simple ROI

$$\text{ROI} = \frac{\text{(gains - investment)}}{\text{investment cost}}$$

Simple ROI works well in situations where both the gains and the costs of the investment are easily known and where they clearly result from the action (Peters *et al.*, 2003: 328). The higher the ratio as calculated by the formula, the better the investment. The ratio in itself does not, however, give any indication of the scale of the investment or the magnitude of the returns or risks in the investment.

Complex ROI (Dupont method) (Humphreys, 1991: 106).

$$\text{ROI} = \frac{\text{average yearly profit during earning life}}{\text{(original fixed investment + working capital) expressed as a percentage}}$$

Other financial ratios are sometimes treated as ROI figures and include ratios such as return on capital, return on total assets, return on equity and return on net worth. All of these ratios have the single goal of expressing cumulative cash flow results of an investment over time (Humphreys, 1991: 106-109).

5.2.2 Return on sales (ROS)

Return on sales gives one an idea of the after tax profit to sales (Newnan, Eschenbach & Lavelle, 2004: 212). If a business is experiencing poor cash flow it could be because the markup or profit allowed is not enough to cover expenses. The return on sales (ROS) ratio can assist in pointing this out and allow management to adjust the profit margin. Should this figure drop over time it might give an indication that the firm might soon run into financial difficulties.

$$ROS = \frac{\text{net profit}}{\text{sales}}$$

5.2.3 Break-even analysis

Break-even analysis involves finding the level of sales necessary to operate a business on a break-even basis (Webb, 2003a: 36). Total costs will equal total revenue. In other words, profit will be nil (Paek, 2000: 40). The following are typical terms used in performing a break-even analysis (Paek, 2000: 40):

- Selling price (SP): This is the price that each unit will be selling for and is expressed as cost per unit.
- Variable costs (VC): These are costs that vary in proportion to sales levels. It can include direct material and labour (Eldenburg & Wolcott, 2005: 41), the variable part of manufacturing overheads and transportation. VC is usually expressed as a cost per unit (Paek, 2000: 40).
- Contribution margin (CM): The difference between the selling price and the variable cost is referred to as the contribution margin.
- Fixed costs (FC): These costs remain fixed irrespective of the number of sales (Eldenburg & Wolcott, 2005: 41). These are generally costs such as overhead administrative costs, cost of interest and depreciation, etc. The fixed costs are generally expressed as a lump sum.

- Units (X): Units refer to the number of items produced or sold. For the purpose of break-even analysis the number of items produced is considered to be equal to the number of items sold during the same period.

Paek (2000: 40) states that each project is like a custom item that is built to serve a special need, so that there are many decisions to be made before deciding whether to bid. Examples can be, for instance, what labour force will be available for the project, or whether the company will be able to keep up with their current workload should they acquire the new project.

Break-even points are not rigid or static. They change with every decision made by management. The break-even volume changes when the margins are raised or lowered and when the efficiency of the operation rises or falls. It changes when there is purchasing or selling of equipment and it changes every time there is an alteration in the overhead spending. It can be considered that the break-even point is only of academic interest and that companies are interested in the profit path (Nottestad & Macklin, 2007: 142-143) above the break-even point and how it is affected by those factors that are controllable. Figure 2.4 indicates a typical break-even point with “cost” at the lower end of the graph and “revenue” at the top end.

The formula for break-even analysis can be noted as follows:

$$SP(X) = VC(X) + FC$$

or

$$X = FC / (SP – VC)$$

Since much data gathered in solving a problem represent projections of future consequences, there may be considerable uncertainty regarding the data’s accuracy (Newnan *et al*., 2004: 285). Since the desired result of the analysis is decision-making, an appropriate question to ask would be: To what extent do variations in the data affect my decision? When small variations in a particular estimate would change selection of the alternative, the decision is said to be sensitive to the estimate. To better evaluate the impact of any particular estimate, the variation to a particular estimate that would be necessary to change a particular decision, is computed. This is referred to as sensitivity analysis (Flanagan *et al*., 2001: 57; Newnan *et al*., 2004: 285).

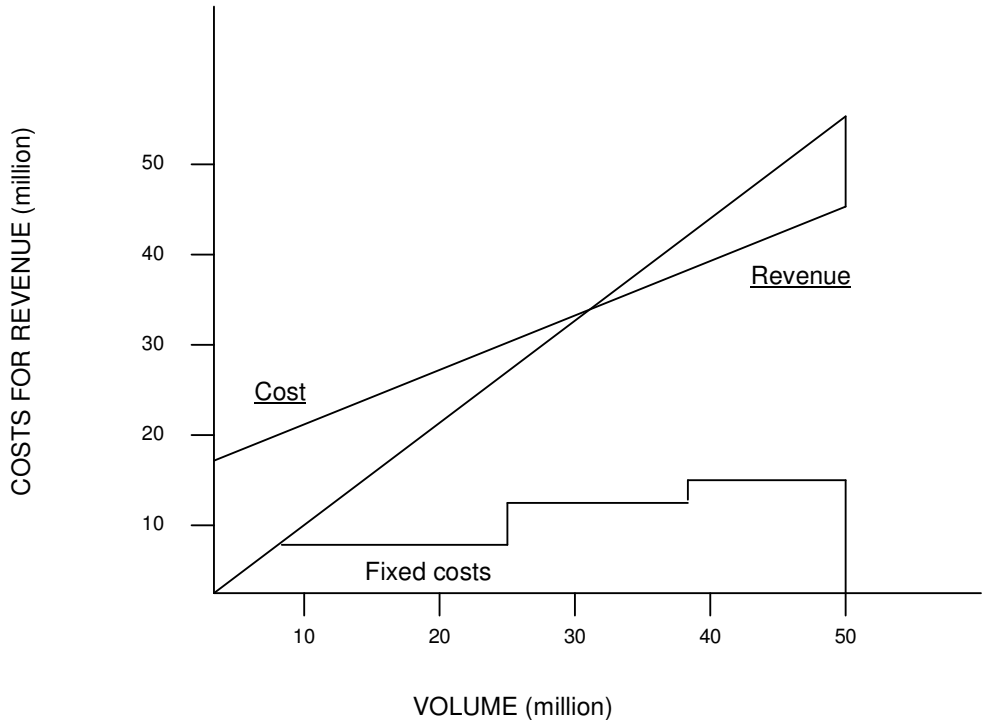


Figure 2.4: Typical break-even distribution
Source: Paek, 2000: 41

5.2.4 Earned value

Prentice (2004: 2) describes earned value as follows:

> *"The periodic, consistent measurement of work performed in terms of the budget planned for that work. In criteria terminology, earned value is the budgeted cost of work performed. It is compared to the budgeted cost of work scheduled (planned) to obtain schedule performance, and it is compared to the actual cost of work performed to obtain cost performance."*

The concept of earned value has been around for more than 40 years. Webb (2003b: 3) indicates that it has been used on some projects with great success, but it has not been used extensively throughout all projects. The main reasons why earned value was not used is that it was too complicated and too costly. These reasons, amongst others, prevented extensive use of earned value outside the USA for the first 30 years (Stratton, 2007: EVM.04.1).

Earned value is a basic concept that goes back to industrial engineering and accounting procedures well before project management was a recognised discipline on projects (Webb, 2003b: 3). Prior to the introduction of earned value techniques, managers were relying on Gantt charts and Critical Path Analysis for scheduling aspects. The difference between planned costs and actual expenditure was reported to get an indication of the financial progress on the project. Organisations were embarrassed by high cost overruns on some projects. These overruns could not have been predicted until it was too late. Studies and investigations brought forward a fairly simple concept (Owen, 2007: EVM.01.1). According to Kuehn (2007: EVM.05.1), a detailed plan and a detailed valuation should be made of the scope of work before the project is started. Notes should be made against each reporting point of the following:

- How much value should have been achieved according to the plan?
- How much value has been created according to the work done?
- How much money has actually been spent?

These three values are illustrated in Figure 2.5. Webb (2003b: 18-24) defines some earned value terminology by means of an example. Refer to Figure 2.6 for more detail. Webb describes a project with an estimated cost of £80m, with a four year duration. After two years the cumulative cost is planned to be £40m. The actual status after two years derived from project accounts accumulates to £30m. Does this mean that the project is actually doing well having spent less than planned after two years or does it mean that the project is behind schedule?

To establish the situation an assessment needs to be made as to what actually has been accomplished after two years. If the updated programme indicates a 56% completion status, which is represented by the bracket in Figure 2.6, it will mean that the project has a current earned value of £45m against an actual spend of £30m.

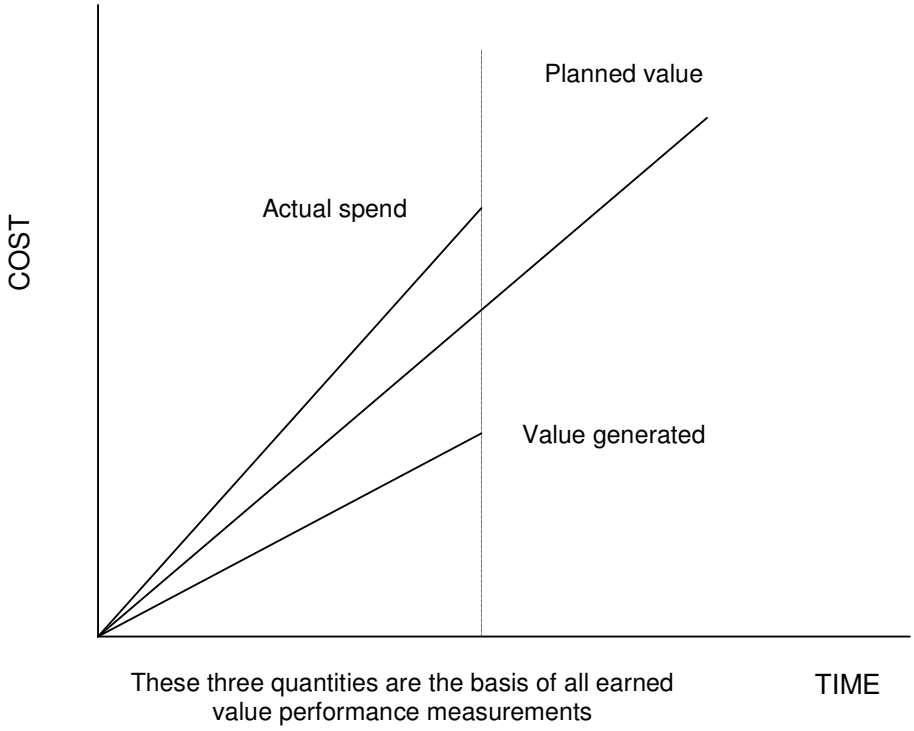


Figure 2.5: Adding the value generated as time passes gives a greater insight into the project than simply the planned actual values

Source: Webb, 2003b: 2

Webb (2003b: 22-24) explains a few common terms frequently used in earned value analysis:

- Budgeted cost for work scheduled (BCWS): – This is the sum of all the planned costs in the project, or any given part of the project, up to the reporting date (refer to the £40m sum in Figure 2.6).
- Budgeted cost for work performed (BCWP): This is the cost of all the progress achieved on the project, up to the reporting date. In the example it refers to the £45m value.
- Actual cost of work performed (ACWP): The total of all expenditure on the project up to the reporting date. This refers to the £30m value in the example.
- Cost variance (CV) = BCWP – ACWP: The numerical difference between the earned value and the actual cost at the reporting date.

- Schedule variance (SV) = BCWP – BCWS: The numerical difference between the earned value and the planned expenditure at the reporting point.

If the CV or SV is positive, the project is doing better than planned. Figures 2.7 and 2.8 indicate a cost and schedule variance using an earned value of £25m, which is different than that of the example, but now it depicts a negative situation instead of a positive situation. Determination of schedule slippage can be noted in Figure 2.8.

5.2.4.1 Earned value calculations

Webb (2003b: 24-25) describes two useful indexes in basic earned value calculations. They are:

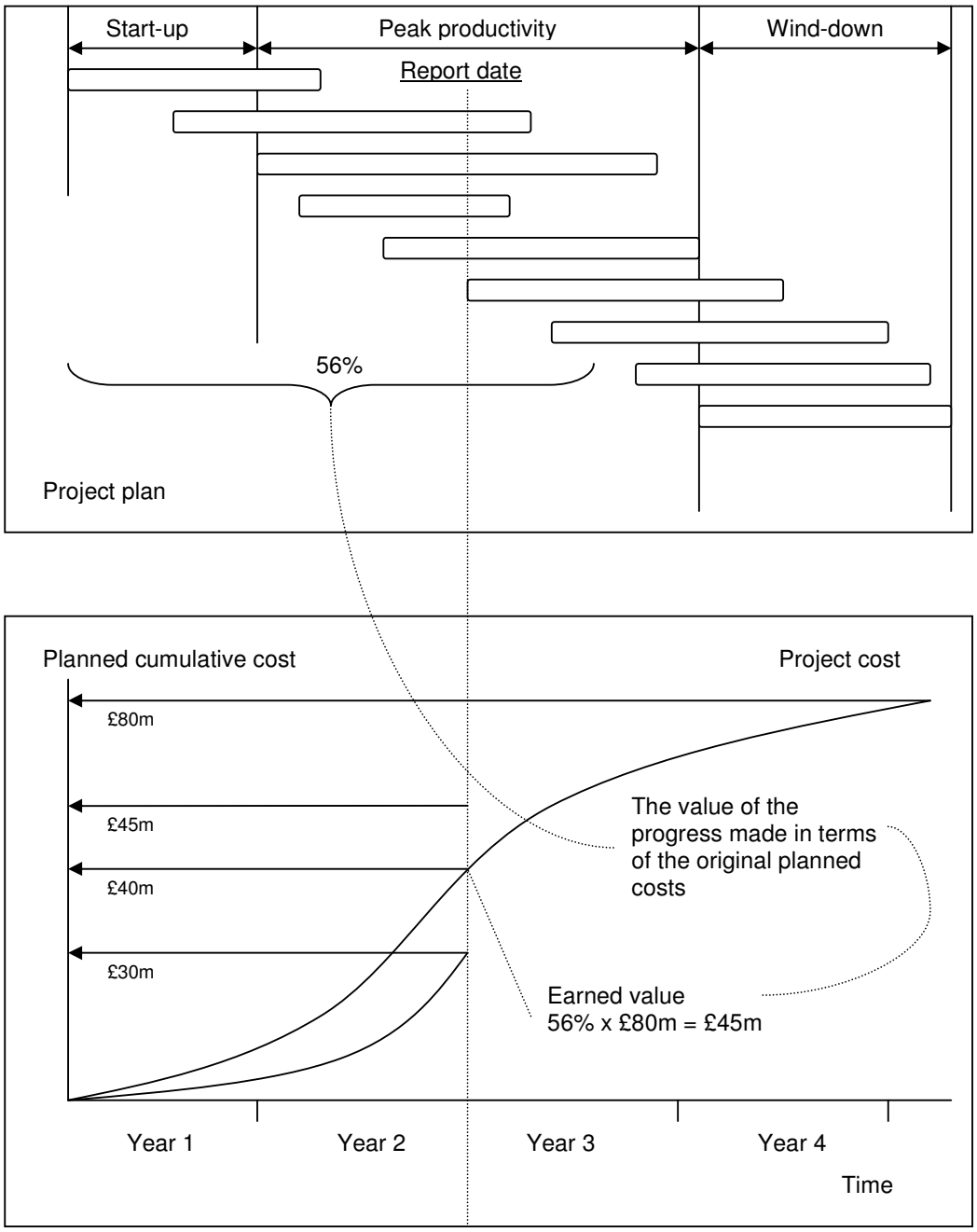
Cost Performance Index: (CPI) (Cost efficiency) – The ratio of the value created to the amount spent at a point in time on the project.

$$CPI = \frac{BCWP}{ACWP}$$

Schedule Performance Index (SPI) (Schedule efficiency) – The ratio of the earned value created to the amount of value planned to be created at a point in time on the project.

$$SPI = \frac{BCWP}{BCWS}$$

Index values greater than one indicate performance either in cost or schedule terms that is better than planned. The CPI is perhaps the more useful of the two. It shows the real worth that is being created by the project. A CPI value of 0,85 indicates that for every monetary unit spent on the project, only 85% of that is being created on the basis of the original budget.



Adding the earned value to the cost curves at the project mid-point

Figure 2.6: Earned value assessment for a project that is running ahead of schedule

Source: Webb, 2003: 23

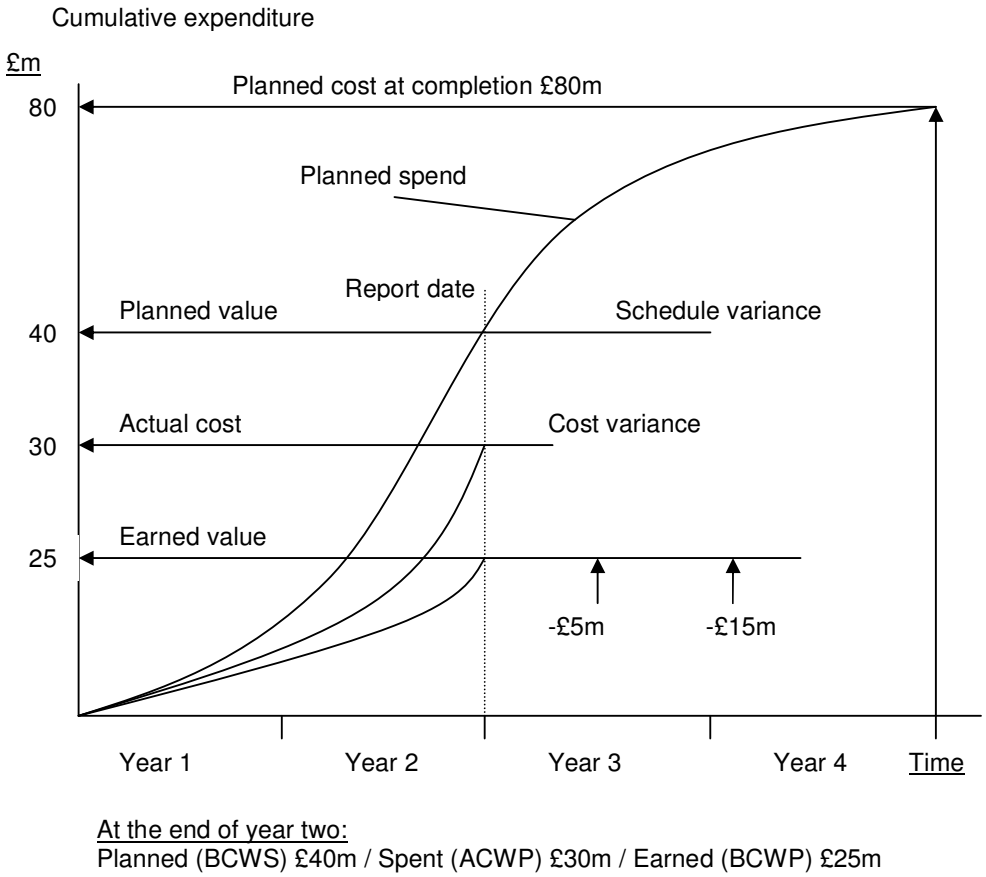


Figure 2.7: Cost and schedule variances

Source: Webb, 2003: 24

Webb (2003b: 25) states that history has proven that once a trend has been established, it tends to remain in force until the end of the project. If it does change, it normally changes for the worse. Two formulae can be derived for estimating both the expected cost at completion and the expected completion date on the assumption that the trends seen up to the reporting point continue until the end of the project.

Estimated Cost at Completion (EAC) – The estimated final cost of the project, calculated as follows:

$$EAC = ACWP + \frac{BAC - BCWP}{CPI}$$

Where: BAC is the Budgeted Cost at Completion.

Historical data indicates that in the USA the EAC forecasting method tends to be optimistic. It depends on the same level of cost efficiency to continue to project completion, but this rarely happens. For the overall duration of the project the formula also consists of two parts - the time elapsed up to the reporting date plus the estimated additional time to complete the project assuming the trends seen to date continue.

$$ETTC = ATE + \frac{OD - (ATE \times SPI)}{SPI}$$

Where: BAC is the Budgeted Cost at Completion.

ATE is the Actual Time Expended

OD is the Original Duration

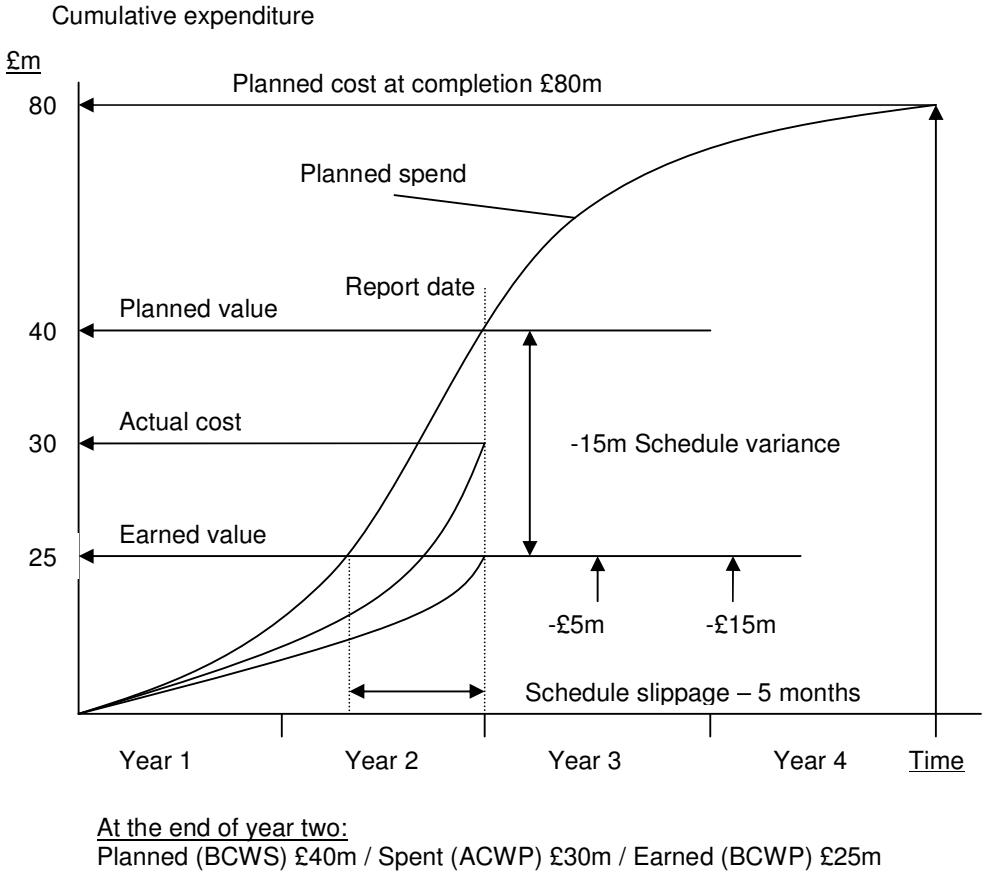


Figure 2.8: Schedule slippage can be established from the earned value and the planned S-curve

Source: Webb, 2003: 25

The calculations using these expressions are shown graphically in Figure 2.9.

5.3 Conclusion

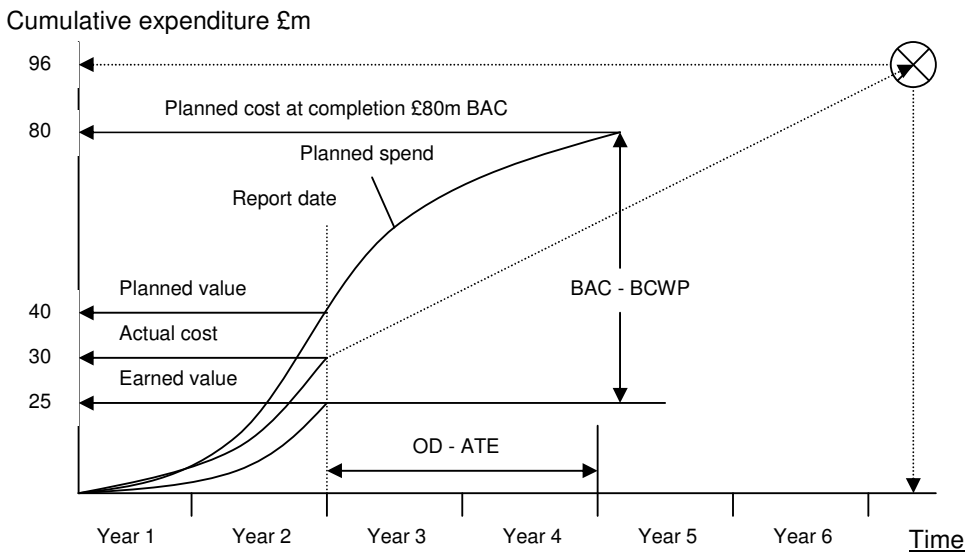
A project is acquired based on the application of financial analysis of the scope and the work breakdown structure (WBS) on preliminary information (Humphreys, 1991: 471). A decision on a business proposition is based on techniques (financial ratios) being applied to information (Newnan *et al.,* 2004: 285). It is of significance to note the process of pricing and to document the results of all tenders as "lessons learned". More information on the use of historical data will follow.

6.0 MATERIALS

Materials are a key resource in almost any economic endeavour. Materials range from the simplest of raw materials to the most complex fabricated materials, with a large range in between (Barlow, 2006: 10). In most projects, materials are a key element. There are isolated instances where no material will be used for certain portions or elements of a project, but in most cases the use of material will apply. Materials must be procured at the right time and at the right cost in proper amounts in order to lead to an efficient production process (Dobler *et al*., 1990: 35).

Most materials compete on a number of characteristics including cost, availability, service life, weight, corrosion/wear resistance, workability, weldability and other ease-of-fabrication criteria. As the well-known phrase in the engineering community goes: "… there are no bad materials, only bad applications of materials…" (Barlow, 2006: 10). Strong performance of a material in a specific application may not guarantee similar performance in another application.

Opfer (2004: 3.1) comments that the automotive industry is a good example of continued competition among materials due to various factors such as weight with its attendant impact on fuel economy. Steel has been replaced in numerous applications in motorcars by high performance plastics and aluminum. In the beginning targets were non-structural elements such as interior panels and trim items. These non-structural applications have through further engineering migrated into structural components such as body parts and engine parts. Applications which traditionally made use of steel might still be using steel although the modern material will be a high strength low-alloy steel.



$$ETTC = ATE + \frac{OD - (ATE \times SPI)}{SPI}$$

$$2 + \frac{4 - (2 \times 0{,}625)}{0{,}625} = 6{,}4 \text{ yrs}$$

$$EAC = ACWP + \frac{BAC - BCWP}{CPI}$$

$$30 + \frac{80 - 25}{0{,}833} = £96m$$

Figure 2.9: Calculating the end conditions from the BCWS, BCWP, ACWP, CPI and SPI

Source: Webb, 2003: 27

6.1 Material handling

Material handling is a requirement of the production process. Inefficiencies in this area create plant wide problems. Poor materials handling can result in either damage to materials or the finished product (Thomas *et al.*, 2005: 810). An ineffective material

handling system can slow production down, creating other excessive costs due to delays.

Barlow (2006: 12) describes how early planning can make a difference, as well as the value of realising the importance of material identification in the early stages of the project to minimise lead times. He continues by stating that "… time is the enemy of flexibility in most projects". Figure 2.10 indicates the importance of early planning and also shows the trend in cost increase when changes to material specification are made at a later stage in the project.

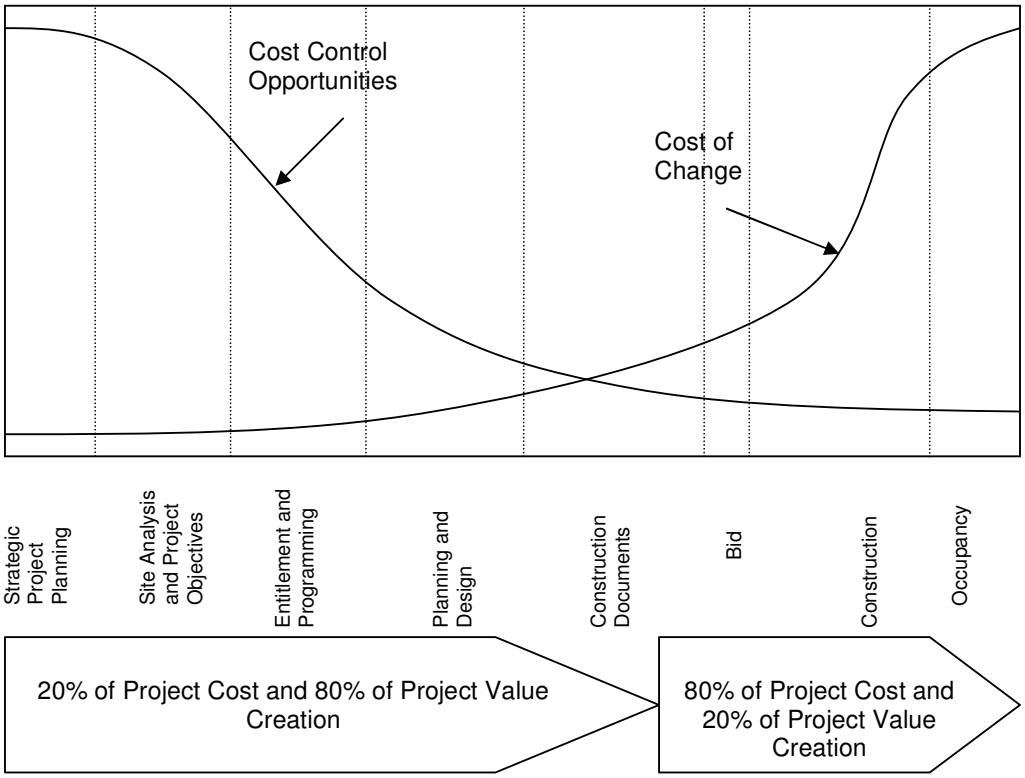


Figure 2.10: There are decreasing cost control opportunities and an increase in cost as the project progresses

Source: Barlow, 2006:12

6.1.1 Material handling principles

The handling of materials in construction differs depending on the location or the type of plant to be built (Thomas *et al.,* 2005: 810). The basic principles, however, remain the same. They include:

- Material movement should be over the shortest possible distance.
- Terminal time should be as short as possible.
- Eliminate manual material handling when mechanised methods are available.
- All materials should be identifiable and retrievable.

Mechanised material handling methods are most cost-effective in high-wage countries (Borowicz, 2007: 19). In a lesser developed country, the capital/labour trade-off given low wages will tend to emphasise manual methods rather than equipment-intensive operations. Meyer (1997: 72) and Eloff (2009: 13) pointed out that traditionally the circumstances in South Africa are no different. Bauer (2010 – Business Day, 15 July) and Mapenzauswa (2010: Mail & Guardian, 3 June) reiterate the extent of low wages in South Africa and that manual labour are more popular here than for instance in Europe, because of cheaper labour. Scott (2005: 4-7) refers to studies being undertaken to compare the cost of manual labour versus non-manual labour in South Africa.

6.1.2 Materials handling decision factors

Navon and Berkovich (2005: 1329) highlight the four basic decision factors affecting material handling:

- Material to be handled.
- Production system type.
- Facility type.
- Material handling system costs.

The second and third decision factor, as mentioned above, have more effect on a factory-type environment. These factors can more accurately be substituted by the type of plant to be constructed when considering the construction industry.

Material handling system costs and their economic feasibility will be dependent on labour costs in the capital/labour trade-off equation (Navon & Berkovich, 2006: 635). Predicted demand can assist in the economic and practical evaluation of alternatives.

6.2 Different material types

In most production/construction projects, material types can be segregated into four basic categories (Opfer, 2004: 3.1):

- Raw materials.
- Bulk materials.
- Fabricated materials.
- Engineered or designed materials.

Opfer (2004: 3.1) comments on the different types of materials. Raw material in construction refers to material in its most basic form and which require a minimum amount of processing to be useful. Examples of this type of material are sand, concrete, stone, etc.

Bulk materials are materials such as timber and steel and are most common on a construction site. Most of this type of material is readily available and if standard sizes are ordered the lead time is minimal.

Fabricated material is bulk material transformed into custom-fit items for a particular project. Steel pipe can, for example, be fabricated into a specific spool piece with specific dimensions to perform a certain function within a line. The same scenario can be sketched when considering structural steel members. Standard steel sections are cut and shaped to manufacture a specific member such as a column or beam with the relevant base plates, end plates, webs, ribs, etc. as per the structural requirement of the project.

The manufacturing process for fabricated material has some significance in this instance since it has economic implications and will impact on the pricing/costing procedure for the project. Chemical and process plant construction relies in most cases on specialists to detail each individual structural member, piping spool piece, etc. These specialists will take the design drawings and break it down to individual defined pieces. Pieces or members will then be detailed on shop details which will be used in a manufacturing workshop to produce a work piece as detailed on the drawing. These individual pieces will then be transported to the construction site. By making use of the

design drawings, members will then be bolted or welded together in a continuous process to take the complete project to commissioning stage.

Engineered or designed materials are those materials manufactured from different components to produce a piece of equipment such as an electrical distribution board, a centrifugal pump, an electrical motor, etc. In most cases these materials will be off-the-shelf items as the engineering team will strive to rather use such items than special design items, thus shortening the lead time. Standardisation in the case of engineered items is therefore desirable as a value-added principle to bring down costs. Costs will be less if one makes use of standard items rather than special items because of the principle of bulk supply/manufacture. Because of shortened lead times consequential damages can also be limited as far as possible.

6.3 Material purchase and management

Purchasing can be defined as the acquisition of necessary material for the correct quality at the correct time for a competitive price, from a selected vendor or supplier (Opfer, 2004: 3.5). Sufficient stocks of material will prevent costly delays.

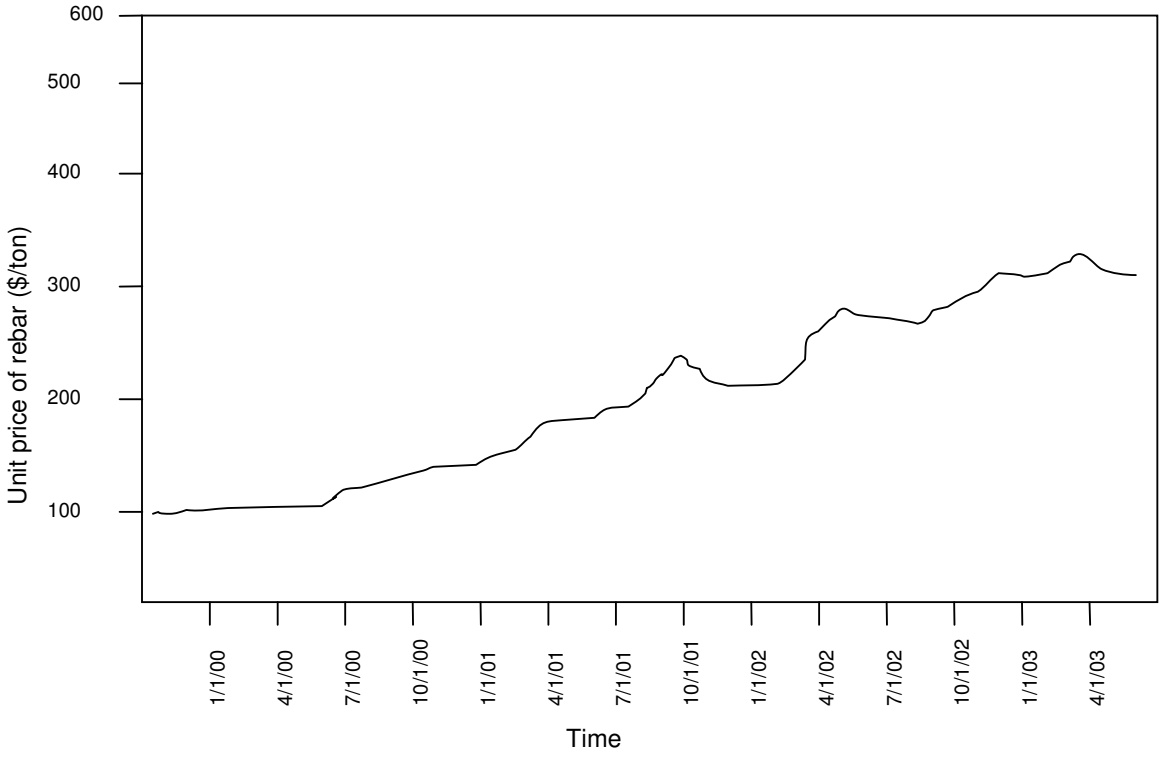


Figure 2.11: Price fluctuation on reinforcement steel in the Turkish construction industry during the period January 2000 to April 2003

Source: Polat and Arditi, 2005: 700

Figure 2.11 from the research conducted by Polat and Arditi (2005: 700) illustrates the price increase on reinforcement steel in the Turkish construction industry for the period January 2000 to November 2003.

Polat and Arditi (2005: 700) extended their research by also investigating the use of reinforcing steel in the Turkish construction industry for the period 1997 to 2002. Figure 2.12 depicts the results.

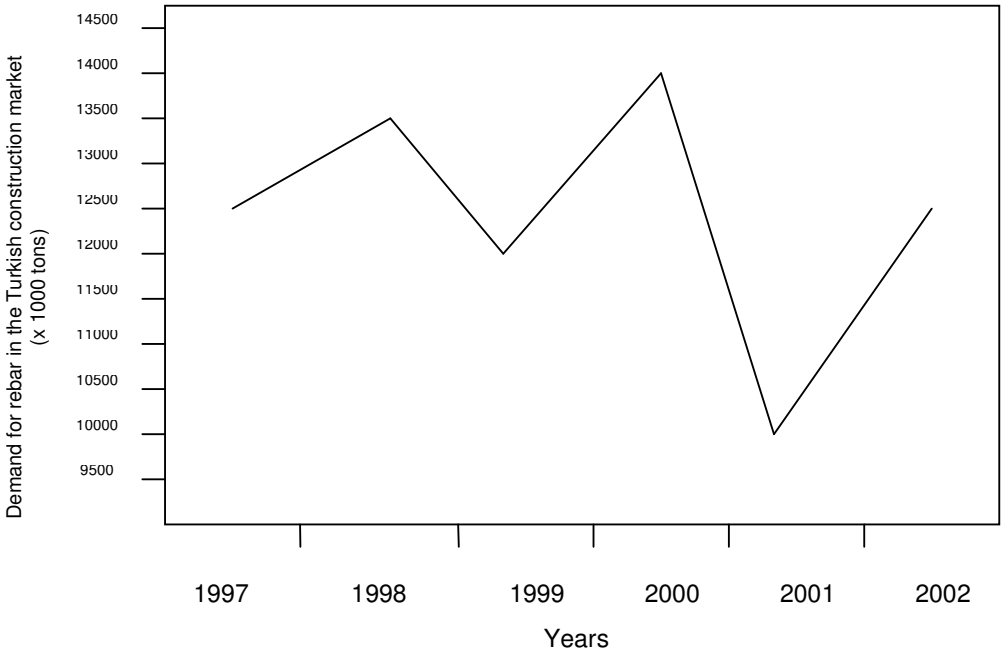


Figure 2.12: Demand fluctuation of reinforcing steel in the Turkish construction market for the period 1997 to 2002

Source: Polat and Arditi, 2005: 700

A comparison of Figure 2.11 and Figure 2.12 shows that although there is a basic economic principle in that the higher the demand the more the price will increase, in construction this will not always be the case. The steady increase in the steel price can be noted in Figure 2.11, irrespective of the demand (Figure 2.12).

6.3.1 Material management

The typical stages of an Engineer/Procure/Construct (EPC) contract is described by Kini (1999: 30-34) as follows:

- Planning – The project team should create and maintain a plan as to how they foresee the execution of the project. In doing this they engage into a psychological process of thinking about the activities required to create a desired goal on some scale. EPC projects are normally lump sum projects constructed on a turn-key basis which makes planning even more important.
- Preliminary design – It will be necessary to do a preliminary design to compare different design possibilities and options to obtain a design philosophy from which the final design can take place.
- Final design – Final or detailed design is the process where the complete project gets designed in the finest detail to allow the contractors to have specifications and drawings to execute the work on site.
- Procurement – Procurement of the material and equipment that will be required to construct the plant. Particular emphasis is placed on long lead items which may impact on the planned end date.
- Vendor control – Vendor selection, appointment and management is necessary to ensure that material and equipment is delivered on time.
- Construction – In the construction phase the material and equipment that was procured must be re-worked to fabricate the designed details and these fabricated items must then be installed on site and connected so that all is in a functional state.
- Close out – As material and equipment gets delivered to site and fabrication and installation take place, constant quality control ensures consistency in quality. As the different portions of the plant are finished, it will be commissioned to make sure all is as per the design. The final step in closing out of the project is to make sure that all final drawings, specification and design packs are delivered and checked against the actual installation.

Material management is an important part of construction and if well conducted can have a significant effect on project costs. Kini (1999: 30) notes that 50% to 60% of project costs relate to the material/equipment. Implementing a proper material management system therefore makes sense. Navon and Berkovich (2006: 635) concur with these findings. Figure 2.13 illustrates the interaction of a typical supply chain for material for a construction project.

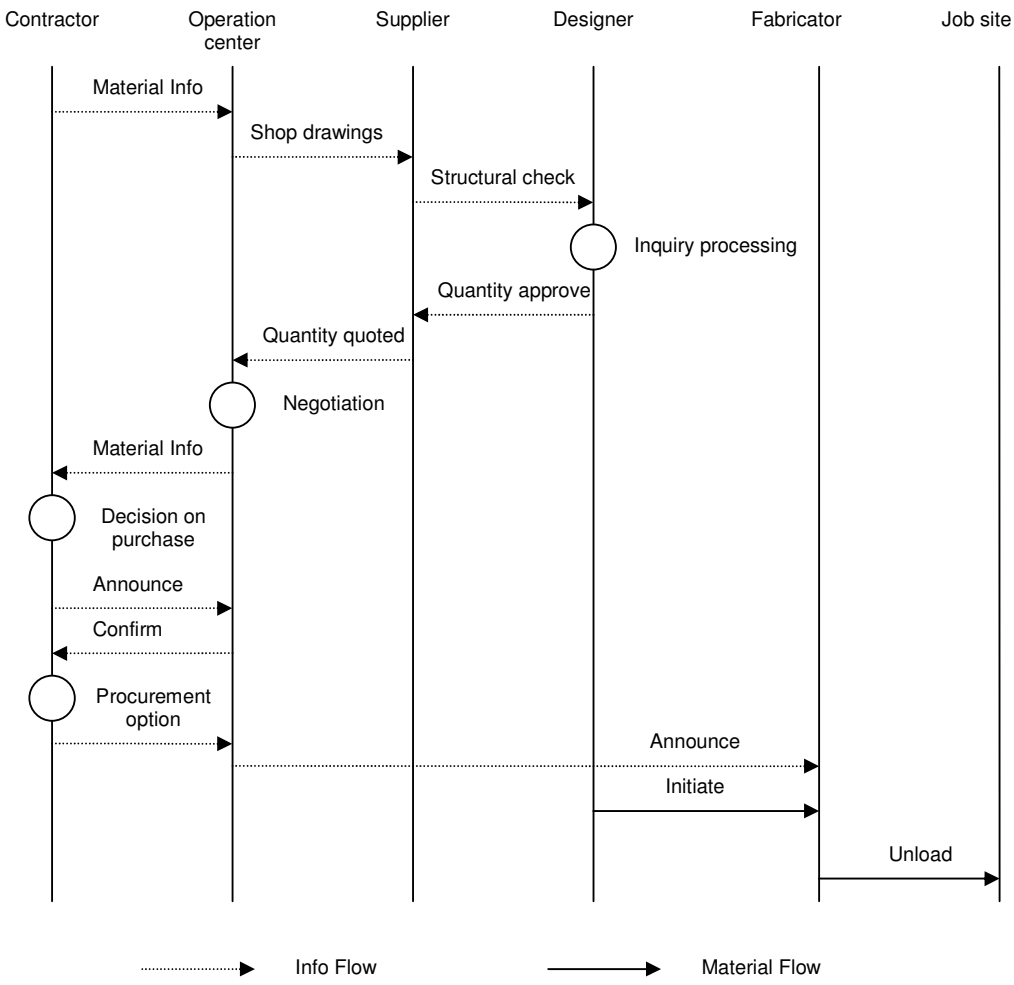


Figure 2.13: Interaction diagram for a typical supply chain of construction materials

Source: Castro-Lacouture and Skibniewski, 2003: 795

6.3.2 Material quality

All material should be procured against a standard set of predetermined standards or specifications. Over-specifying material will lead to increased costs (Sterner, 2000: 393). Higher specification in material is not necessarily always a good advantage to have, especially when considering the added cost to the project (Flanagan *et al.*, 2001: 53).

Poor quality material, on the other hand, might lead to material failure or high levels of fatigue which will eventually lead to failure. This will obviously lead to additional expenses in replacing the material in question and will thus end in rework. This means

that not only will the material have to be replaced, but there will also be additional labour costs and sundry overhead costs involved.

6.3.3 Material traceability

In some cases it is necessary for the raw material supplier to produce milling certifications to prove the quality of its raw material and that the material meets the standards that are required. Bulk materials might also be exposed to these requirements. The supplier of piping material, for instance, used to manufacture a certain spool piece might have to prove that its piping adheres to the set specification required (Barlow, 2006: 12).

6.3.4 Vendor surveillance

Vendor surveillance is especially important when dealing with fabricated and engineered materials. Quality control might indicate certain hold points during the manufacturing process of these types of materials and inspections (surveillance) will be required to ensure that the manufacturer meets the required standards and specifications (Lu & Anson, 2004: 218).

6.3.5 Material quantity

Acquisition of materials on any project may pose some logistical and practical problems for the company employed to construct the plant. Material quantity will have to be a well-balanced act to optimise costs in this regard. Under-ordering of materials will lead to stoppages in construction which will be costly (Barlow, 2006: 11); especially if the crews at hand have to accelerate to catch-up to the agreed programme. Ordering too little of a certain material will also have the effect that the discount from the supplier might be less due to the smaller order. Over-ordering will have the effect that storage might become problematic, not only because of space requirements but also because of added costs to the project (Miltenburg & Pong, 2007: 1643).

Some financial losses may be recuperated on resale of excess material but in most cases this material will be considered to be “second-hand” and will not reach the same price as the initial purchase price, thus resulting in a loss. The loss of interest will add to the total financial loss on material. Some materials, cement for example, can only be stored for a limited period of time. If this type of material is used beyond the acceptable

selling date it will have a negative effect on the quality of the end product (Kumar, Nottestad & Macklin, 2007: 143).

7.0 LABOUR

Each task is directly connected to a certain effort by certain employees to complete this task (Perry, 2006: 402). When conducting an estimate, management must know how long certain tasks will take to complete and what the cost implications will be to pay for the labour to accomplish a task (Whiteside, 2006: EST.08.3). The monitoring of progress and a good understanding of the cost factors will therefore be essential to controlling costs (Stenzel & Stenzel. 2003: 37-38).

7.1 Labour classification

There are basically three classifications of labour contributing to the final labour content of a project (Borowicz, 2007: 19):

- Direct labour: The labour directly involved in building or producing a certain product or installation.
- Indirect labour: This form of labour includes activities which will not become part of the final installation but is required to complete the project as a whole.
- Overhead labour: Labour that cannot be charged or identified with a specific piece of work and must therefore be allocated on some arbitrary basis, or be handled as a business expense irrespective of the quantity of work.

The role assigned to certain classifications of labour might alternate from project to project. On smaller projects it might not be feasible to appoint specific administrative personnel. These tasks will then be handled from head office. Larger projects might look at dealing with these tasks on site. These costs will then form part of the site establishment and might be treated as indirect labour rather than overhead labour.

A boom in construction also requires more labour to construct new projects. Ziguras (2006: 204) refers to the situation in Australia. Anonymous (2008a: 4) and Palmer and Hughes (2008: 3-4) refer to the labour and skills shortage in the United Kingdom. Anonymous (2006a: Business Week, 27 March 2006) also refers to the shortages of labour in China and how this is influencing the wage rates there.

7.2 The cost of human resources

The focus of this study is more directed to direct costs than indirect costs, but it is nevertheless necessary to understand the importance of indirect costs and the effect it might have on the cost philosophy in general. More and more human resource management activities are evaluated in economic terms (Ahn & McLean, 2006: 262). In the current climate of rising personnel costs and rising costs for energy and raw materials, estimates of expected costs and benefits are expected (Buchner, 2007: 60).

7.2.1 Human resource accounting

The inauguration of an efficient human resource accounting system will be the first step in developing a sophisticated measurement system that will enable the firm to report accurate estimates on the worth of the human assets of the organisation (Carmeli & Weisberg, 2006: 191).

7.2.2 Value to the organisation

Gilbreath and Montesino (2006: 565) indicate that one alternative to measure the historical cost of an employee is to measure the cost of replacing that employee (Shafritz, 1992: 23). In professional sports, the value of an athlete's services is often determined by how much money a particular team, acting in an open market, is willing to pay for his or her services. The same can be said of employees competing for work in the open market (Gilbreath & Montesino, 2006: 567).

Advocates of human resource accounting make a strong and compelling case for the need of measurement of replacement cost and employee turnover cost (Innes, Kouhy & Vedd, 2001: 17). Cascio (1982: 6-7) points out that these measurements tend to ignore the fact that monetary values cannot always be attached to the information that is collected. Perhaps the most significant limitation is that these measurements only measure inputs and not effectiveness.

7.2.3 Costing employee behaviour

The general idea of costing human resources is not a new one. A classic article by Brogden and Taylor (1950: 133) addressed the potential for developing on-the-job performance criteria expressed in dollars. They noted:

> *"The criterion should measure the contribution of the individual to the overall efficiency of the organization. It centers on the quantity, quality and cost of the finished product. Such factors as skill are latent – their effect is realized in the end product."*

The contribution each employee makes is not related to the size of the firm's investment in an employee, but is directly related to how each person works and what is produced (Cascio, 1982: 6-7).

7.3 Development of labour rates

Basic wages constitute the portion of the labour rate which will go directly to the employee. Base wages are usually reported on a time basis and will be expressed in hour, week or month. Craft labour is normally expressed per hour whereas supervisory labour is expressed per week/month (Borowicz, 2007: 19).

The extent to which overtime will be worked on a project depends on the programme or time frame in which the project must be completed. The extent to which overtime is worked will influence the labour cost for the project. The increased cost in labour for working overtime is offset against the earlier completion of the project.

The calculation of indirect labour cost can be done by making use of primarily two methods – direct estimate and historical data (Pickett & Elliott, 2007: EST.02.2). The direct method lists the resources needed to complete the project. Each of these resources is then priced out to determine the total cost. Alternatively, historical cost data can be used and by doing this the estimator can base his costing on previous completed projects (Pickett & Elliott, 2007: EST.02.2).

7.4 Estimating hours to complete a task

Each task constitutes a certain labour input to take the task to completion. According to Thomas (2006: 36), a time study can be applied to establish the duration of each task. Thomas (2006: 36) also refers to the methodology of these time studies and Finlay, Norman, Stolberg, Weaver and Keane (2006: 233) comment on modern methods of keeping time for tasks completed. Ampt, Westbrook, Creswick and Mallock (2007: 18-24) use time studies to establish the labour content of a task.

Depending on the level of information available, the estimator can group the quantities in the appropriate work packages and working with the planners start to develop the work package sequence. By making use of databases (Pickett & Elliott, 2007: EST.02.2), the estimator can then apply a time factor to the work packages and also add the overall staffing content.

7.4.1 Work break-down structure (WBS)

The importance of Work Break-Down Structure (WBS) is emphasised by Hewitt (2006: EST23.1) and Zhao (2006: RISK05.1). Labour estimates are based on material quantities and will therefore only come into play at a more advanced stage of the project. The first step is to break the project down into meaningful packages (work break-down structure) (Humphreys, 1991: 471).

Determining the hours it will take to construct a certain portion of work can be done by consulting a database where time durations are captured. These databases are based on actual historical projects and should be kept up to date on a regular basis (Pickett & Elliott, 2007: EST02.1). Alternatively, time-cost studies can be used. This method is based on the observation of a team of workers working on a specific piece of the construction (Ampt *et al.,* 2007: 18-24). The time spent to complete the work gets recorded and priced.

7.4.2 Cost to support the worker

As previously mentioned there are also indirect and overhead costs which need to be taken into account since direct labour alone will not complete the project. The pricing methodology of these costs has been discussed previously by Borowicz (2007: 19). The most important aspect here is to make allowance for these costs and to include it in the estimated final cost irrespective whether a percentage method or a detailed calculation is followed.

7.4.3 Factors affecting productivity

Carrell, Kuzmits and Elbert (1989: 74) define productivity as follows:

> *"Productivity is the ratio of some measurable unit of output to some unit of input. Productivity is therefore a measure of efficiency, or the*

amount of work that the employees accomplish during each working day."

Whiteside (2006: EST.08.1) demonstrates that in a perfect world, perfect productivity (1.0) would be accomplished in a 40-hour work week, with everyone taking all their holidays and vacation days as planned. All of the engineering drawings would be 100% complete, there would be no delays of any kind, everyone would work safely, everything would fit perfectly the first time, the weather would be perfect and there would be no litigation at the end of the project.

Whiteside (2006: EST.08.3) also describes the effect of labour legislation on productivity and how jurisdictional rules have an impact on productivity. Figure 2.14 shows a productivity graph of a specific craft mix performing a specific task, but taking more time due to the effect of labour law preventing the same craft to perform more tasks.

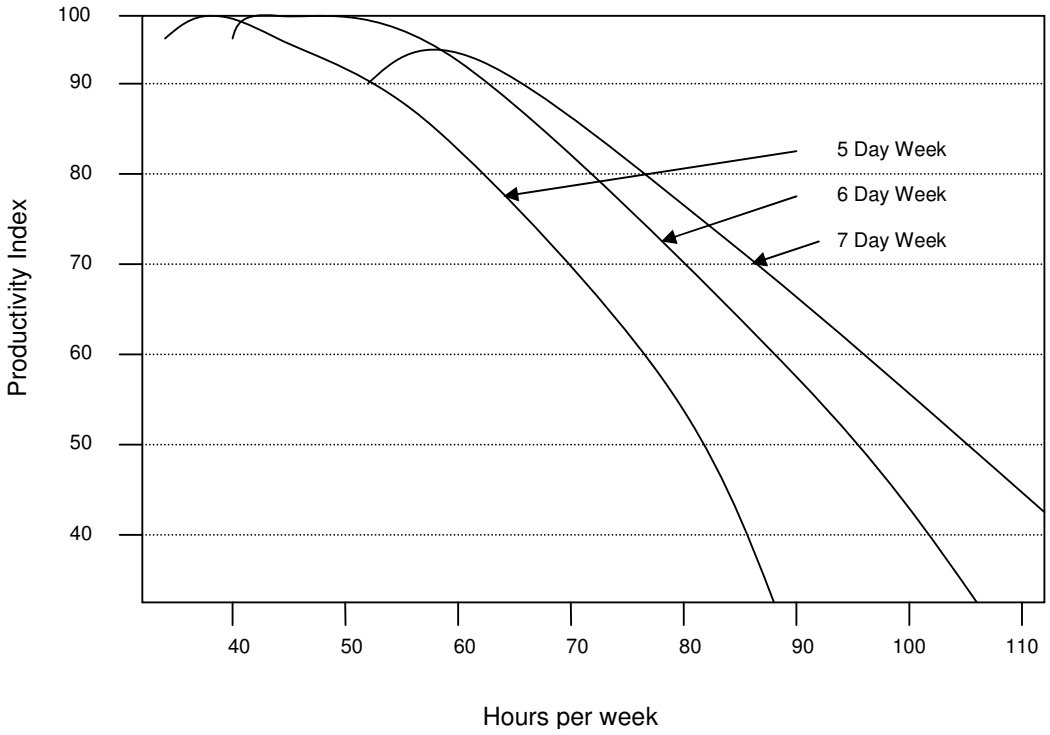


Figure 2.14: Productivity index versus hours per week
Source: Whiteside, 2006: EST.08.3

How much work can be completed in a specific time frame? This is a frequently asked question when costing the labour content of a project. Optimising the labour efficiency is one of the biggest challenges for management to make labour more cost-effective (Boyle, 2007: CDR.02.1).

In America, for instance, the "Houston-Gulf Coast Indices" are used in the petrochemical industry. These indices provide the estimator with a base time to complete a specific task. Adjustments for variables will then be needed to improve the indices according to the specific project specifications/conditions.

When pricing the labour cost of the project the estimator should look into the following since these factors will influence the price for labour (Fayek & Oduba, 2005: 939).

- Is sufficient skilled/unskilled labour available in the area?
- If the site is remote, will labour have to be transported to and from work?
- Weather conditions?
- Public holidays?
- Living quarters or living out allowances?
- Will overtime be required and to what extent?
- Political situation of the area in which the project will be constructed?

Boyle (2007: CDR.02.1) continues to describe some design factors and management factors that will also influence productivity. He points out, for instance, that vertical construction is more complex than horizontal construction. The effect of disruption of work on productivity is also discussed.

On repetitive tasks, in particular, the learning curve for labour increases as each task gets finalised. As the crew gets more and more involved in a certain task they become more efficient working together with familiar tools, or in many cases special tools for specific tasks.

Thomas, Riley and Messner (2005: 811) indicate (as per Figure 2.15) the daily productivity curve of a specific construction team with the different factors affecting this team's productivity.

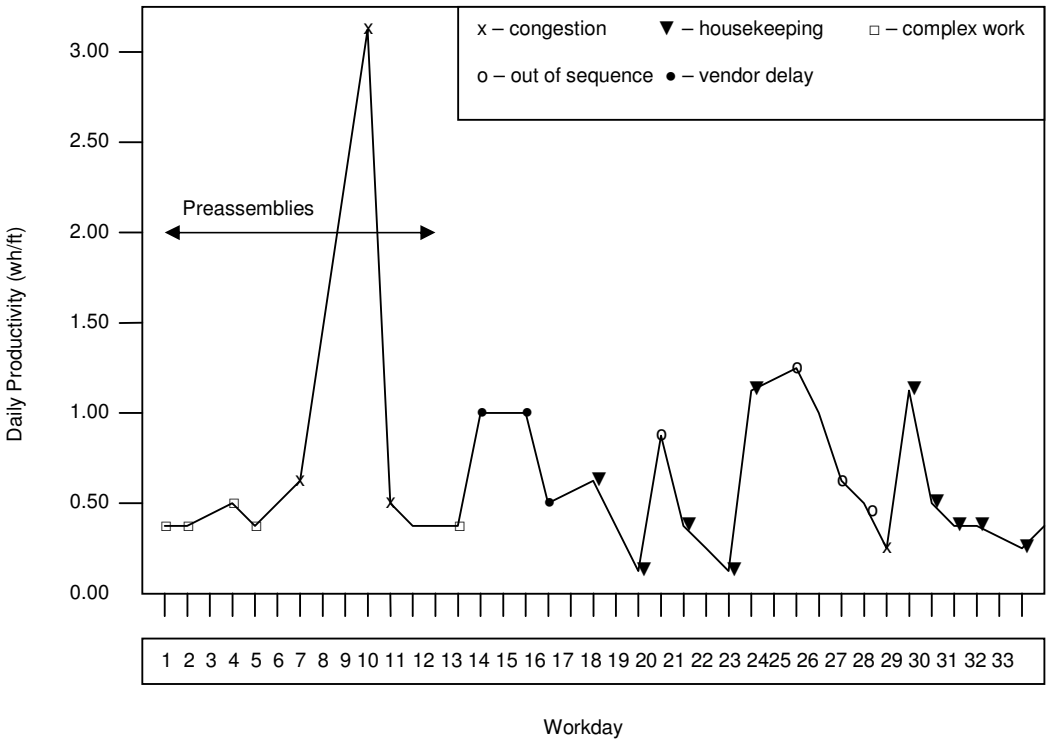


Figure 2.15: Productivity of a construction team with the different factors affecting their productivity

Source: Thomas, *et al.* 2005: 811

A similar illustration of how productivity fluctuates during the course of a construction project can be seen in Figure 2.16 where Whiteside (2006: EST.08.4) plotted a resource loaded productivity curve. Ewing and Thompson (2007: 356) also comment on the measurement of productivity over the time span on a project.

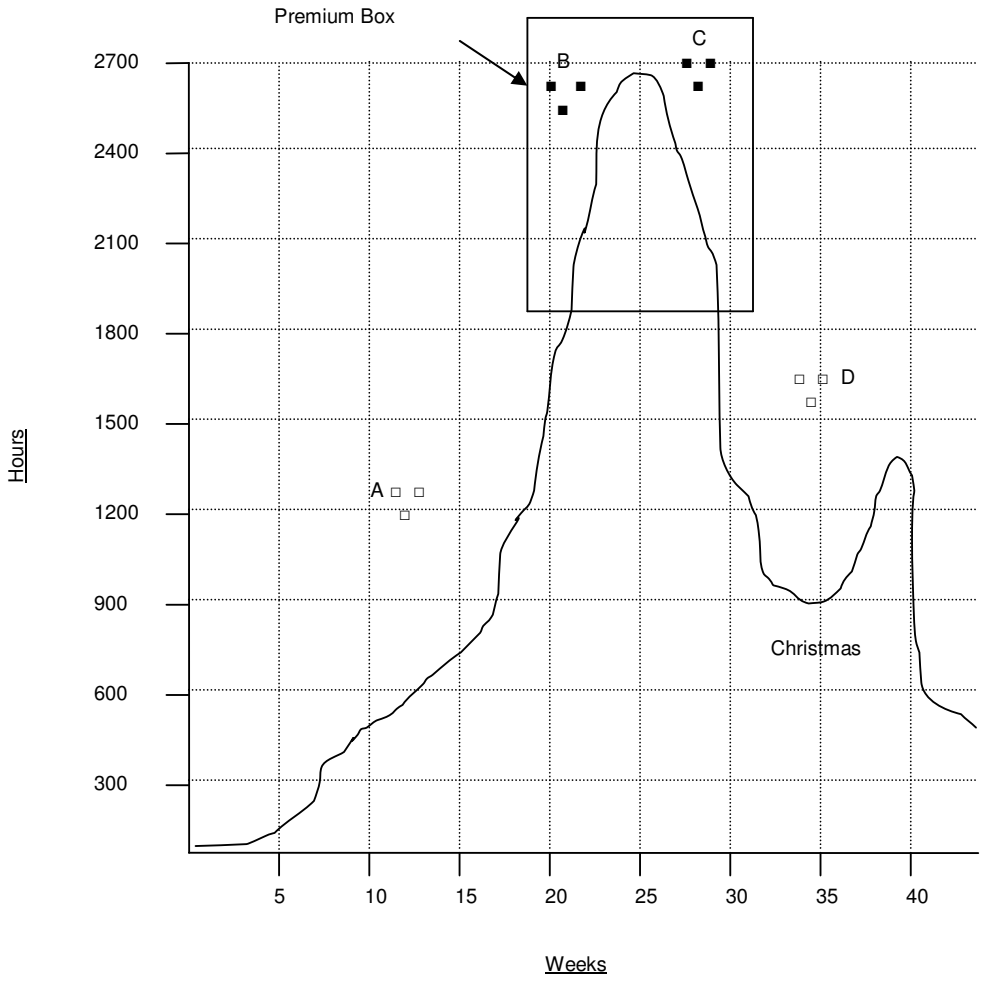


Figure 2.16: Resource loaded curve

Source: Whiteside, 2006: EST.08.4

7.5 Performance monitoring

Coetsee (2002: 7) describes the concept of performance as follows:

> *"Performance is the realizing of goals, agreed upon or set by the individual for himself and meeting its own expectations or those of other people, such as managers or colleagues, to whom a product is delivered or to whom a service is rendered."*

Work output and the costing thereof are addressed in activity-based cost (ABC) methodology (Anonymous, 2008e: online). This system has been developed to assist in organising, analysing and setting-up labour monitoring systems. Activity-based

costing is mainly done by making use of a work break-down structure (Grandlich, 2004: online; Katz, 2002: online). The labour estimate is usually the basis for project performance monitoring.

The comparison of actual work hours expended, versus the estimated work hours and the development of a relationship between milestone goals, is a key tool in determining how much of the project is completed (Pickett & Elliott, 2007: EST.02.2). How much of the project has been expended to get to the current point and if there are any problems, what has to be worked on to overcome these problems? Most importantly, how will this affect the completion date and final costing?

As previously stated in this chapter, different indicators exist to indicate the performance of the project, such as the two provided below. Although these indicators can be used to track a complete project's progress, they can also be used to track portions of work.

CPI (cost performance indicator) = hours earned/hours expended (Patiro, 2007: online; Reh, 2008: online; Weber & Thomas, 2005: Paper presented by the Ivara Corporation).

and

SPI (schedule performance indicator) = hours earned/hours planned (Lipke, 2005: Unpublished paper presented by Lipke; Lipke & Henderson, 2006: 5).

In any event, if the value obtained in the above formulas is "one" or more than "one" it means that the project is on or ahead of cost and/or schedule (Humphreys, 1991: 501). A value below "one" will mean that this portion of work will need some attention to make it perform better. It is, however, important to note that should the critical path be behind schedule and all the other indicators are above "one", the project will still be in trouble and will finish late (Anonymous, 2008g: online).

Earlier in this chapter the summarised explanation of work sampling was mentioned. Work sampling entails the monitoring of time spent on a certain activity (Finlay *et al.,* 2006: 232). By making use of the unit cost per employee, work sample can be priced to determine the labour cost for the activity. These time studies and costs will then form part of a database to be used on future estimates. Frequent studying of the same type

of activity will lead to improved data which in turn will lead to improved estimates (Pickett & Elliott, 2007: EST02.2).

8.0 ENGINEERING AND DESIGN

Flemming and Koppelman (2009: 24) defined engineering as follows:

> *"Engineering is the discipline, art, skill and profession of acquiring and applying scientific, mathematical, economic, social, and practical knowledge, in order to design and build structures, machines, devices, systems, materials and processes."*

The success of a project is to a large extent dependent Houston-Gulf Coast Indices on the engineering done in the design of the project. Improved engineering is continuously required to be more competitive, especially in an increasing global market. Globalisation, according to Lucena (2006: 322), has caused trade barriers to fall away and adequate engineering is not enough anymore (Becker, 2006: 262). Engineering has to be such that it can compete internationally (Lucena, 2006: 322).

The new trend (or at least for the past couple of years) is to outsource the engineering effort to more experienced companies on a global playing field (Becker, 2006: 262). In the case of large firms with global offices the engineering can be kept within the boundaries of the firm's own experience, but the increasing level of technology and engineering involved in the construction of petrochemical plants necessitate the involvement of specialised firms (Lucena, 2006: 322).

8.1 Engineering and design of new processes and projects

The design of new processes and projects may take years to complete depending on the level of engineering required and the technology used. New technology requires more research and development, thus resulting in extended time frames. Anonymous (2007a: 30) refers for instance to the Pebble Bed nuclear power technology currently taking shape in South Africa. According to Anonymous (2007b: 545), Ireland is also investigating this technology.

8.1.1 Pure and applied research

In the petrochemical industry constant research is required to develop new or improved products. The results of such research will eventually lead to either alteration to existing plants to produce the improved products or the construction of new plants to introduce the new product in the market place. New products, improved products or more economic methods to put a specific product in the market, all have financial benefits to the developer. It is therefore a constant goal of the researcher to strive towards perfection in these fields.

Pure research is mostly undertaken by universities and institutes and does not produce a particular end product. It is therefore not applied with the aim to design a specific product but rather an investigation into the interaction between different chemicals, for instance.

8.1.2 Life cycles

The life cycle of a project will have significant influences on various aspects of the design of the project (Humphreys, 1991: 125; Sterner, 2000: 387; Life Cycle Costing, 2008a). Methodology and material are but two factors that will be involved in the extension of the life cycle of a project. Different parts of plants will also have different life spans (Flanagan & Norman, 1983: 12). The civil infrastructure, for instance, will have a far greater life span than some of the mechanical equipment.

The life cycle of a plant should be predetermined and incorporated in the design of the plant (Ashworth, 2004: 350). If the product of the plant will be obsolete in five years it will not make sense to construct a plant that has a life span of 30 years. The prediction of market conditions and the forecasting of market reactions to new products is a difficult process and in many cases go hand-in-hand with risk (Figure 2.17 and Figure 2.18). Newnan *et al*., (2004: 37) indicate that the time to consider all life cycle effects, and make design changes, is during the needs and conceptual/preliminary design phases.

A good example of market reaction to a product is the reaction from the public and concerned environmental groups to the proposed development of nuclear power plants in South Africa (Anonymous, 2007a: 13; Anonymous, 2007c: 141; Reina, 2006: 18). Many believe that these plants' advantages (Wicks, 2007: 37-38) will far exceed any

disadvantages (Anonymous, 2007d: 13; Tuffs, 2008: 13), but the resistance from society should be reduced to prevent future complications when funds might have been expended which might result in losses. A similar situation is currently being played out in the bio-fuels field in South Africa (Anonymous, 2006b: online; Anonymous, 2008c: online; Anonymous, 2008d: online; Creamer, 2008: online).

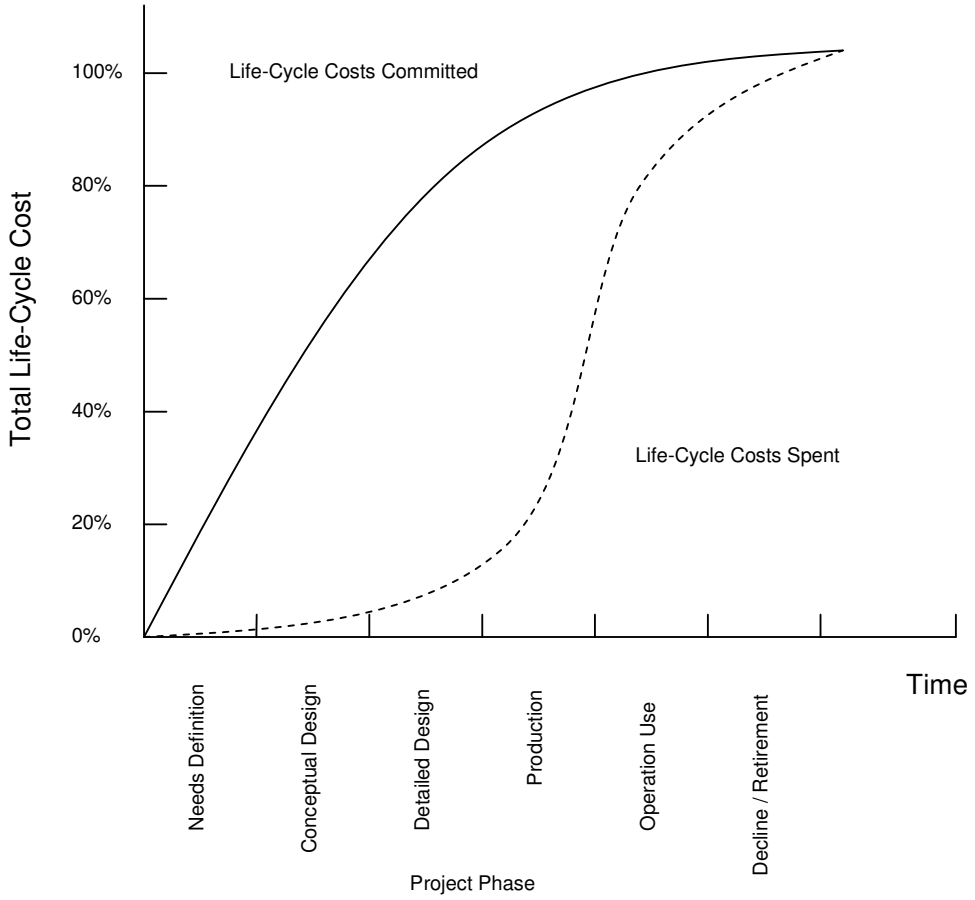


Figure 2.17: Cumulative life cycle costs committed and dollars spent

Source: Newnan *et al.*, 2004: 37

8.1.3 Computer aided design (CAD)

The engineering and design of plants is to a large degree dependent on computer aided design (CAD) or computer aided engineering (CAE) (Pratt, Anderson & Ranger, 2005: 1251). The inclusion of computers in the design of plants is, however, not a new trend and has been used for many years now (Karshenas, 2007: IT.06.1). New and improved software is constantly available in the market. This new software enables the

designer/engineer to improve his design and in most cases do it in less time which is always favourable (Pratt *et al*., 2005: 1252).

As previously mentioned, the globalisation of the construction industry and engineering is an increasingly popular method to construct plants (Becker, 2006: 262). The use of computers and computer aided design packages makes globalisation much easier (Anonymous, 2008b: 4). Electronic correspondence and interaction via the Internet makes distance between offices a minor inconvenience rather than a major obstacle (Shah, Jeon, Urban, Bliznakov & Rogers, 1996: 348).

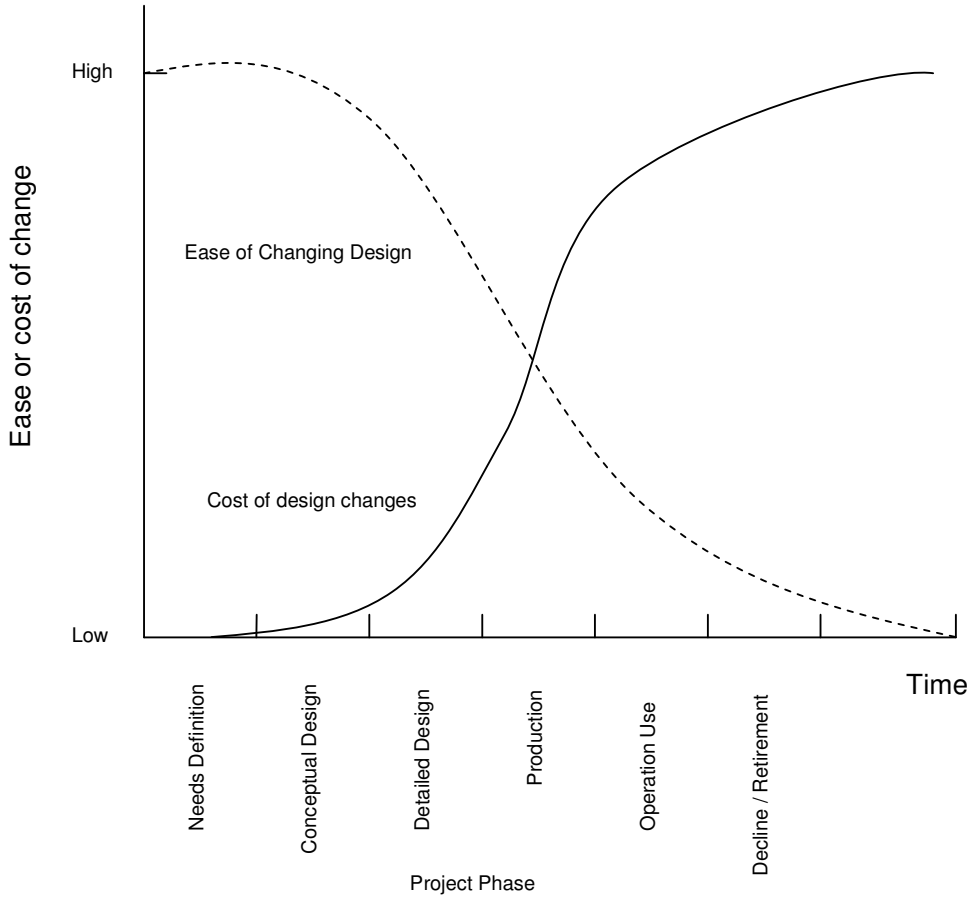


Figure 2.18: Life cycle design change cost and ease of change
Source: Newnan *et al*., 2004: 37

8.1.4 Prototype plants

Prototype plants or pilot plants are generally constructed in the event of new technology that needs to be tested before being put into action as a full-blown production plant (Voronin & Prokhorov, 1993). Prototype plants are expensive to build, but are cost-effective in the long run as savings are indirectly instigated in the construction of the production plants (Anonymous, 2008f: online). A prototype plant is generally a simulation of parts of the complete process or it can be a full small-scale plant built to function and operate as the production plant. Prototypes can either be actual small plants or computer simulations (Revkin, 2005: New York Times, 7 December 2005).

8.2 Project and process design

Peters *et al.,* (2003: 72) indicate that often in the process creation step, after elimination of the less profitable processes, several entirely different flow sheets for the manufacture of the same product can still be used. These processes must be compared in order to select the one that is best suited for the existing conditions. The availability and cost of several factors will lead to the best process being selected. These factors include the following:

- Technical factors.
- Raw materials.
- Waste products and by-products.
- Equipment.
- Plant location.
- Time factor.
- Process consideration.

The design team should never lose sight of the practical limitations involved in a design. It may be possible to determine an exact pipe diameter for an optimum economic design, but it does not imply that this exact size must be used in the final design. If the optimum diameter is something other than a stock size, it will in most cases be impractical to have this pipe purpose made and it will likely cost more.

The basis of an optimum economic design will be that, should there be two or more methods obtaining exactly equivalent final results, the preferred method is the one involving the least total cost. One typical example of an optimum economic design lies in determining the pipe diameter to use when pumping a given amount of fluid from one point to another. The same final result can be accomplished by using an infinite number of different pipe diameters. The pipe to be used should be the one leading to the least total cost. The total cost will be represented by the total of the cost for pumping and the cost to install the piping system. A graphical representation showing the meaning of an optimum piping design can be seen in Figure 2.19.

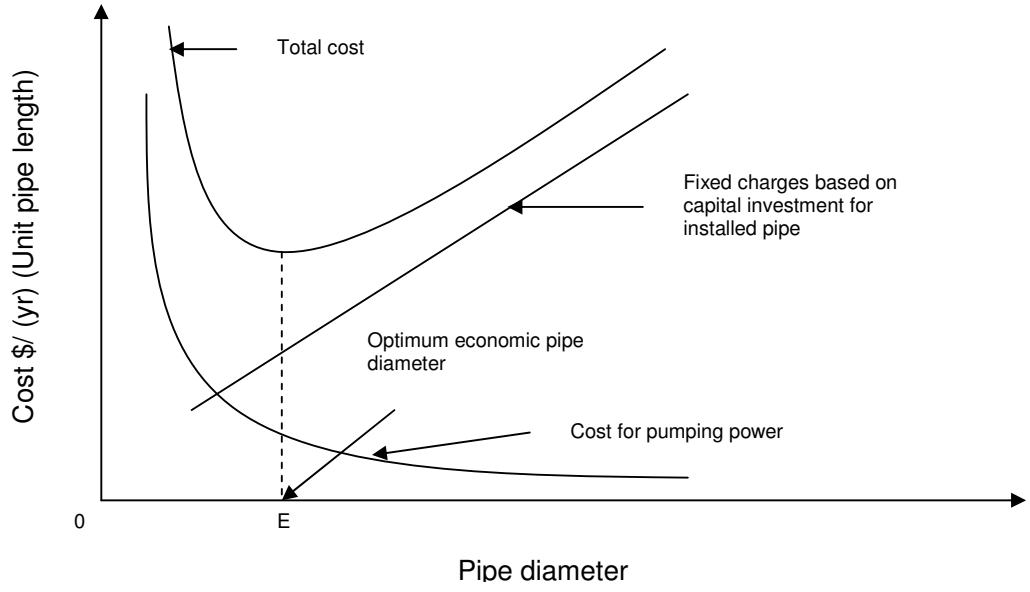


Figure 2.19: Optimum economic pipe diameter for a constant mass-throughput rate

Source: Peters *et al.*, 2003: 9

Payne (2007: CDR.03.1) refers to the implications of poor design documentation and how this may lead to claims from contractors.

8.2.1 Standardisation

Standardisation is an attempt to base designs, as a whole or in part, on similar designs. By doing this the availability of material, expertise, labour skills, etc. become more readily available, thus making the process more cost-effective. The inclusion of existing and tested technology into a new process or plant will also reduce the costs further in the sense that these portions of the plant will not have to be re-designed.

A good example might be found in the inclusion of diesel engines to drive pumps, compressors, etc. on a given plant. The output of one type of engine can, for instance, be changed by adding turbo chargers to the engines as to normally aspirated engines and by doing so altering the horse power output of the engine. Engine displacement can be varied by changing the stroke and holding the cylinder bore constant. In this example one type of engine is used in various functions on a particular plant. The advantage for plant maintenance is that engine parts will be similar on these engines resulting in a more simplistic maintenance programme, making it more cost-effective. The previously mentioned learning curve of labour craft (maintenance teams in this case) will also be improved by this procedure.

8.2.2 Process selection

Although process selection is not crucial to the costing of a project it will influence design which will ultimately influence the construction cost of the project. Process selection is normally driven by factors such as reliability, safety, environmental impact and economics. External factors such as current/future markets for products produced by the plant also plays a role, but will surface in the feasibility study (Peters *et al.*, 2003: 72).

8.2.3 Manufacturability

Design must not only focus on product design, but also on manufacturing the design. Manufacturability refers more to factory-based product manufacturing rather than project construction.

8.2.4 Constructability

Constructability, on the other hand, refers to the construction of a project (Anders & Lars, 2007: 113). The design may look good on paper and may work well in a simulation, but the practical construction of the design might pose problems. Opfer (2004: 5.4) describes constructability as the optimum use of construction knowledge and experience in planning, design, procurement, and field operations to achieve overall project objectives.

9.0 SUMMARY

Advances over the past two decades in the level of understanding of chemical principles and process plant design, combined with the availability of new techniques and computer-based tools, have led to an increased degree of sophistication that now can be applied to the design of chemical and bio-chemical processes.

In order to construct feasible plants, it is essential to understand the total cost control philosophy surrounding the construction of these plants. The development of a new process or plant from concept evaluation to profitable reality often is a very complex operation. Understanding the basis of the cost implications will enable the student of the economic principles surrounding plant feasibility and profit analysis, to grasp the importance of the relevant influences on these factors.

Muscianesi (2003: 2), Lukas (2006: EST.03.1) and Harbuck (2007: EST.16.1) indicate that at the beginning of a project, cost is the first concern. The estimator is selling his project price to his management (Postula, 2004: 1.1). In many cases, after this sale, costs drop to a much lower position on the project priority list. Other project commodities such as schedule (Aslaksen & Vigerust, 2007: RISK.02.1), safety (Tuffs, 2008: 13), constructability (Lam *et al*., 2007: 36), etc. then take precedence.

Scott (2006: New York Times, 16 June) indicates that in a highly competitive bidding market, and especially in an economic construction recession, project pricing is forced down by market conditions (Hill, 2006: 347). This and the current tendency of larger employers in South Africa to award contracts on a “lump sum” basis, shifts the importance of cost from the employer to the contractor (Van Niekerk, 2008: personal communication). This makes it even more important to understand cost and why it is important to control costs on any project (Patterson, 2006: IT.05.1; Lucas, 2007: OWN.05.1). Profit forecasting (DiMonica, 2006: 10) begins at project level (Tague & Morrison, 2007: 12).

Cost is the value of an activity or an asset (Azhar *et al*., n.d.: 1). Generally this value is determined by the cost of the resources that are expended to complete the activity or produce the asset. Resources utilised are categorised as material, labour, plant and indirect costs. Money and time are often considered to be resources but they only implement and/or constrain the use of the physical resources (Postula, 2004: 1.1).

To determine the cost of a plant or the proposed profitability of the plant, it will require getting involved in pricing the project. Pricing can be described as the process by which the cost of a project is established. It refers to a set of tools and techniques which can be used in the costing process. Some of these tools would include pricing strategies, sales and revenues, return on investment, return on sales and break-even analysis.

Material purchases form an approximate total of 60% to 80% of the total plant value – depending on the type of plant. It is therefore important to emphasise control over material. Materials are a key resource in almost any economic endeavour. Materials range from the simplest of raw materials to the most complex fabricated materials with a large range in between (Barlow, 2006: 10). In most projects, materials are a key element. There are isolated instances where no material will be used for certain portions or elements of a project, but in most cases the use of material will apply. Materials must be procured at the right time and at the right cost in proper amounts in order to lead to an efficient production process (Dobler *et al*., 1990: 35).

Current labour law and legislation, together with the human factor surrounding project execution, force the project team to consider the consequences of labour and human resource management. More and more human resource management activities are evaluated in economic terms (Ahn & McLean, 2006: 262). In the current climate of rising personnel costs, as well as rising costs for energy and raw materials, estimates of expected costs and benefits are expected (Buchner, 2007: 60).

Before the effect of material and labour can take effect on the total project cost, the project must be designed. The success of a project is to a large extent dependent on the engineering done in the design of the project. Improved engineering is continuously required to be more competitive, especially in an increasing global market. Globalisation, according to Lucena (2006: 322), has caused trade barriers to fall away and adequate engineering is no longer enough anymore, (Becker, 2006: 262). Engineering has to be such that it can compete internationally (Lucena, 2006: 322).

Taking a step backwards and looking at the complete scope of cost control philosophy one should realise that the very beginning of cost control starts with an estimate of some sort. All the aspects, as mentioned in this chapter, have to some extent an influence on the outcome of the estimate.

Estimating is the key to a successfully conceived, managed and completed project. Estimating is not limited to construction alone, but rather is a function common to a broad spectrum of projects whereby one desires to manage cost and time (Humphreys, 1991: 363). Understanding the accuracy limitations of the estimate and its potential variation is important for the user. Although the final test as to the validity of the estimate can come only when the complete plant has been put into operation, it is possible to make remarkably accurate estimates even before the final process design gives detailed specifications (Peters *et al.*, 2003: 6-7).

The basic essentials of cost estimating (Williams, 1996: 10), as well as the methodology of cost estimating (Brook, 2007: 66; Humphreys, 1991: 367), beg important answers which can lead a project to be a success or failure. For cost control to be effective and to have a good basis for financial reviews, it is very important to have accurate cost estimates. The following chapter will look into the general aspects surrounding cost estimating and will describe the importance of this tool to management.

CHAPTER 3

ESTIMATING IN CONSTRUCTION

1.0 INTRODUCTION

One of the most important tools of control during the course of a project is the cost estimate. All the elements that were discussed in the previous chapter surrounding cost control philosophy will become cost drivers in the cost estimate, whether it is a conceptual estimate or a detailed estimate.

Scope definition or project identification remains one of the most important factors in completing a project within budget and on schedule. Without a proper scope write-up, the estimator will not be able to clearly identify what needs to be included in the estimate and what not. Sharma and Lutchman (2006: EST.16.1) and Brook (2007: 91) suggest that as a project progresses through the various stages of the project cycle, cost estimation occurs as the project scope is “defined, modified and refined”. As the scope becomes clearer the cost estimation process becomes more finite and the range of estimation becomes tighter. It is in the implementation phase that specific scope definition gains greater importance in the cost estimation and scheduling process.

With scope definition comes several added advantages; in other words the clearly defined scope also adds value to the total construction process. Schedule time is brought down to a minimum because uncertainties are eliminated from the start. Rework is either removed from the construction cost, or at least minimised, so as not to cause unnecessary delays and further costs (Ciccarelli, 2004: CDR.11.02). Love and Li (2000: 480) point out that rework does not always constitute work that has to be redone due to poor workmanship. It can also be work that has to be redone due to changes, errors, omissions and quality failures. Abdul-Rathman, Thompson and Whyte (1996: 50) describe rework as the costliest of all mistakes.

When the scope is defined it can be categorised into a work breakdown structure (WBS). A work breakdown structure is a tree-like structure that permits summing of subordinate costs for tasks, materials, etc. into their successively higher “parent” tasks, materials, etc. (Gordon, 2008). For each element of the work breakdown structure, a description of the task to be performed is generated. A work breakdown structure

requires formal change control. This is another reason why a work breakdown structure should be outcome-orientated and not prescriptive of methods.

Scope definition is, as mentioned, the most important factor of estimate accuracy and the work breakdown structure can be useful in improving the estimate even further as well as in assisting in planning the project and auctioning important milestones. The cost estimate can be a useful tool throughout the project. Accuracy of the estimate is therefore important. Humphreys (1991: 368 - 369) stresses that different types of estimates have different levels of accuracy, depending on the purpose of the estimate. There are, however, external factors that may impede the accuracy of the estimate. Should these factors not be properly managed, it might lead to misconceptions later on during the lifespan of the project (Zastrozny, 1974: 16). The estimate purpose is, however, important and will also determine the type of estimate to use.

Uppal (2007: EST.03) refers to estimating as the key to successfully completing any project from conception through detailed engineering, construction and successful start-up. He warns, however, that estimating is an approximation procedure that provides answers with significantly less than 100 percent probability of being correct or even close. As previously mentioned in this chapter Uppal (2007: EST.03) also stresses the importance of scope definition before any estimate can begin.

The engineering construction sector employs different types of estimating models that provide improved answers and are industry specific. Dysert (2004: 9.4) points out that two main types of estimates are used in the engineering field and more specifically in the petrochemical industry. These are “conceptual” and “deterministic” estimating methodologies.

Conceptual estimating methods require a significant effort in data gathering and methods development before estimating preparation even begins. There is a significant effort in historical cost analysis to develop accurate factors and estimating algorithms to support conceptual estimating. Preparing the conceptual estimate itself takes relatively little time (Muscianesi, 2003: 2).

In contrast, a deterministic estimate (detailed estimate) requires much effort during the preparation of the estimate (Kwak & Watson, 2005: 1430). The evaluation and qualification of the project scope can take a significant amount of time (Sharma & Lutchman, 2006: 16.1). Research and application of accurate pricing information and

application of specific estimating judgements to the quantified scope can also add to this time-consuming process.

Different types of estimates should, however, be grouped together to enable the estimator and the rest of the team to announce their purpose of any given type of estimate. In other words the estimator should know, by classifying the estimate, to what degree of accuracy the estimate will have to be and also on what type of information the estimate will be based upon. Estimate classification is such a tool.

Liu and Zhu (2007: 93) and Aslaksen and Vigerust (2007: RISK.02.2) state that formal estimate classifications have been developed to establish a series of “gates” to allow the project team to better manage the estimate process. According to Molenaar (2005: 343), cost estimates should transparently convey the true nature of uncertainty involved in the project at each stage of the process. Estimating procedures must model both the technical and non-technical nature of the challenges in quantifying capital costs early in the project’s life cycle.

The type of estimate determines the clarification thereof, or vice versa. The estimate type is based on the level of detail that the estimator has at his disposal. Depending on the level of available information, the estimator will have to add allowances to the estimate for known and even unknown items, based on experience. Allowances are often included in an estimate to account for the predictable but indefinable costs associated with project scope. A way to include these allowances is by adding a contingency amount to the estimate total (Burroughs & Juntima, 2004: EST.03.1). Such a contingency is required because estimating is not an exact science.

The estimator’s experience has much to do with the allowances that will be added to the estimate (Dysert, 2004: 9.27). The estimate accuracy is therefore dependent (at least to some extent) on the accuracy of the calculation of the allowances. As expected, estimate accuracy tends to improve (i.e. the range of probable values narrows) as the level of project definition improves. Part of improving the estimate accuracy will also be to ensure that the estimate is representative of the complete scope of work. This is mostly done by the estimator in conjunction with management and is known as the estimate review.

The estimate is a prediction of the expected final cost of a proposed project. By its very nature, an estimate is associated with uncertainty and is therefore also associated with

the probability of overrunning or under-running of the predicted cost (Dysert, 2004: 9.27). Leo and Knotowicz (2005: EST.05.1) point out that many companies do not necessarily rely on in-house estimating practices or services. Businesses' estimates are generated by a variety of sources. Some are done by centralised in-house estimating groups, others by groups at a business' international site, or by an array of contractors. Furthermore, estimates are generated in a variety of formats with a great degree of variability with regards to detail and clarity (Sonmez, 2005: EST.07.1).

The need for standardised estimating requirements to put a review process in place has long been realised. By doing so the project team can review the project deliverables and estimated costs before the project is approved for execution. Estimates are checked to make sure that they are complete, accurate and generally ready to use as a project controls baseline.

2.0 REQUIREMENTS FOR AND AIDS TO ESTIMATING

2.1 Scope definition or project identification

Song and AbouRizk (2005: 362) loosely describe project scope as the quantities of construction items within each labour discipline that can be easily measured, such as volume of earth hauled (Son, Mattila & Myers, 2005: 303), concrete poured or the length of pipe installed. This definition is improved upon by Sharma and Lutchman (2006: EST.16.1). Humphreys (1991: 367) also engages in defining scope. These authors' findings are noted in this chapter.

Scope definition or project identification remains one of the most important factors in completing a project within budget and on schedule (Song & AbouRizk, 2005: 361). This is due to the fact that the project scope definition is the reference point for developing estimates and schedules, coordinating teamwork, applying control strategies and evaluating engineering performance. Zastrozny (1974: 3), Love (2002: 138) and Love, Mandal, Smith and Li (2000: 567) stress these points and refer to the importance of scope definition in general. Sharma and Lutchman (2006: EST.16.1) and Alani and Khosrowshahi (2007: 36) refer to the current competitive global environment and point out that the challenge for project leadership is to deliver projects on schedule and within budget. Love and Li (2000: 479) and Sharma and Lutchman (2006: EST.16.1) state that properly planned and phased developmental projects generally

reduce problems associated with project execution and interface connections during expansion of an operating facility or additions to an existing operating facility.

On the other hand, when older facilities are upgraded to facilitate new technologies, or expanded to take advantage of market opportunities, poor planning and a poorly defined work scope can make the task of the project team almost impossible (Coleman, 2006). Moreover, a poorly defined scope and scope changes during project execution can result in significant budget cost overruns, delayed schedules (Hollmann, 2007b: 8), poor work morale, more conflict between procurement contractors (EPC) and owners, and more incidents.

Sharma and Lutchman (2006: EST.16.1) define project scope definition as follows:

> "*Project scope definition is that stage of the project where risks associated with the project are analysed, early designs are formulated, critical decisions are made and the specific project execution approach is defined."*

Humphreys (1991: 367) defines scope of work as follows:

> "*Total work to be accomplished and administrative requirements associated with a contract as described within the contract documents, which may include the general conditions, special conditions, specifications, drawings and addenda."*

Sharma and Lutchman (2006: EST.16.1) and Brook (2007: 91) also suggest that as a project progresses through the various stages of the project cycle, cost estimation occurs as the project scope is "defined, modified and refined." As the scope becomes clearer the cost estimation process becomes more finite and the range of estimation becomes tighter. It is in the implementation phase that specific scope definition takes greater importance in the cost estimation and scheduling process (McCuen, 2008: BIM.01.6). Properly defining the scope of the project and maintaining a strong resistance to what might be considered scope creep (additional work not originally defined in the scope), helps in maintaining schedule delivery within budget. Snedaker (2006) has similar views on the negative impact of scope creep.

Phua and Rowlinson (2004: 48) state that in project management scope definition includes equipment and material to be provided as well as work to be done and is documented by the contract parameters for a project to be completed by a service provider. Sharma and Lutchman (2006: EST.16.1) argue that in its simplified form, scope definition refers to accurately defining the boundaries of the project, defining the resources to complete the work, ensuring all stakeholders are properly informed and have agreed on the task to complete and risks are identified and analysed, and mitigating actions defined. Advantages of scope definition can be summarised as follows:

- With properly defined scopes, there is a higher labour productivity during the implementation or execution of the scoped tasks (Whiteside, 2006: EST.08.3).
- Scope definition allows for clearly defined and planned-for interface requirement thereby facilitating easier execution.
- A properly defined scope generates cost savings from material management, interface management and a reduction of production losses for tie-ins on live facilities (Anonymous, 2008j and McCuen, 2008: BIM.01.6).
- Properly conducted scope definition with stakeholder involvement results in reduced instances of overlooked obstacles during the execution stage (Al-Duaij, Awida & Kollarayam, 2007: 24).
- There are fewer incidents and accidents during the execution stage of the project. There exists ample proof of poor planning leading to incidents in construction. Rashbaum, (2008a: New York Times, 24 September 2008), Rashbaum, (2008b: New York Times, 19 September 2008), Rashbaum, (2008c: New York Times, 16 September 2008), O'Connor, (2008: New York Times, 12 September 2008) and Lee, (2008: New York Times, 12 September 2008) all elaborate on incidents on construction sites in recent history that occurred only in New York.
- Conflicts are reduced and significantly less time is spent amongst stakeholders resolving discrepancies.

Scope definition is arguably the single most important cost driver that influences the ability to forecast project cost (Sharma & Lutchman, 2006: EST.16.1). When the scope is being defined, the aim is to better the engineering, cost forecasting in work

packages and management of change, quality and timing of information. Sharma and Lutchman (2006: EST.16.1) state that project scope evolves across the various stages of the project cycle. During the implementation and control phase of the project cycle, the level of scope definition is most useful in assisting the project team in managing both cost and schedule. Figure 3.1 illustrates the project cycle.

The scope statement is the document basis for making project decisions. This is important to have a common understanding of a project amongst the team members. The scope statement can be revised or refined as the project evolves (Song & AbouRizk, 2005: 362). The scope write-up generally comprises or refers to the following components:

- Project justification: The project justification encapsulates the business need for undertaking the project while providing a basis for future trade-offs.
- Project product: This section summarises the product description which is a compilation of characteristics of product or service to be created upon completion of the project.
- Project deliverables: Project deliverables refer to a list of finished products to be delivered by the service provider (contractor) upon full implementation and execution of the project.
- Project objectives: The project objectives define quantifiable criteria that must be met for the project to be considered successfully completed.

Table 3.1 shows stakeholders classified into two categories. Parties involved in scope definition can either be internally or externally involved. Involvement of both groups is essential to effective scope definition. Interfacing between these parties is essential – especially when designing a green field project. The uninformed observer might think that it will be unnecessary to involve all parties stated in Table 3.1. Concerns are raised when all parties are involved that the project will not be finished in time and that it might lead to cost loading.

Sharma and Lutchman (2006: EST.16.3) advise that when all parties are included in the project team (particularly during the project definition), an agreed-to project execution plan is developed that should minimise the potential for changes being introduced during detailed engineering and construction. Further advantages include continuation of the team raising productivity, reduction of potential scope changes and

associated negative externalities during the implementation and control stage of the cycle (Berg & Hinze, 2005: 830).

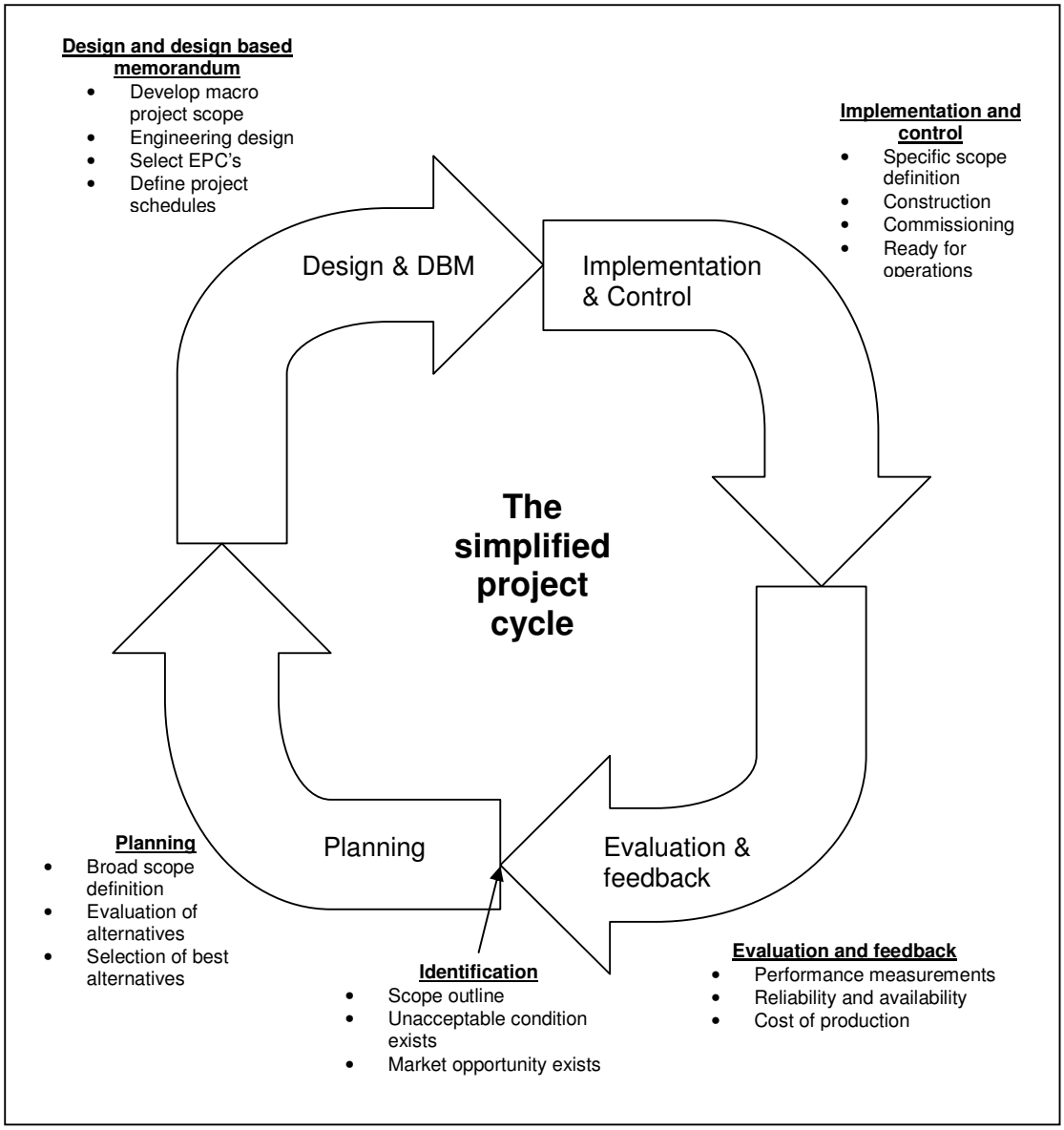


Figure 3.1: The simplified project cycle

Source: Sharma and Lutchman, 2006: EST.16.2

Ultimately, a clearly defined scope with joint internal and external stakeholder involvement, aligned interpretation of scope and a common vision among all stakeholders creates opportunities for project implementation and execution that minimises stakeholder value and avoids costly budget overruns and project delays (Shi, Cheung & Arditi, 2001: 63).

Internal to the organisation	External to the organisation
Leaders	
End users	Engineering and procurement contractors
Support services (maintenance and accounting, etc.)	Suppliers
Planner and business analysts	Consumers
Project management team	Special interest and lobby groups
Engineering team and disciplines	Regulatory bodies
Loss management and safety advisors	

Table 3.1: Classification of stakeholders

Source: Sharma and Lutchman, 2006: EST.16.3

Project scope management should also be considered as key in controlling changes on the project. Song and AbouRizk (2005: 360) indicate that scope management is critical to the success of the project. They summarise the scope management process in the following key words: involving, initiation, scope planning, scope definition, scope verification, and scope change control.

2.2 Scope factors contributing to cost overruns and delayed schedules

Poor scope definition has led to significant cost overruns on many projects in the past (Hanvey, 2008; Anonymous, 2008i). While in no way exhaustive, common causes identified where scope definition is involved as precursors for cost overruns and schedule delays include the following:

- Grey areas up to interpretation by service providers (contractors).
- Incomplete scope definition of overlooked elements of the scope.
- The need for rework.
- Concurrent work and risk management.
- Poor interface definition and preparation.
- Scope expansion and scope changes.

2.2.1 Grey areas up to interpretation by service providers

Generally, activities that are small in value and repetitive in nature lend themselves easily to poor scope definition (Bowen, Pearl, Cattell, Hunter & Kelly, 2007: 59). Often the project team decides that it is not worth incurring engineering hours on defining the scope of such small activities, leaving it up to interpretation by the service providers. Sharma and Lutchman (2006: EST.16.4) explain this phenomena by means of a project to increase oil and gas operations which went wrong due to poor scope definition. The running of electrical cables was limited to generic wording such as “run cables from substation to pump motors in tray baskets”. Lack of details surrounding the cable route and cable tray usage left scope interpretation open to the contractor to maximise returns from this project. The unintended consequence of such omission is a loading of small cost to the project which over time, if undetected, can result in significant cost overruns.

2.2.2 Incomplete scope definition of overlooked elements of the scope

Incidents of incomplete scope definition are very common when end users are not consulted or involved in defining the scope of the project. End user involvement should begin very early in the project cycle. End users continually identify opportunities for upgrades and repairs in an existing facility that can be easily executed during project expansion work (Vianna & Teles, 2008: EST.11.1).

Another factor that can fall within this category occurs when owners attempt to fast track a project. Fast tracking a project can save a great deal of time and money when implemented judiciously (Sappe, 2007: 21). On the other hand, it can be akin to a blank cheque to contractors when the scope is not properly defined; which normally is the case in fast track contracting. A typical example is when drawings, which have not undergone all reviews, are provided to vendors for pricing purposes. This approach can expedite the procurement process; however, changes during the review process almost always lead to changes in scope. This will invariably lead to cost increases during the construction phase.

2.2.3 The need for rework

Love and Smith (2003: 147-148) define rework as:

> *"…the process by which an item is made to conform to the original requirement by completion or correction."*

They also comment on the definition of rework as provided by The Australian Construction Industry Development Agency (CIDA). CIDA define rework as:

> *"…doing something at least one extra time due to non-conformance to requirements."*

Ashford (1992: 12) also includes repairs as a form of rework. He defines a repair as follows:

> *"…the process of restoring a nonconforming characteristic to an acceptable condition even though the item may still not conform to the original requirement."*

Love and Li (2000: 480) point out that rework does not always constitute work that has to be redone due to poor workmanship. It can also be work that has to be redone due to changes, errors, omissions and quality failures. The Building Research Establishment (BRE) in the United Kingdom found that 50% of all errors in construction had their origin in the design stage and 40% in the construction stage (Love & Smith, 2003: 147-148). The BRE concluded that the biggest culprits in rework in design were the lack of coordination of design and unclear or missing documentation. Love and Smith (2003: 148) suggest that, based on research conducted by Cnudde, a rework factor of up to 10% of the contract value can be experienced on projects with poor quality control.

Love and Smith (2003: 148) reported that a major Australian construction company had experienced rework costs of 5% of the contract value in one project that were attributable to poor documentation by the design team; furthermore, the subcontractor in question experienced a 31% cost increase. Love and Smith (2003: 149) also proved through their research that the cost to rectify a poor quality product or service can be more than eight times the original cost. Costs due to rework in a specific sector of the Swedish construction industry ranged from 2,2% to 9,0% of the contract value. Of this 50% originated from site and 32% was due to the client or design inconsistencies. Love, Smith and Li (1999: 638) point out that in the Australian context "… it is suggested that most organisations have learnt to accept it as part of their operations,

inasmuch as they have not realised its true extent or its influence on their own and a project's performance."

Anonymous (2006c) describes rework as the costliest of all field mistakes. Love and Sohall (2003: 330) comment on the capturing of rework costs. When scope is poorly defined, it is not uncommon for the completed product to be unable to fulfil the goal it was initially intended for. In such cases, rework is required after the final product is tested and found unsuitable for addressing the concerns or opportunities initially identified. Love (2002: 139) states that the outcome of rework is always unintended expenditures and costly delays. Rework can also result from damage incurred after the project is completed and before it has been energised (Love *et al.,* 2000: 568). In most cases this form of rework results in minor costs.

Sharma and Lutchman (2006: EST.16.5) illustrate, by means of an example, a typical poor engineering design that resulted in rework. A sub-project of electronic data collection in an industrial environment by means of hand held computers resulted in rework. The idea to use hand held computers was not communicated in the scope write-up before the project started. The project team failed to consider the physical size of these computers and the impact it would have on the operators during the conduct of their duties, such as climbing cat ladders at elevated heights at -25°C while wearing protective gloves. Poor data collection resulted in a costly hardware change to ensure that the correct data was collected.

Efforts to reduce failures in construction projects by studying their causes have led to a meaningful reduction in occurrences (Love & Josephson, 2004: 70). The same authors point out that the main causes of rework in construction can be attributed to human error. Love & Josephson (2004: 70) state that a plethora of human errors have been reported in the popular press. The Swedish newspaper, *Göteborgs-Posten*, for example reported on the error that resulted in a section of the Chalmers Tunnel not following the correct profile. The error occurred in the data input phase of the design of the tunnel. Love and Josephson (2004: 70) suggest that errors can essentially be avoided by eliminating the root causes using techniques embedded in the philosophy of total quality management, e.g. root cause analysis and failure mode effect analysis.

Figure 3.2 illustrates the chain of events from the cause of the error to the corrective measure. The causes of errors are often difficult to determine because there can be several apparent causes for the same erroneous action. Identifying the root cause of

an error and altering this cause will have the effect that the recurrence of the error can be prevented. Figure 3.3 demonstrates the tracing of apparent and root causes of errors.

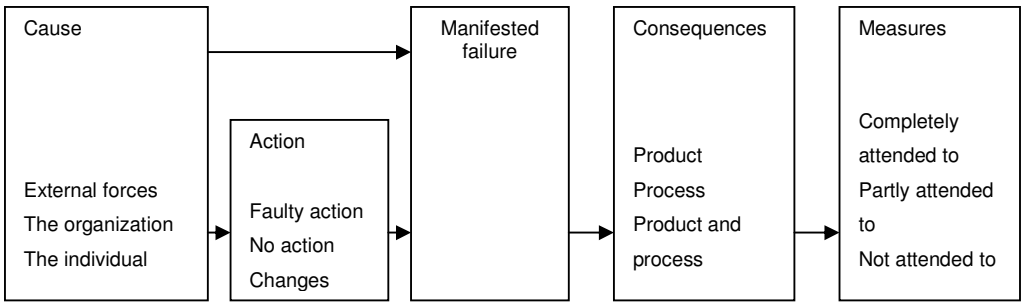


Figure 3.2: Chain of events model

Source: Love and Josephson, 2004: 71

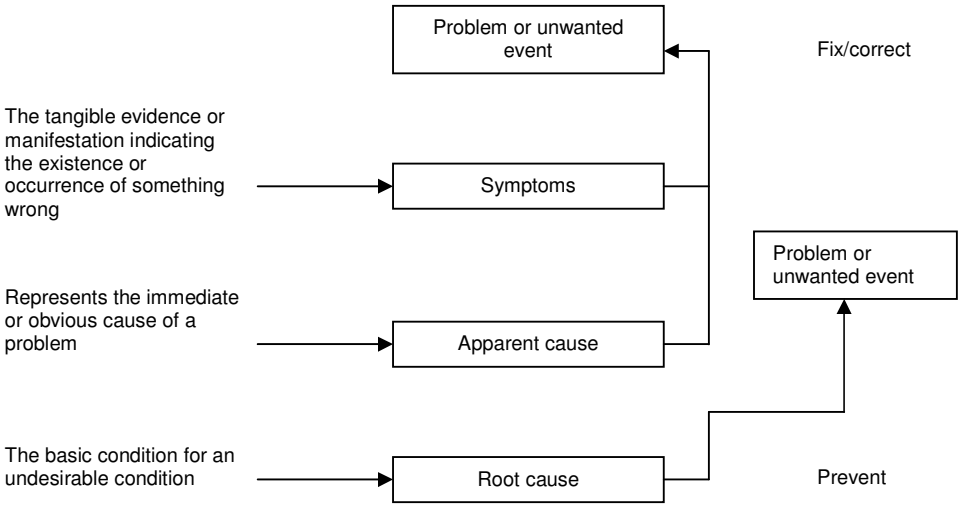


Figure 3.3: Apparent and root causes of errors

Source: Love and Josephson, 2004: 71

Love and Edwards (2004: 261) indicate by means of Figure 3.4 the determinants of rework.

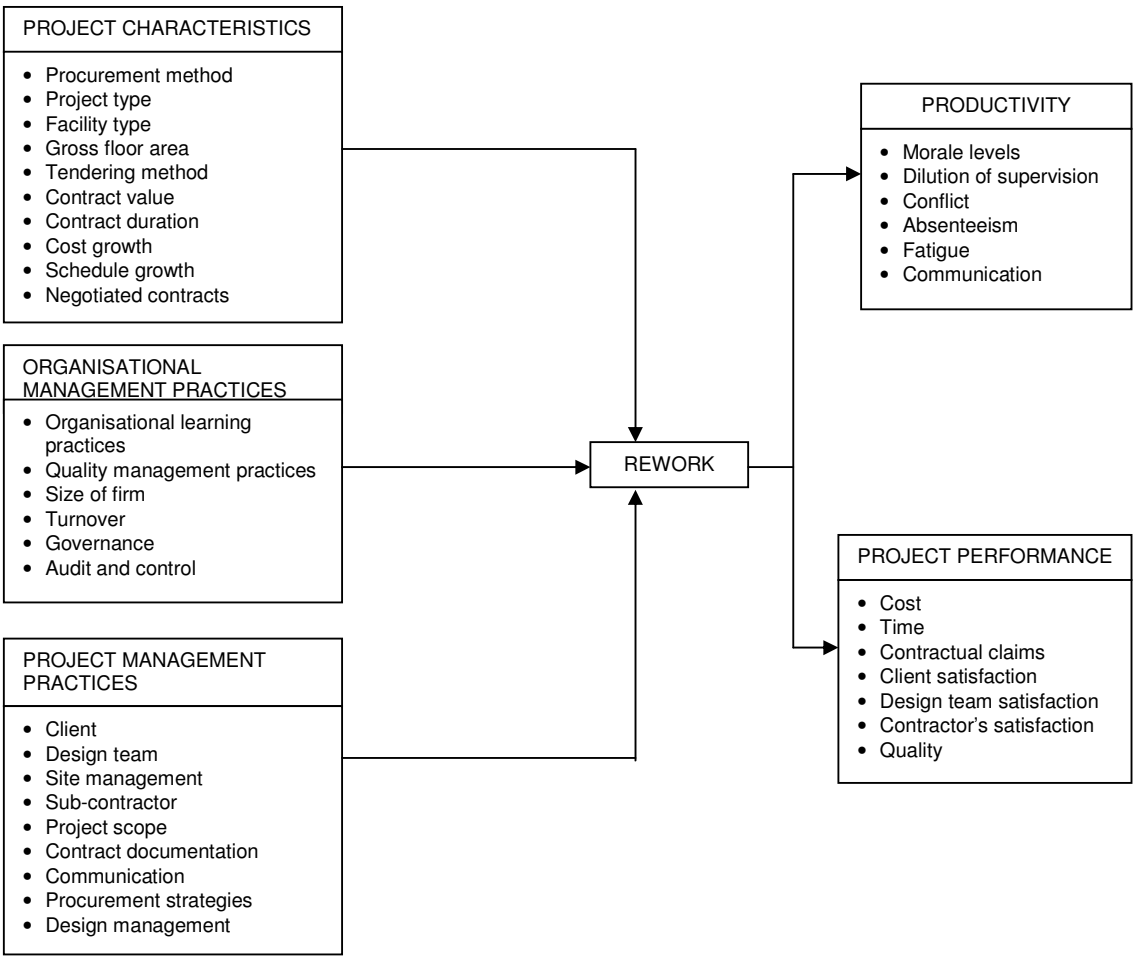


Figure 3.4: Conceptual model of rework determinants

Source: Love and Edwards, 2004: 261

2.2.4 Concurrent work and risk management

Snedaker (2006) points out that changes to the scope can either be managed or unmanaged. The amount of unplanned concurrent work to be undertaken during the implementation stage, not included in the scope definition, holds significant implications for the project cost and schedule delivery. This is particularly important for expansion of live facilities where continuous operation is occurring on the same site on which construction activities are taking place. Unplanned and unmitigated risks from overhead lifting, for instance, may result in increasing cost and schedule delays (Bradshaw & Gruber, 2007: PM.09.4).

Aslaksen and Vigerust (2007: RISK.02.2) researched the Ormen Lange Project in Sweden. They found that there are six steps in the risk management process, which can be described as follows:

- Preparation for risk management
- Identify risks
- Evaluate risks
- Develop action plans
- Respond to risks
- Risk communication

Figure 3.5 illustrates the process of risk management. Aslaksen and Vigerust (2007: RISK.02.2) elaborate on the mitigation of risk in construction and describe the procedure used in the Ormen Lange Project. A risk register is maintained. When performing cost risk analysis (CRA) or schedule risk analysis (SRA), the risk register is evaluated according to each area. Relevant risks from the register are either used as a basis for maximum or minimum values or incorporated as separate events/activities in the analysis.

Lofton and Coppo (2007: RISK.05.1) stated that proper risk analysis should identify the following:

- Cost risk: An additional value to a quantity or cost uncertainty or an event which will occur with a certain probability, and which will have a certain cost and/or schedule impact if it occurs.
- Schedule risk: An activity with uncertainty. An additional cost or time to oblige for the mitigating actions has to be agreed on.

More information will follow in this study regarding risk management in construction.

2.2.5 Poor interface definition and preparation

The scope of work should be clearly defined especially where there are interfaces between different disciplines or different systems (Anonymous, 2008i). Scope definition should also address the risks and mitigation plans for live and new systems during interface management and preparation. A typical example of interface management

between disciplines occurs when defining boundaries for instrumentation and communication cables (Motlong, 2008: Financial Mail – 12 September) that reside within the scope definition of electrical work. Sharma and Lutchman (2006: EST.16.5) refer to another example of poor scope planning whereby a cogeneration facility was to be integrated with a commercial steady state oil and gas operation, which resulted in several unplanned shut downs and unnecessary costs.

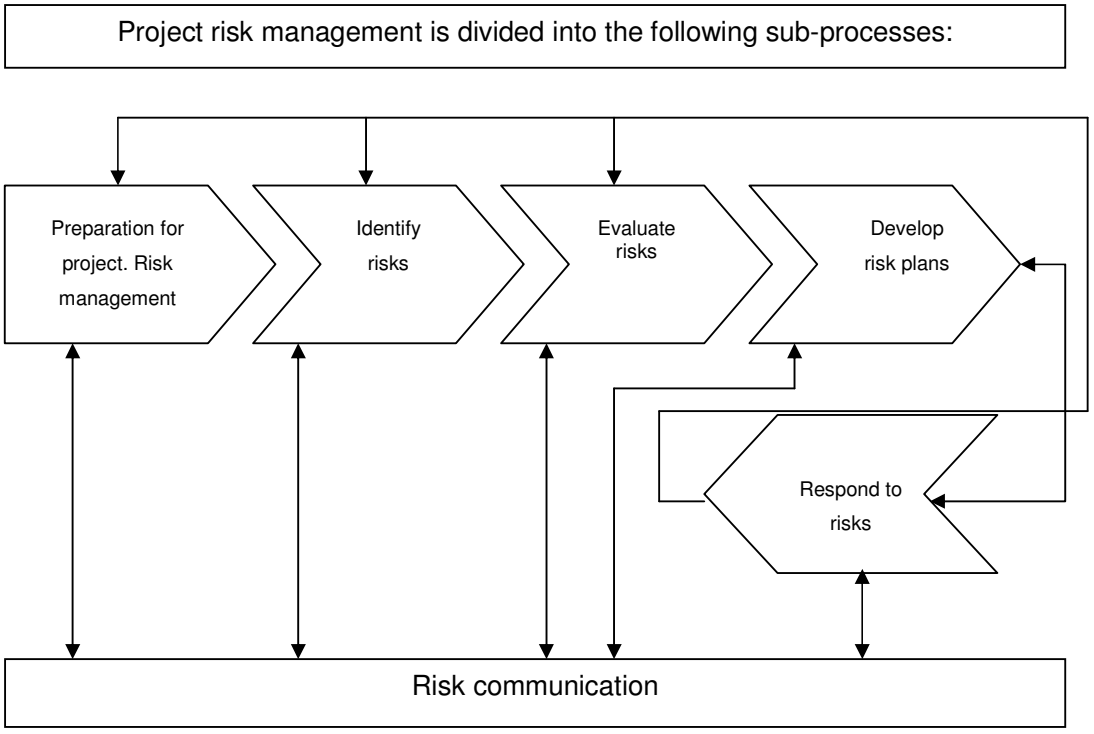


Figure 3.5 Risk management process
Source: Aslaksen and Vigerust, 2007: RISK.02.2

2.2.6 Scope expansion and scope changes

Anonymous (2008k) comments that major scope expansions or changes do impact the project because they are normally identified by the project controls team and are filtered out for proper sequencing and actions. Small scope changes and expansions are often referred to as scope creep. These changes are within the project team's capabilities to execute, but can result in a significant cost increase (Al-Duaij, Awida & Kollarayam, 2007: 23).

Barlow (2006:12) reports (as mentioned in Chapter 2) that the cost implications of material specification change increase dramatically as the project progresses. Early changes are therefore much cheaper. Sullivan (2008) expands this philosophy and illustrates this chain of thinking in total scope change. The earlier a change to the scope is made in the life of the project, the less effect it will have on the schedule. Figure 3.6 sketches a graphic explanation of this statement.

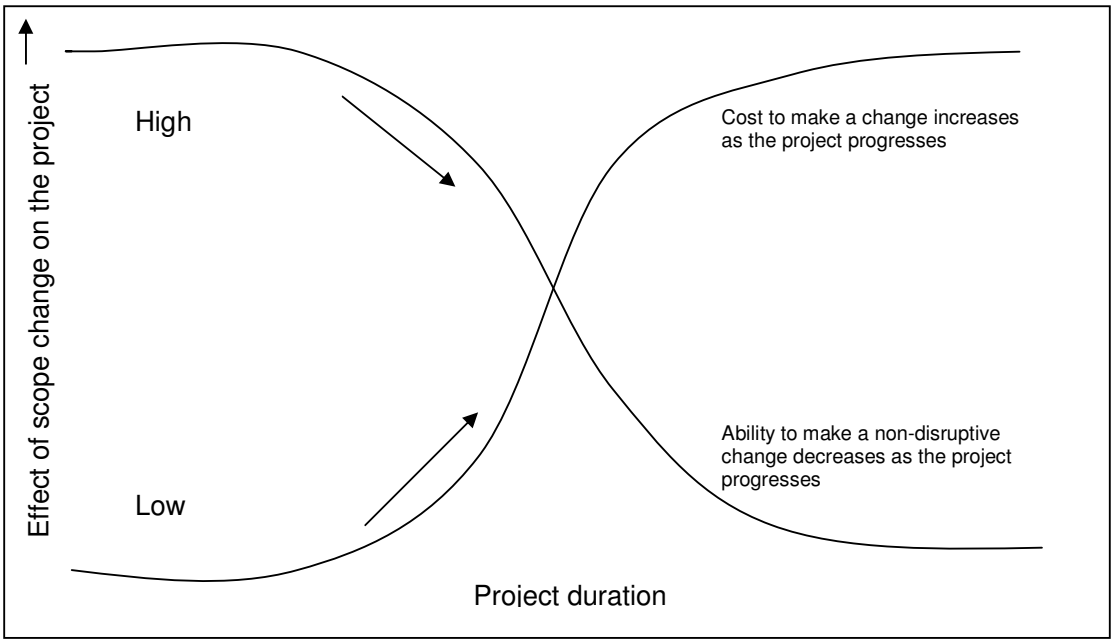


Figure 3.6 Effect of scope change on the project schedule
Source: Sullivan, 2008

Sullivan (2008) proposes creative strategies to deal with change without incurring unnecessary delays and additional costs. Polaski and Horman (2005: 1276) point out that these strategies are similar to value engineering whereby the parties involved scrutinise the design and look for items that can be deleted or modified to make the project more cost-effective (Shengping & Tiong, 2004: INT.08.1). Figure 3.7 illustrates this process.

3.0 WORK BREAKDOWN STRUCTURE

Phillips (2005) probably offers the best definition of what a work breakdown structure is. He states:

"A work breakdown structure (WBS) is a deliverables-orientated decomposition of the project. It is not the activities needed to create the project deliverables; it is the outcome that the activities create."

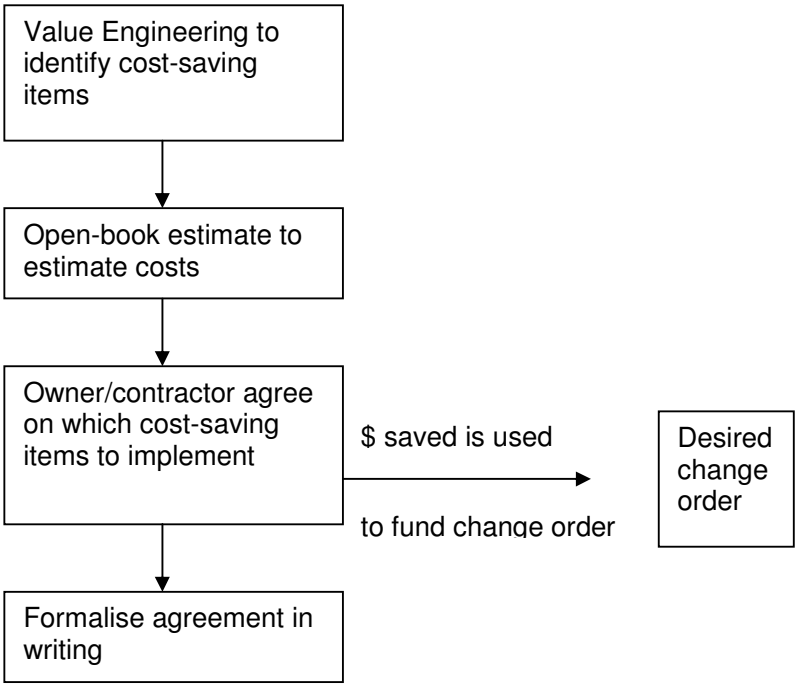


Figure 3.7 Basic process of creative thinking in change order management

Source: Sullivan, 2008

A work breakdown structure is a tree-like structure that permits summing of subordinate costs for tasks, materials, etc. into their successively higher "parent" tasks, materials, etc. (Gordon, 2008). For each element of the work breakdown structure, a description of the task to be performed is generated. A work breakdown structure is organised around the primary products of the project, (Biffi, 2008). As previously stated this means that the work breakdown structure is organised around the planned outcomes rather than planned actions (Kauffmann, Keating & Considine, 2002: 13).

These tasks or "work packages" are described by Humphreys (1991: 471) as follows:

"A work package is a well-defined scope of work that terminates in a deliverable product(s) or completion of a service. Each package may vary in size, but each must be a measurable and controllable unit of work to be performed."

3.1 History of the work breakdown structure

The concept of the work breakdown structure developed with the Program Evaluation and Review Technique (PERT) in the United States Department of Defence (Anonymous, 2008l). PERT was introduced in the United States of America's Navy in 1957 to support the development of the Polaris missile program. By June 1962 the United States of America's Department of Defence, NASA and the aerospace industry published a guidance document for the PERT cost system which included an extensive description of the work breakdown approach. In 1968 the Department of Defence issued Work Breakdown Structures for Defence Material Items (MIL-STD-881), a military standard mandating the use of work breakdown structures across the Department of Defence. This document has been revised several times, most recently in 2005.

In 1987 the Project Management Institute (PMI) documented the expansion of these techniques across non-defence organisations (Anonymous, 2008m). The Project Management Body of Knowledge (PMBOK) Guide provides an overview of the WBS concept, while the Practice Standard for Work Breakdown Structures is comparable to the Department of Defence Handbook, but is intended for more general use.

3.2 Planned outcomes, not planned actions

Billows (2008a) indicates that the work breakdown structure should include 100% of the work defined by the project scope and should capture all deliverables – internal, external, interim – in terms of the work to be completed, including project management. This "rule" is referred to as the "100% rule" and is one of the most important principles in guiding the development, decomposition and evaluation of the work breakdown structure (Anonymous, 2008l). The rule applies at all levels within the hierarchy: the sum of the work at "child" level must equal 100% of the work at "parent" level and the work breakdown structure should not include any work that falls outside the actual scope of the project.

Should the work breakdown structure designer attempt to capture any action-orientated details, he will likely include either too many actions or too few (Billows, 2008b). This will have the effect that the complete "parent" scope will not be addressed. Figure 3.8 shows an example of a typical simplified work breakdown structure for an aircraft system.

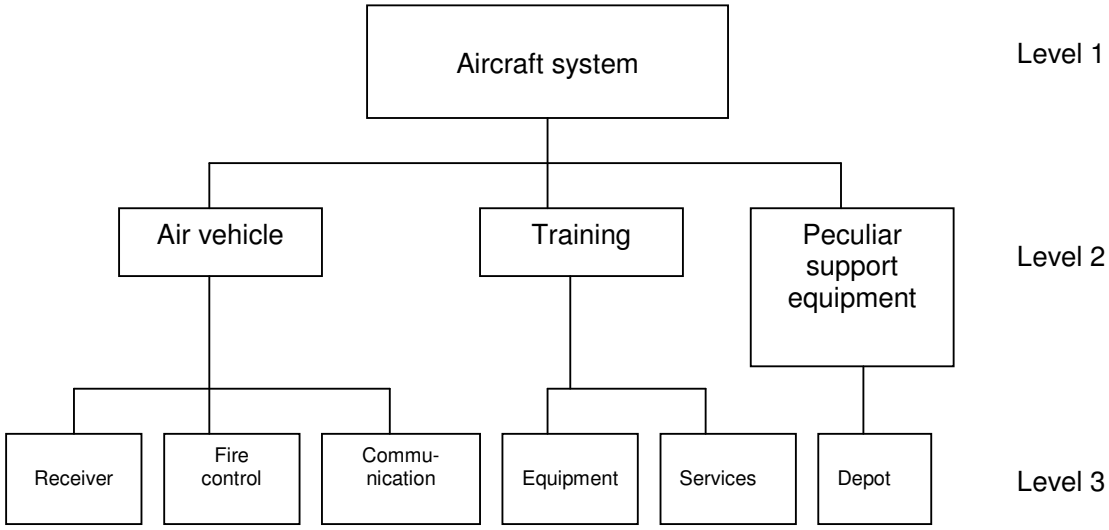


Figure 3.8 Work breakdown structure of an aircraft system

Source: Anonymous, 2008l

3.3 Common pitfalls and misconceptions

Anonymous (2008l) notes that a work breakdown structure is not an exhaustive list of work. Instead it is a comprehensive classification of project scope. It is also not a project plan or a project schedule and it is not a chronological listing. According to Mathis (2008) and Gordon (2008), it is considered to be poor practice to construct a project schedule before designing a proper work breakdown structure. The work breakdown structure is not an organisational hierarchy and it should not shadow the organisational chart.

A work breakdown structure requires formal change control. This is another reason why a work breakdown structure should be outcome-orientated and not prescriptive of methods (Anonymous, 2008l). Methods change frequently, but changes in planned outcomes require a higher degree of formality. If outcomes and actions are blended, changes control may be too rigid for actions and too informal for outcomes (Anonymous, 2008n).

4.0 INFLUENCES ON ESTIMATE ACCURACY

Humphreys (1991: 368 - 369) emphasises that different types of estimates have different levels of accuracy; depending on the purpose of the estimate. There are, however, external factors that may impede on the accuracy of the estimate (Prince,

2002: 10). Should these factors not be properly managed, it might lead to misconceptions later on during the lifespan of the project (Zastrozny, 1974: 16).

4.1 Economic climate change in construction

The economic climate in countries worldwide is ever changing. Different factors effect the economic situation. The construction industry is also affected by the greater local economics and the international economic scene. Ample examples exist of the current international occurrences that have significant effects on the world economy. Moola (2008: Financial Mail – 15 August) describes the economic growth in China. Zou and Wong (2008: 279) also depict the current economic situation in China. Klopper (2008: Radio broadcast 21 November) states that America's prime lending rate is 0,01%, which results in a 10 cent return per annum for every $100 lent. Staff reporter (2008: Accessed 21 November), Buffet, (2008: Accessed 21 November), Schoen, (2008: Accessed 21 November) and Austin (2008: Accessed 21 November) all comment on the current American economy and how it influences the world economy. Benjamin (2008: Accessed 21 November) and Laubscher (2008: Accessed 21 November) elaborate on the current South African economy, while Anonymous (2008u: Accessed 21 November) reports on the possibilities of normalising the Zimbabwean economy.

Anonymous (2008o: 6) describes how the recent recession in the United States and the stagnation in Japan caused major difficulties for construction companies worldwide. Vinci remained the world's top contractor for 2007 and French company Bouygues remained in second place, but the rest of the competition was completely reshuffled. Hazelton (2008: 16) reports on the European situation and states that the construction industry will be dragged into a mild recession for the next two years because of the world economic situation.

Rameezdeen and Ramachandra (2008: 499) draw parallels between a country's economy and its construction sector. In fact, the industry first affected by any country's economy is the construction industry. Rameezdeen and Ramachandra (2008: 499 - 500) researched the current situation in Sri-Lanka where they found that the effects of economic change had almost immediate impact on the local construction industry. Construction plays an important role in economic development. Wong, Chiang and Ng (2008: 824) describe, by means of empirical research, the complexity and similarities between the Hong Kong economy and its construction industry. Hua (2008: 485) indicates the complexity of the construction industry and how the economy can

influence the industry, while Jha and Devaya (2008: 337) report on the small percentage of the international construction market that India manages, but how even this small percentage (0,05% of $3 to 4 trillion) has a positive effect on the Indian economy.

According to Johnson (2007: 30), the consumption and availability of resources such as fuel and electricity also play a role in the economic climate of a country and ultimately on construction costs. Jacobson and McLay (2006: 308) report on the effect of fuel consumption on the economy. Parry (2008: Financial Mail. 29 August 2008) also comments on the price fluctuations in crude oil and how this impact on the economy. Lünsche (2004: Financial Mail. 10 December 2004) shows the possible effects of electricity supply on the economy. Anonymous (2008q: 10) reflects the effects of the price of steel on the different industries in America. The economy in the United Kingdom has influenced the construction business to such an extent that brick manufacturing is at its lowest level in 60 years (Anonymous, 2008t: 5).

The overall state of the economy and ultimately the construction industry is influenced by the above-mentioned factors, which also have an effect on the lending market (Strugnell, 2008: 48) and credit control (Beech, 2006: 18). Anonymous (nd: 30) discusses the effect of the lending market and credit control on Latin American countries. Galf and Monacelli (2008: 117) indicate the advantages of optimum monetary and fiscal policy and how such a standard economic principle can direct the economy.

4.2 Contracting and type of contract used

Contracting is a primary method that both owners and contractors use to allocate identified risks associated with a project (Lucas, 2007: OWN.05.1). In the current global construction market, the risks associated with long term major capital projects are high because of various supply and demand factors. This requires both the owner and the contractor to be innovative in their contracting strategies in order to mitigate their perceived risks.

The different types of contracts used on a project have a significant impact on the complexity of providing accurate and consistent information. The cost analyst must recognise the contract types and be able to implement the appropriate forecasting techniques (Lucas, 2007: OWN.05.1). Although not the purpose of this study, it is

necessary for the cost estimator to understand that different contract types have different views on specific issues. Claims, for example, are treated differently depending on the contract in question (Hassanein & El Nemr, 2007: INT.04.1).

Berends (2006: 36) indicates that the difference between an Engineering, Procurement and Construct (EPC) contract and a For-and-on-behalf type contract or Project Management Contract (PMC) lies to a large extent in the mitigated risks. Yongqiang, Fei and Libo (2004: Paper presented at The 4th World Congress of ICEC) comment on cost associated with PMC contracts. A contracting firm tendering on an EPC contract will have to price according to the risks associated with the scope of work (Yonezawa, 2005: CSC.18.1). The two main differences between the different contract types are the distribution and sharing of risks and the remuneration of the contracting company (Berends, 2006: 36). The cost-plus-fee type contract poses perhaps the least risk for the contractor, which will positively influence the tenderer's rates (Rossetti & McKeeman, 2008: 6).

Creech (2006: OWN.1.02) points out that different contract types have different requirements when it comes to administration and related issues such as mediation, arbitration, etc. Zuckerman (2007: 43) describes the costs involved with these legal processes. Broome (1999: 6-7) sheds light on the constant drive to simplify contract documentation with a resulted reduction in costs. The basic concept for increasing or decreasing costs on a project is to alter the risks associated with the project accordingly (Ribeiro, 1996: 55). Swart (2004: Paper presented at The 4th World Congress of ICEC) comments on the value of good administration for any party to a contract.

4.3 Foreign currency fluctuations

The international construction business is sensitive to world events and it entails political, financial, cultural, and legal risks (Belcher, 2004: 2 and Cheung, Suen & Lam, 2002: 411). Understanding the opportunities and threats associated with international markets and assessing a company's preparedness for international ventures are crucial to the growth and sometimes the survival of construction companies (Gunham & Arditi, 2005: 273). Han and Diekmann (2001: 300) indicate that globalisation of construction markets allows for local construction companies to compete internationally. The threats and opportunities of target countries should be understood (Hastak & Shaked, 2000: 59). Gunhan and Arditi (2005: 275 - 280) list some of the

pitfalls in international construction. They are project management capability, international network, financial strength, foreign competitors, cultural differences, and bribery and corruption in the host country. Chan, Tam and Cheung (2005: 111) report on similar findings in the Hong Kong construction sector.

Possibly the latest project to fall victim to the added cost to the budget due to foreign currency fluctuations in South Africa is the Gautrain project (Venter, 2008: Accessed 03 December 2008). Venter comments that the project manager of this project, Jack van der Merwe, mentioned that approximately 20% of the total project value of R25 billion will be spent overseas and will therefore be subjected to foreign currency fluctuations.

Any construction firm venturing overseas will have to deal with foreign currency fluctuations and will have to allow for this as a risk item in the tendering process. The world economy dictates the markets and the influences on foreign currencies (Minahan, 2007: 24). This sensitive nature of foreign currencies, for instance, had BHP Billiton applying crisis management to some extent in 2003 (Anonymous, 2003a: The Sydney Morning Herald. 24 February). Anonymous (2003b: The Sydney Morning Herald. 24 February) reiterates these findings. Chadee and Crow (1997: 41) and Burnside, Eichenbaum and Rebelo (1999: Paper presented at conference held at The World Bank. 03 August) also comment on the influences of foreign currency fluctuations. Kawai and Akiyama (2000: Seminar - Kuala Lumpur. 30 May) report on the currency crisis for exchange rate arrangements in emerging East Asia. Anonymous (2008v: Accessed 03 December) and Henock (2008: Accessed 03 December) describe the influence of foreign currency fluctuations on the broad economy.

4.4 Weather conditions

Inclement weather causes disruptions on construction sites the world over on a daily basis. The importance of weather on the costing of a project has long been realised. Cohen (1990: New York Times 19 August) mentions an increasing number of private companies engaging in weather forecasts/databases to assist them in improving their costing. Although estimators allow for unfavourable weather conditions during construction, it is the unforeseen or abnormal conditions for which there has not been allowed for that will cause financial losses (Doyon & Werick, 2008: Accessed 9 June). Too much rain, snow, cold and heat can cause construction to be either impractical or unsafe. Nogueira and Paixão (2007: 545) comment on health risks due to heat when performing construction work. De Villers (1986: 1) reports that already in 1986 the

annual financial losses due to inclement weather in the United States amounted to between $3 and $10 billion per annum. Palutikof (2006: 66) refers to the decline in activities during the drought summers of 1975 – 76 and the severe winters of 1962 – 63 in Great Britain.

Unfavourable weather conditions can cause rework which will be for the construction company's account. Extreme cold can, for example, freeze concrete influencing its strength Afrisam (2008: Technical guide to the use of rapid strength cement). Ekanayake and Ofori (2000: Paper presented – Pretoria; 23 – 25 August) and Faurie, J. (2008: Martin Creamer's Engineering News – 07 November) also refer to weather influences on construction materials.

4.5 Labour availability, productivity and political influences

The influence of labour on the cost of a project was discussed in Chapter 2. Townssend and Charles (2008: 67 – 68) report that from the earliest times to the Industrial Revolution the craft of skilled trade was the basic unit, the elementary cell of the labour process. In each craft the worker was presumed to be the master of a body of traditional knowledge, and methods and procedures were left to his or her discretion. In each such worker repose the accumulated knowledge of materials and processes by which production was accomplished in the craft. The potter, tanner, smith, weaver, carpenter, baker, miller, glassmaker, cobbler, etc., each representing a branch of the social division of labour, was a repository of human technique for the labour processes of that branch (Jackson & Rogers, 2007: 895).

Townssend and Charles (2008: 68) make the statement; "…there is arguably enough a much less significant level of skill utilisation in many contemporary work stations." Esposto (2008: 101) describes skill as the ability that comes from knowledge, practice, aptitude, etc., to do something well. Esposto (2008: 103) proposes several methods for measuring skill and also comments on the steady decline of skill in the workplace. Hall and Leeson (2007: 658) indicate that there exists a trade-off between labour standards and income and that some first world countries made this trade-off years ago and are today reaping the benefits. They add that many sub-Saharan countries will only reach this point between 100 and 300 years from now.

Hall and Leeson (2007: 658 – 659) illustrate this point by means of an example. Romania's government structure is in many ways based on those in other modern

countries. Their tax system is, for example, based on that of the United States. Their gross domestic product per capita, however, is (at the time of this research) $3,167. The United States already reached this point in 1887. Developmentally, the United States' equivalent of Romania is 120 years ago. Hall and Leeson (2007: 659) point out that this is largely due to the state of skilled labour in these two countries. O'Mahony, Robinson and Vecchi (2008: 1435) state that the skills premium has increased because the demand for skills by modern technology has risen even faster than the supply. According to Addison, Bellmann, Schank, and Teixeira (2008: 115), the situation in Germany is no different. For several decades now the demand for unskilled labour has declined and that of skilled labour has risen.

It is inevitable that the decline of skilled labour will have an effect on wage rates. Borowicz (2007: 19) outlines the effect of wage rates on construction cost. Anonymous, (2006a: Business Week - 27 March) refers to the sudden increase in construction cost at the time in China due to unforeseen increased construction labour wages. Blandy (2006: 2) seconds the reform of the Australian labour market and states that the increasing involvement of unions and increased wages necessitate this step. Tan, Lester and Richardson (2008: 80) concur with these findings. Campbell (2008: 1389) mentions a general international trend in higher-than-usual wage increases and abnormalities due to an increased demand. Lechthaler and Snower (2008: 1224) add training as a prerequisite for improved skills in the labour market and demonstrate the effect of training. Training will result in an initial increase in wages, but will have added benefits at a later stage (Matsaganis, 2007: 540). Together with training, factors such as income protection (pension) and union involvement (Matsaganis, 2007: 537), will have an effect on wage rates, depending where construction takes place.

Saville (2010: Mail & Guardian – 10 September) points out that skilled labour availability in South Africa is declining. Würth (2006: 97) and Saville (2010: Mail & Guardian – 10 September) both indicated that it is crucial for South Africa to increase its productivity to improve economic growth. Letsoalo (2010: Mail & Guardian – 21 May), Steenkamp (2010: Die Burger – 19 May) and Barnard (2010: Die Burger – 11 May) all point out negative effects of recent labour strikes in South Africa. Hancock (2010: Engineering News – 8 October) and Anonymous (2010b: Mail & Guardian – 20 April) refer to the effects of political interference on the construction of nuclear power plants which in turn has a long term effect on the availability of power and ultimately on the South African economy. Poor economic conditions in neighbouring countries also

cause labour migration which in turn puts strain on the South African economy (Dagut, 2006: 262).

The basic principles surrounding productivity were discussed in Chapter 2. The measure of productivity is a complex process. Whiteside (2006: EST.08.1) states that it will be wrong to assume that productivity is measured uniformly and that all productivity values have the same basis. Quiggin (2006: 18) reports on the effect of productivity on the Australian economy. Picard and Hutcheson (2008: PM.11.1) comment on the growing need to increase productivity in the American construction industry. Refer to Figure 3.9. According to Motwani, Kumar and Novakoski (1995: 18), it is relatively easy to establish the quantity of work to be performed and the cost per hour for labour to perform that work. However, it is the identification and the evaluation of the critical factors which influence productivity that provide a challenge (Enshassi, Mohamed, Mayer & Abed, 2007: 358). Errors in productivity estimation cause an inverse effect in the actual cost of labour to perform a scope of work (Selg & Thomas, 2004: CSC.05.1).

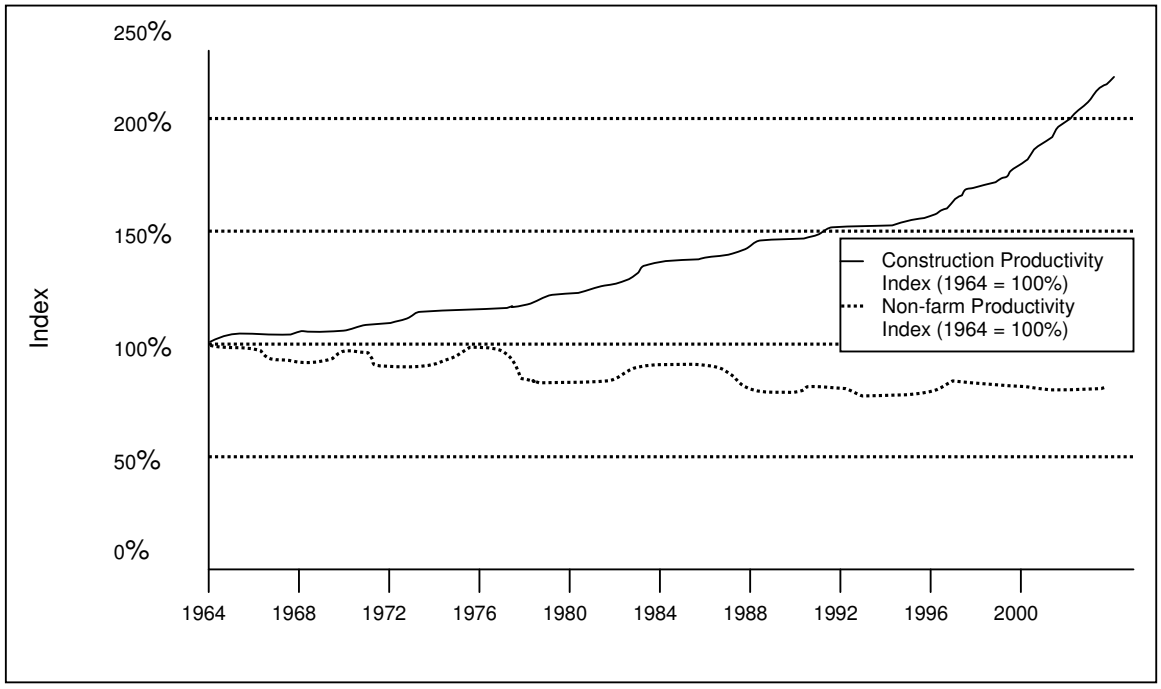


Figure 3.9 Labour productivity index for US construction industry and non-farm industries

Source: Picard and Hutcheson, 2008: PM.11.1\

Several trade specific productivity factors exist. Alinaitwe, Mwakali and Hansson (2007: 169) report on factors affecting building craftsmen. Song and AbouRizk (2006:

EST.25.1) do the same regarding the steel industry while Lee, Lee and Ibbs (2007: EST.05.1) mention factors influencing productivity on freeway construction and Hanna, Peterson and Lee (2002: 331) comment on mechanical and electrical projects. These productivity factors (discussed in Chapter 2 influence the cost of labour on a project.

Bradley (2008: EST.05.1) says that it was during the early 1900's that companies started to accumulate labour metrics. These statistics included what effort hours were required to install the major components such as a cubic yard of concrete, a meter length of cable, a ton of steel, etc. As more companies entered the construction scene competition became tougher and the tendering for new work had to be more dependent on historical data analysis. According to Dumond (2000: 1063), the increased need for a baseline to which all companies could compare or measure their labour productivity was imminent. This sparked the development of the United States Gulf Coast Baseline Worker Hour Norms (USGC). Although this is probably the most well-known tool for estimators in the petrochemical industry, there are other methods and ways of measuring productivity. Park, Thomas and Tucker (2005: 772) describe the Construction Productivity Metrics System (CPMS). This index provides an industry norm for production rates. Zayed and Halpin (2005: 779) use regression models, while Fayek and Oduba (2005: 938) rely on fuzzy expert systems, and Ezeldin and Sharara (2006: 650) use neural networks.

AbouRizk, Knowles and Hermann (2001: 502) show that, especially for labour intensive construction work, the productivity factor is important. The estimator will normally start with an average production rate and then modify it to reflect the expected conditions on site. If the weather is expected to be unfavourable or the skills level is expected to be low, the estimator will increase the number of man-hours required to complete a specific task. In tendering for work in developing countries this activity of altering the average production rate is even more important (Koehn & Jagushte, 2005: INT.03.1). In these countries most construction is carried out using labour intensive methods, making productivity a serious factor to deal with.

Li (2005: CSC.16.1) and Chang, Hanna, Lackney and Sullivan (2007: 287) describe other functional uses for productivity analysis. Schedule adjustment, for instance, is one way where the productivity database can be used to capture possible increases or savings on the schedule. Moselhi, Assem and El-Rayes (2005: 354) indicate that especially in fast track construction, where construction begins prior to design completion, that in the case of change orders, production analysis can be used to more

accurately estimate the possible cost increase. Productivity analysis can also be used to improve construction processes (Cottrell, 2006: 189; Zayed, 2005: 677; Dunlop and Smith, 2004: 55) and labour-flow-planning (Thomas, Horman, Minchin & Chen, 2003: 251). Productivity analysis can even influence scope definition as indicated by Song and AbouRizk (2005: 360). O'Connor and Huh (2005: 1013) and O'Connor and Huh (2006: 408) indicate how productivity can influence the construction schedule.

Luiz (2002: 594) reports on the socio-economical state of South Africa and the post-apartheid economic reconstruction. The new government came with new ideas; some which worked and some which did not work (Easterly, 2007: 330). The apartheid-era went hand-in-hand with economic sanctions, all of which were abolished when the new government took over (Ramabodu, Kotze & Verster, 2007: 7). The main drive behind socio-economical upliftment was planned through executing the Reconstruction and Development Programme (RDP). Especially in the housing sector, construction benefitted from the RDP programme, but later when it became apparent that the programme would fail because of constant political interference (Luiz, 2002: 596) everything came to a standstill.

Andersen (2008: RISK.04.1) states that political interference can be one of the biggest single causes for drastic cost increases on a construction project. He describes how Danish Professor Bent Flyvbjerg proposed recommendations to the Danish government for improving planning on mega projects; one of which was to refrain from political interference. Hand-in-hand with the political influence on the cost to construct a project is the socio-political aspects or cultural differences (Chan & Tse, 2003: 375).

4.6 Project location

Oladapo, Aladegbaiye and Aibinu (2008: 119) state that a good estimator can readily estimate the cost of a project in his area of operation, but it may not always be so for projects outside his familiar area. This can be ascribed to the fact that the estimator will find himself on unfamiliar ground should he venture into unknown areas of operation. Gerber (2008: personal communication) describes the two main considerations in price increases on remote projects as transportation costs and increased labour costs. Unlike factory conditions, construction is different in the sense that the work is not performed in a set factory, but on site which differs in geographical location with every new project.

Oladapo *et al.,* (2008: 120) describe the effect of location on construction prices as twofold. Firstly, institutional factors such as local regulations (laws and by-laws) and the level of taxation, and secondly, market factors that include demand and supply of construction inputs. Generally, the more remote a project location is, the more expensive it will be because of the effect of commodities, such as transport. Algarni, Arditi and Polat (2007: 729) indicate that poor infrastructure (especially in developing countries) also has an effect on the estimated cost.

The only way to counter the effect of location is to incorporate the major influences of location into the calculation of the final estimated cost. The most common way to do this is by means of Location Factored Adjustment (LFA) (Jansen-Romijn, 2008: EST.13.1). Jansen-Romijn (2008: EST.13.1) formulates the definition of a location factor as follows:

> *"A location factor is an overall total project factor for translating all of the project cost elements of a defined construction project scope of work from one geographical location to another."*

This factor recognises differences in productivity and costs of labour, engineered equipment, commodities, freight, duties and taxes, procurement, engineering, design and project administration. Jansen-Romijn (2008: EST.13.1) describes a simplified overview of the location factoring method as follows:

- Selecting a detailed estimate for the base location.
- Creating a parallel estimate by applying overseas labour, material and equipment factors (all developed at a constant exchange rate) to the base estimate.
- Calculating allowances for taxes, fees, input duties, freight, etc. with expected percentages from the foreign location.
- Calculating allowances for procurement, engineering, design and project administration with expected percentages for the foreign location taking into account that part of it cannot be executed locally.
- Dividing the base estimate to the parallel factored/percentage estimate to produce a location factor.

Oladapo *et al.* (2008: 123) describe the specific methodology for the adjustment of estimated costs for regional influences using factors. Three common types of price indices exist to calculate inflation. They are the Laspeyres Index, the Paasche Index and the Fisher Ideal Index. The Laspeyres Index is a base weight index which uses the relative quantities of the base period to provide the weighing of the respective prices. The Paasche Price Index is a current weight index. The Laspeyres Index has been found to overstate inflation while the Paasche Index understates inflation. The Fisher Ideal Index is a combination of the two and has been proven to be the best method (Yu & Ive, 2006: 786).

The basic methodology for the determination of a Location Adjustment Factor (LAF) is described by Jansen-Romijn (2008: EST.13.1). Oladapo *et al.,* (2008: 124) built on this description and developed a basic equation to reflect the effect of location on construction cost. This equation can be put as follows:

$$\text{Location factor A} = \frac{\text{Price of construction at location A}}{\text{Price of construction at location B}}$$

It is important to note that the prices used in this case should have the same base date and that prices of different base dates will result in askewed results.

4.6.1 Supply chain

Schary (1998: 155-156) indicates that the concept of supply chain is not new and that it has been well documented that it occurred from the Renaissance period. Firms have become dependent on their suppliers and require other firms to market their products. Competition does not necessarily lie between individual firms, but in increasing importance between supply chains themselves as supra-organisations. The managerial context of the supply chain combines these two perspectives with a third - close coordination of all operations within the chain from raw materials to ultimate customer, and beyond, to the disposal of the consumed product. Improving the supply chain and the management of this chain can result in a reduction in transport costs. Alvi (2008: 36) and Goodwill (2008: 38) elaborate on the importance of supply chain management.

4.6.2 Transportation

Stock and Lambert (2001: 312) state that an industrialised society cannot exist without an efficient transportation system. It is often assumed that the products will move from where they are produced to where they are consumed with a minimum of difficulty, in terms of both time and cost. In most economies transportation is so pervasive that its effect on society is not realised. In the United States transportation constitutes approximately 6% of the gross domestic product (GDP) (Stock & Lambert, 2001: 312). In 1999 transportation costs amounted to $556 billion in the United States. Figure 3.10 indicates the ratio between freight costs and the GDP. It will be noted that the growth rate of freight costs declined in the years 1980 to 1981 (Gransberg, Lopez del Puerto & Humphrey, 2007: 405). This is due to the economic deregulation during that period of the United States transportation system, as well of the introduction of new technologies and the implementation of many leading edge technologies and management philosophies. Alonso-Villar (2005: 589) also comments on the effects of transport costs.

Shakantu, Tookey and Bowen, (2003: 105) demonstrate the importance of transport in construction with special emphasis on the transport of construction materials. They also state that construction is one of the most cost-orientated industries in any economy and that construction estimates (in general) are based on straight “take-offs” of the quantities required. All further “other” costs in the form of overheads, profit, labour and wastage are consolidated into the cost of the material (Liu & Ling, 2005: 395). Construction is unique within the various industries making up a modern economy in that the bulk of the material and the components that it uses are of relatively low value while being of high volume. Consequently, a significant proportion of the “other” costs associated with material purchases must be in the form of transportation (Shakantu *et al.*, 2003: 105).

Stock and Lambert (2001: 314) name some factors that influence the cost of transportation:

- The degree of intermode and intramode competition.
- The location of markets.
- The nature and extent of government regulation.
- The balance or imbalance of freight traffic in the market.
- The seasonality of product movements.

- Domestic or international transport.

To understand the effect of transport on the cost of a construction project, the different transport modes should be discussed. Figure 3.11 compares the five main modes of transport in the United States of America. Stock and Lambert (2001: 322 - 328) also describe the following five basic transport modes:

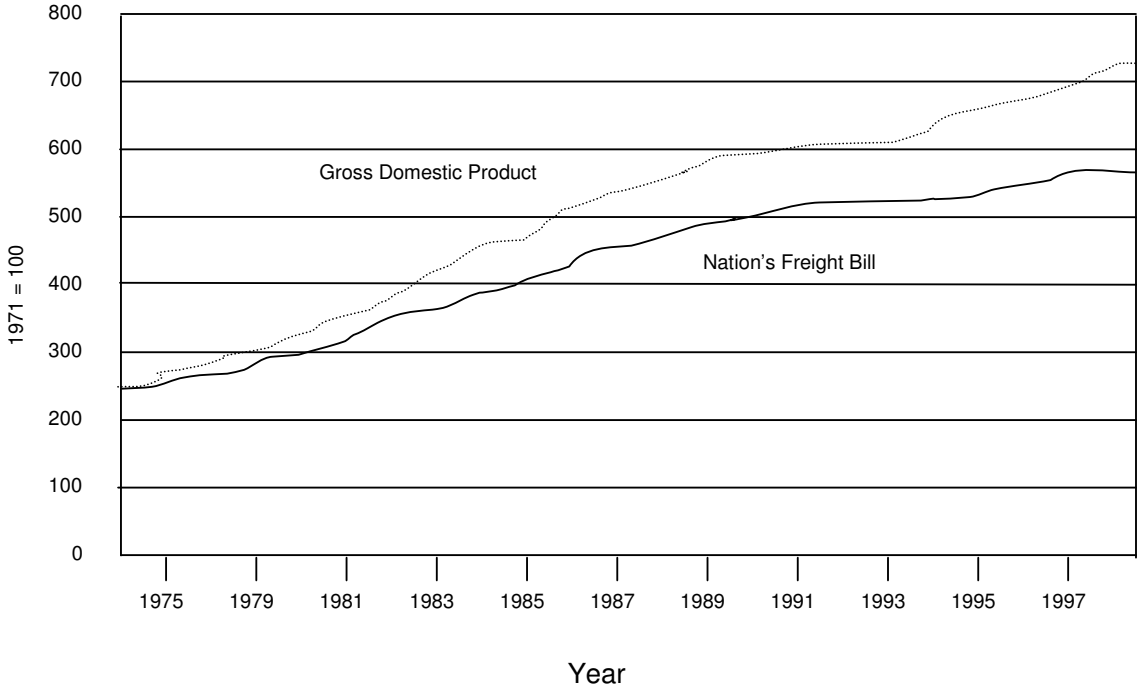


Figure 3.10 Freight transportation outlays versus GDP of the United States
Source: Stock and Lambert, 2001: 312

4.6.2.1 Motor

During the late 1960's motor carriage replaced rail carriage as the dominant form of freight transport in the United States. Motor carriers often compete with air carriers for small shipments and with rail carriers for large shipments. An efficient motor carrier can compete with an air carrier on a point-to-point basis for any size shipment if the distance is less than 1 000 miles (Stock & Lambert, 2001: 323). This is because motor carriers can realise greater efficiencies in terminal, pickup and delivery options (Dennis, 2007: 5).

	Motor	Rail	Air	Water	Pipeline
Economic characteristics					
Cost	Moderate	Low	High	Low	Low
Market coverage	Point-to-point	Terminal-to-terminal	Terminal-to-terminal	Terminal-to-terminal	Terminal-to-terminal
Degree of completion (number of competitions)	Many	Moderate	Moderate	Few	Few
Predominant traffic	All types	Low-moderate value, moderate-high density	High value, low-moderate density	Low value, high density	Low value, high density
Average length of haul	Short to long	Med to long	Med to long	Med to long	Med to long
Equipment capacity (tons)	10 – 25	50 – 12,000	5 – 125	1,000 – 60,000	30,000 – 2,500,000
Service characteristics					
Speed (time in transit)	Moderate	Slow	Fast	Slow	Slow
Availability	High	Moderate	Moderate	Low	Low
Consistency (delivery time variability)	High	Moderate	High	Low	High
Loss and damage	Low	Moderate	Low	Low-moderate	Low
Flexibility (adjustment to shipper's needs)	High	Moderate	Low-moderate	Low	Low

Figure 3.11 Comparison of United States domestic transport modes
Source: Stock and Lambert, 2001: 329

Motor carriers are more flexible and versatile than other transportation modes. The flexibility of motor carriers in the United States is made possible by a network of over four million miles of roads, which enable them to offer point-to-point service between almost any origin-destination combination. Motor carriers are versatile in that they can transport products of varying sizes and weights over any distance. The combination of flexibility and versatility of motor carriage has enabled it to become the dominant form of transport in the United States, as well as many other parts of the world (Stock & Lambert, 2001: 323). Smyrlis (2008: 4) and Westell (2008: 10) elaborate on some modern problems with motor carriage, i.e. congestion and increased rates due to price increases on fuel.

Styan (2010: Fin 24 – 29 April) comments on the steady collapse of the South African railway systems and how this deterioration force companies to make use of road transport instead. Creamer (2008: Engineering News – 16 July) mentions efforts by the

South African government trying to re-instate some of the rail system, but questions are being asked about the economic viability of this effort should it be compared to road transport. The increased usage of the country's road network is causing major damage (Van Wyk, 2010: Die Burger – 25 May). Van Wyk further states costs to repair roads in South Africa are fast becoming a problem that will only be able to be addressed on a national level.

4.6.2.2 Rail

In many regions of the world, such as Europe and China, rail is the dominant transportation mode. In the United States railroads carried over one trillion ton-miles of freight over a track network of 175,000 miles in 1996. Post-World War II saw a decline in the use of railroads and a shift to motor transportation (Stock & Lambert, 2001: 324).

The biggest disadvantage of rail transport is that the rail network is not nearly as extensive as the road network (Cilliers & Nagel, 1994: 10). Rail transport lacks the versatility and the flexibility of motor carriers because it is limited to fixed track facilities. Although the South African situation differs from that of the United States', rail transport has also declined drastically, but Transnet is busy with a drive to shift at least some of the "lost" freight back to rail carriers (Anonymous, 2008s: Accessed 19 November 2008).

4.6.2.3 Air

In the United States air freight represents less than 1% of the total ton-mile traffic. Although increasing numbers of shipments are using air freight for regular service, most view air transport as a premium emergency service because of the higher cost. Putzger (2008a: 6) describes the takeover of Air Canada's Toronto-Frankfurt route by Lufthansa due to increased demand. When products must be delivered to a distant location quickly, air freight offers the shortest time-in-transit of any transportation mode. Contradicting this statement, and probably due to the specific situation in America, Putzger (2008b: 16-18) documents some facts also proving the increased costs of air transportation. US-based company, Boeing, recently had some orders cancelled due to the current poor economic situation in America, but mainly due to the high price of aviation fuel.

Air transport is given to constant enquiries regarding safety and issues pertaining to the safe use of this form of transport. Finger and Piers (2005: 20) describe the effect of the increased safety regulations on the air freight costs in Switzerland. Barbot (2005: 110) expresses similar views.

4.6.2.4 Water

Stock and Lambert (2001: 327) elaborate on the use of water transport. Water carriage can be divided into two main categories: inland waterways and ocean/marine transport. In South Africa there is no inland transport of any economic significance due to the fact that there are no significant waterways. Overseas, for instance in Germany, inland water transport amounts to 20% of all freight transported. In the Netherlands and Norway it is much higher. Water carriage is perhaps the cheapest method of shipping high-bulk low-value commodities.

Marine transport has played an increasing role in the international transport arena. Large container ships and super-tankers have paved the way for bulk transport of items such as coal, crude oil, etc. Water carriage especially is of value where the speed of delivery of the material is not a high priority. Brooks and Button (1996: 21-22) elaborate on the pricing methodology of shipping rates and how marine transport cost is influenced.

4.6.2.5 Pipeline

Natural gas and crude oil account for the majority of pipeline traffic. Coal is also grind into dust. Water is added and the slurry is then pumped through a pipeline. Bausbacher & Hunt stated that pipelines are able to deliver products on time because of the following factors:

- The flows within the pipeline are monitored and controlled by computer.
- Losses and damages due to pipeline leaks are extremely rare.
- Climatic conditions have a minimal effect on products moving in pipelines.
- Pipelines are not labour-intensive and labour-related issues have little effect on them.

The minutes of a meeting (2002: Accessed 19 November 2008) describes Sasol's intention to start development of the natural gas line from the Temane Pande gas fields in Mozambique to Secunda in South Africa. Anonymous (2002: 01 January) describes the start of this project. Hill (2007: 13 September) refers to the R11 billion fuel line Transnet-contract to pump fuel from Durban to Johannesburg and how this pipeline will lesson then current tanker road transport.

4.7 The estimator (the human factor)

Estimating the cost of a construction project involves the gathering, organising and presenting of many pieces of information to make a whole and eventually arriving at a cost for a particular project (Rajpatty, 2008: DEV.12.1; Janssen & Yang, 1999: 501). Doing this requires a person with special skills. Especially in the fast-track type construction that occurs in modern times, the estimator must sometimes analyse poor information and add missing information based on experience (Fellows & Liu, 2000: 362).

McDowell (2008: EST.18.1) indicates that the main attribute of an estimator should be an inquisitive mind. Possible outcomes should be considered to reduce any possible oversights. This is a skill that will only be developed over time. McDowell (2008: EST.18.1) shows that in order to estimate the costs required to provide complete and operable systems, all related items, elements and components must be included. The practical execution of the construction work should therefore be questioned (Hannon, 2007: IT.03.1). A sound knowledge of construction methodology, basic process engineering, project management, planning, etc. is therefore necessary. Richards (2008: EST.01.1) also comments on the skills of the estimator. The estimator should be able to envision a project as it appears built and envision the steps required to build it. All of this should be done by considering the budget.

5.0 ELEMENTAL STRUCTURE OF A PROCESS PLANT

Humphreys (1991: 374) illustrates the basic structure of a cost estimate in Figure 3.12. The definitions and influences of each cost type have been discussed in Chapter 2. Further discussions on the influences of these cost types will follow.

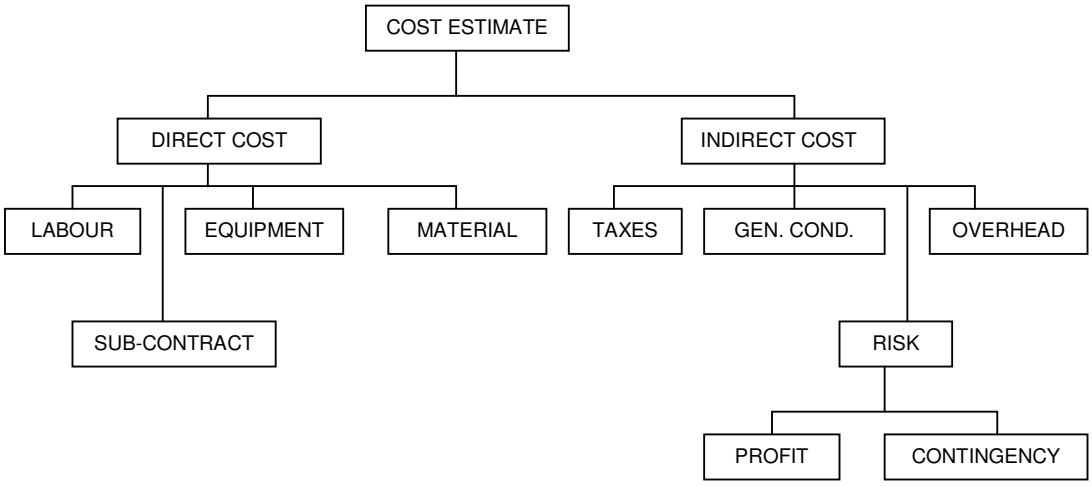


Figure 3.12 Components of a cost estimate
Source: Humphreys, 1991: 374

McAuley (2008: HPG.04.2) and The Association of Cost Engineers (1991: 3) state that construction plants are not standard and the differences arising from the type of construction, building, plant or process, together with the special requirements relating to climate, local regulations, conditions, customs and resources, are numerous (Alinaitwe, 2008: 74). Addendum A refers to an estimating checklist for capital projects and can be used as an *aide-mémoire* that outlines the elemental structure of a typical process plant.

6.0 TYPES OF ESTIMATES, THEIR USE AND APPLICATION

Tam (2007: 6) cites Luke Chapter 14 verse 28 - 30 from the Holy Bible which probably proves the importance of cost estimating, when dealing with construction work, best.

> *"Suppose one of you wants to build a tower. Won't you first sit down and estimate the cost to see if you have enough money to complete it? For if you lay the foundation and are not able to finish it, everyone who sees it will ridicule you, saying, 'This person began to build and wasn't able to finish.'"*

From this verse one can deduce that some type of estimating method for construction cost was used as far back as 2 000 years ago. Tam (2007: 6) also quotes from writings from the ancient Chinese civilisation of 5 000 years ago:

> *"When a rich man wants to build a house, he must first estimate the resources at his disposal and then determine the size of the house to build and ask in what amount materials and labour are needed, how long it will take, and where to get the materials such as earth, stone, bamboo and reeds. The architect will tell him where to get the materials required and how much is the cost and labour involved. By following his advice, the man is able to complete the construction of the house on schedule. It is due to the fact that everything has been carefully planned ahead that the new house is found all in order."*

Pheng (2007: 193) also refers to ancient Chinese literature which mentions calculations which captured time-cost studies and the development of work units indicating the amount of work that a skilled artisan can accomplish in one day. This system is still being used today. Pheng (2007: 195) also refers to master craftsmen who had the responsibility of estimating the materials and labour required for a certain project. He goes on to discuss ancient formulas for calculating volumes and areas of material.

Bowyer (1973: 229-235) mentions the situation in Roman times as described in the book Vitruvius, written 100 AD. Advice was, for example, given as to the methodology of levelling. This contributed to the development of mass earthworks and ultimately in the estimating of costs for such works (Lofton, 2006: OWN.02.2). Vitruvius also referred to the importance of the economic value of construction and stated that construction is not only about the aesthetics. It also referred, for example, to the management of materials. Bowyer (1973: 229-235) also mentions the situation in the 17th century with the Great Fire in London in 1666. The amount of construction work involved in rebuilding London was too much for architects to handle and a specialised position for the quantity surveyor was created. Tam (2007: 11) discusses estimation during the Middle Ages where Free Masons (the highest ranked masons) kept records of costs.

It was essentially the introduction of computers that boosted the evolution of the estimating process in all industries. Karshenas (2007: IT.06.1) and Richards (2005: EST.12.1) describe some aspects of computer applications in estimating. Masmoudi,

Bouaziz and Hachicha (2005: 298-299) describe how computers can be applied even in defined estimating procedures such as welding operations.

Dysert (2004: 9.4) states that although modern estimating is based on proven methods, these methods get more defined with the increase in technology and data from previous projects. World events such as World War II, space travel, the current war in Iraq, etc. almost always lead to a surge in improving estimating models. It is therefore not surprising that some of the most complicated and advanced estimating models in existence were developed by NASA and the American Defence Force, with most of the ground work conducted in the mid-Fifties following World War II.

Modern design enables architects and engineers to do designs more accurately and faster than their predecessors (Grant, Jones & Vlachos, 2007: 20). Because of technology, different estimating processes can be used. Model-based estimating is one example (Kraus, Watt & Larson, 2007: IT.01.1; Tas & Yaman, 2005: 253). Computer designs can be imported into different computer estimating software packages to determine construction cost. Kraus *et al.,* (2007: IT.01.1) refer to Building Information Modelling (BIM) as an example.

Barmania and McMullan (2006: IT.01.1) mention neural networks and artificial intelligence being incorporated into the estimating techniques, thus leading to the commonly used term “intelligent estimating”. Ezeldin and Sharara (2006: 650) offer good examples of where neural networks are employed in productivity analysis in concreting activities. Barmania and McMullan (2006: IT.01.1) refer to three dimensional modelling as a way of performing an estimate. In this technique modelling software is used to model all disciplines including equipment, piping, structural steel, HVAC, electrical, and instrumentation. The three dimensional model can then be used for scope definition, as well as upgraded estimate quantities throughout the project design, and can therefore assist with trending on the project (Hanvey, 2008b: Accessed 2 October).

Richards (2005: EST:12.1) also stresses the fact that although computers can be very useful in estimating, they should only be used to assist and should not completely take over the process. The estimator will not be able to eliminate activities such as physical site visits, consideration for unique project aspects, etc.

6.1 Different types of estimates

Uppal (2007: EST.03) refers to estimating as the key to successfully completing any project from conception through detailed engineering, construction and successful start-up. He warns though that estimating is an approximation procedure that provides answers with significantly less than 100 percent probability of being correct or even close. As previously mentioned in this chapter, Uppal (2007: EST.03) also stresses the importance of scope definition before any estimate can start.

To understand the different methodologies of estimating it is necessary to define what an estimate is. Uppal (2007: EST.03) defines it as follows:

> *"An estimate is a prediction of quantities, cost and/or resources required by the scope of an asset investment option, activity or project. As a prediction, an estimate must address risks and uncertainties. Estimates are used primarily as inputs for budgeting, cost or value analysis, decision making in business, asset and project planning, or for project cost and schedule control processes. Cost estimates are determined using experience and calculating and forecasting the future cost of resources, methods and management within a scheduled time frame. Included in these costs are assessments and an evaluation of risks."*

Clark and Lorenzoni (1985: 5) also emphasise the fact that an estimate is only a prediction based on the knowledge at hand. Dysert (2006: EST.01.1) defines a cost estimate as follows:

> *"Cost estimating is the predictive process used to quantify, cost and price the resources required by the scope of an investment option, activity or project. The output of the estimating process, the estimate, is typically used to establish a project budget."*

Lukas (2006: EST.03.1) reiterates both Clark and Lorenzoni's and Dysert's definitions of cost estimating by using terminology such as "*… rough calculation…"* and *"… approximate computation…"*, again stressing the point that an estimate is nothing more than a prediction of what the end cost of the project will be based on certain variables.

Dysert (2004: 9.5) states that the method of estimating depends on some factors, i.e. the end use of the estimate, the amount of time and money that is available to prepare the estimate, the estimating tools and data available, and the level of project definition and design information available. Zack (2007: 3) and Han and Park (2008: 199) stress the importance of cost estimates and highlight two important facts pertaining to estimating:

- Client decision-makers rely on estimates to make business decisions.
- Estimating involves more than looking up past numbers and factoring it for size, location and time.

Zack (2007: 4) points out his concern regarding some modern estimators who rely heavily on computer software and who produce estimates without applying some form of judgement. Factors influencing productivity, escalation, construction programme, construction methodology, etc. all play a role in estimating and should be considered (Sandberg, Hetland & Tolo, 2005: EST.21.1). Richards (2008: EST.01.1) gives the following guidelines that should be examined when doing an estimate:

- Estimating should be implemented early.
- Estimating involves more than counting.
- The entire project team must be involved in the estimate.
- Accuracy in estimating is in the details.
- What is not in the estimate is as important as what is.
- Estimate organisation must be carefully considered.
- Current information is key.
- Estimating done right serves as a check on project scope.
- An estimate should not be high or low, but just right.
- An estimator must be visionary.

Richards (2008: EST.01.1) continues that the estimate is more than a simple translation of technical project information into financial terms. An estimate should serve as a check of scope with the established budget (Munde, 2003: 144). The process of developing an estimate should be used as an opportunity to verify agreement between the various project documents. If the estimate is not developed early enough in the design process, the estimate becomes only a limited financial forecasting tool. If the estimate is put off until the end of the design, any forecasting

attempts are of little help and required changes are made only through major effort and may jeopardise continuation of a project.

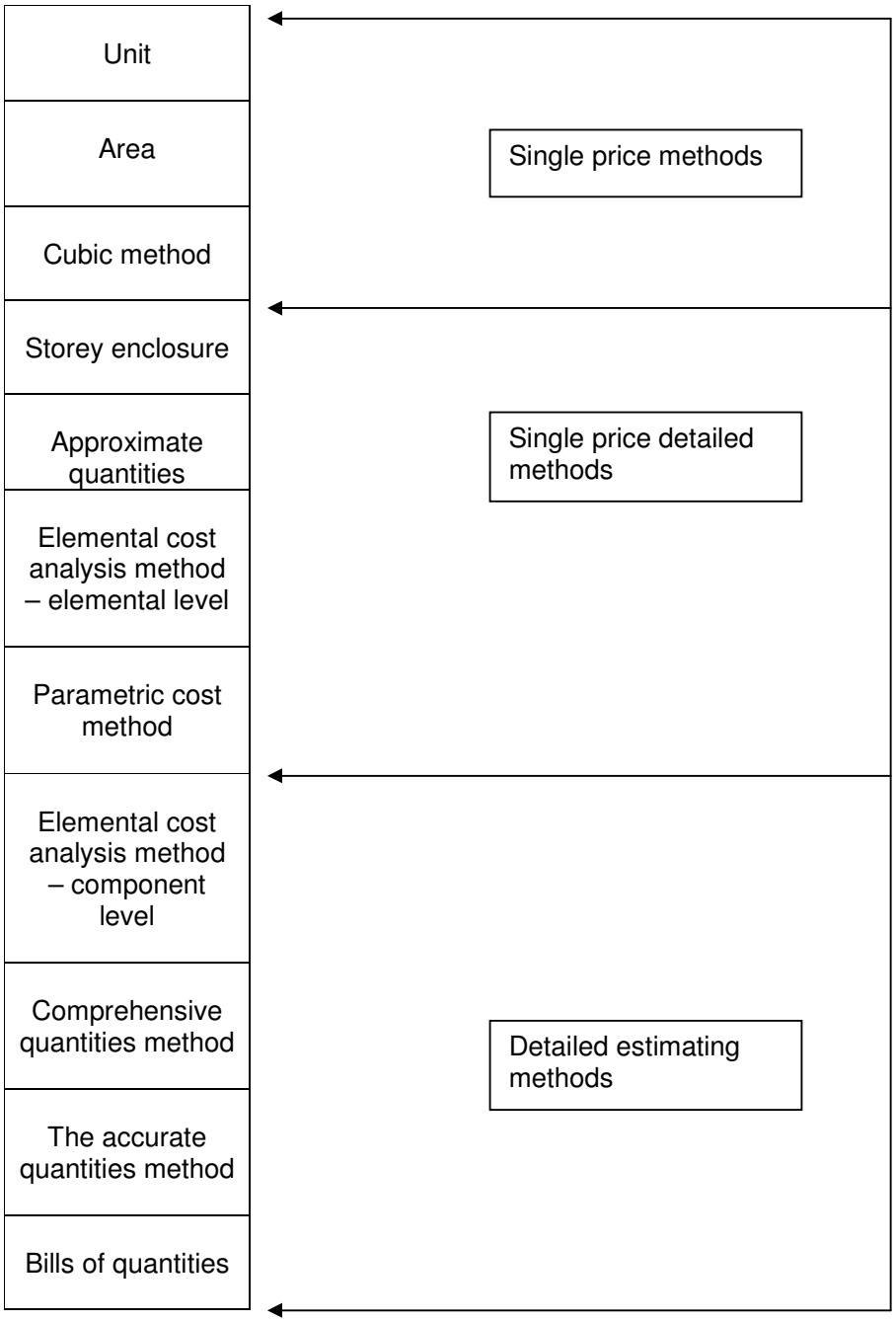


Figure 3.13 Traditional cost modeling – arranged from simple to complex

Source: Ferry and Brandon, 1980: 103

Estimating models differ depending on what industry the estimate must be conducted in. Technology is ever-changing and leads to improved methods for estimating. In the construction sector there are also different trends in estimating. Building construction

estimating is to a large extent based on principles set by quantity surveyors and architects. Figure 3.13 illustrates the traditional cost modelling types that are employed in the building construction industry. For the purpose of this study it will, however, not be necessary to describe these methods in detail.

The engineering construction sector employs different types of estimating models that provide improved answers and are industry specific. According to Dysert (2004: 9.4), two main types of estimates are used in the engineering field, and more specifically in the petrochemical industry. These are “conceptual” and “deterministic” estimating methodologies. Several authors refer to different estimating types within these two main methodologies. Zastrozny (1974: 40) refers to “order of magnitude, economic study, board, check and detailed” estimates. Dysert (2004: 9.5) refers to terms such as “end-product unit method, capacity factor method, ratio or factor methods”, and the “parametric method.”

As the level of project definition increases, the estimating methodology tends to progress from conceptual (stochastic or factored) methods to deterministic methods (Vilela & Longo, 2008: INT.11.1 and Uppal, 2007: EST.03). With conceptual estimating methods, the independent variables used in the estimating algorithm are generally something other than a direct measure of the units of the item being measured. They usually involve simple or complex modeling (or factoring) based on inferred or statistical relationships between costs and other typically design-related parameters (Musgrove, 2007: EST.19.1). For deterministic estimating methods, the independent variables used in the estimating algorithm are more or less a direct measure of the item being estimated, such as straightforward counts or measures of items multiplied by unit costs. Deterministic estimates require a high degree of precision in the determination of quantities, pricing and the completeness of scope definition (Zastrozny, 1974: 40).

Shah *et al.,* (1996: 347) and Pickett and Elliott (2007: EST.02.1) state that there is another key difference between conceptual and deterministic estimating methods. Conceptual estimating methods require a significant effort in data-gathering and methods development before estimating preparation can begin. There is a significant effort in historical cost analysis to develop accurate factors and estimating algorithms to support conceptual estimating (Farkas & Uys, 2004a: 1). Preparing the conceptual estimate itself takes relatively little time (Muscianesi, 2003: 2).

It was previously stated that in contrast to the above mentioned, a deterministic estimate (detailed estimate) requires a large effort during the preparation of the estimate (Kwak & Watson, 2005: 1430). The evaluation and qualification of the project scope can take a significant amount of time (Sharma & Lutchman, 2006: 16.1). Research and application of accurate pricing information and application of specific estimating judgements to the quantified scope can also add to this time consuming process.

As previously mentioned, the specific methodology for estimation to be used depends on various factors, but most of all on the level of design that has been completed. Estimate classification is also discussed later in this chapter.

6.1.1 Conceptual estimates

Conceptual estimates are typically used for low level accuracy estimates to assist management in early stage decision-making. These estimates are often referred to as "order-of-magnitude" or OOM estimates in reference to their typical wide range of estimating accuracy (Zastrozny, 1974: 41). They provide a relatively quick method of determining the approximate probable cost of the project without the benefit of detailed scope definition. Conceptual estimates are typically used for the following purposes:

- Establishing an early screening estimate for a proposed project or programme.
- Evaluating the general feasibility of a project (Kinney & Soubiran, 2004: EST.15.1).
- Screening project alternatives (such as different locations, technologies, capabilities, etc.)
- Evaluating the cost impacts of design alternatives.
- Establishing a preliminary budget for control purposes during the design phase of the project (Serpell, 2005: EST.13.1).

Conceptual estimates are generally based on little project information, for instance engineering deliverables, thus subjecting it to a wide range of estimate accuracy. Serpell (2005: EST.13.1) indicates that their accuracy can depend on several factors, including the level of project definition, the quality of the past historical cost data (Pickett & Elliott, 2007: EST.02.1) in development of the factors and algorithms, as well

as the judgment and experience of the estimator. These limitations should be recognised in using conceptual estimating methods. Nonetheless, there can be cases where conceptual estimates can be very reliable, especially in estimating repeat projects (Sonmez, 2004: 677). Generally, the emphasis with conceptual estimating is not on detailed accuracy, but on obtaining a reasonable cost estimate of sufficient accuracy to ensure that the results are meaningful for management to make the decision at hand (Dysert, 2008: EST.03.1).

It is an accepted practice throughout the petrochemical industry to make important business and design decisions early in the evolution of the project. The result is that the ultimate costs of a project are dramatically influenced by those early decisions made during the process design stage of the project (Kinney & Soubiran, 2004: EST.15.1). Kinney and Soubiran also indicate in Figure 3.14 the importance of accuracy in conceptual cost estimating.

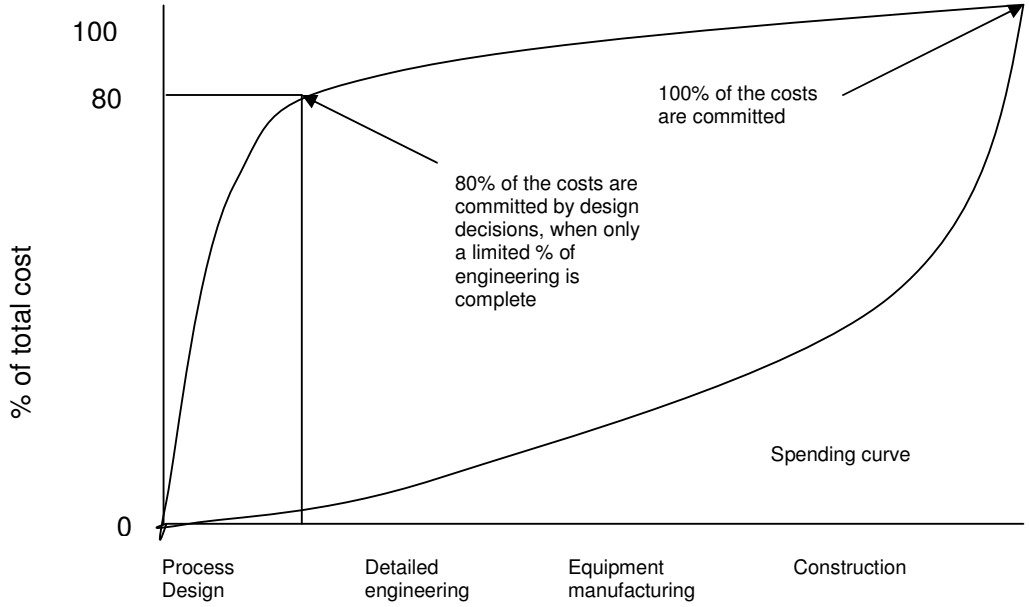


Figure 3.14 Importance of accuracy in conceptual estimates
Source: Kinney and Soubiran, 2004: EST.15.1

6.1.1.1 End-product units method

This conceptual estimating method is used when the estimator has enough historical data available from similar projects to relate the end-product units (capacity units) of a

project to its construction costs (Ellsworth, 2007: 26). This allows an estimate to be prepared in a relatively short space of time. It is, however, necessary to know the end-product unit capacity of the proposed plant. Examples of such an end-product can be the gallon-per-day production of a fuel refinery or the kilowatt output of a power station.

This type of estimate is useful in determining the cost of a proposed project when only the bare minimum is known. As previously stated, only the expected production capability is necessary as a benchmark (Kwak & Watson, 2005: 1430). It is therefore very useful in early stage feasibility analysis to make the initial go-no-go decision.

A direct correlation between different plants based on their output will, however, not reflect the actual movement of costs as projects become bigger or smaller depending on their output. Economies-of-scale are, for instance, ignored. Experienced estimators can make data adjustments to accommodate these changes to an extent. Most of the external factors that can influence an estimate's accuracy are, however, ignored if this methodology is used. Oladapo *et al.,* (2008: 119) indicates how special adjustments are necessary to allow for project location, timing, etc.

6.1.1.2 Physical dimensions method

This method is very similar to the end-product unit method. It has similar uses and similar limitations. Tam (2007: 13) indicates that it is employed in the building construction sector where plan sizes of similar buildings and building heights can vary and simple adjustments are made to accommodate these changes in design. In the petrochemical industry this method is not often employed, but it can be useful when performing semi-deterministic estimates (Dysert, 2004: 9.5), but then only on specific items such as area finishing, buildings that form part of the plant design, etc.

6.1.1.3 Capacity factor method

Ellsworth (2007: 26) demonstrates that a capacity factor method is one in which the cost of a new facility is derived from the cost of a similar facility, but usually with a different capacity. It relies on the non-linear relationship between capacity and cost. The ratio of costs between two similar facilities of different capacities equals the ratio of the capacities multiplied by an exponent:

$$\$B / \$A = (Cap_B / Cap_A)^e$$

Where $A and $B are the costs of the two similar facilities, and Cap_B and Cap_A are the two capabilities of the facilities. This is demonstrated in Figure 3. 14. If this equation is rewritten it becomes:

$$\$B = (\$A)\ (Cap_B / Cap_A)^e$$

Where:

$B is the cost of the facility to be estimated,
$A is the known cost of a similar facility,
Cap_B is the capacity of the facility being estimated,
Cap_A is the capacity of the similar facility, and
"e" is the exponent or proration factor.

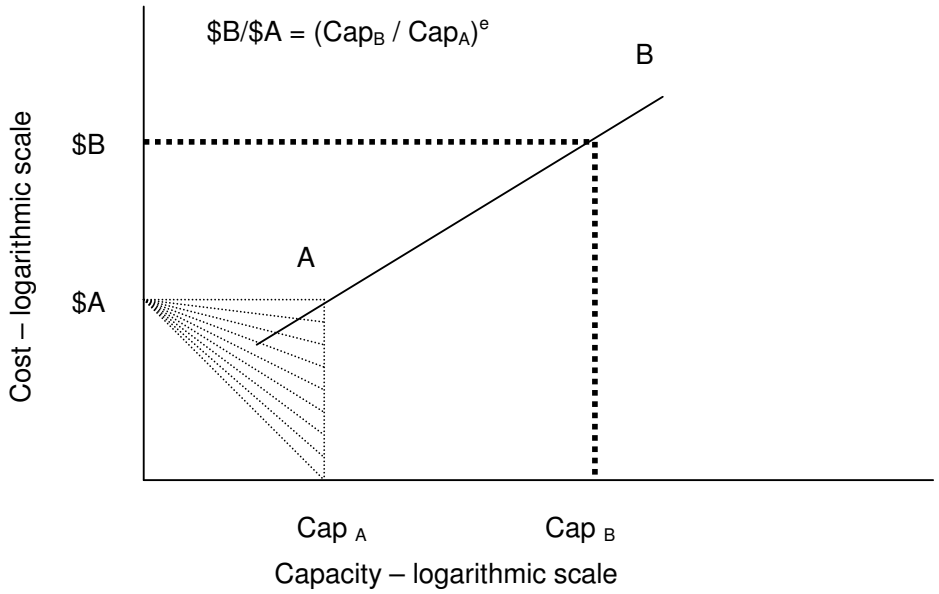


Figure 3.15 Capacity factor relationship
Source: Dysert, 2004: 9.6

Ellsworth (2007: 27) shows that the exponent "e" typically lies between 0,5 and 0,85 depending on the type of facility, and should be carefully analysed for its applicability to each estimating situation. The exponent used in the capacity factor equation is actually the slope of the curve that has been drawn to reflect the change in cost of a facility as it is made larger or smaller. These curves are usually drawn from the data points of the known costs of completed projects. With an exponent value less than 1, scales of economy are achieved such that as facility capacity increases by a percentage, the

costs to build the larger facility increase by less than the same percentage (Ellsworth, 2007: 27).

Dysert (2004: 9.6) indicates that the methodology of using capacity factors is sometimes referred to as the "scale of operations" method or the "six tenth's factor" method due to the common reliance on an exponent value of 0,6 if no other information is available. With an exponent value of 0,6 doubling the capacity of a facility increases the cost by approximately 50 percent, and tripling the capacity of a facility increases the cost by approximately 100 percent.

Dysert (2004: 9.6) says that it is important to realise that as the graph gets plotted, it appears to be in a straight line over a small range of capacity values. It is, however, not constant over the entire range of possible capabilities or facility sizes. In reality, as facility sizes increase, the exponent tends to increase as illustrated in Figure 3.16. As an example, between the capacities A and B as illustrated in Figure 3.16, the capacity factor may have a value of 0,6. However, between capacities B and C, the exponent has a value of 0,65. Between capacities C and D, the value of the exponent may have risen to 0,72. Eventually, as the facility capacity increases to the limits of the existing technology, the exponent tends towards a value of 1. At this point it becomes more economical to build two facilities of a smaller size than one large facility. Cost becomes a linear function of capacity, and scales of economy are no longer obtained. Ellsworth (2007: 27) demonstrates Dysert's findings by means of actual plant costs of hydro-electric pumped storage facilities in Table 3.2. Table 3.2 indicates that it is not always the case that plant cost per output unit decrease as plant size increases. The specific design of each facility needs to be taken into account.

Facility	Year	Capacity in MW	Facility cost in 2005 ($)
Bad Creek, SC	1991	1,065	1,705,000,000
Bath County, VA	1985	2,100	3,632,000,000
Bear Swamp, MA	1974	600	464,000,000
Blenheim-Gilboa, NY	1973	1,000	1,083,000,000
Castaic, CA	1972	1,331	1,735,000,000
Eastwood, CA	1987	200	490,000,000
Fairfield, SC	1978	511	535,000,000
Helms, CA	1984	1,053	1,802,000,000

Jocassee, SC	1973	610	529,000,000
Ludington, MI	1973	1,979	1,687,000,000
Northfield Mountain, MA	1972	846	687,000,000
Racoon Mountain, TN	1978	1,530	797,000,000
Rocky Mountain, GA	1995	848	1,220,000,000
Seneca, PA	1970	422	1,105,000,000
Wallace Dam, GA	1979	209	540,000,000

Table 3.2 Cost and capacity of hydro-electric pumped storage facilities
Source: Ellsworth, 2007: 27

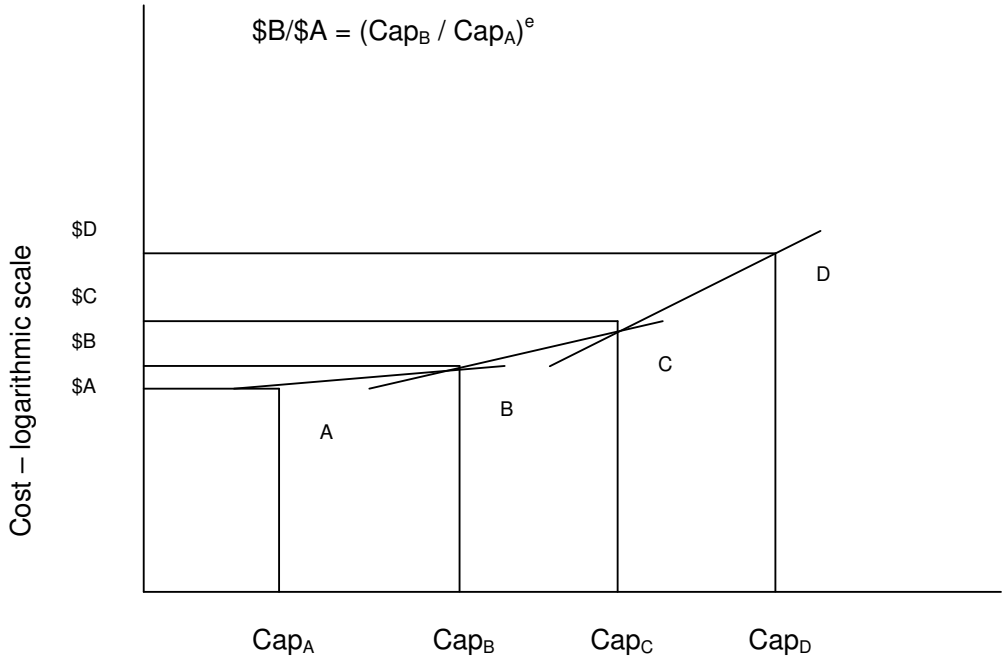


Figure 3.16 Capacity factor exponents are not constant across all capacity ranges
Source: Dysert, 2004: 9.7

This form of estimating can be quite accurate if the capacity factor used in the estimating algorithm is relatively close to the actual value, and if the facility being estimated is relatively close in size to the similar facility of known cost. In a case like this, the potential error from capacity factoring is quite small and is well within the level of accuracy that would be expected from such a method.

Thus, if the facility size being estimated is reasonably close to the size of the known facility, and a realistic capacity factor exponent is used, error from the capacity factoring algorithm is small. However, this error can be compounded by other assumptions that might be necessary to allow for the actual estimating situation such as adjustments for scope, location and time. Each of these adjustments can also add to the level of error in the overall estimate.

The key steps in preparing a capacity factor estimate are described by Dysert (2004: 9.6) and are as follows:

- Deduct costs from the known base case that are not applicable in the new plant being estimated.
- Apply location and escalation adjustments to normalise costs. This determines what the adjusted scope for the base case will cost in the new location and time frame.
- Apply the capacity factor algorithm to adjust for plant size.
- Add any additional costs which are required for the new plant but which were not included in the known plant.

The capacity factor estimating method provides a relatively quick and sufficiently accurate means to provide early estimates during the concept screening stage of a project. The method requires historical cost and capacity data for similar plants and processes. Although published data on capacity factors exist, the best data would be from the specific organisation for which the estimate is being conducted. When using this method the new and existing known facilities should be near duplicates and reasonably close in size. Each of the adjustments that are made, add additional uncertainty and potential error to the estimate. Nevertheless, this estimating method remains a firm favourite when dealing with early stage support decision-making and pre-design estimates.

6.1.1.4 Ratio or factor method

Ratio or factored estimating methods are used in situations where the total cost of an item or facility can be reliably determined from the cost of a primary component. In the case of most petrochemical plants, the specialised process equipment makes up a significant portion of the total project cost. This is often referred to as “equipment factor” estimating (Uppal, 2007: EST.03).

Equipment factor estimates are used to develop costs for process and utility units for which the behaviour of the costs of the direct labour and bulk materials used to construct the facilities is correlated with the costs (or the design parameters) of the major equipment. Liu and Zhu (2007: 91) describe that this estimating methodology typically relies on the principle that a ratio or factor exists between the cost of an equipment item and the costs for the associated non-equipment items (foundations, piping, electrical, etc.) needed to complete the installation.

An equipment factor estimate can typically be generated when project definition is approximately 1 to 15% complete. An equipment list should be available at this point of time in the project. This estimate is often a feasibility estimate used to determine whether there is sufficient business case to pursue the project. If so, then this estimate may be used to justify the funding required to complete the engineering and design required to produce a funding or budget estimate (Newnan *et al.,* 2004: 46).

Depending on the particular factoring techniques and data used, the factors may estimate Total Installed Cost (TIC) or Direct Field Cost (DFC). Usually the factors generate costs only for the Inside Battery Limit (IBL) facilities, and require the Outside Battery Limit (OBL) costs to be estimated separately. Refer to Figure 3.17 (Kinney & Gauche, 2006: EST.14.1). In rare cases there might be sufficient factors to estimate both IBL and OBL at the same time. It is therefore important to understand the basis of the factors used in an equipment factored estimate.

Hans Lang published an article in 1947 where he proposed the use of the total cost of the equipment of a plant multiplied by a factor to calculate the total construction cost of the plant (Uppal, 2007: EST.03). Lang produced three factors which cover all the costs associated with the construction of a plant. This means that it includes IBL as well as OBL costs. Table 3.3 illustrates Lang's factors.

Type of plant	Factor
Solid process plant	3.10
Solid-fluid process plant	3.63
Fluid process plant	4.74

Table 3.3 Lang factors

Source: Dysert, 2004: 9.8

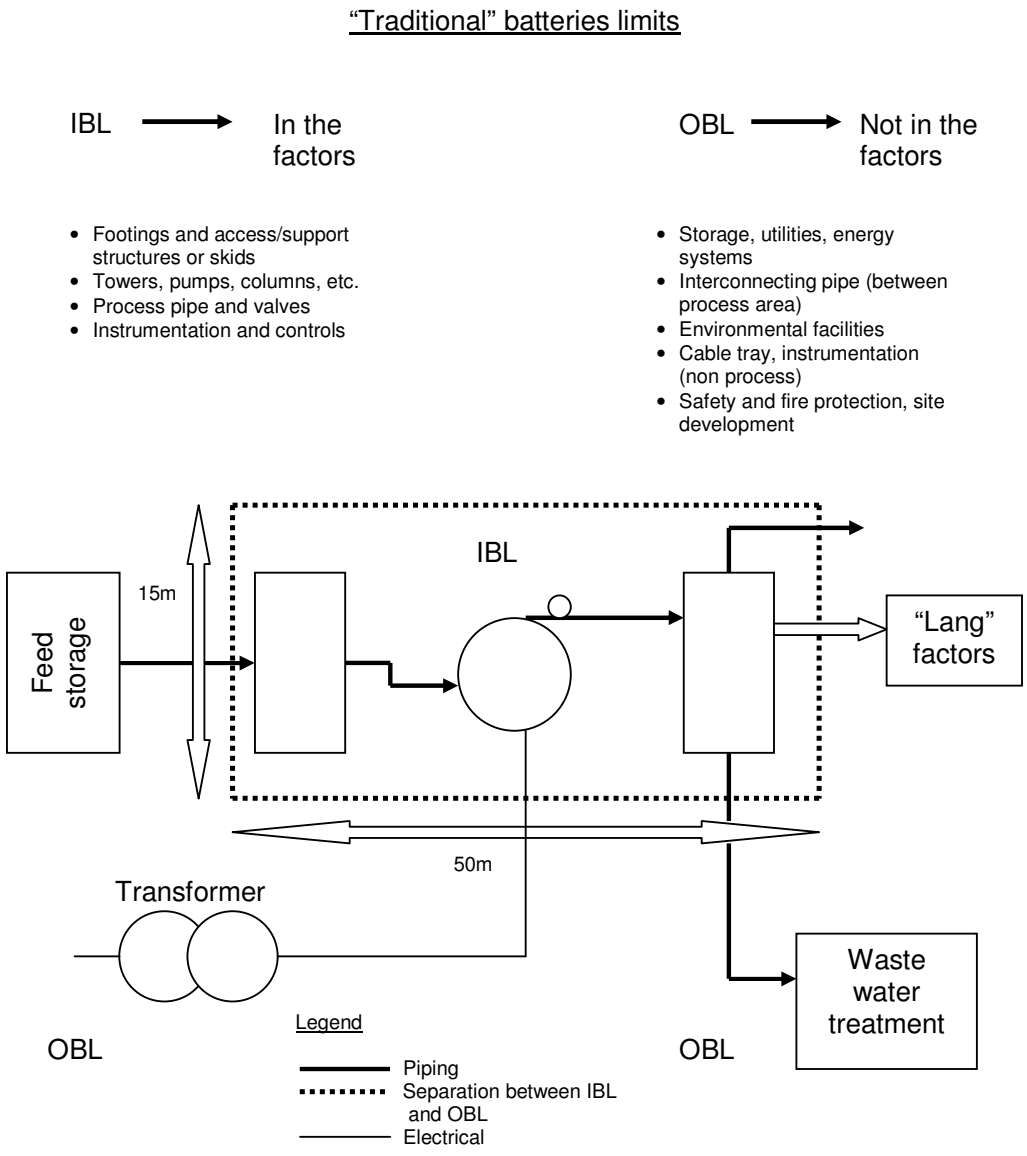


Figure 3.17 Traditional definition of IBL and OBL

Source: Kinney and Gauche, 2006: EST.14.1

Lang's approach was rather simple, utilising a factor that varied only by the type of process. Since that first publication many methods of equipment factoring have been proposed and some have become very sophisticated. The term "Lang factor" is often used to refer to all types of equipment factors.

In 1958 W. E. Hand (Uppal, 2007: EST.03.2) elaborated on Lang's work by proposing different factors for each type of equipment (columns, vessels, heat exchangers, etc.) rather than process type. Hand's factors estimated direct field costs excluding instrumentation. Hand's published equipment factors ranged from 2,0 to 3,5 (which might correlate with 2,4 to 4,3 including instrumentation). Hand's factors excluded indirect field costs, home office costs and the costs for off-site or outside battery limit costs. These costs would have to be estimated separately.

In 1965 Arthur Miller proposed another enhancement to the concept of equipment factors. Miller recognised the impact of three specific variables that affect the equipment material cost to a greater degree than they affect the cost of the associated bulk materials and installation (Dysert, 2004: 9.8). These three factors are the size of the major equipment, the materials of construction (metallurgy) of the equipment, and the operating pressure. Miller notes that as the size of a piece of operating equipment becomes gets larger, the amount of corresponding bulk materials (foundations, support steel, piping, instrumentation, etc.) does not increase at the same rate. Thus, as the equipment increases in size, the value of the equipment factor decreases.

Dysert (2004: 9.8) indicates that similar tendencies exist for an increased quality of material or increased operating pressure. The better the quality of material or the higher the operating pressure, the smaller the factor value. Miller suggests that these three variables could be evaluated in terms of a single attribute known as the "average unit cost" of equipment. The average unit cost of equipment is:

Total cost of process equipment/number of equipment items

If the average cost of equipment increases, then the equipment factor is scaled smaller. The correlation between increasing average unit cost of equipment and decreasing equipment factors was statistically validated in subsequent studies (Nishimura, 1995: 235; Rodl, Prinzing & Aichert, 1985: 112).

The equipment factors described thus far were used to generate all the DFC or the TIC cost. Another method of using equipment factors is to generate separate costs for each of the disciplines associated with the installation of the equipment. Uppal (2007: EST.3.5) describes the use of this methodology. Using this methodology, each type of equipment is associated with several discipline specific equipment factors. For example, one factor will generate the costs for concrete, one for structural steel and one for piping, etc. An advantage of this method is that it allows the estimator to adjust the costs for the individual disciplines based on specific knowledge of the project conditions and improves the accuracy thereof. The estimator can also use the costs for the different disciplines and compare them against other similar costs.

Developing the actual equipment factors to be used in preparing process plant estimates is a time consuming affair. When these factors are used, there should be a clear explanation of what is included in the factors and what not. Equipment factors are typically developed by generating detailed estimates for a matrix of equipment types, size ranges, metallurgies, operating pressures, etc. The estimates are then carefully analysed to develop individual equipment and adjustment factors so that other variables can be accounted for.

The factors developed in this manner can be tested and calibrated against actual project histories. The proposed equipment factors are applied to the actual equipment costs for completed projects, and the result for the factoring exercise is compared to the actual project cost to determine if a reasonable degree of accuracy has been obtained. If the factoring results vary consistently from the actual costs an analysis to determine the reasons will have to be performed. These factors will have to be developed on a continuous basis to improve the accuracy of the method.

When comparing an equipment factored estimate, the first step will be to establish the cost of each piece of equipment. The equipment list should be examined carefully and compared against the process flow diagrams (PFDs). If factored estimating is used, the complete list of equipment is generally not available. Assumptions should be made as to which auxiliary equipment will be used in conjunction with the major pieces of equipment.

Equipment sizing should also be verified. At this preliminary stage of engineering a common problem is that equipment is often sized at 100% of normal operating duty. What typically happens is that by the time the equipment data have been added to the

purchase order, a percentage of over sizing has been added to the design specifications. The percentage of over sizing depends on the type of equipment and the specific company procedures.

The purchase cost of the equipment may be obtained from several methods using purchase orders, other purchase information from recent purchases, published equipment cost data, and firm vendor quotations. Since the material cost for equipment can vary between 20 and 40% for process plants it is important to estimate the costs as accurately as possible. If historical purchase information is used, one should ensure that the costs are escalated appropriately and adjusted for location and/or market conditions as required.

When the equipment cost is established, the appropriate equipment factors need to be established and applied. Adjustments for equipment size, metallurgy and operating conditions are included if necessary. Any specific project or process conditions should be evaluated to determine if scope-based adjustments to the factored costs will be required. A more congested site, for example, will lead to shorter pipe and cable runs due to closer equipment spacing, but the congestion on the site will have a negative effect on productivity. Areas prone to seismic activity probably will require adjustments to the foundations and might include the use of piles or raft foundations.

When the equipment factored estimates are complete, the remainder of the project costs that are not covered by the factors must be estimated. Depending on the type of factors used, this may include indirect field costs, home office costs and outside battery (OBL) costs. A very important factor that should be taken into account when making use of this method is to know exactly what is included in the factors and to include all costs that are not covered by the factors.

6.1.1.5 Parametric method

A parametric cost model is a useful tool for preparing conceptual estimates when there is little technical data or engineering deliverables to provide a basis for using more detailed methods. NASA (Dysert, 2004: 9.11) defines parametric estimating as follows:

> *"A parametric model is a mathematical representation of cost relationships that provide a logical and predicable correlation between the physical or functional characteristics of a plant and its resultant cost. A parametric*

estimate comprise cost estimating relationships and other parametric estimating functions that provide logical and repeatable relationships between independent variables, such as design parameters or physical characteristics and the dependent variables, cost."

Capacity and equipment factor estimates are simple examples of parametric estimates, however, sophisticated parametric models typically involve several independent variables or cost drivers (Brunsman, Robson & Gransberg, 2008: EST.06.1). Though similar to those estimating methods, parametric estimating is reliant on the collection and analysis of previous cost data in order to develop the cost estimating relationships. The process of developing a parametric model should generally involve the following steps (Dysert, 2008: EST.03.2):

- Cost model scope determination,
- data collection,
- data normalisation,
- data analysis,
- data application,
- testing, and
- documentation.

The first step in developing a parametric cost estimate model is to establish its scope. This includes defining the end use of the model, the cost basis of the model, and the critical components and cost drivers (Dysert, 2008: EST.03.2). The end use would typically be to prepare conceptual estimates for process plants. The type of process to be covered by the model, the type of costs to be estimated, the intended accuracy range of the model, etc. should all be determined as part of the end-use definition. The model should be based on actual costs from completed projects, and should reflect a specific organisation's engineering practices and technology (Brunsman *et al.,* 2008: EST.06.1). The model should generate current year costs or should have the ability to escalate costs to current year costs. The model should be based on key design parameters that can be defined with reasonable accuracy early in the project scope development and provide the capability for the estimator to easily adjust the derived cost for specific complexity or other factors affecting the particular project, (Fang & Rogerson, 1999:45).

The quality of the resulting model cannot be better than the data that it is based upon (Polla, 2007: 12). The level at which cost data is collected will affect the level at which the model can generate costs and may affect the derivation of the cost estimating relationships. It is advisable to collect cost data at a fairly low level of detail. The cost data can always be summarised later if an aggregate level of cost information provides a better model. A base date should be recorded for each set of data collected to allow future normalisation. Kwak and Watson (2005: 1431) state that the scope information should include all proposed design parameters or key cost drivers for the model, as well as any other information that may affect costs. It is usually best to create a formal data collection form that can be consistently used, and revised if necessary.

After the data has been collected the next step in the process of developing a parametric model is to normalise the data before it can be analysed. (Dysert, 2008: EST.03.2) states that normalisation of the data involves making adjustments to the data to account for the differences between the actual basis of the data for each project, and a desired standard basis of data to be used for the parametric model. Typically, data normalisation involves making adjustments for escalation, location, site conditions, system specifications, and cost scope.

There are many diverse methods and techniques to analyse the data (Kwak & Watson, 2005: 1434). Further information on these methods will follow further in this study. Typically, data analysis consists of performing regression analysis of costs versus selected design parameters to determine the key drivers for the model.

The data application stage of the development process involves establishing the user interface and presentation form for the parametric cost model (Wong, 2002: 373). Using the mathematical and statistical algorithms developed in the data analysis stage, the various inputs to the cost model are identified, and an interface is developed to provide the estimator with an easy and straightforward way in which to enter this information (International Society of Parametric Analysts and the Society of Estimating and Analysis, 2007: 2.8). Once the regression analysis have been performed and algorithms have been obtained, it must still be examined to ensure that it make sense. If the relationships from the model appear to be reasonable, additional tests can be performed for statistical significance and to verify that the model does provide answers within an acceptable range of error.

A quick test to run is to test the regression results directly against the input data to see the percent error for each of the inputs. This can then be used to determine the range of error, and interpreting the results can assist in determining problems and refining the algorithms. The whole model should be tested against new data (data not used in developing the model). The data used to create the model should be documented, including a discussion on how the data was adjusted and normalised. All the assumptions and allowances designed into the model should be documented, as should any exclusions. The range of applicable input values and the limitations of the model's algorithms should also be explained.

6.1.2 Deterministic (detailed) estimating methodologies

A detailed estimate is one in which each component of a project scope definition is quantitatively surveyed and priced using the most realistic unit prices available (Vilela, & Longo, 2008: INT.11.1). Yepez (2008: 70) points out that detailed estimates are typically prepared to support final budget authorisation, contractor bid tenders, cost control during project execution, and change orders. Detailed estimates use a deterministic approach and require a substantial amount of time and are quite costly to prepare (Tam, 2007: 28).

At a minimum, the required engineering and design data required to perform a detailed estimate includes process and flow diagrams, piping and instrument diagrams, equipment data sheets, motor lists, electrical one-line diagrams, piping isometrics (for alloy and large diameter pipes), equipment and piping lay-out drawings, plot plans and engineering specifications. Pricing data should include quotations from vendors, current pricing information from recent purchase orders, current labour rates, project schedule information, etc.

In a completely detailed estimate, all costs are detailed including direct field cost, indirect field cost, head office costs and all other miscellaneous costs for IBL, as well as OBL facilities. A semi-detailed estimate might include factored IBL costs and measured quantities for the OBL facilities. A forced detailed estimate is one where quantities are taken off preliminary drawings and design information (Dysert, 2004: 9.13). The following steps comprise the activities undertaken during the preparation of a detailed estimate:

- Prepare project estimate basis and schedule.

- Prepare direct field cost estimate.
- Prepare indirect field cost estimate.
- Prepare head office cost estimate.
- Prepare sales tax and duties estimate.
- Prepare escalation estimate.
- Prepare project fee estimate.
- Prepare cost risk analysis / contingency determination.
- Review and validate estimate.

The preplanning of the estimate is essentially the first step in performing the estimate. The estimate basis documents the activities and course of action that will be used to prepare the estimate. The organisation's estimating guidelines and procedures should be reviewed with the estimating team. The project's work breakdown structure (WBS) should be reviewed and an agreement should be reached on the estimating format. The structure of the detailed estimate is mostly used to support cost control during the execution of the project and should be structured to accomplish that purpose. The listing of engineering and technical deliverables should be reviewed. Any exclusion should be documented not to omit these when the estimate is finally submitted. As previously stated, the items not included in the estimate are just as important as those included in the estimate.

Estimating the direct field costs is the most intensive activity of the detailed estimate. Project scope should be reviewed and understood, and all technical deliverables assembled. As the drawings are issued from the engineering department a take-off must be done to quantify all material and labour components in order to cost it later on. Labour hours are assigned to all activities and get adjusted for labour productivity. The direct field cost estimate then is summarised and reviewed for completeness and accuracy.

The labour component of the direct field cost is normally a basis for the indirect field cost estimate. These labour hours are factored to determine what the indirect field cost component will be. The construction manager should be heavily involved in finalising the indirect field cost estimate. The estimator, in conjunction with management, will discuss the sundry items such as tax allowances, profit allowances, etc. to be added to the total estimate (Anonymous, 2008r: 5). An important additional cost will be the

contingency that should be calculated and added to the estimate. More information on contingency calculation will follow in this study.

The costing of the process equipment is as important in the detailed estimate as it is in the equipment factored estimate. Equipment cost will be the most significant cost on the project. The minimum requirements for pricing the equipment will be the process flow diagrams, equipment lists, and the equipment process data sheets. In many cases there will not be enough time to obtain formal quotations for equipment and the estimator will revert to parametric estimating to determine the cost of the equipment. A check between the equipment list and the flow diagram should be standard practice. The estimator should also ensure that all additional items should be included in the price for any given piece of equipment. Freight costs can be significant and should not be forgotten.

Equipment installation costs are usually prepared by the estimator, with assistance from the construction team where required. Construction assistance is usually required when heavy lifts, site access, scaffolding or special installation methods are required. The labour content for the installation of equipment is usually based on the weight of the equipment. Using the equipment weight and physical size, the man-hours required to install the piece are typically determined from production curves based on historical data. Depending on the information available, the labour hours to set and erect a heavy vessel may not include the hours to erect, take down, and dismantle a guy derrick, gin poles or other special lifting equipment. Special consideration may also be given to calibration, soil settlement procedures, special internal coatings, hydro testing and other testing requirements.

As previously stated, detailed estimate is the most accurate form of estimating, but also requires the most time and effort to prepare. In modern construction almost all projects are based on the fast track principle which means that the fully detailed estimate will almost never be used as a pre-contract estimating tool, but rather as an in-contract cost control device. In most cases the semi-detailed estimate or the forced-detailed estimate will prevail. These estimates can be done sooner since they are based on a lower level of detail. This will mean that management will be sooner in a position to make financial decisions as to whether a project should continue or not.

6.2 Estimate classifications

Liu and Zhu (2007: 93) and Aslaksen and Vigerust (2007: RISK.02.2) state that formal estimate classifications have been developed to establish a series of routes to allow the project team to better manage the estimate process. Figure 3.18 shows that for a conventional project the emphasis in the conceptual stage should be on input factors such as project information and team experience. In the design stage, attention is shifted to estimation design and estimation process, in addition to project information and team experience. Entering the tendering stage, the focus is on expected accuracy level, benchmarking, and team alignment, in addition to estimation design and estimation process. Finally, at the construction stage, focus narrows further down to review and acceptance of estimate, estimation design, team alignment and benchmarking (Liu & Zhu, 2007: 93).

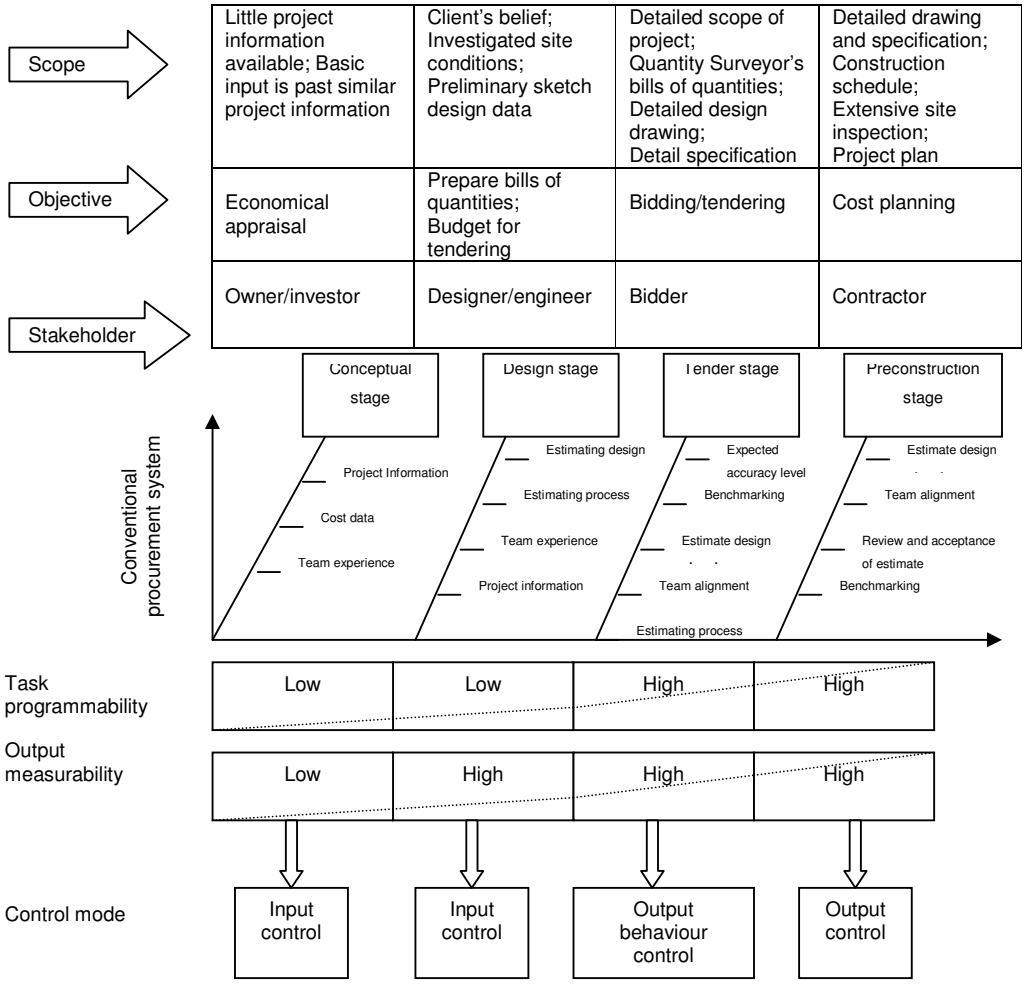


Figure 3.18 Stage-by-stage controls factors framework

Source: Liu and Zhu, 2007: 93

To obtain the various levels of accuracy (as proposed by Liu and Zhu) certain types of estimates were labelled, assigned to certain levels or classifications. Molenaar (2005: 343) comments that cost estimates should transparently convey the true nature of uncertainty involved with the project at each stage of the process. Estimating procedures must model both the technical and non-technical nature of the challenges in quantifying capital costs early in the project's life cycle.

Molenaar (2005: 344) states that cost estimating techniques and tools should relate and adapt to the various phases of project development. Molenaar (2005: 344), Barmania and McMullan (2006: IT.01.2) and Uppal (2006: EST.07.4) describe the estimate classification system of The Association for the Advancement of Cost Engineering International (AACE). Table 3.4 illustrates this proposed classification system. The system described in Table 3.4 is fairly similar to the generic cost estimate classification matrix proposed by AACE.

Estimate class	Engineering complete	Typical contingency	Typical estimate accuracy	Purpose of estimate	Required for PA gate
5	Minimal	-	± 50%	Evaluation Screening	1
4	1 – 10%	15 – 25%	- 15% + 30%	Concept selection FEED decision	2
3	10 – 25%	10 – 15%	- 10% + 15%	AFE Project sanction decision	3
2	30 – 80%	5 – 10%	- 5% + 10%	Control estimate Re-forecast of Class 3	
1	80 – 100%	0 – 5%	- 3% + 7%	Final control estimate Re-forecast of Class 2	

Table 3.4 AACE estimate classification

Source: Barmania and McMullan, 2006: IT.01.2

The system allows for an expected range of accuracy for each phase. A Class 5 estimate is based on the lowest level of project definition and a Class 1 estimate is close to full project definition. Table 3.4 also describes the methodological approach to the estimate as either stochastic or deterministic, depending on the level of design and information available.

Figure 3.19 and Figure 3.20 explain how identifying, quantifying and managing cost and schedule uncertainties relate to management of the cost of major projects. Figure 3.20 applies to situations where the scope is unchanged and where an estimate at some early stage (e.g. 5% design stage) has included uncertainty. There should be a reduction in the range of cost or schedule uncertainty as a project proceeds from concept to completion. The reduction in estimated cost is as a result of better defining cost variables and eliminating uncertainty as cost factors are finally incorporated into the project plan (Molenaar, 2005: 344).

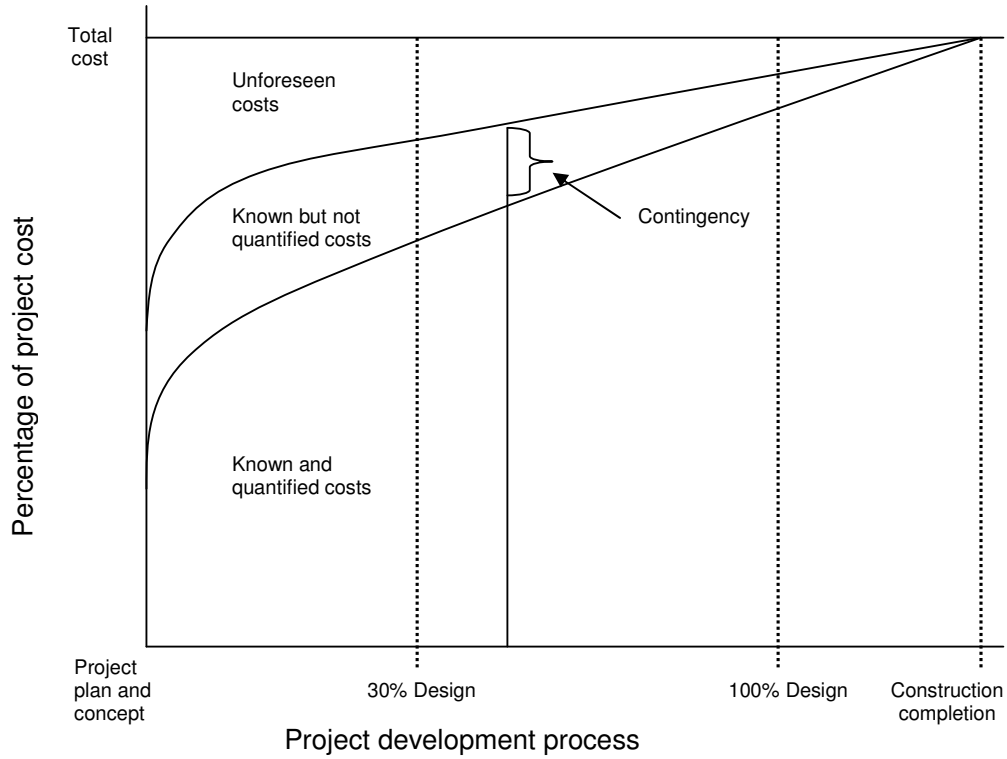


Figure 3.19 Conceptual components of a cost estimate

Source: Molenaar, 2005: 344

6.3 Take-off

The traditional quantity surveying profession is most familiar with quantity take-offs. Bills of Quantities are based on quantity take-offs and are thus an essential part of a quantity surveyor's function in the professional team. In the engineering field, the total responsibility is shared by the quantity surveyor, as well as the cost controller/cost engineer. The main difference in taking off for tendering purposes as a consultant on the client's side and that of a take-off for an estimate for tendering purpose is probably that the estimator on the contractor's side does not have the luxury to include provisional measures and provisional amounts that can later be re-measured (Claasen, 2008a: Financial Mail – 25 April). More clients tend to opt for the "Lump Sum Fixed Price" type contract and in the case of a design-construct contract will hold the contractor responsible for under-measuring the tender (Henschel & Hildreth, 2008: CDR.S02.1).

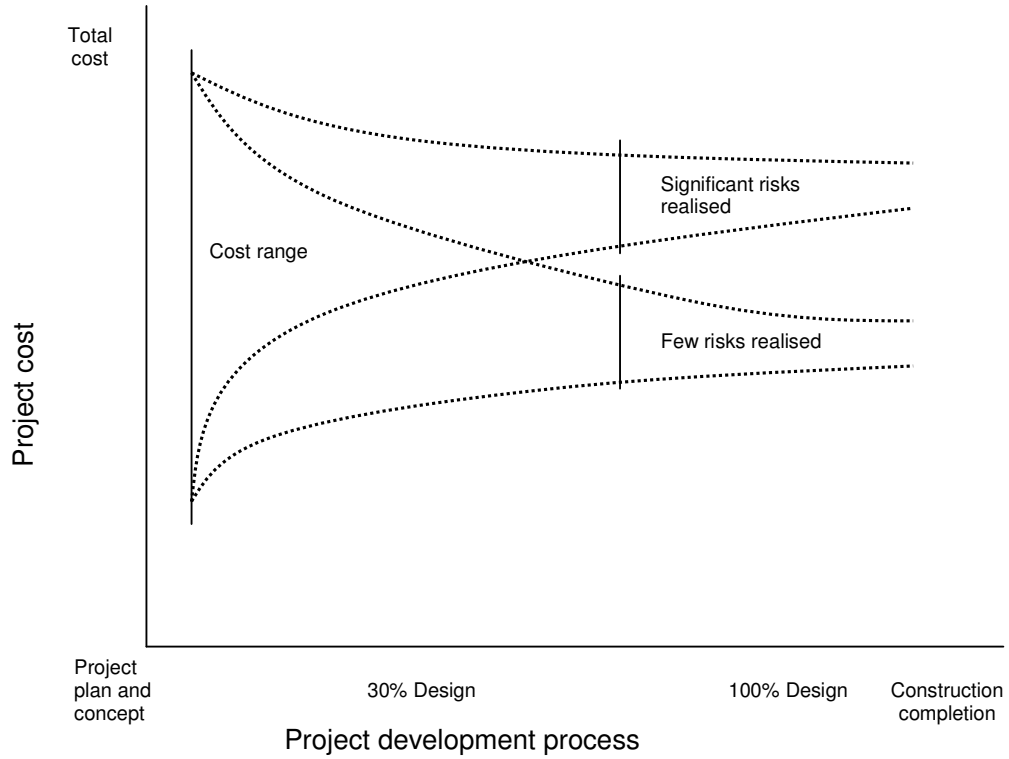


Figure 3.20 Conceptual refinement of a cost estimate

Source: Molenaar, 2005: 345

Take-offs are an essential part of detailed estimates (Dysert, 2004: 9.18). By keeping a uniform and consistent take-off process, the chance of error or omission is reduced.

This will enable new estimators on the team to pick-up much easier where the previous estimator left off. It is not necessary to discuss the basic principles of take-offs here, but should the estimator keep to these principles he will seldom experience a problem in these tasks.

6.4 Estimating allowances

Harbuck (2007: EST.16.2) demonstrates in Figure 3.21 the change in construction variables during the course of construction. Allowances are often included in the estimate as a percentage of some detailed cost component. Harbuck (2007: EST.16.2) indicated some typical examples of allowances that may be included in detailed construction estimates:

- design allowances for engineered equipment,
- material take-off allowances,
- overbuy allowances,
- unrecoverable shipping damage allowances, and
- allowances for undefined major items.

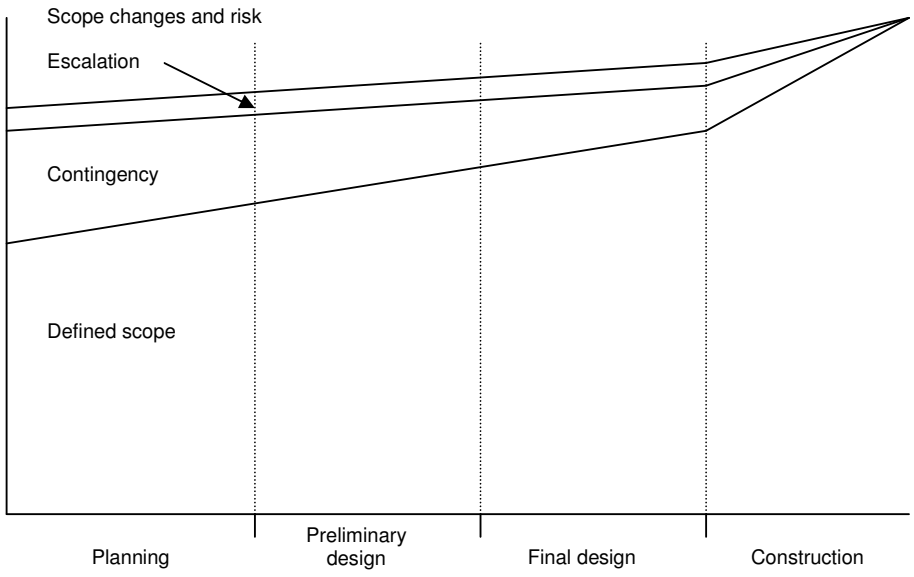


Figure 3.21 Change in construction variables during the course of a construction project

Source: Harbuck, 2007: EST.16.3

With speciality engineered equipment it is often likely that the quoted cost is not the final cost incurred by the project. Past project experience will lead the estimator to certain allowances for certain elements. Miscellaneous allowances may be included in an estimate in situations where a statistical correlation is more reliable than a detailed quantification, or where it is not economical to perform a detailed take-off. Percentage allowances are often included for such items. Material and/or labour costs routinely covered by such items include:

- percentage of hand excavation versus machine earthworks,
- formwork accessories,
- structural steel connection materials,
- bolts, gaskets, etc.,
- piping hangers, guides, etc.,
- miscellaneous welding operations, and
- hydro-testing and other testing operations.

Specific application of estimating allowances will depend on many considerations. For conceptual estimates, such as capacity factored estimates, allowances may not be required as the estimating methodology itself covers all scope and costs included in the project (Uppal, 2007: EST.03.9). Allowances are usually more applicable to semi-detailed and detailed estimates, with the cost value of allowances (or percentage costs) becoming less as the project definition increases. A specific allowance will usually depend on specific organisation estimating procedures and experiences (Dysert, 2006: EST.01.4).

Allowances are often included in an estimate to account for the predictable but indefinable costs associated with project scope. A way to include for these allowances is by adding a contingency amount to the estimate total (Burroughs & Juntima, 2004: EST.03.1). Such a contingency is required because estimating is not an exact science. The concept of contingency allowances is covered in more detail later in this study, but the basic essence of the contingency is illustrated in Figure 3.22 adopted from Noor and Tichacek (2004: RISK.04.2). With estimating in mind, it is however important to note some important allowances that the contingency does cater for and what it does not cater for. The contingency typically covers the following (Zhao, 2006: RISK.05.2; Singh Shiramizu & Gantam, 2007: 23 - 25):

- Errors and omissions in the estimating process.
- Variability associated with the quantification process.
- Design that may not be complete enough to determine final quantities at the time of estimate preparation.
- Some items that may defy precise quantification but are required to be estimated.
- Some items that need to be quantified that are generally computed by factored or other factored conceptual methods.
- Labour productivity variability.
- Labour availability skills and productivity that may vary from that originally assumed.
- The fact that there is no such thing as an “average” tradesman that installs every incremental quantity of an item at an “average” rate typically used in preparing the estimate.
- Weather which may vary from that assumed affecting labour productivity.
- Wage rate variability (Cohen, 1990: New York Times – 19 August).
- Wages that may vary from that assumed in the estimate due to inflationary reasons, changes in assumed crew mix, labour availability, and market conditions.

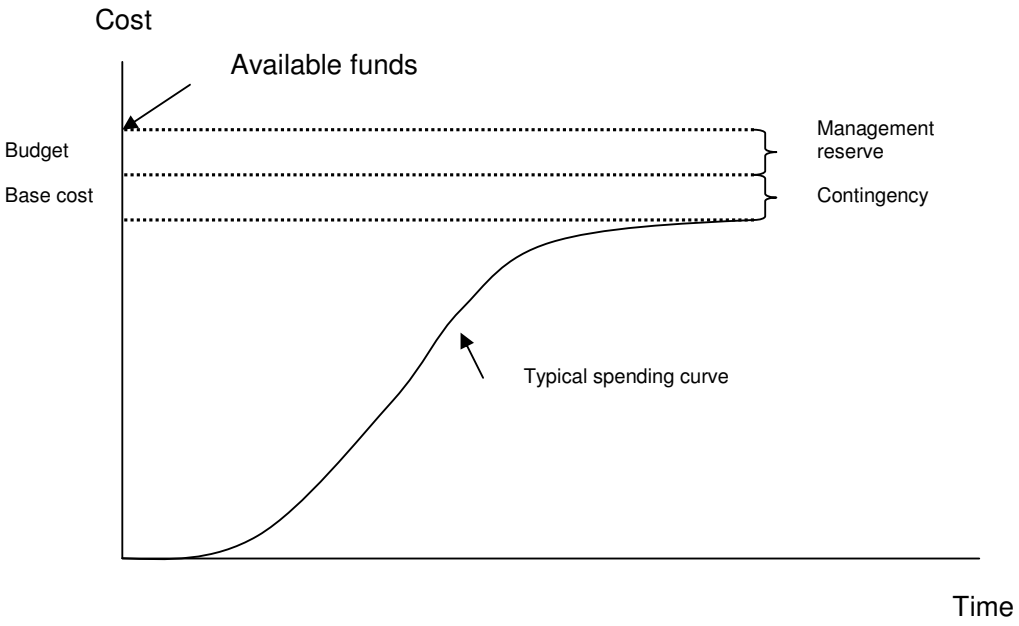


Figure 3.22 Relationship between the budget, contingency and management reserve

Source: Noor and Tichacek, 2004: RISK.04.2

- Inflation in material and equipment costs.
- Certain materials of construction that may be substituted from that assumed in the estimate.
- Changes in actual quantities that may change discount schedules from that assumed in the estimate.

Zhao (2006: RISK.05.2) points out that contingencies specifically exclude the following:

- Significant changes in scope.
- Major unexpected work stoppages (strikes, etc.)
- Acts of God.
- Excessive, unexpected inflation.
- Excessive, unexpected currency fluctuations.

6.5 Estimate accuracy

Estimate accuracy is described by Dysert (2006: EST.01.1) as follows:

> *"Accuracy is the degree to which a measurement or calculation varies to its actual value; thus estimating accuracy is an indication of the degree to which the final cost outcome of a project may vary from the single point value used as the estimated cost for the project."*

Figure 3.23 illustrates the concept of estimate accuracy in relation to the estimate's probability distribution. In the example the point estimate (the estimate before contingency) has a value of $1 million. Here the point estimate has a greater than 50% probability of being exceeded by the final cost of the project, and thus a positive amount of contingency would be added to reflect a 50% probability (or a 50% confidence level) of under-run or overrun of the expected final cost (Dysert, 2006: EST.01.1).

In this example the accuracy range is expressed as a percentage based on the point estimate. Should a contingency be added and the same variables would be applied, the situation will alter to the scenario sketched in Figure 3.24.

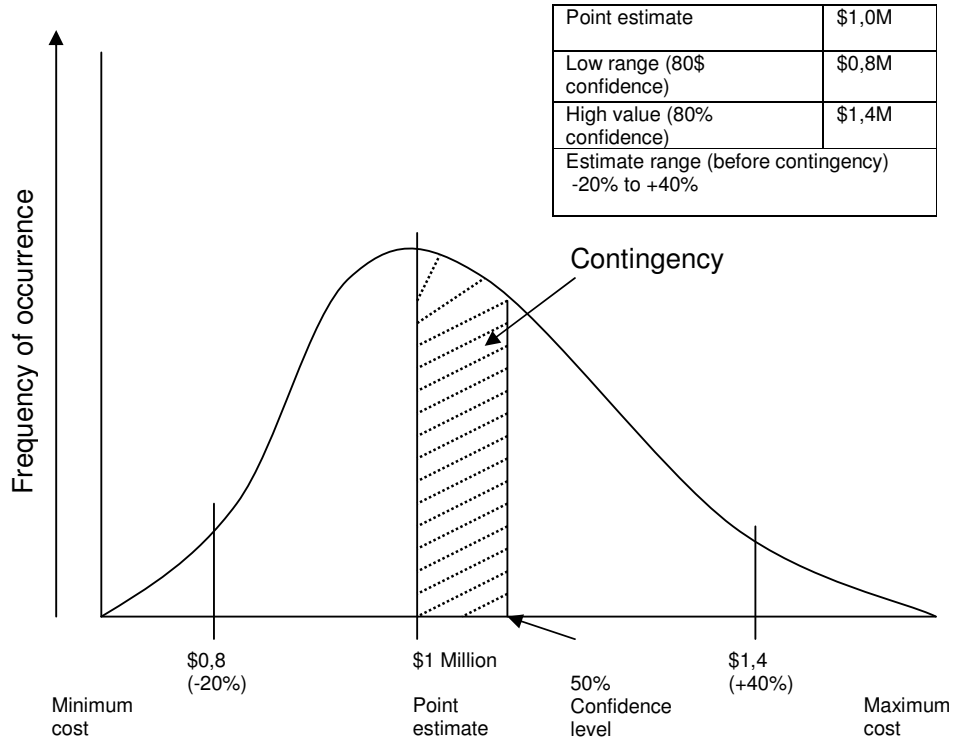


Figure 3.23 Estimate accuracy range around the point estimate

Source: Dysert, 2006: EST.01.1

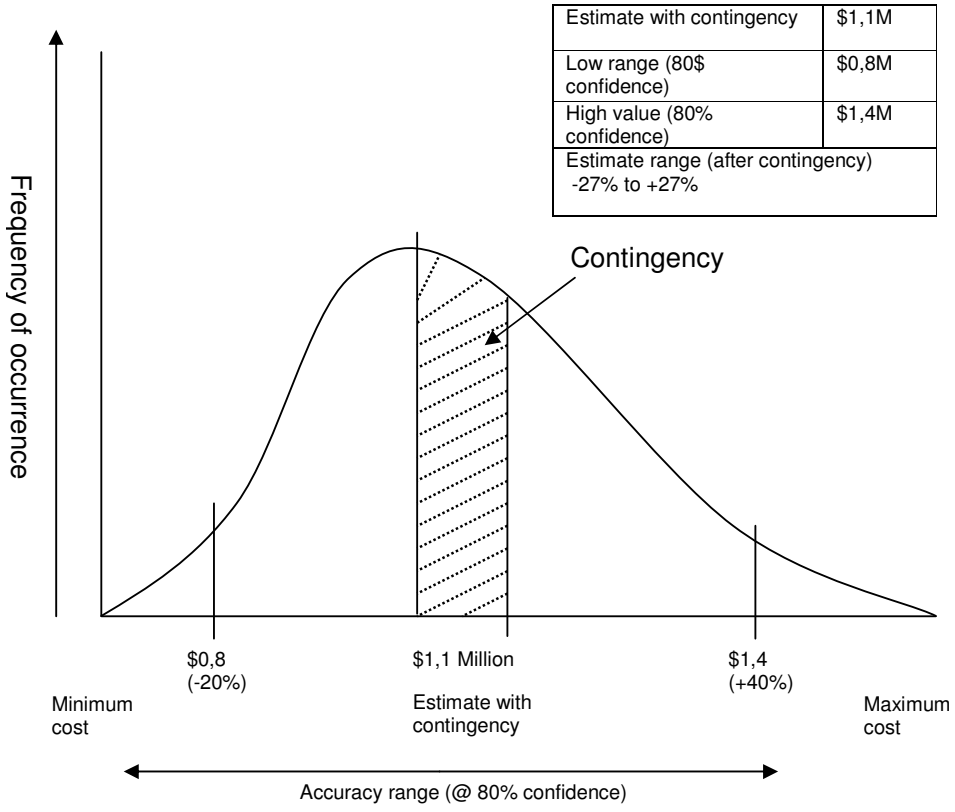


Figure 3.24 Estimate accuracy range around the estimate including contingency

Source: Dysert, 2006: EST.01.1

As should be expected, estimate accuracy tends to improve (i.e. the range of probable values narrows) as the level of project definition improves. Should this statement be compared to the AACE's classification of estimates, where increasing levels of project definition are associated with moving from Class 5 estimates to Class 4 estimates and eventually to a Class 1 estimate, accuracy can be directly linked to estimate classification. Figure 3.25 demonstrates this point.

Lukas (2006: EST.03.1) proposes four main factors that influence estimate accuracy making it a poor quality estimate. They are

- lack of scope definition,
- poor communication,
- unrealistic client expectations, and
- optimistic team members.

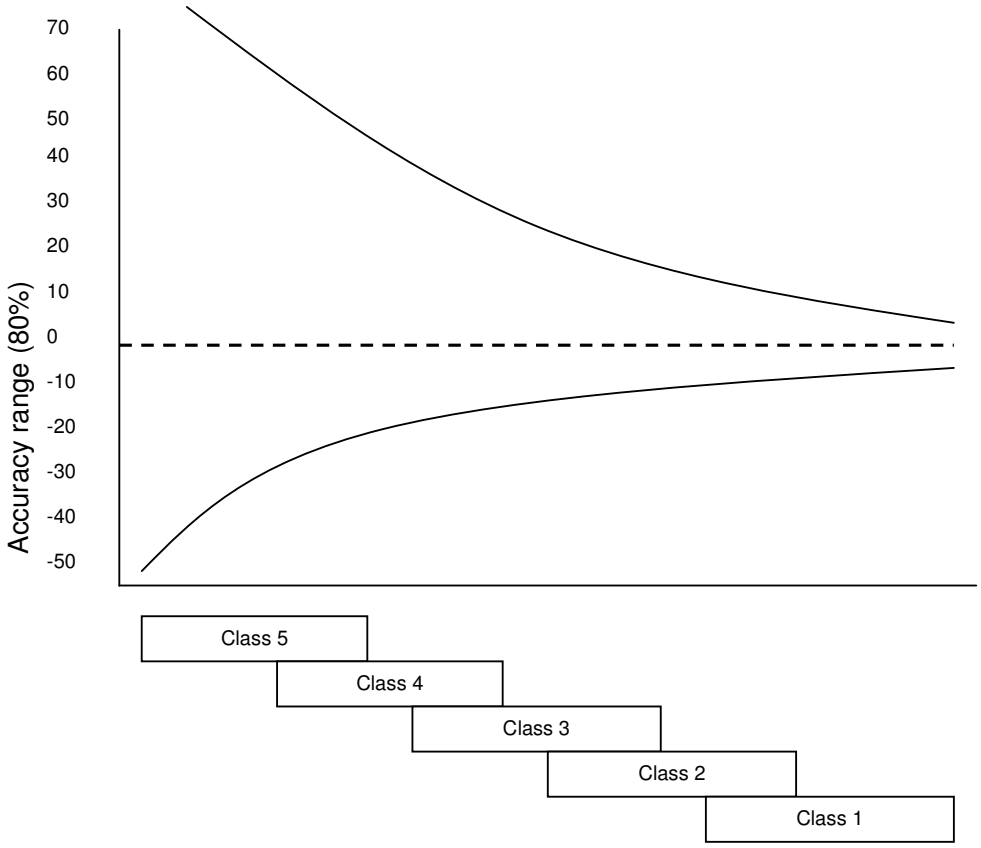


Figure 3.25 Estimate accuracy improves as the level of project definition improves

Source: Dysert, 2006: EST.01.1

Lukas (2006: EST.03.4) proposes the following tools to improve the accuracy of an estimate:

- Make sure the estimate matches the work breakdown structure.
- Do not allow over-optimistic persons to influence the estimator.
- Never estimate alone. Multiple opinions and views make for better estimates.
- Use risk analysis tools to help determine the potential estimate range and the appropriate amount of contingency to be included.
- Watch the level of precision used for the estimate total. Reflecting too exact a number implies a high level of precision, which probably does not exist within the estimate.
- Document assumptions and exclusions.

Lukas demonstrates in Figure 3.26 how the accuracy of the estimate increases as the estimate type changes to more detailed estimates as the project progress. This also ties-in with Dysert's illustration in Figure 3.25 that refers to the classification of the estimates.

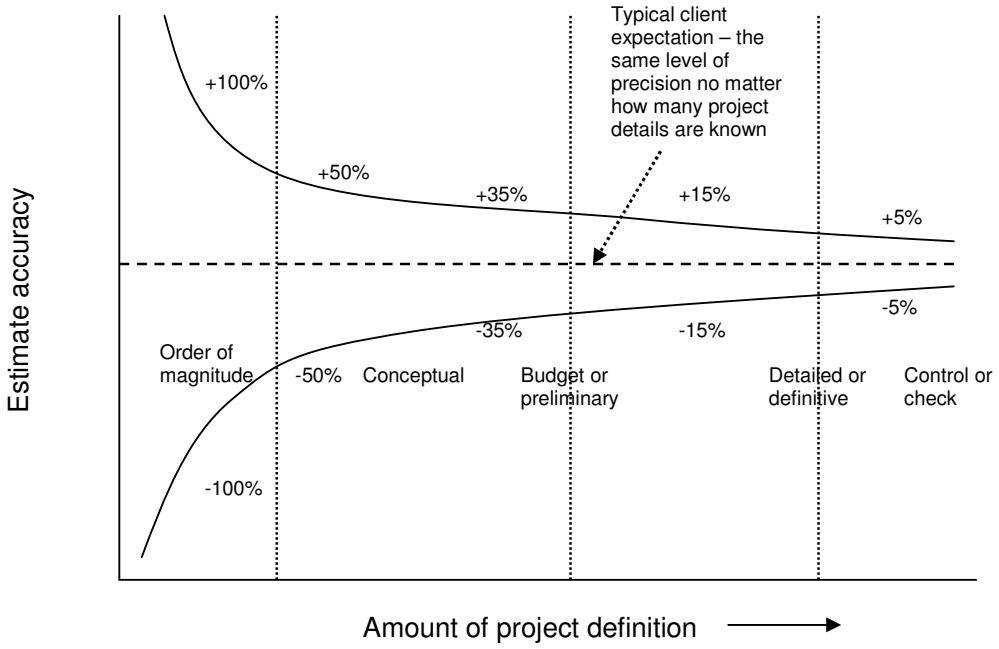


Figure 3.26 Estimate accuracy is dependent on the amount of project definition
Source: Lukas, 2006: EST.03.2

6.6 Structuring the estimate

The control structure for a project is the breakdown of the total work into manageable units or packages for the purpose of estimating and control of cost and schedule (Biffi, 2008: TCM.02.1). The structure will vary with the size and complexity of the project, as well as the reporting requirements (Bender, 2006: 3). The proper structuring of a project for control purposes contributes greatly to the effective implementation of project control procedures and the success of the project itself (Biffi, 2008: TCM.02.3).

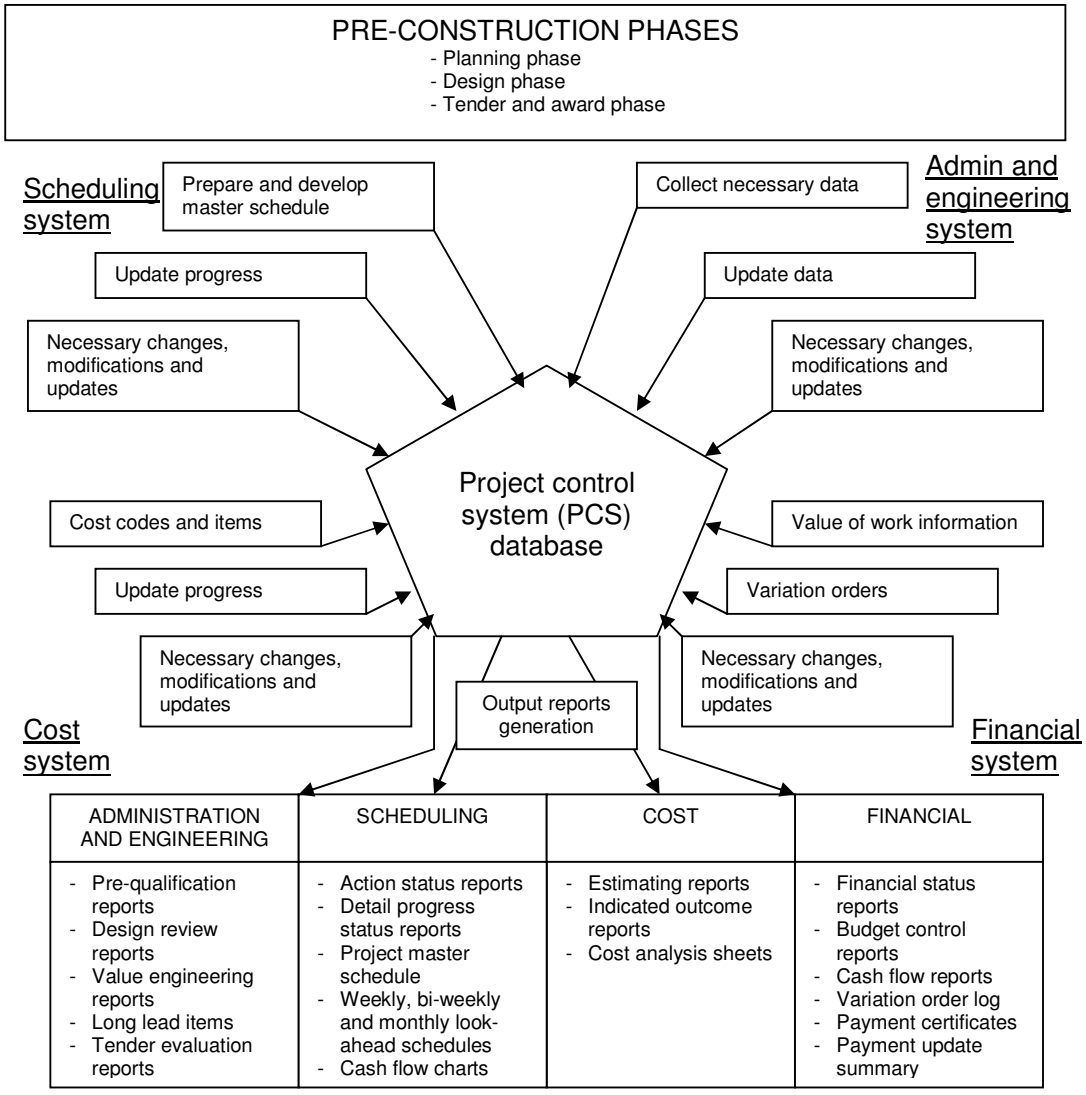


Figure 3.27 Project cost control system

Source: Al-Reshaid *et al.,* 2005: 353

The basics of project cost control have been discussed in Chapter 2 but Tang, Wang and Wang (2007: 1564) and Fleishman (2004b: CSC.09.2) comment on the importance of cost control and the proper structuring thereof and how it affects project success. Fleishman (2004b: CSC.09.2), Kern and Formoso (2006: 76), Dow (2004: 7) and Bredenhoeft (2005: EST.08.4) comment on the use of certain tools to perform cost control of which the proper structuring of the estimate is one. Al-Reshaid, Kartam, Tewari and Al-Bader (2005: 353) illustrate a typical project cost control flow diagram in Figure 3.27. It is important to note the structure and sequence of the project cost control system since the estimate will have to be built and expanded with this in mind.

To maintain some kind of order in the estimate (and later in project execution), it is necessary to segregate costs into various categories:

- Material and labour costs versus subcontracts.
- Direct costs versus indirect costs versus home office costs.
- Concrete versus structural steel versus piping versus other construction disciplines.

The control structure should be established as early as possible in the project life cycle (Biffi, 2008: TCM.02.1) because it will set the pattern for accumulation of project costs, and it should be used to form the basis for the structuring of the estimate. The process producing the project control structure, often known as work breakdown planning, is an ongoing process requiring updates as the scope of the project is refined during the project life cycle. The segregation of costs can be referred to as establishing the project "coding" structure, or more specifically, the "code of accounts".

Verveniotis (2008: PM.02.2) points out that larger projects normally will make use of a work breakdown structure (WBS) as well as resource breakdown structures (RBS) as components of the overall coding structure. Smaller projects will use a simpler code of accounts based on the disciplines or construction trades used in the project. The WBS and RBS are basic project management tools that define the project along activity levels that can be clearly identified, managed and controlled (Nachtmann & Al-Rifai, 2004: 225). Verveniotis (2008: PM.02.2) states that the WBS is the division of the project, for the purpose of management and control, into sub-projects according to its functional components. The WBS was discussed earlier in this chapter. Dysert (2004: 9.24) demonstrates the WBS and RBS in Figure 3.28 and Figure 3.29 respectively.

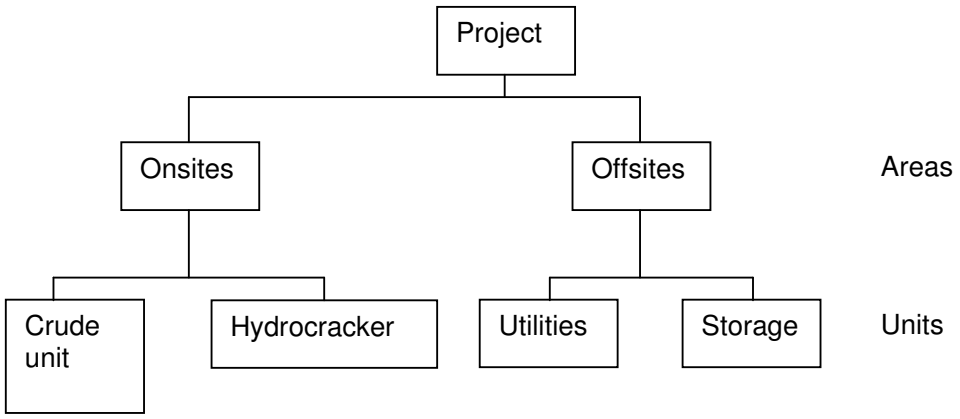


Figure 3.28 Simple work breakdown structure (WBS)
Source: Dysert, 2004: 9.24

Valle-Riestra (1983: 623) demonstrates a portion of a code-of-accounts in Table 3.5. In this case the 700 code series is reserved for the category of instrumentation. Most companies have their own standard code-of-accounts which can be adopted for each new project. In this case the code 722, for instance, represents control valves. These codes can be fairly detailed. Dysert (2004: 9.24), for instance, demonstrates how the labour for a concrete pouring exercise can be coded. He used this example: 01-02-C-2-003-1, which translates to (onsite-hydrocracker-construction-concrete-pour-labour). The coding structure must reflect the manner in which the project will be executed and the way in which costs can reasonably be expected to be collected (Verveniotis, 2008: PM.02.2). Estimates should therefore be structured to match the specific organisation's code-of-accounts (Chua & Godinot, 2006: 67).

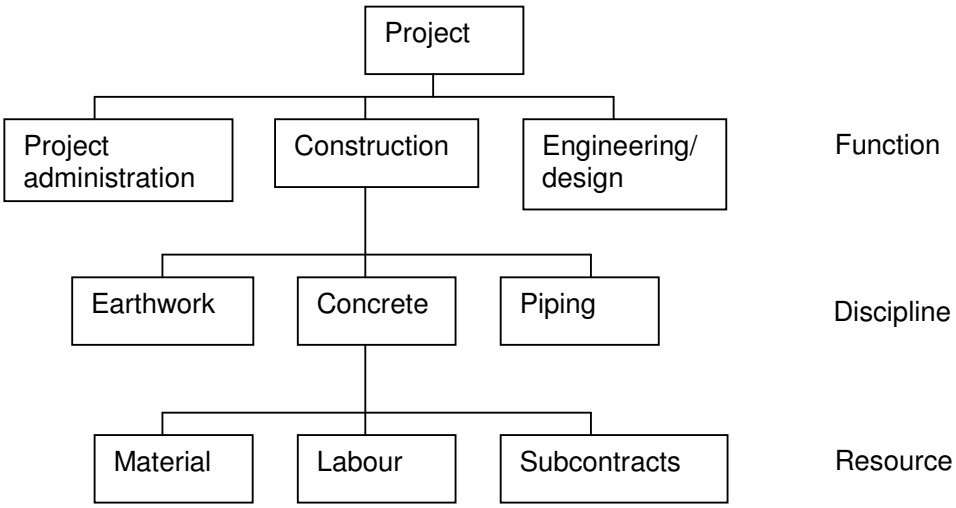


Figure 3.29 Simple resource breakdown structure (RBS)

Source: Dysert, 2004: 9.24

700-00 Instrumentation	
Activity code	**Description**
700-10	Design calculations
700-20	Specifications – general
700-30	Vendor correspondence
700-40	Enquiries
700-50	Operating instructions and start-up data
700-60	Correspondence – general
701-00	Indicators – gauges
702-00	Controllers – recorders
703-00	Transmitters
704-00	Thermocouples – RTD
705-00	Analysers
706-00	Transducers
707-00	Switches
708-00	Alarms – annunciators
709-00	Intercom
710-00	Panel – enclosure – mounting shelves

711-00	Graphics
712-00	Control computer
713-00	Management information computer
714-00	Input terminal
715-00	Printer
716-00	Video terminal
717-00	Modems
718-00	Air supply set
719-00	Orifice meter run
720-00	Valve manifolds
721-00	Relief valves
722-00	Control valves
723-00	Regulators
724-00	Piping
725-00	Wiring
726-00	Supports
727-00	Installation
728-00	Painting
729-00	Testing

Table 3.5 Excerpt from a typical code-of-accounts
Source: Valle-Riestra, 1983: 623

6.7 Estimate review

The estimate is a prediction of the expected final cost of a proposed project. By its nature, an estimate is associated with uncertainty, and, therefore, is also associated with a probability of overrunning or under-running of the predicted cost (Dysert, 2004: 9.27). Leo and Knotowicz (2005: EST.05.1) point out that many companies do not necessarily rely on in-house estimating practices or services. Businesses are seeing their estimates being generated by a variety of sources. Some are done by centralised in-house estimating groups, others by groups at its international site or by a never-ending array of contractors (Hewitt, 2008: INT.05.1) Furthermore, estimates are generated in a variety of formats with a great degree of variability with regards to detail and clarity (Sonmez, 2005: EST.07.1).

The need for standardised estimating requirements to put a review process in place has long been realised. By doing this, the project team can review the project deliverables and estimated costs before the project is approved for execution. Estimates are checked to make sure that it is complete, accurate and generally ready to use as a project control baseline (Richards, 2006: EST.15.1).

Shirley and Banks (2007: EST.11.1) report on the estimate review process when involved in high-cost, high-risk projects. According to Ferrao (2004: 1) this refers to projects in excess of $100 million based on low technology levels. Experience shows that subjecting high-dollar cost estimates to a review process adds assurance that the overall estimate, assumptions, and the underlying data are verifiable and credible, at least at the point in time. Figure 3.30 shows how estimate reviews by management have altered initial estimated final costs. Shirley and Banks (2007: EST.11.1) conducted research on changes to estimates due to management reviews and the findings of four large size projects are shown in Figure 3.30.

6.7.1 The review process

A defined estimate review process makes good business sense and should be implemented in every estimating department (Leo & Knotowicz, 2005: EST.05.2). In order to conduct a review of a project estimate, certain project deliverables are requested from the estimator. Information with regards to the estimate should be available so that the reviewer can determine if the estimate is of sufficient quality to satisfy its independent purpose. A written “base of estimate” is a critical component of a cost estimate because it highlights what the estimate does or does not contain. Without this information, it becomes difficult to perform change management to control costs (Arain & Pheng, 2005: 4). Basis information needs to include the following:

- General overview: Provides a brief overall description of the facility or project.
- Scope description: This section should provide greater detail about each major segment of the project
- Execution strategy: This describes the general construction philosophy to be utilised for the project.
- Allowances: The level and types of allowances used in the estimate should be noted.

- Exclusions: What is excluded from the estimate is just as important as what is included.
- Assumptions: Any other assumptions not identified elsewhere in the basis should be noted.
- Exceptions: Any pre-determined project deliverable not available will be recorded.
- Contingency: The amount of contingency included and the method utilised to determine the contingency should be documented.
- Reference documents: A list of the information used to prepare the estimate.

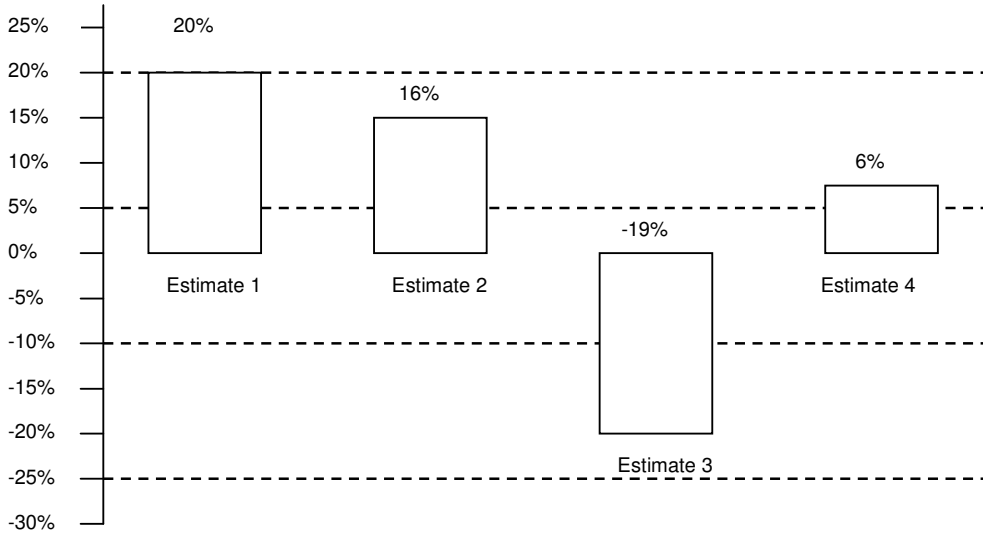


Figure 3.30 Percent change in estimates due to management reviews
Source: Shirley and Banks, 2007: EST.11.1

Jambhekar and Weeks (2007: OWN.02.3) report on the estimate review process and in particular on the challenges it poses to the project team. Figure 3.31 demonstrates how the development of a schedule and cost estimate is related to the steps taken by the owner to complete the estimate review.

To conduct the review an understandable project estimate utilising an agreed upon code of account type structure is necessary. Leo and Knotowicz (2005: EST.05.2) refer to the following items that can be used to easily identify and benchmark costs:

- Administration/home office costs.
- Engineering costs.

- Major equipment costs.
- Installation costs.
- Investigation costs.
- Software costs.
- Debug costs.

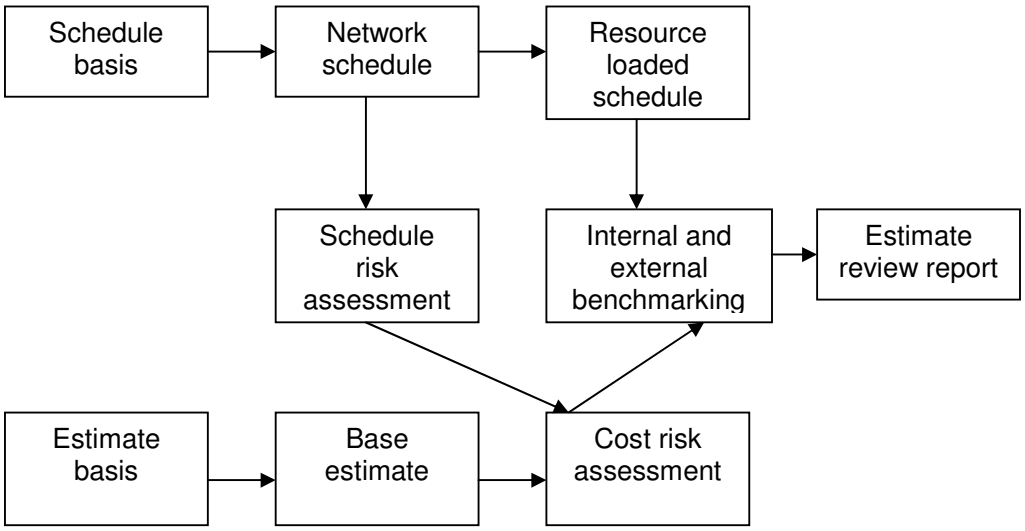


Figure 3.31 Estimate review process for a full-funding decision
Source: Jambhekar and Weeks, 2007: OWN.02.3

Organising estimates in this kind of systematic procedure provides a means for identifying costs incurred in the execution of the project. Furthermore, this method allows estimates to be benchmarked against actual costs of similar type projects during the review process. Bredenhoeft (2005: EST.08.5) illustrates the estimate-review (validate)-approval process by means of a flow diagram in Figure 3.32.

To understand the estimate content, the reviewer will need a list of all relevant drawings, sketches, specifications, equipment lists, design basis of estimate and engineering/design costs (Bain, 2008: Financial Mail – 12 September). It is important to understand how the project contingency was determined. Did the team perform a formal risk analysis on the project to determine the probability of overrunning specified estimate values? Contingencies are too often added to an estimate by a “gut feel” approach rather than an approved statistical methodology. More information on contingency allowances will follow. Benchmark evaluations comparing key project

estimate ratios and factors against actual project histories need to be presented and reviewed.

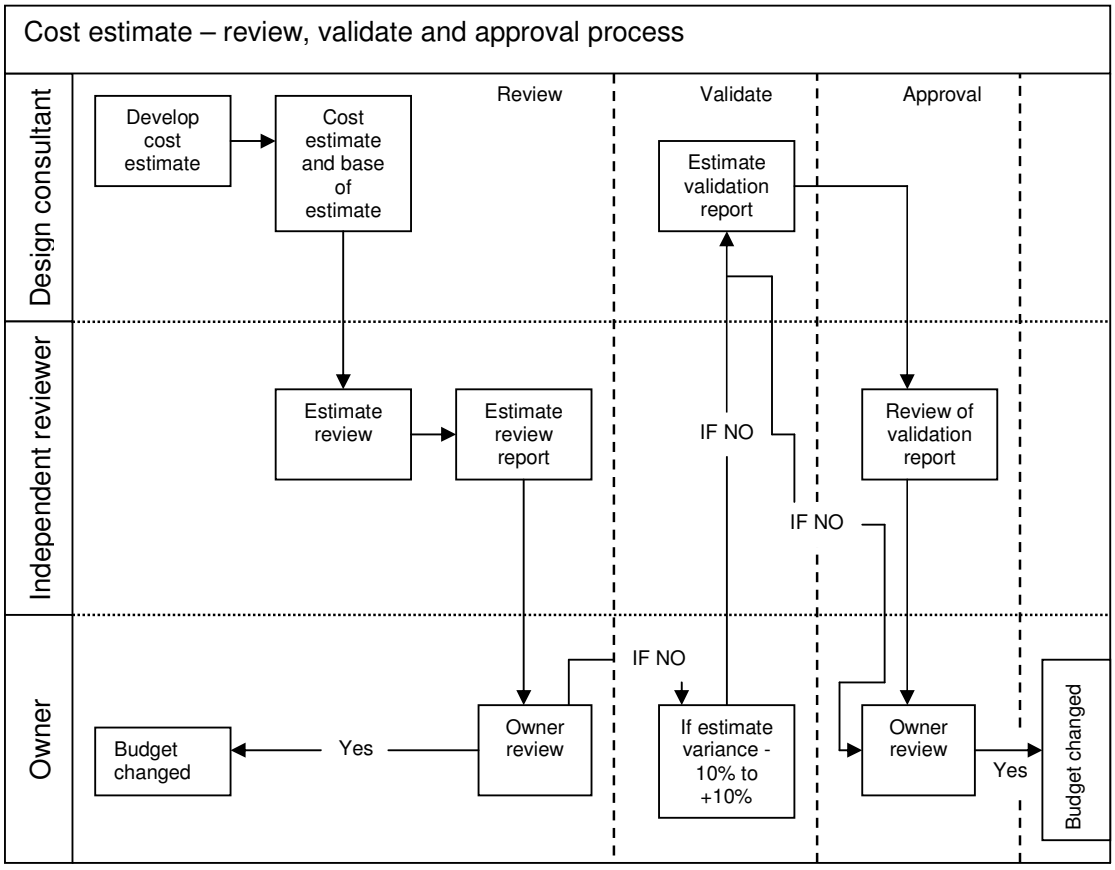


Figure 3.32 Cost estimate-review (validate)-approval process

Source: Bredenhoeft, 2005: EST.08.5

6.7.2 Conducting the actual review

Estimates are presented in different ways by various parties. Some estimates have too little information and some estimates too much. In an effort to provide a degree of estimate clarity and consistency, a series of tools can be used.

6.7.2.1 Estimate summary worksheet

The first tool to assist the estimate reviewer is the estimate summary worksheet that can be viewed in Addendum B (Leo & Knotowicz, 2005: EST.05.2). Cost information is summarised on a relatively high level into a code of accounts format. This allows the estimate reviewer to easily see cost totals for items such as engineering, purchases and constructions and how they relate to the total project cost. The cost of procurement

should relate to the engineering and installation costs. The summary level report will enable the review process to benchmark the estimate against other similar estimates.

6.7.2.2 Project team “basis of estimate” report

As previously mentioned, the “basis of estimate” report is critical and needs to be provided in order to understand the cost basis of the estimate. This report needs to highlight what the estimate does and does not contain. Too often projects get into trouble because of incorrect assumptions as to what the estimate costs represent. This document basically puts the amounts of the estimate into words (Jambhekar & Weeks, 2007: OWN.02.3).

6.7.2.3 Cost estimate review and benchmarking report

This report is the basis for the actual review of the estimate. The main contents of what should be included in such a report are clear scope definition, risk analysis and benchmarking. Scope definition for conceptual estimates is different from that of semi-detailed and detailed estimates (Leo & Knotowicz, 2005: EST.05.2). A detailed estimate that is loaded with cost allowances would require a great deal of explanation. Exceptions to the scope should be reviewed and suggestions for possible improvements should be offered. Any technical deliverables that are not available should be noted. Major mechanical equipment, electrical and instrumentation components need to be double checked and any adjustments to allowances and contingencies must also be double checked. Benchmark ratios for similar projects will be used to compare with the estimate. Through the use of a defined estimate review process, the estimator can ensure that high quality estimates are prepared that will support the decision-making process for capital projects.

6.7.3 Estimate review challenges

Chuong (2007: EST.07.3) comments that in the current dynamic global market, cost engineering professionals face unprecedented challenges in cost estimation. Similar challenges are encountered during project estimate review (Creech, 2005: PM.16.1). These challenges include the following:

- High crude oil prices affecting the capital project market.
- Increase in material prices (steel, copper, etc.)

- Increase in day rates of offshore vessels.
- Volatility in foreign currency exchange.
- Local content requirements.
- Limited contractor pool in certain areas.

6.8 Engineering/design review

Shah *et al.,* (1996: 348) describe the importance of engineering history. This history can be very helpful when pricing engineering projects and can also be of help when assessing the estimated cost for a future project (Struts & Griffis, 2005b: 56). The main purpose of the engineering review is to evaluate the scope of work. The first objective of such a review is to make sure that the engineering deliverables have not been misunderstood and that the plant is designed to meet the client's objectives (Baskaran, Ham & Lei, 2006:1 170). It is especially when late changes to the engineering drawings have occurred that the estimator should make sure that the estimate is based on the latest drawing revisions (Kirkham, 2005: 9).

The cost of mechanical equipment will have a major influence on the equipment list used. This is also an important consideration as equipment prices are in most cases the driving factor of plant costs (Maples, Greco, Heady & Tanner, 2005: DEV.05.1). Any queries that the estimator has regarding the project scope have been asked by this stage, but the estimator can clarify any specification or drawing details during this review (Whiteside, 2005: EST.04.2).

6.9 Estimating resources

Reliable estimate preparation depends on good information and in particular on good historical information (Marx, 2004: 2). Dysert (2004: 9.32) describes some of the additional information, besides the engineering and design information, needed to quantify the scope of the project:

- Conceptual estimating factors.
- Material cost and pricing information.
- Labour work hour charts and information.
- Labour productivity information.
- Labour wage rates, composite crew mixes, etc.

- Other estimating factors and information.

Normally estimating guidelines and procedure manuals will be used to promote standard estimating methods and procedures. In-house cost history manuals will provide historical cost data for completed projects (Musgrove, 2008: EST.07.2). Engineering and design manuals will be used to identify specific materials of construction, and all related labour operations required to complete the scope of work.

Completed projects should be documented by means of a post-mortem final job report covering everything about the project from design considerations to construction execution strategy and to cost summaries (Humphreys, 2007: 10). Estimators continually rely on historical project information and cost data in the preparation of new estimates. Together with this information, the estimator will also rely on computer software (either in-house developed or from commercial sources). Karshenas (2007: IT.06.1) and Masmoudi *et al.,* (2005: 299) demonstrate how specialised computer software can be integrated into existing design packages to assist the estimator while Richards (2005: EST.12.1) cautions estimators on the use of computers in estimating even though it can be of great assistance. Inconsiderate use of formulas or the lack of appropriate formulas can lead to gross mistakes.

7.0 SUMMARY

Cost estimating is by no means an exact science. The estimate is a prediction of the expected final cost of a proposed project. By its nature, an estimate is associated with uncertainty and therefore is also associated with a probability of overrunning or under-running of the predicted cost.

To perform an estimate the estimator should be well versed in the different types of estimates and their uses. He should understand the scope of work and should ask the right questions when it comes to scope clarification. Scope definition should in fact be considered the most important aspect of estimate success and the estimator must make sure that enough time is spent on understanding the scope to have sufficient information to rewrite the scope of work in terms of cost.

Even though the scope of work is a major component in the estimate process, there are several other factors influencing the estimate accuracy (Schottlander, 2006: EST.17.2). Whether they are external or internal factors, these items should be

reviewed and allowances should be made accordingly. Each project differs and certain factors which might not have had a significant influence on previous projects may now be important and carry major costs. All estimating tools are therefore useful to some or other extent.

Estimating principles and procedures will have to be followed in order to proof the hypothesis of this study. Although detailed estimates provide a more accurate estimate for management to use, there is not always time to perform such an estimate or the information required to do such an estimate is not yet available at that stage of the project. This is especially true in the case of financial forecasting. Well-balanced conceptual estimating methodologies will therefore be more useful when evaluating financial forecasts.

Conceptual estimates are typically used for low level accuracy estimates to assist management in early stage decision-making. These estimates are often referred to as “order-of-magnitude” or OOM estimates in reference to their typical wide range of estimating accuracy. The following chapter will investigate the spirit of the conceptual estimate and will discuss the methodologies and uses of these estimates. Specific focus will be placed on factored estimates, as this will be the estimate type used in proving the hypothesis.

CHAPTER 4

CONCEPTUAL COST ESTIMATING METHODOLOGY

1.0 INTRODUCTION

Kinney and Soubiran (2004: EST.15.1) state that it is accepted practice throughout the petrochemical industry to make important business and design decisions early in the evolution of the project. Engineering and construction professionals are under increasing pressure to build more efficient chemical process plants at lower costs (Uher, 1996: 85). To that end, significant demand exists for cost professionals to develop a work method designed to proactively support increased consistency and accuracy in the development of conceptual cost estimates much earlier in the evolution of a project. Conceptual estimates are also referred to as “Order-of-Magnitude” estimates and usually take form in a Class 4 or 5 estimate. Refer to Chapter 3 for more information on estimate classification.

The importance of early cost establishment of project costs has been discussed earlier in this study. The result is that the ultimate costs of a project are influenced by those early decisions made during the process-design stage of a project (Abi-Karam, 2004b: PM.04.2). To optimise those early decisions, cost estimates should be developed in the early stages of design evolution (Ahcom, Uddin & Shash, 2006: EST.26.2). The conceptual estimate is ideally intended to reflect the full impact of those early decisions (Anonymous, 2008h: 21).

While realising that the method of creating a conceptual estimate is an art and not an exact science, the accuracy and completeness of a conceptual estimate becomes crucial to making cost-effective decisions earlier in the development stages of a project (Li, Shen & Love, 2005: 440). Kinney and Soubiran (2004: EST.15.1) indicate that when 80% of costs are committed, only a limited portion of the engineering is completed.

Kinney and Soubiran (2004: EST.15.1) indicate that the conceptual estimate supports budget and business development and resource planning by:

- Establishing a budget and cash flow for funding decisions, screenings and approvals.

- Optimising resource utilisation.

Serpell (2005: EST.13.1) indicated that conceptual estimates support engineering and design development by:

- Identifying completeness of process design and clarifying the project scope.
- Providing the basis for value engineering, feasibility studies and design changes.
- Developing design and construction schedules.
- Highlighting process design decisions and associated risks.

Conceptual estimates are generally based on little project information, for instance engineering deliverables, thus subjecting them to a wide range of estimate accuracy. According to Serpell (2005: EST.13.1), their accuracy can depend on several factors, including the level of project definition, the quality of the past historical cost data (Pickett & Elliott, 2007: EST.02.1) in development of the factors and algorithms, as well as the judgment and experience of the estimator. These limitations should be recognised in using conceptual estimating methods. Nonetheless, there can be cases where conceptual estimates can be very reliable, especially in estimating repeat projects (Sonmez, 2004: 677). Generally, the emphasis with conceptual estimating is not on detailed accuracy, but on obtaining a reasonable cost estimate of sufficient accuracy to ensure that the results are meaningful for management to make the decision at hand (Dysert, 2008: EST.03.1).

The development of the initial conceptual estimate is only one step of many in expanding an interactive process of communicating the cost, scope, and schedule risks inherent in early process designs (Serpell, 2005: EST.13.1). Even though the quality and level of design definition developed during the conceptual stage of design is sufficiently accurate for feasibility studies and alternative analysis, it is not sufficiently accurate to make full funding decisions and investments without incurring substantially more risk than most corporations are willing to accept (Humphreys, 2004).

2.0 ROADMAP TO CONCEPTUAL COSTS ESTIMATING

The conceptual estimating process is composed of a multitude of information formats. Kinney and Soubiran (2004: EST.15.1) describe six steps towards successful conceptual estimating. These steps are as follows:

- Develop an estimating plan.
- Develop major equipment costs (MEC).
- Apply factored costs.
- Develop quantified costs.
- Develop indirect costs.
- Analyse risks, apply contingency and finalise estimate.

Failure to plan the estimate almost always results in failure to communicate many of the critical aspects of the design that are revealed during the development of the conceptual estimate (Termini, 2003: 47). Planning of the conceptual estimate (Step 1) is illustrated in Figure 4.1.

Figure 4.2 demonstrates Step 2 of the process for the pricing of major process equipment. The purchase cost of many types of major process equipment can be estimated at the conceptual stage by using historical actual costs (Kaka, 1999: 256). Early in the conceptual stages a list of major process equipment is developed from the Process Flow Diagrams (PFD's) (Uppal, 2007: EST.03.2). Normally the equipment list consists of four line items which include a description, design capacity, material of construction and design temperature and pressure (Louw, 2002: 52).

An internal database of previous purchased costs is useful as a tool to validate prices from other sources (Shah *et al.,* 1996: 347). When possible, do not make use of vendor prices too early in the project. Early quotes are usually less accurate than historically based costs, but can be useful in assessing market trends (Abi-Karam, 2004: DEV.04.1).

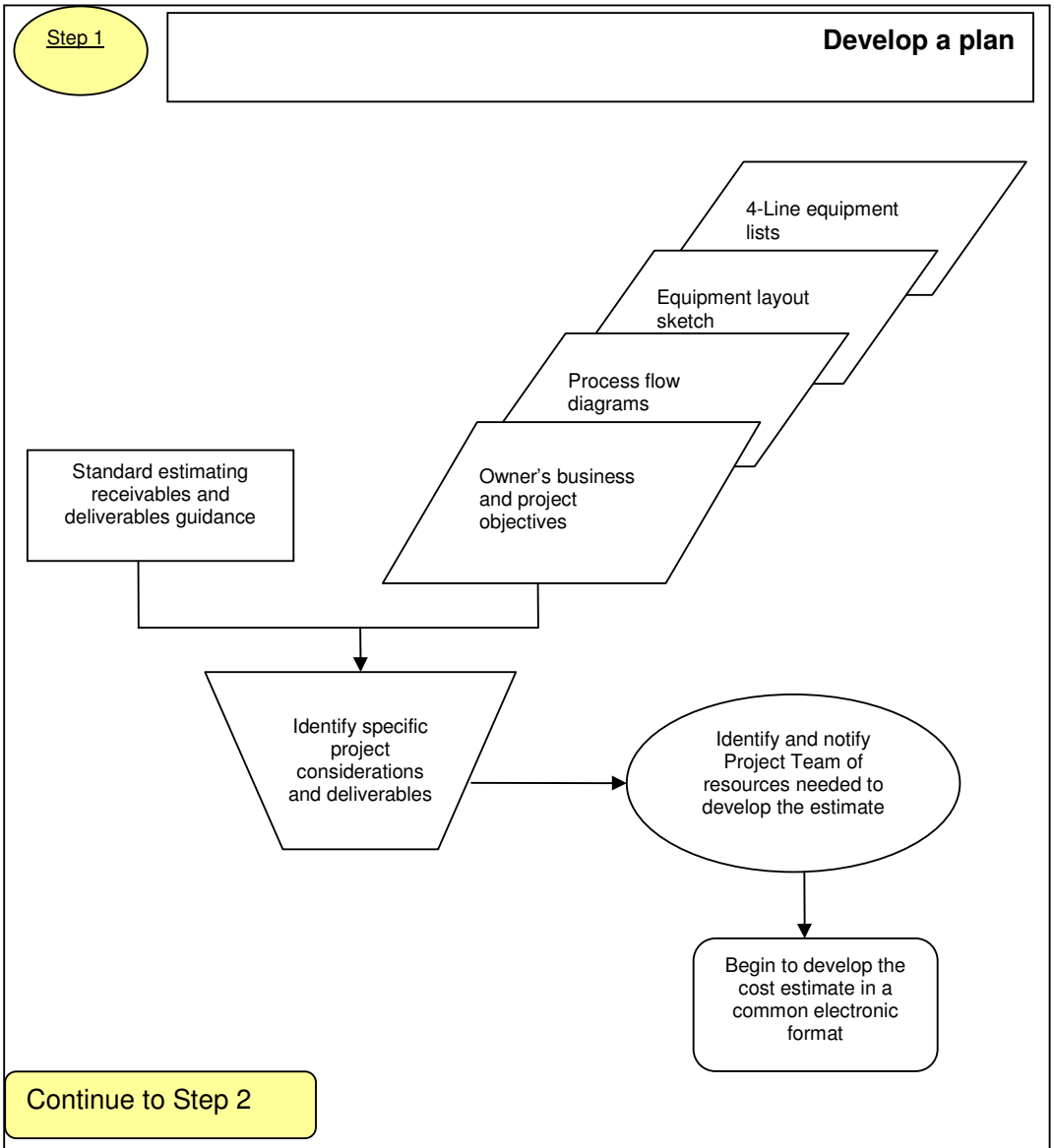


Figure 4.1: Step 1 in the conceptual estimate process: Develop a plan

Source: Kinney and Soubiran, 2004: EST.15.4

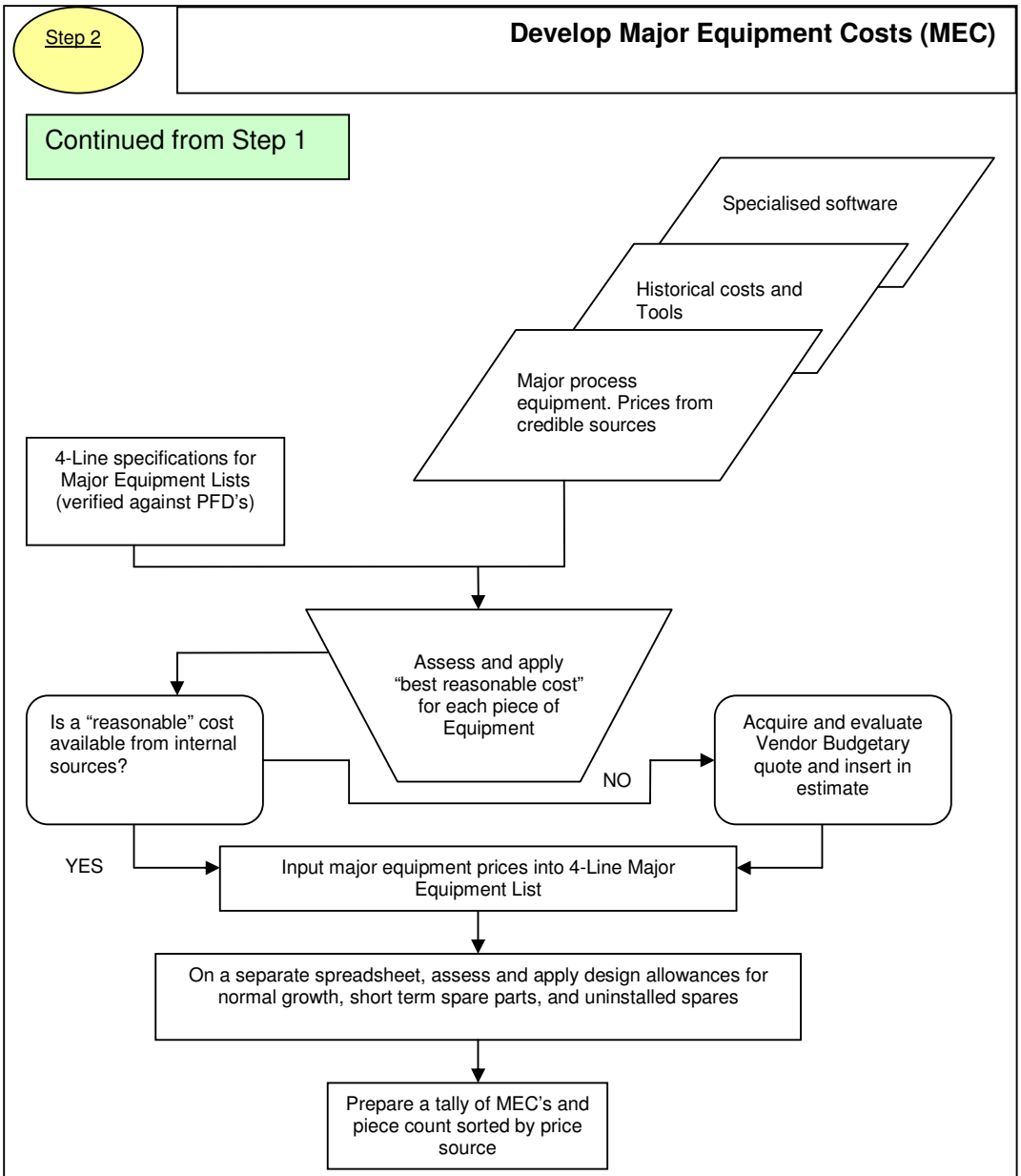


Figure 4.2: Step 2 in the conceptual estimate process: Develop Major Equipment Costs (MEC)

Source: Kinney and Soubiran, 2004: EST.15.5

Figure 4.3 illustrates the development of the construction and site (field) installation elements of the "total installed cost" for the major process equipment which will be Step 3 – the application of factored costs. "MEC factors" are cost multipliers applied to the Major Equipment Costs (MEC) to obtain a Total Installed Cost (TIC) (Noor, Grumo, Kniskern & Kopach, 2006: OWN.05.2). MEC factors consist of the cost for bulk commodities (materials), direct field labour to install the equipment and the bulks, and indirect cost such as engineering, project staffing and construction equipment. The MEC factors can range from a multiplier as little as 2 for skid mounted equipment to a multiplier of 20 for very small bench-top scale complex equipment.

Musgrove (2008: EST.07.2) points out that the most accurate cost factors are cost models created by collecting and using historical cost data. These can be accurate to ± 10% if developed and applied properly. Table 4.1 shows a table of commonly used MEC factors and breakdowns. These factors are limited to In-Side Battery Limits (ISBL) and do not capture any Outside Battery Limits (OSBL) cost for infrastructure or utilities. Normally ISBL includes concrete foundations, structural supports at grade (not elevated), pipe to the nearest header, local instruments and controls, cabling to the nearest junction box and insulation (Kinney & Gauche, 2006: EST.14.1). To properly use factors it is important to have a clear understanding of what is included in the factors (Kapetanios & Marcellino, 2009: 208). Factors can be impacted on equipment size (capacity), material of construction, pre-fabrication, market conditions, and horizontal and vertical layout.

Figure 4.4 illustrates the fourth step in conceptual estimating – the development of non-process and infrastructure elements of a project. OSBL cost factors, at the conceptual stage, are usually historically based costs of similarly constructed plants. However, OSBL costs are impacted by pre-investments in existing infrastructure and utilities.

For a higher degree of accuracy, the OSBL scope should be conceptually quantified (Serpell, 2005: EST.13.5). Table 4.2 illustrates this statement. This table shows "assemblies" rather than detailed single line items. The design in the OSBL area normally changes quite significantly in the conceptual stage of the project. It is therefore not wise to prepare detailed estimates of the OSBL area at this stage. OSBL typically includes pipe racks outside the process area for vertical and horizontal separation between the production processes, control building and equipment isolated from production processes, treatment systems, packaged systems, etc. (Kinney & Gauche, 2006: EST.14.1). Budgetary quotes can be used on OSBL assemblies, but

only with caution. Budgetary quotes are never totally complete. The estimate should be adjusted to allow for these incomplete items.

Major Process Equipment Cost Factors for Bulk Commodities and Direct Field Labour (Process capitalised costs only)

Major Equipment Item	Range of Factors	Suggested Factors	(CS) MEC	Bulks	DFL
AIR – Air Coolers	1.7 – 2.1	1.70	1.00	0.96	0.74
ATR - Agitators	1.1 – 2.0	1.10	1.00	0.62	0.48
BLT – Belt Conveyors	1.7 – 2.2	1.70	1.00	0.96	0.74
ATR - Blenders	1.6 – 2.0	1.60	1.00	0.91	0.69
BLO – Blowers & Fans	1.1 – 2.2	1.10	1.00	0.62	0.48
BOI – Boilers (Design & Fabricate)	0.75 – 2.3	0.90	1.00	0.51	0.39
BKL – Bucket elevators	1.8 – 2.2	1.80	1.00	1.02	0.78
BUL – Bullets (Pressure)	0.9 – 2.5	0.90	1.00	0.51	0.39
CNT – Centrifuge	1.2 – 1.9	1.50	1.00	0.85	0.65
COL – Columns	1.3 – 2.6	2.00	1.00	0.74	0.56
CMA – Compressors - Air	1.2 – 2.3	1.30	1.00	0.74	0.56
CMR – Compressors - Centrifugal	0.9 – 2.1	1.10	1.00	0.62	0.48
CTP – Cooling Tower Package	0.6 – 3.9	0.91	1.00	0.38	0.53
CRU – Crushers and Mills	1.6 – 2.1	1.60	1.00	0.91	0.69
CYC – Cyclones	1.5 – 2.1	1.50	1.00	0.85	0.65
DEM – Demineralisers (Ion exchange)	1.3	1.30	1.00	0.74	0.56

Table 4.1: Commodity used MEC Factors and Breakdowns

Source: Kinney and Soubiran, 2004: EST.15.6

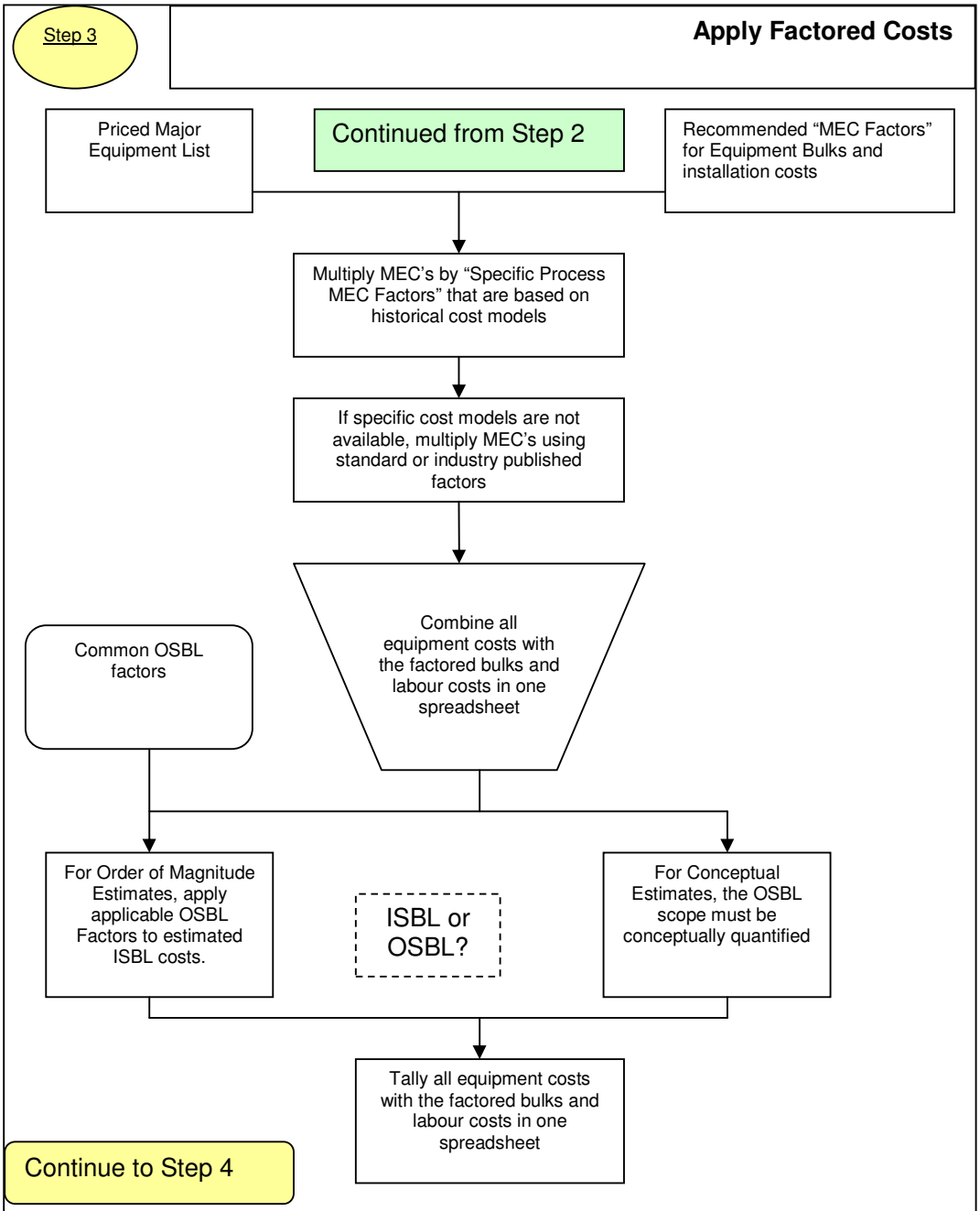


Figure 4.3: Step 3 in the conceptual estimate process: Application of factored costs

Source: Kinney and Soubiran, 2004: EST.15.6

Conceptual (+/- 3%) unit prices for Process Plant construction costs (USD$) (Note: these costs do not include design, engineering or contingency.)					
		US Gulf Coast based costs			
Element of Cost	Pricing basis	Unit of measure	Furnish price	Install price	Furnish and install price
Pipe Rack – Loaded:					
Single tier – TEE	8' Wide x 16' tall, Ptd CS. 25' span (2,5m x 5m) @ 7,5m OC)	LF	$180	$140	#320
2-Tier Pipe Rack	8' x 16' t w/mild beam, Ptd CS, 25' span	LF	$310	$240	$550
3-Tier Pipe Rack	24' x 24' w/2 mild beam, Ptd CS, 25' span	LF	$500	$400	$900
Rack loading - Adder	Adder per Tier for 6 ea 6" dia (150) pipe plus 6 ea 1" dia (25) CS pipe for cable tray	LF	$310	$250	$560
Road bridge	30' wide x 35' tall (9m x 11m) under clearance	Each	$10,000	$10,000	$20,000

Table 4.2: Conceptual unit costs (assemblies)
Source: Kinney and Soubiran, 2004: EST.15.7

The design and project execution costs are captured in the fifth step on the roadmap to conceptual estimating. This is illustrated in Figure 4.5. At this stage an estimate basis document should be developed. This document should include the following information:

- A brief scope statement.
- The 50/50 estimate and range.
- A single cost summary page.
- A list of major exclusions and assumptions.
- A list of allowances for known but unquantified and/or undefined scope.
- Project design and execution concerns.
- Identify project resources used to create the estimate (documents and people).
- MEC price source/analysis.
- Cost basis (factors used) with adjustments for time and plant location.

- Critical and major schedule milestone dates.
- Reconciliations to previous estimates.
- Reviews and validations of the cost estimate.

A staffing plan is required and should be based on a list of deliverables and hours with associated rates. Engineering costs are typically broken down as “Expense” or “Capital” costs and can be included in the conceptual cost estimate using typically industry benchmarks if better historically based cost information is not available.

Probably the most important step in the roadmap to conceptual estimating is the assessment of project risks, review cycles and the finalisation of the cost estimate (Singh *et al.,* 2007: 20). Figure 4.6 illustrates this step. An important part of this step is the development of an undefined sum of money, or contingency amount, to be included in the estimate as a risk buffer (Gunham & Arditi, 2007: 495). More detail on contingency development will follow later in this study.

At this stage of the discussion on conceptual estimates it should, however, be noted that the contingency should only be applied for “changes that experience shows will likely be required”. It is for known, non-quantifiable, but statistically proven unknowns and uncertainties (known unknowns). Most importantly, the contingency is not a tool for capturing incomplete or inadequate scope (Burroughs & Juntima, 2004: EST.03.2).

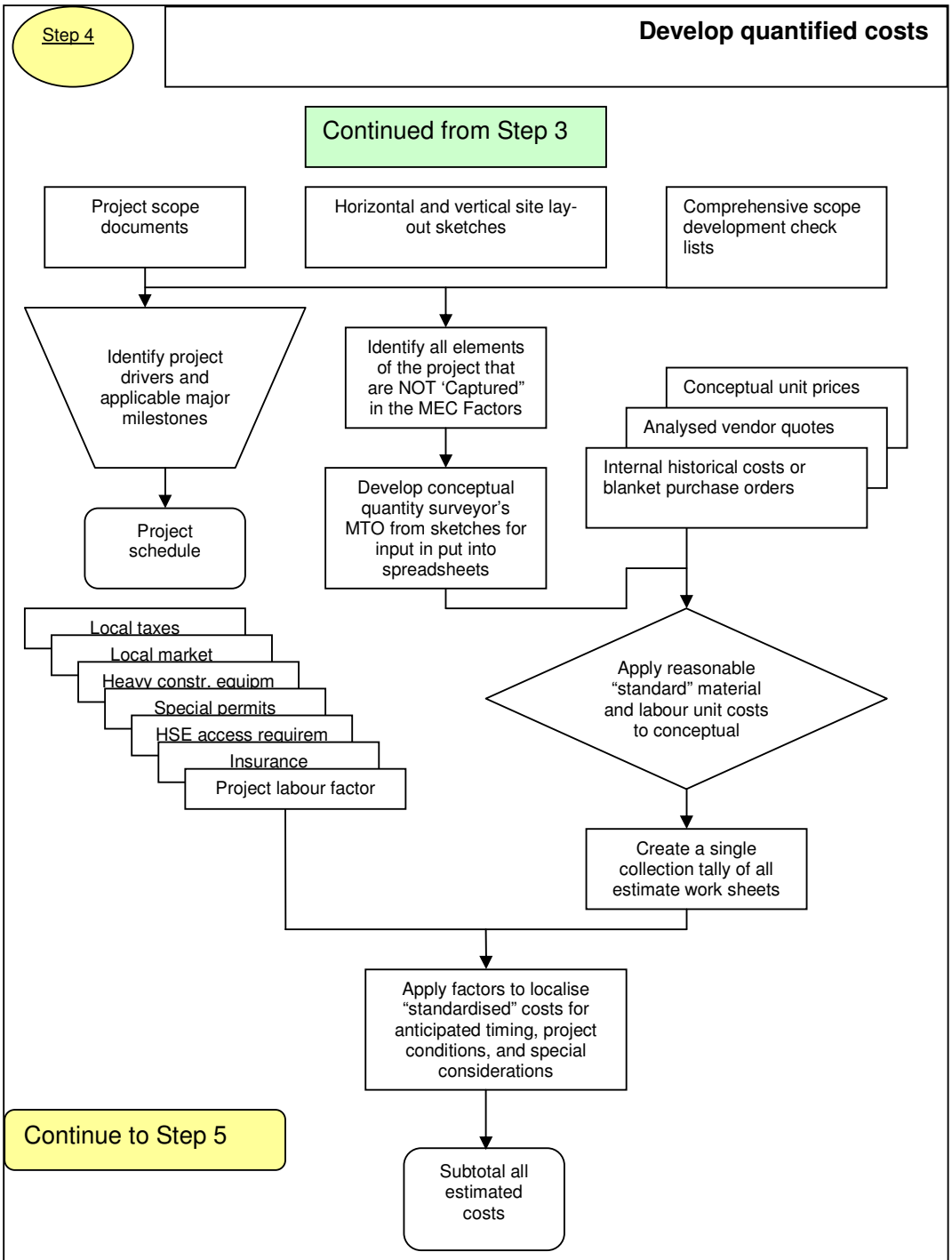


Figure 4.4 Step 4 in the conceptual estimate process: Develop quantified costs

Source: Kinney and Soubiran, 2004: EST.15.9

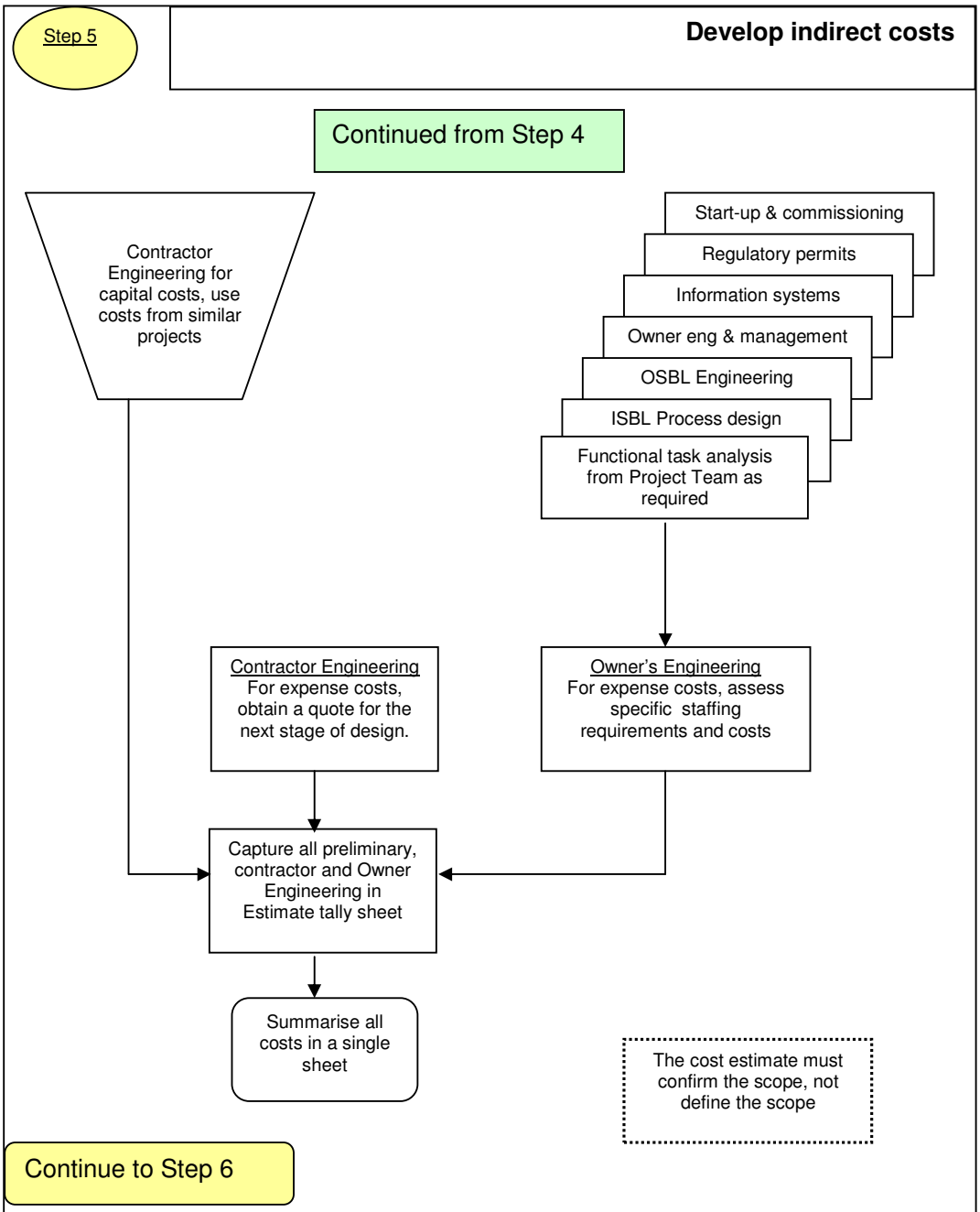


Figure 4.5 Step 5 in the conceptual estimate process: Develop indirect costs

Source: Kinney and Soubiran, 2004: EST.15.10

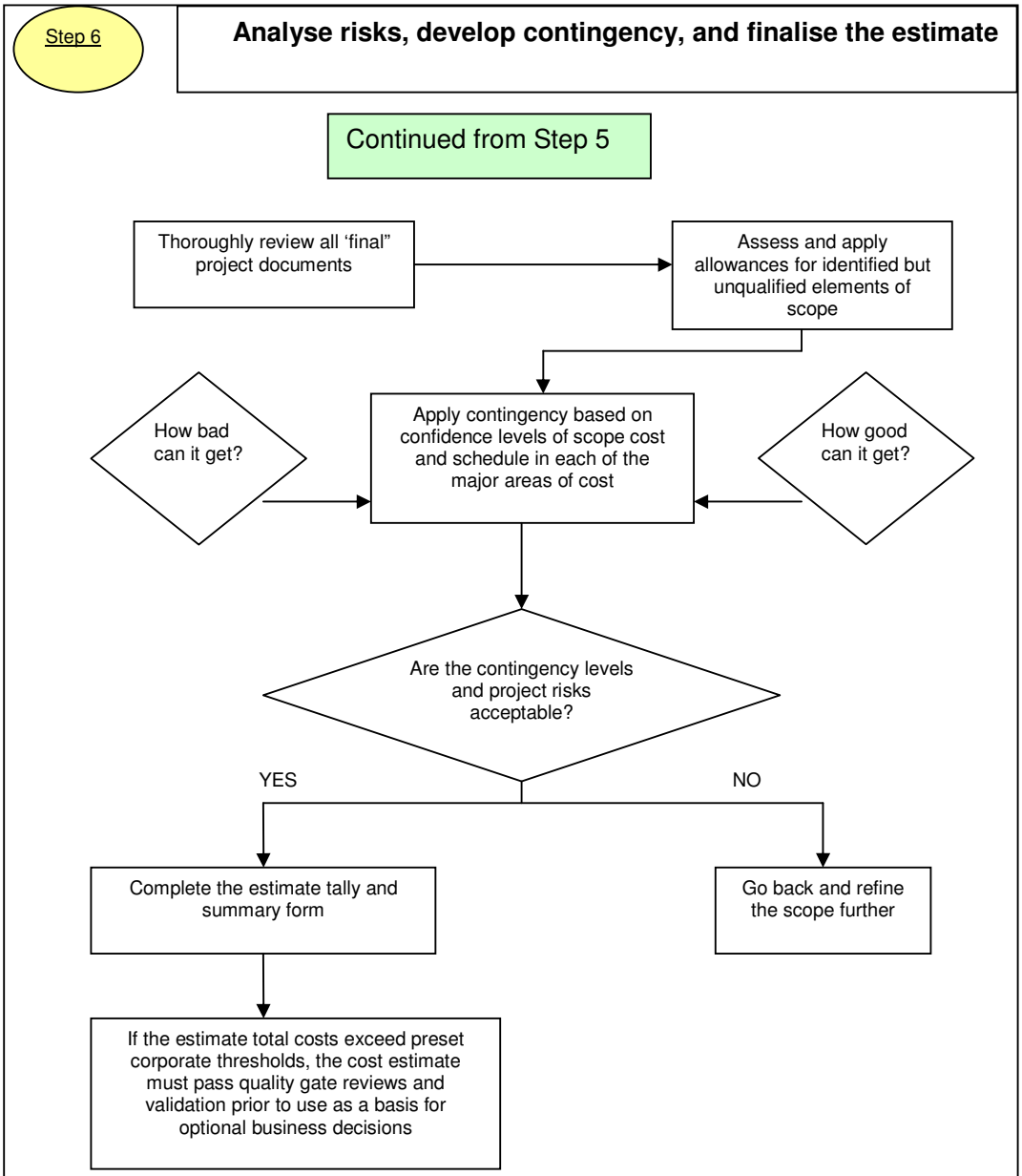


Figure 4.6 Step 6 in the conceptual estimate process: Analyse risks, develop contingency, and finalise the estimate

Source: Kinney and Soubiran, 2004: EST.15.11

Noor and Tichacek (2004: RISK.04.1) state that some of the contingency predictability issues to consider will include the following:

- Normally engineering design at conceptual stage includes for first pass equipment sizing at 100% and not 100% plus final equipment duty and sizing.
- Design detail assumptions and design allowances.
- Rework (identified as design and field change orders occur on every project).
- Complexity of design, particularly for new technology or even retrofits.
- Methods, motivations and biases during the development of the scope and the cost estimate.
- Inaccuracies, omissions and misunderstandings of the early engineered design.
- Mistakes using a complex set of calculations
- Accuracy of historically based "actual" cost data used in the estimate.
- Planning, project execution and contracting strategies.
- Mistakes in material take-offs, waste allowances, theft, etc.
- Financial stability of owner/contractor.
- Weather delays, unplanned bonuses, etc.

2.1 Project escalation

In Chapter 6 of this study project escalation and how it influences the project's total estimated cost is discussed. Hollmann and Dysert (2007: EST.01.2) mention that it is important to note that price escalation can be seen as a project risk and should be included in the estimate. According to Butts (2007: EST.08.1), the determining of the escalation percentage to an estimate is often the subject of fierce debate. He goes on to say that cost increases are determined by dynamic relationships between many factors, including acts of nature, interest rates, oil prices, global commodity markets, wars, wage rates, and the overall health of the economy, as well as supply and demand for the required goods or services. Morris and Wilson (2006: CSC.06.2) and Hollmann and Dysert (2008: EST.08.2) note similar findings. Accurately forecasting escalation rates can play a pivotal role in determining project profitability or project viability – especially for large multi-year construction projects (Hollmann & Dysert, 2007: EST.01.1). The estimator must predict the cost of future goods or services that

must be procured in the future, perhaps many years from now (Jackson, 2008: INT.S01.2).

Project start date	**Duration days**	**Index at start**	**Index at end**
2001-04-17	500	100.0	120.0
Percent of duration between project approval and ready for operation. Construction starts at 35%.	Day number	Index	Payment dates
0.0	0.0	100.0	2001-04-17
20.0	90.9	103.6	2001-07-16
35.0	159.1	106.4	2001-09-23
37.0	168.2	106.7	2001-10-02
38.8	176.1	107.0	2001-10-10
40.0	181.8	107.3	2001-10-15
42.5	193.2	107.7	2001-10-27
43.0	195.5	107.8	2001-10-29
44.0	200.0	108.0	2001-11-03
45.0	204.5	108.2	2001-11-07
46.3	210.2	108.4	2001-11-13
48.0	218.2	108.7	2001-11-21
50.0	227.3	109.1	2001-11-30

Table 4.3: Escalation index increase as time goes by
Source: Louw, 2002: 99

Escalation is directly associated with time (Butts, 2007: EST.08.1). The longer any contractor stays on site because of factors beyond his control, the greater the risk to the employer (Touran & Lopez, 2006: 853). Table 4.3 shows an example of how the escalation index increases as time goes by. Should the information in this table be illustrated on a cumulative graph, the result will look similar to the graph shown in Figure 4.7.

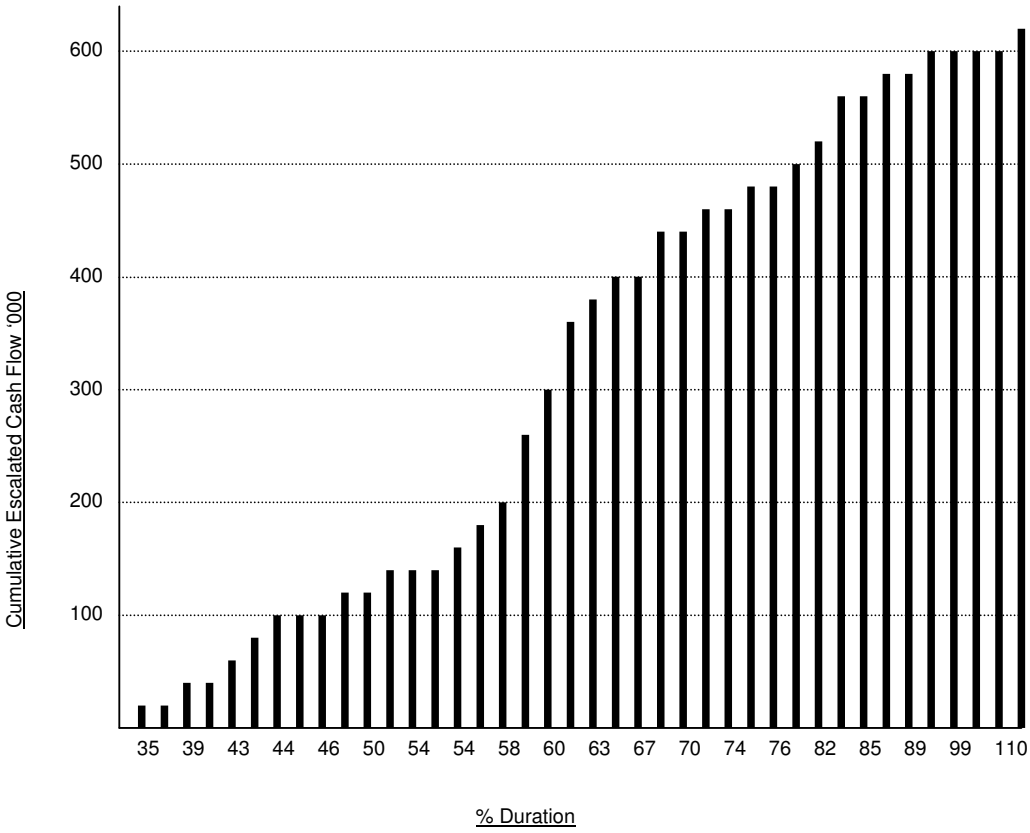


Figure 4.7: Cumulative escalated cash flow

Source: Louw, 2002: 100

2.2 Estimate range

The estimate range is intended to communicate the project team's level of confidence in the completeness of the current scope and the potential for variations in the ultimate scope (Noor *et al.,* 2006: OWN.05.1). The range and contingency are collective assessments of varying levels of risk (Shaheen, Fayek & AbouRizk, 2007: 325). Contingency and risk are reflected in the accuracy range and are very dependent and are not disconnected. Maddex (2008: RISK.03.1) states that contingency applications impact on the range of accuracy. Table 4.4 shows suggested contingency and ranges pertaining to the cost estimate. Also refer to Figure 3.32 in Chapter 3 of this study.

"Normal" contingency and range chart (applied against lowest reasonable bid/cost)						
Level of estimate	Mature technology		New technology		Retrofit project	
	Contingency	Accuracy range	Contingency	Accuracy range	Contingency	Accuracy range
OOM	25%	±50%	30%	±50% to 75%	25%	±50%
Conceptual	20%	±25% to 30%	25%	±40% to 50%	20%	35% to 40%
Accuracy range is based on a 50/50 chance of cost over/under run						

Table 4.4: Suggested contingency and ranges around the cost estimate
Source : Kinney and Soubiran, 2004: EST.15.12

A proper conceptual cost estimate starts with planning of the estimate, factoring costs and analysing and applying contingency. The most important aspect of conceptual cost estimating is the use of proper factors. These factors are most reliable when derived from historical cost data and the estimator should differentiate between ISBL and OSBL areas. This is necessary because OSBL scope normally consists of typical brown field construction work which makes the use of factored quantities and costs very dangerous. When the estimate has been completed and the contingency allocated, the estimator should also make an allowance for escalation on the project. All of this added together will provide the project team with some sort of confidence level which will be expressed as an estimate range.

3.0 TYPES OF CONCEPTUAL ESTIMATING

The preceding discussion on conceptual estimating outlined the basis of this form of estimating in general. Following these steps one should be able to perform a conceptual estimate of average accuracy. To improve the accuracy range of this estimate the different types of conceptual estimating should be discussed to understand the pitfalls and advantages of each technique (Shekaran, 2008: 12).

This estimate form has been briefly discussed in Chapter 3 of this study. The main difference between this form of estimating and detailed or deterministic estimating is that conceptual estimating normally takes place at the beginning of a project (Ashworth, 1996: 6). As construction drawings and specifications generally are not available during the early stages of a construction project, conceptual estimating normally takes place without the take-off of quantities. Ballentine and Gignac (2008: TCM.04.2) state that the level of accuracy of the conceptual cost estimate mainly depends on the level of information available and the techniques being used to determine the conceptual cost estimate. The accuracy of an estimate at a certain information level could be improved by using the proper technique for the available data.

Several modeling techniques have been suggested for conceptual estimating including probabilistic modeling, regression analysis, neural networks, ratio estimating and parametric estimating (Cummins & Jenks, 1989: 15). This study focuses more on ratio conceptual techniques, but an understanding of the other methods is also necessary to grasp the full extent of this form of plant estimating.

3.1 Probabilistic cost estimation

The most commonly used conceptual estimation techniques stem from the probabilistic cost determination of process plants. It is therefore the quickest way for quantifying uncertainties included in the early cost estimate. These techniques require historical cost data of previous construction projects (Hassanein, 2006: PS.17.02). A probability distribution function is selected for the cost data by fitting the data against major theoretical distribution functions and comparing goodness of fits. Beta and log-normal distributions are normally used, however selecting the distribution function for a specific data set may depend on the characteristics of the project data and other distribution functions may provide better fits (Sorenson & Lavelle, 2008: 44; Singh, 2007: 29).

Probabilistic cost estimation for construction projects may be performed at different levels. As an example for building projects Level 0 may include total cost and Level 1 may include system level of cost breakdown such as structure, electrical, mechanical, etc. If probabilistic cost estimation is done at Level 0, the only data required will be historical data of total cost of past projects. The cost of each project could then be adjusted for inflation (escalation) and location with the use of historical and location cost indices (Touran, 2003: 281). A unit cost ($/m2) could then be calculated with the

adjusted cost data set and this data set could be used for selection of the probability distribution function. Once the distribution function is selected cost estimates for different probabilities can be computed and range estimating can be performed (Vargas, 2004: CSC.16.03).

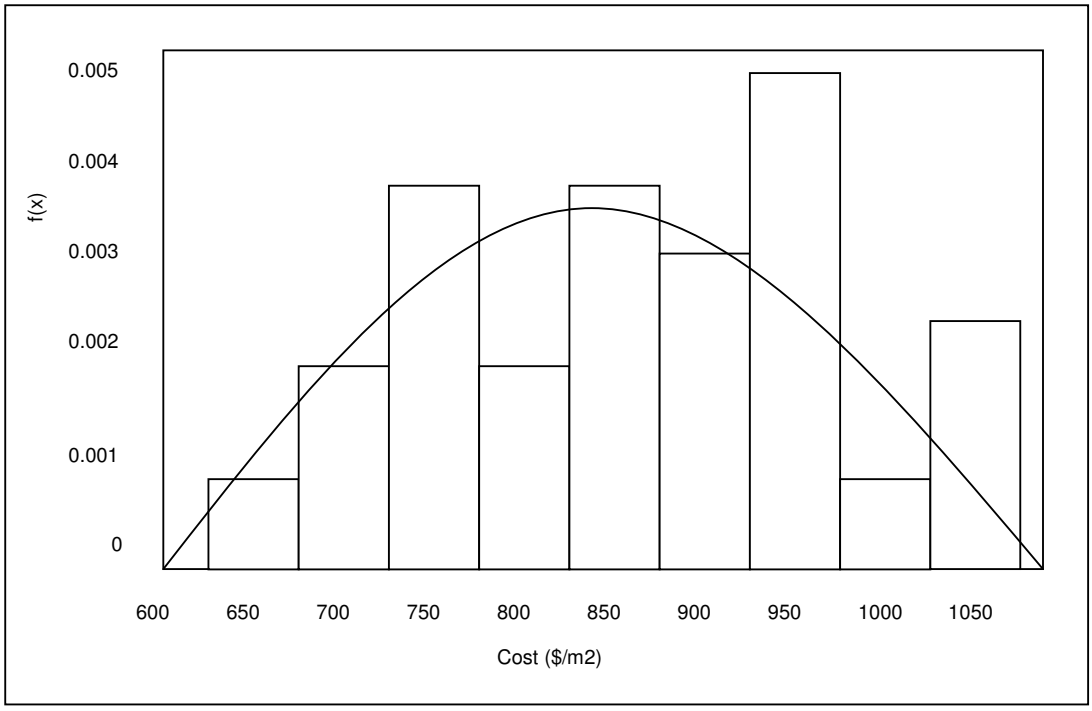


Figure 4.8: Plot of project cost data and fitted probability distribution
Source: Sonmez, 2005: EST.07.2

Sonmez (2005: EST.07.1) illustrates the working of probabilistic estimating by means of an example. He refers to data of 30 building projects which were constructed in 14 states over a 20 year period that were used to develop range estimates at Level 0 with the probabilistic cost estimating technique. Figure 4.8 demonstrates the functioning of range estimating which is the invert function of the graph as demonstrated in Figure 4.9.

A 10% to 90% range estimate for the unit cost ($/m2) has been developed with the distribution function selected. Figure 4.9 demonstrates this range. The range estimate indicates that there will be an 80% chance that the actual cost will be within the range of 687.5 – 940.2 $/m2, and that there is a 10% chance that the actual cost will be lower than 687.5 $/m2 and higher than 940.2 $/m2. The range estimate gives an idea of the degree of uncertainties included in the estimate.

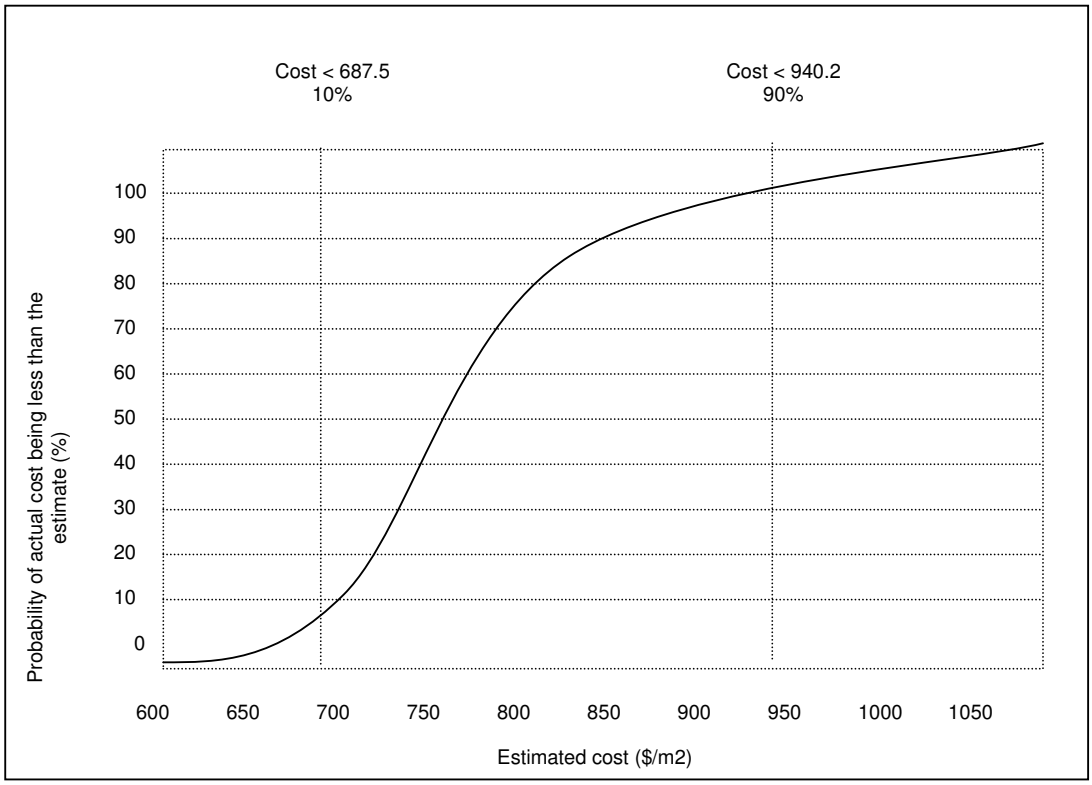


Figure 4.9: Range estimation with probabilistic modeling

Source: Sonmez, 2005: EST.07.2

Probabilistic cost estimation at Level 1 requires detailed statistical analysis. First cost data has to be compiled and adjusted for inflation and location at Level 1 and a probability distribution function cost of each system such as structure, electrical, mechanical, etc. has to be selected. Depending on the characteristics of the cost data for each system, different probability functions may provide better fit to the data sets. Correlations among cost of each system need to be calculated after selection of the probability distribution functions. Considering correlations amongst systems is very important for accurate estimation of costs and variations of the cost estimate. Finally cost estimating can be performed by use of a Monte Carlo simulation technique (Hollmann, 2007a: RISK.03.1).

The bottom line of a model may be a function of hundreds or thousands of uncertain variables. A random number based technique, the Monte Carlo Method, may be applicable and useful (Vrijland, 2005: DEV.06.1). With modern computers, the computing power is available to perform millions of calculations within seconds, which makes the use of Monte Carlo simulations practical. Whiteside (2008: EST.04.1)

indicates that in the multi-variable case, a mathematical model is developed containing all relevant variables, preferably restricted to those with a significant impact on the bottom line. Verschoor (2005: RISK.10.1) points out that the model gets calculated many times, in every trial assigning a fresh random number based value to each of all the input variables. The assigned value will be within the probability range of each variable (Vargas, 2004: CSC.16.1).

3.2 Ratio conceptual estimating

Page (1996: xvi) suggests two types of factored conceptual estimating in the petrochemical industry. The first method (when properly applied) can produce semi-definitive estimates with an accuracy range of ± 10%, while the second method relies on ratio estimating and is based on the known equipment material value and the application of weighted percentage costs for all other items. It produces an estimate with an accuracy range of ± 30% (Kwak & Watson, 2005: 1431).

Page (1996: xvii) describes the more accurate "Method One" as a process where major discipline quantities are determined, hence the reference of a "semi-definitive" estimate, and then cost accordingly. To achieve the desired level of accuracy the following information will be required:

- Plant capacity, product form, basic process and raw material.
- Total general specifications.
- Plant location (site conditions).
- Preliminary soil report with foundation recommendations.
- Plot plan and equipment arrangements.
- Mechanical flow sheets.
- Equipment lists.
- Building listings, type, size and description.

"Method Two" as described by Page (1996: xvii) can be referred to as Ratio Conceptual Estimating and is used in situations where the total cost of an item or facility can be reliably determined from the cost of a primary component. In the case of most petrochemical plants, the specialised process equipment makes up a significant portion of the total project cost. This is often referred to as "equipment factor" estimating (Uppal, 2007: EST.03).

According to Nitithamyong and Skibniewski (2006: 80), equipment factored estimates are used to develop costs for process and utility units for which the behaviour of the costs of the direct labour and bulk materials used to construct the facilities is correlated with the costs (or the design parameters) of the major equipment. Liu and Zhu (2007: 91) state that this estimating methodology typically relies on the principle that a ratio or factor exists between the cost of an equipment item and the costs for the associated non-equipment items (foundations, piping, electrical, etc.) needed to complete the installation.

An equipment factored estimate can typically be generated when project definition is approximately 1 to 15% complete. An equipment list should be available at this point of the estimate. This estimate is often a feasibility estimate used to determine whether there is sufficient business case to pursue the project. Shen and Liu (2003: 486) state that if there is sufficient business case to pursue the project, then this estimate may be used to justify the funding required to complete the engineering and design required to produce a funding or budget estimate (Newnan *et al.,* 2004: 46).

Louw (2002: 88) makes reference to the increased accuracy of the equipment factored method over that of the capacity factored method which is described later in this chapter. In Table 4.5 certain minimum equipment description requirements are depicted as applicable equipment factored estimating. Louw uses the example of the cost estimation of a pressure vessel where one would at least require the internal diameter, the tangent-to-tangent length, the internal pressure and temperature, and material of construction.

The estimator assumes that the general engineering specifications which applied to previous purchases will likewise apply to this equipment list, and searches the accumulated price and technical data for comparably rated pieces of equipment. Xiao and Proverbs (2003: 325) state that the estimator can also obtain commercially binding quotations for the equipment. As soon as the equipment list is priced, the cost of other elements in the plant is estimated by assuming a certain pattern will apply.

Boilers	Capacity t/h or MW duty, pressure, superheat temperature, type
Furnaces	Duty in MW, materials of manufacture, fuel feed rate, type
Flares and stacks	Height, diameter, materials of manufacture, flare tip specifications, capacity t/h

Heat exchangers	Total heat exchange surface area, finned area for air cooled heat exchangers, materials of manufacture, type, e.g. shell-and-tube, floating head, fixed tube, double pipe, U-tube, plate, air cooled, MW duty for plate exchangers
Reactors	Tangent-to-tangent length, inside diameter, pressure, temperature, materials of manufacture, type, e.g. fixed bed, fluidised bed, vapour phase, slurry
Distillation columns	Tangent-to-tangent length, inside diameter, pressure temperature, materials of manufacture, type and number of internals, e.g. valve trays, structural packaging, bubble cap trays
Tanks	Diameter, height, pressure, materials of manufacture, type, e.g. fixed roof, floating roof, sphere, bullet
Drums and separators	Tangent-to-tanget length, inside diameter, pressure, temperature, materials of manufacture, type, e.g. horizontal, vertical, with or without boots, semi-elliptical heads, hemispherical heads, internals, e.g. heating coils
Filters	Capacity m^3/h, pressure, temperature, materials of manufacture, type, if possible filter area and particle retention size
Compressors	Capacity m^3/h at suction conditions, kW rating, inlet and discharge pressures, medium compressed, type, e.g. reciprocating, centrifugal, axial, driver type, e.g. steam turbine or electric motor, if possible temperatures and number of stages
Pumps	Capacity m^3/h, kW, type, e.g. centrifugal, driver type, inlet and outlet pressure, medium pumped, if possible net positive suction head
Dryers	Capacity t/h, kW, materials of manufacture
Centrifuges	Capacity t/h, kW, materials of manufacture
Crushers	Capacity t/h, kW, materials of manufacture, type, e.g. jaw, roller
Crystallisers	Capacity t/h, kW, materials of manufacture
Ejectors	Capacity t/h, medium pumped, suction and discharge pressure, number of stages, pumping medium and pressure
Mills	Capacity t/h, kW, type, medium milled, speed
Mixers	Power kW, speed, materials of manufacture, type
Refrigeration units	Duty MW, coolant type, evaporator temperature, type
Cooling towers	Duty MW, capacity, e.g. water flow m^3/h, materials of manufacture, type, e.g. induced draught, if possible cooling

	range, wet bulb temperature
Boiler water treatment system	Capacity t/h, quality of feed and of product e.g. total dissolved solids in parts per million, materials of manufacture, type, e.g. ion exchange or reverse osmosis
Conveyors	Capacity t/h, kW, length, width, material to be handled, type, e.g. rubber belt, bucket
Cranes	Lifting capacity, tons at given radius (m), type, e.g. overhead, tower
Lifts and elevators	Capacity (t), duty, e.g. freight or personnel, speed m/s, type
Hoists	Load (t), speed m/s, type

Table 4.5: Equipment design details: minimum requirements
Source: Louw, 2002: 53-54

Table 4.6 offers an example of the total cost of a process plant Type X, having a Capacity of Y tons per annum, expressed as proportions of the mechanical equipment cost. This gives an idea of how much needs to be added in addition to the mechanical equipment to make it a functioning whole (Yan Xiaoyan, 2004: 3).

Plant type X, capacity Y tons per annum	**Cost**
Mechanical equipment	100
Other materials	95
Labour for construction	55
Sub-total (direct field cost)	250
Other costs	150
Total cost	400

Table 4.6: Example of cost components as percent of mechanical equipment cost
Source: Louw, 2002: 89

In the *Conceptual Cost Estimating Manual,* Page (1996: 1-10) provides a list of the disciplines of work that should be taken into account when performing a Ratio Conceptual Estimate. The disciplines are illustrated in Table 4.7.

DISCIPLINES OF WORK	
	DIRECT COST ITEMS
Process equipment	The equipment cost, labour, material and sub-contracts necessary to set and erect or install the process equipment in the final position and condition for mechanical operation.
Site preparation	All general preparation of the plant site for construction including, but not necessarily limited to, clearing, rough grading, cut, fill, borrow, disposal, soil stabilisation and finish grading.
Site improvements	Includes items of work that provide permanent improvements to the plant site, such as drainage ditches, culverts, storm drain pipes, canals, dikes, all base materials for roads, parking lots, and railroads including ballast, railroads, and fencing. Pavements for roads, process areas and parking areas are included under “Paving”.
Concrete	All earthworks, forms, reinforcing steel, miscellaneous embedded items and placing, finishing and curing of concrete for equipment foundations and equipment structures are included. All building concrete including foundations is included under “Buildings”.
Structural steel	All cost for procuring, fabricating, and erecting structural and miscellaneous steel, not embedded, for framed structures, equipment supports, equipment platforms, walkways, ladders, handrails and pipe supports. Steel for buildings is

DISCIPLINES OF WORK	
	included under “Buildings”.
Buildings	All cost of buildings including earthworks, foundations and other concrete, total superstructure, HVAC, plumbing and utility piping to outside of building, insulation, small power and lighting, painting and all architectural finishes.
Underground piping	All project underground piping serving the project including fire water loops and their components, water lines and special process lines.
Above ground piping	Fabrication and erection of all above ground process piping, valves and fittings required for plant operation. Installation only of relief valves, control valves, and orifice fittings for instrumentation are also included. The material cost for these instruments are, however, included under “Instrumentation”.
Underground electrical	All labour and material for underground power and lighting, ducts, conduit, wire, cable, etc. Also includes earthwork and concrete for embedments.
Above ground electrical	All items required for the complete above ground power and lighting systems for the total project, excluding buildings. Also includes the installation of all electrical instruments and their hook-ups.
Instrumentation	Includes material and labour for instrumentation work defined as follows: - material cost includes instruments, control valves, relief valves, control panels, meter runs, orifice fittings and all other instrument items plus tubing, tube bundles, and tray materials required to install

DISCIPLINES OF WORK	
	such items; - labour cost includes the installation of the above except as noted; - labour cost to install relief and control valves and orifice fittings is included under “Above Ground Piping”. Labour cost to install electrical hook-up is included under “Above Ground Electrical”; - all header piping labour and material costs are included under “Above Ground Piping.”
Insulation	All labour and material cost of insulation, refractories, and linings for process equipment and piping. Building insulation is included with “Buildings”.
Painting	Includes all preparation and protective coating of surfaces with paint and/or epoxy for the total project excluding buildings.
Paving	Includes the furnishing and placing of concrete, asphalt, or gravel used for the final surfacing of roads, sidewalks, parking areas and process work areas as required.
Proratables	Includes the labour and material cost for the daily area clean up, all required scaffolding and final test, startup, and pre-commissioning assistance.
	<u>CONSTRUCTION EQUIPMENT</u>
Rental or purchase	Cost of rental or purchase of construction equipment required for the project. Does not include small tools.
Service labour	All labour required to service and maintain the construction equipment. Does not include the operation of the equipment

DISCIPLINES OF WORK	
	when working.
Fuel, oil, grease, supplies	Includes the cost of all fuels, lubricants, and supplies required to operate and maintain the construction equipment. OVERHEAD AND INDIRECT COSTS All or part of the items described below are used to establish costs for: - salaried indirect, - office hourly indirect, - field hourly indirect. The distribution will vary depending upon the type of project, local labour practices, and contractor preferences.
Engineering salaries – estimating	Civil, cost, electrical, general, mechanical and structural estimating salaries.
Engineering salaries – field and technical support	Project chief engineer, assistant project chief engineer, chief field engineer, civil, electrical, mechanical, structural, field, staff, office, piping, instrument engineers, coordinators, engineering draftsmen, party chiefs, instrument men, chainmen, rodmen and labourers temporarily assigned to a field party performing general layout work.
Watchmen and janitors	Security supervisor, security coordinator, guards, watchmen, janitors. This does not include for contract security personnel.
Holiday pay	Pay for holidays not worked. Personnel covered by overhead and indirect estimate only.

DISCIPLINES OF WORK	
Salaries – office clerical	Administrative clerks, office clerks and secretaries
Quality assurance – labour	Chief construction inspector, construction inspectors, welding inspector, piping inspector, electrical inspector, boiler inspector and civil inspector.
Salaries – sub-contract administration	Salaries for sub-contractor coordinators.
Salaries – cost engineering	Salaries for cost/schedule supervisor, chief field cost engineer and cost engineers.
Salaries – scheduling and planning	Salaries for chief field scheduler and planner/schedulers.
Salaries – technical clerks	Salaries for clerical technical personnel.
Material control labour	Material control coordinators and material control personnel assigned to implement and follow-up the material control programme.
Move in/out labour	Job payroll labour for loading, unloading and transporting from facilities to project construction area tools and construction equipment, temporary facilities, etc. Move-in is defined as assembly of tools and construction equipment at jobsite. Move-out is the return of tools and construction equipment to other approved destination in the immediate area of the project.
Non-productive labour	Wages paid to hourly employees during a temporary period

DISCIPLINES OF WORK	
	when work is stopped. Also wages paid to craftsmen for voting in accordance with union or government regulations. Welding test labour and jury pay differential. Work stoppages due to inclement weather and show-up time are considered in productivity factors used elsewhere.
Safety and medical expense – labour	Safety supervisor, safety inspectors and medics.
Salaries – office	Chief accountant, accountants, bookkeepers, invoice auditors, expeditors, chief time keepers, personnel manager, personnel clerks, data controllers, data entry operators, and procurement officers.
Salaries – supervision	Project manager, general superintendent, assistant project manager, assistant superintendent, administrative manager, office manager, area coordinator and master mechanic.
Sick pay	Wages paid overhead and indirect employees only for authorised absence due to personal illness, as approved by project construction manager.
Warehouse salaries	Warehouse supervisor, assistant warehouse supervisor, warehousemen, tool room attendants, warehouse labourers – assigned full time to warehouse operation. Must be on project payroll only.
	TEMPORARY CONSTRUCTION FACILITIES (Labour and material)
Temporary buildings and facilities – labour	Labour only for construction or erection, maintenance and dismantling of the temporary facilities, in accordance with but not limited to the following: roads, ditches, bridges,

DISCIPLINES OF WORK	
	storage areas, parking lots, fencing, buildings, water system, sanitary system, power distribution, telephone and communication systems, and plant and air system. Does not include construction camp, quartering or catering facilities.
Temporary buildings and utilities – material and supplies	Material and supplies and maintenance for construction and dismantling of the temporary facilities in accordance with but not limited to the following: rental of temporary field offices and warehouses, roads, ditches, bridges, storage areas, parking lots, fencing, buildings, water system, sanitary system, power distribution, telephone and communications system. Does not include construction camp, quartering or catering facilities.
	LABOUR BURDENS AND OVERHEAD PERSONNEL BENEFITS
Retirement and savings plan (for overhead and indirect personnel only)	Actual cost fixed by appropriate accounting office. Does not include any like or similar item which is a part of a union fringe benefit.
Insurance – employees' life and hospitalisation (for overhead and indirect personnel only)	Direct premium charges only. Does not include any like or similar item which is a part of a union fringe benefit.
Taxes – payroll	Unemployment contributions, etc.
Vacation pay (for overhead and indirect personnel only)	Actual cost for overhead and indirect personnel only based on gross payroll as billed by the appropriate Accounting Office. Does not include any like or similar item which is a

DISCIPLINES OF WORK	
	part of a union fringe benefit. SMALL TOOLS AND CONSUMABLES
Construction supplies	This account should include items that are consumed and are, by their use, directly related to construction, for example, sandpaper, rope, chalk, soapstone, emery paper grinding wheels, moil points, saw blades, padlocks, threading dies, drill bitts and reamers, rags, brooms and mops, air and water hose for general use.
Small tools (in accordance with contract limits)	Purchase or rental of hand tools, power operated hand tools, etc. Rental or repair parts for such tools will be included in this account. This account includes minor equipment such as small pumps up to 3", vibrators, light plants (up to 3,000 watt), chain saws, pipe threaders, tar pots, small sand blasting machines, air and chain hoists.
Workmen's supplies	This cost will include items that are, by their use, directly beneficial to and for the convenience of the workmen, for example, towels, toilet paper, drinking cups, ice drinking water, hard hats, protective clothing, gloves, boots, salt tablets, soap and safety shoes. Credit is to be received for sales by payroll deduction for items charged here. OTHER INDIRECTS
Advertising	Classified ads, public advertisements.
Bond premiums	Bid bonds, performance bonds, maintenance bonds, and fidelity bonds.
Communications and	Telephone, telegraph, teletype, postage, radio rental or

DISCIPLINES OF WORK	
postage	communication system rented from a third party. Includes data lines and couplers.
Containers	Deposits for returnable containers and reels.
Dues	Membership dues for clubs and professional organisations, for overhead and indirect personnel only. Does not include union dues.
Engineering supplies	Surveying instruments (purchase or rental), drafting supplies, surveying supplies, blueprint or photostat work, progress photos.
Expediting	Cost for services from expeditors who are not on the job payroll.
Heat, light, water and power	Public utility charges and heating fuels for job buildings. Cost for water not used for construction purposes.
Insurance – general	Premiums for builder's risk, fire and extended coverage, equipment, floater coverage, non-owned automotive liability, independent contractor's liability, contractual liability, special risk coverage, such as war risk heavy lift, hull and umbrella.
Legal	Abstracts, lawyers fees, court costs, notary fees, sign-up expense.
Licenses and permits	Business permits, construction permits, export/import licenses, government inspection fees, hauling permits.
Move in/out – supplies and services	Transportation of tools and construction equipment by others to project construction area and miscellaneous supplies consumed and services used for move-in and -out purposes.

DISCIPLINES OF WORK	
Office supplies	Stationary supplies, printing, office equipment purchase, rental or repair, office and warehouse forms and supplies, jobsite reproduction costs and furniture.
Safety and medical expense – material	Medical examination fees, medical supplies, safety signs and literature, first-aid equipment, fire extinguishers and refills.
Testing and laboratory analysis	Soil surveys, concrete cylinder tests, independent inspectors. Lab charges to test welders.
Travelling	Transportation and subsistence expense of overhead and indirect employees on business trips (excluding quality assurance personnel travel).
Welding supplies	All material, supplies and tools required by a welder, i.e. acetylene, oxygen, flux, welding rods, lighters, flints, chipping hammers, wire brushes, stingers, helmets, lenses, asbestos gloves, goggles, gauges, welding qualification test material, etc.
Unclassified	Flowers, weather reports and forecasts, and bank service charges.
Data processing services	Cost for data processing services for the project. Terminal rental, supplies, computer charges from outside jobsite sources, etc.
Consulting fees	Cost for outside consulting services which might be required in connection with the project which are not a part of engineering.

DISCIPLINES OF WORK	
Trade journals, books, publications and subscriptions.	Cost of books and subscriptions.
Contract guard service	Cost of subcontract guard service.
Quality assurance – material and supplies	Normally includes travel costs for quality control personnel.
Employee educational assistance	Cost of employee educational assistance for overhead and indirect personnel only.
	HOME OFFICE COST
Engineering/design services	Total labour and material cost for the complete engineering and design of the project including engineering fee.
Construction services	Services furnished by various home office departments such as estimating, scheduling, expediting, etc. as may be required to assist the project. Services are charged to the project only for time actually spent on the project.
Project general management	Includes the portion of time that the contractor's management staff applies in regard to overall direction of the project.

Table 4.7: Disciplines of work covered in ratio conceptual estimating
Source: Page, 1996: 1-10

As stated later in this chapter when discussing capacity factored estimating, the cost pattern (or functions of mechanical equipment cost) for a certain plant would only be valid under the same typical circumstances (Bentley, 1987: 43). One would not expect the same pattern for a platformer unit as for an ethylene plant or for an oxygen plant, and neither would a pattern found in the USA necessarily hold true for a country like

Germany or South Africa. The reason for this is the differences in labour rates, productivity, specifications, equipment and material prices.

Bertisen and Davis (2008: 120) mention that capacity as well as equipment factored estimating can only be made if a complete unit is involved. For modifications or additions more detailed scope descriptions would be required. Table 4.8 shows the make-up of a selection of different types of plant. It is interesting to note how wide the bottom-line figures vary, mechanical equipment to bottom-line cost ranging from a ratio of 1:6,92 to 1:1,68 (Louw, 2002: 90).

Brent and Labuschagne (2007:416) point out that an ethylene plant proportionally has much more piping than other types of refinery units, and this characteristic is highlighted by the item “other materials” as well as by the high labour figure.

Plant components as percent of mechanical equipment	Ethylene plant	Refinery Unit	Low temperature gas handling unit	Steam plant	Oxygen plant
Mechanical equipment	100	100	100	100	100
Other materials	109	82	82	52	28
Labour	190	128	46	40	20
Indirect field cost	135	147	77	15	9
Engineering, supervision, project management, etc	159	101	58	45	12
Total cost	**692**	**558**	**362**	**252**	**168**
Variance ratio	1:6,92				1:1,68

Table 4.8: Plant components as a percent of mechanical equipment

Source: Louw, 2002: 90

The equipment and other materials of the "low temperature gas handling unit" given here is more expensive than normal carbon steel, hence the labour and other items are comparatively smaller. An oxygen plant has very expensive equipment such as air and oxygen compressors and other equipment fabricated in aluminum or stainless steel, hence the very high proportion in equipment (Louw, 2002: 90).

Table 4.9 shows an example of equipment factored cost estimating, based on the carefully recorded cost history of a previously built carbon steel refinery unit constructed some time ago. The table gives all the cost items as percentages of the total estimated cost of all mechanical equipment. Kapp (2004) points out that escalation is dependent on the particular time schedule of the project. Contingencies depend on the risk of the particular project (Prasad, 2008: EST.S02.3). The mechanical equipment was estimated piece by piece based on an equipment list with sizes, materials and ratings, as given by the process designer, and using in this case historical prices being updated to the present date by applying the appropriate escalation indices (Morris & Wilson, 2006: CSC.06.2).

Carbon steel refinery unit	**% of ME**	**% of ME**	**% of ME**	**Estimated cost of proposed plant**
Estimated mechanical equipment cost (ME)	100	Materials	Labour	1,000,000
Site preparation and earthworks	5.1	2.0	3.1	51,000
Concrete	5.1	2.0	3.1	51,000
Structures	15.2	7.6	7.6	152,000
Buildings	2.5	1.0	1.5	25,000
Mechanical equipment	100.0	100.0	0	1,000,000
Mechanical equipment erection	6.2	0	6.2	62,000
Piping	52.4	31.4	21.0	524,000
Electrical	15.9	12.7	3.2	159,000
Control systems	26.3	19.7	6.6	263,100
Insulation and painting	8.3	4.6	3.7	83,100
Direct field cost	237	181.1	55.9	2,370,200
Indirect field cost	19.8			198,200

Carbon steel refinery unit	**% of ME**	**% of ME**	**% of ME**	**Estimated cost of proposed plant**
In-house engineering	7.5			74,700
Engineering & other services	98.0			980,100
License fees	19.0			189,600
Insurance	1.1			10,600
Catalysts & chemicals	0			0
Operations (capitalised)	12.6			126,400
Customs duties	6.5			65,300
Total without contingencies	401.5			4,015,100
Contingencies	20.0			802,384
Total before escalation	421.5			4,817,484
Spares	10.5			105,292
Operations (Operating cost)	4.0			40,000
Escalation	33.7			337,224
End-of-job cost (EOJC)	**469.7**			**5,300,000**

.

Table 4.9: Factoring by equipment cost

Source: Louw, 2002: 91

Another factored type estimate is described by Louw (2002: 86) and refers to Capacity Factored Conceptual Estimating. This method is not that common, but is sometimes used when output capacities are known (Ellsworth, 2007: 27).

For process plants, capacity factored estimates assume that the cost of the proposed plant will follow certain mathematical rules that have been found to be true in numerous previous cases (Louw, 2002: 86). In the case of plant capacity, the rule most frequently applied is illustrated as follows:

$$\frac{\text{Cost of Plant A}}{\text{Cost of Plant B}} = \left(\frac{\text{Capacity of Plant A}}{\text{Capacity of Plant B}} \right)^{n}$$

Note that the value of the exponent “n” in this relationship would only be true for a given technology, process and location which means a certain climate, topography, distance from sources of equipment and materials, the infrastructure available and the

availability of skilled craftsmen and experienced engineers or other professions (Jansen-Rommijn, 2008: EST.13.1). It would also only be valid for a certain range of scale-up or scale-down ratios. Despite these qualifying statements, the tool is useful for quick comparisons (Kelly, 2005: CDR.13.1).

3.3 Regression analysis

Conceptual cost estimates are not expected to be precise since project scope is not finalised and very limited design information is available during the pre-design stages of a project. A quick, inexpensive and reasonably accurate estimate is needed, based on the available information (Lowe, Emsley & Harding, 2006: 750). Regression analysis is one such method. Sonmez (2004: 677) states that in regression analysis the project cost is estimated with a regression model including a number of independent variables. He also mentions that some authors suggest using location, construction year, plant type, technology, etc. The use of regression analysis is not only limited to construction cost estimation. Zayed and Halpin (2005: 779), Edwards, Holt and Harris (2000: 45) and Blyth and Kaka (2006: 82) refer to several uses of regression analysis and how this concept can be extended to be functional in construction cost estimation.

Sonmez (2004: 677) states that in regression analysis the project cost is estimated with a regression model including a number of independent variables. Plant location, year of construction, plant type, etc. can be used as independent variables. The advantage of regression models lies in their generally economical use of parameters compared to some other techniques (Lowe *et al.,* 2006: 750). The technique of regression analysis, however, requires the user to make decisions about the use of interaction terms and also about the class of relationship (linear, quadratic, etc). Trost and Oberlender (2003: 198) point out that one of the main advantages of probabilistic estimating techniques is their capability to develop a range of estimates for quantifying the uncertainty of the estimate. In simulation, however, a probability distribution function needs to be selected to model the data (Sonmez, 2004: 678). The importance of regression analysis can also be found in parametric estimates which will be discussed later in the chapter.

3.4 Neural network analysis

A neural network is a form of artificial intelligence which could also be used for conceptual cost estimation. Bhokha and Ogunlana (1999: 133) and Ko and Cheng (2007: 317) point out that these networks have the capability to capture the relations

between independent and dependent variables. Kuprenas (2008: CSC.05.1) states that location, contract duration, size of the contract and type of project all have a measurable effect on construction cost. Edwards *et al.,* (2000: 46) point out that neural networks, similar to regression analysis, require the historical data of past projects so that it can capture the relations between variables and cost. Sonmez, (2004: 678) comments on the use of neural networks when performing conceptual estimates and how this form of analysis can assist the estimator.

Walsh, Sawhney and Vachris (2006: 125) indicate that to make estimates of construction cost sensitive to factors that influence their values, thereby freeing estimates of future costs from the assumption that past conditions will prevail in the future, procedures have been developed that use historical data to relate construction costs to the factors believed to influence them (Wilmot & Mei, 2005: 765). Typically, regression analysis has been used to establish this relationship but recent applications include the use of artificial neural network (ANN) and neuro-fuzzy models (Ezeldin & Sharara, 2006: 650). These relational models are different to the trend models since they only assume that the relation between construction cost and the influential factors will remain constant and not that past trends are unchanging (Fayek & Oduba, 2005: 940; Knight & Robinson, 2002: 505). Mazouk and Moselli (2004: 879), Moselli and Alkass (2006: 1196) and Omitaomu and Badiru (2007: 159) also comment on the use of fuzzy logic, which is a form of neural networking, in estimating construction related activity costs.

The linear relationship in linear regression imposes a functional relationship which may not always be appropriate (Chehayeb & Al-Hussein, 2006: CDR.18.1). While this may be at least partially addressed through transformation of variables, the assumption of a specific mathematical formulation limits the ability of the model to fit the data on which it is estimated (Skorupka, 2004: RISK.15.1). In contrast, neural network (NN) models have no implicit functional form and therefore have greater freedom to fit the data than regression models (Elazouni, Ali & Abdel-Razek, 2005: 33).

3.5 Parametric estimating

SCEA (2005: 3) reports that current industry and government practitioners commonly use parametrics to perform a variety of analyses, such as independent cost estimates and trade studies. Practitioners have argued that proposal preparation, evaluation and negotiation costs, and cycle time can be reduced considerably through the increased

use of parametric estimating (Dysert, 2008: EST.03.1 and Kapetanios & Marcellino, 2009: 210). They also state that these benefits can be achieved while maintaining or improving the quality of estimates produced.

Beginning in the early and mid 1990's, both the American industry and government, through the Parametric Cost Estimating Initiative (PCEI), evaluated the ability of parametric estimating techniques and tools to support government proposal cost estimating requirements (Noor, Grumo, Kniskern & Kopach, 2006: OWN.05.2). The key issues considered included parametrics' ability to maximise the use of historical data in the estimating process, increase the estimate's realism, and reduce the cost associated with proposal preparation, evaluation and negotiation. SCEA (2005: 4) indicates that the PCEI, through numerous workshops and the Parametric Estimating Reinvention Laboratory, concluded that parametric techniques and tools, when properly implemented and correctly used, could produce realistic cost estimates at significantly reduced costs and times.

The benefits of using parametric estimating are well documented. It is estimated that savings to proposal preparation are between 40% and 80% when compared to some other approaches of estimating. Dysert (2008: EST.03.1) and Kwak and Watson (2005: 1430 – 1431) state that parametric tools and techniques have much more versatility than other estimating approaches. The following describe some reasons for this:

- Better estimates are provided, often in a matter of minutes.
- There exists a high-quality link between the technical and cost proposals.
- The data is well understood through the calibration and validation activities.
- It is much easier to estimate conceptual designs.
- Early costing cannot be done effectively any other way.
- No bill of material (BOM) is required.
- It is much easier to handle scope, technical and performance changes.

3.5.1 What is parametric estimation/analysis?

Dysert (2008: Est.03.1) describes parametric estimating as follows:

> *"A parametric estimate is comprised of cost estimating relationships and other parametric estimating functions that provide logical and*

> *repeatable relationships between independent variables (such as design parameters or physical characteristics) and the dependant variable (cost).”*

Kwak and Watson (2005: 1430 – 1431) demonstrate that the parametric estimating technique does play a significant role in the early stage of a project lifecycle regardless of the assertions that the results may lack the precision of the detailed estimate. Figure 4.10 demonstrates a suggested timeline for parametric estimating. Kwak and Watson (2005: 1430) propose a parametric estimate terminology to be as follows:

> *“A parametric estimation is obtained by using Cost Estimating Relationships (CER) among the project characteristics and applying an algorithm to determine an approximation of the total project cost. The characteristics may be physical attributes, performance specifications, or functions.”*

Polla (2007: 12) simplifies what seems to be the generalised conception of what parametric estimating involves and makes the following statement:

> *“Parametric estimating is a technique that uses simple to complex statistical relationships between historic data and applicable variables to calculate an estimated cost for a specific item or task.”*

Parametric analysis involves computerised cost models that use the parameters of consequential projects and the project’s products to estimate the use of resources required to perform the project such as labour, materials and time (Polla, 2007: 12). Stewart and Mastenbrook (1983: 40) and Vis (2005) state that these models have economic value because, when properly designed and used, they can improve the accuracy of project estimates, reduce the likelihood of serious overruns of budgets and schedules, reduce the costs of preparing project proposals, and enable project leaders to consider more options with regard to the best way to proceed (Bidarra & Bronsvoort, 2000: 215).

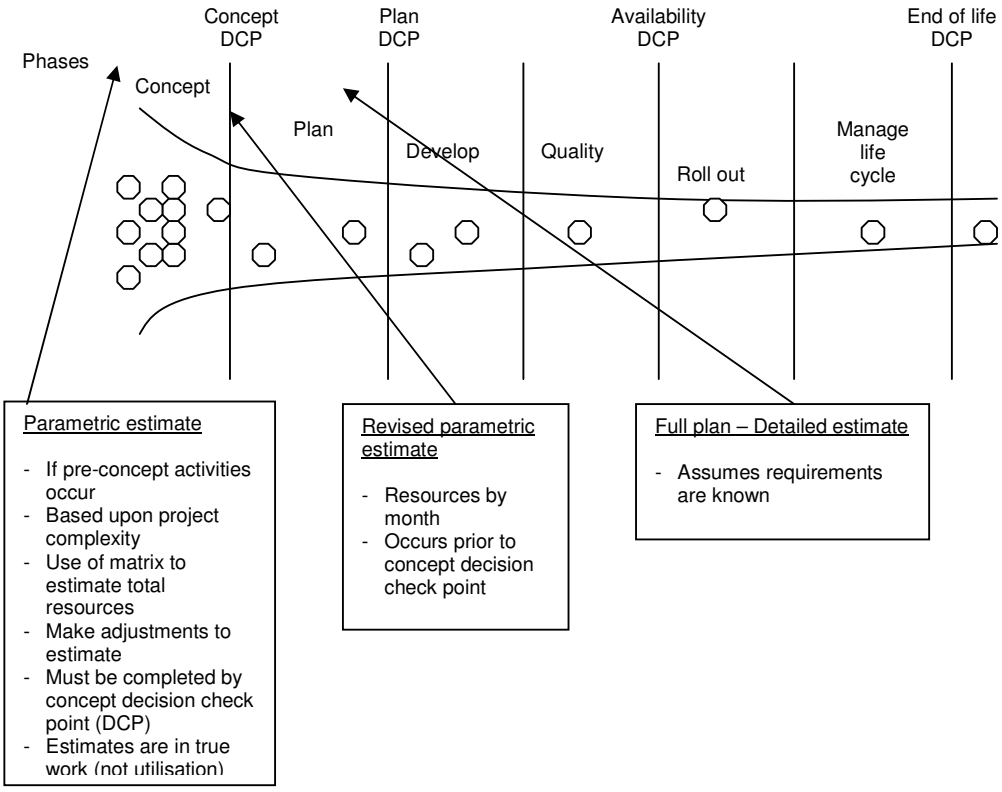


Figure 4.10: Suggested timeline for parametric estimating

Source: Kwak and Watson, 2005: 1431

Many parametric models also serve to advise on the uncertainties and risks associated with the project cost schedules (Iyer & Jha, 2006: 875; Khan, 2007: 14). This is an important function because modern projects are often complex. A purely cost or duration estimating model will provide what is called a “point estimate” of cost or duration. A point estimate is a single number that will always be in error to a greater or lesser extent (Polla, 2007: 15).

A model that deals with uncertainty and risk will provide a “range estimate”, also called a probability distribution, i.e. an estimate that tries to give some idea of the possible range of cost or schedule outcomes, and of the relative likelihood or particular outcomes (Sonmez, 2005: EST.07.1). The process of developing range estimates are inherently of more value to project management than point estimates because they help with understanding of what could happen and why (Smith, O’Keefe, Georgiou & Love, 2004: 264). They frequently point to certain risk abatement possibilities and

options that otherwise would have gone unnoticed (Maddex, 2008: RISK.03.1; Noor *et al.,* 2006: OWN.05.2).

The process of parametric estimating has three main components: database development, model development and model use (Camargo, Rabenasolo, Jolly-Desodt & Castelain, 2003: 2). Parametric analysis is a major management innovation. In common with several other management innovations, such as network scheduling and earned value analysis, modern parametric analysis has its genesis in the US and British military-industrial complex. The use of parametric analysis also has seen increased employment in the construction industry in recent years. Prentice (2004: 2), Ruskin (2004: 27) and Buell (2008: EVM.07.2) all comment on the use of earned value analysis and how that slots in with construction cost estimation and in particular, parametric estimating.

The first step in developing a parametric model is to establish its scope (Dysert, 2008: EST.03.2). This defines the end use of the model, the physical characteristics of the model, the cost basis of the model, and the critical components and cost drivers. The end use of the model is typical to prepare conceptual cost estimates for a process plant or system (Kapetanios & Marcellino, 2009: 209). The model should be based on actual costs from completed projects, and reflect the organisation's engineering practices and technology (Cass, 2007: 18). The model should generate current year prices or should be able to escalate to current year costs. The model should be based on key design parameters (Fang & Rogerson, 1999:45) that can be defined with reasonable accuracy early in the project scope development, and should provide the capability to be easily adjusted for specific complexity or other factors influencing the costs. Figure 4.11 shows a diagram of the typical steps that will have to be followed to build a parametric model.

3.5.2 The parametric model building process

The development and normalisation of historical auditable historical data is a key starting point in parametric model development (Pickett & Elliott, 2007: EST.02.2). The historical data will dictate and restrict the level of detail and the approach the parametrician can take (Kaka, 1999: 260; Melamed *et al.,* 2007: RISK.06.2).

3.5.2.1 Database development

Musgrove (2008: EST. 07.1) points out that a sound database of historical information is important to a successful parametric estimate. A cost model is a forecast of future costs based on historical fact (Park, Han & Russell, 2005: 164). Thus, future cost estimates must be consistent with historical data collection and cannot provide a lower level of detail than provided by the historical detail without some allocation or distribution scheme devised by the parametrician. Dysert (2008: EST.03.2) points out that proper data collection is the basis of good parametric estimating and that the developed model can only be as good as the data it is based upon.

Parametric techniques require the collection of historical cost data and the associated non-cost information and factors that describe and strongly influence those costs (Stewart & Mastenbrook, 1983: 37). Data should be collected and maintained in a manner that provides a complete audit trail with expenditure dates so that costs can be adjusted for inflation (Kaka, 1999: 256; Melamed *et al.,* 2007: RISK.06.1).

Technical non-cost data describes the physical, performance and engineering characteristics of a system or individual item. For example, weight is a common non-cost variable used in cost estimating relationships (CER's) and parametric estimating models (Camargo *et al.,* 2003: 3). A fundamental requirement for the inclusion of a technical non-cost variable in a CER is that it must be a significant predictor of cost.

Once collected, cost data must be adjusted to account for the effect of certain non-cost factors such as production rate, improvement curve and inflation – this is data normalisation (Oladapo *et al.,* 2008: 119). In Chapter 5 more can be found on the development of a database for estimating purposes.

3.5.2.2 Model requirements and architecture

The expectation of a parametric model is that it will estimate costs virtually instantaneously and accurately if the correct information is entered with respect to its parameters (Kwak & Watson, 2005: 1430). Each parametric model contains at least one cost estimating relationship (Ibrahim, Shash, Assaf & Jannadi, 2007: 18). Love, Tse and Edwards (2005: 187) and Lowe, Emsley and Harding (2006: 11) also comment on estimating relationships. These relationships are also known as CER's.

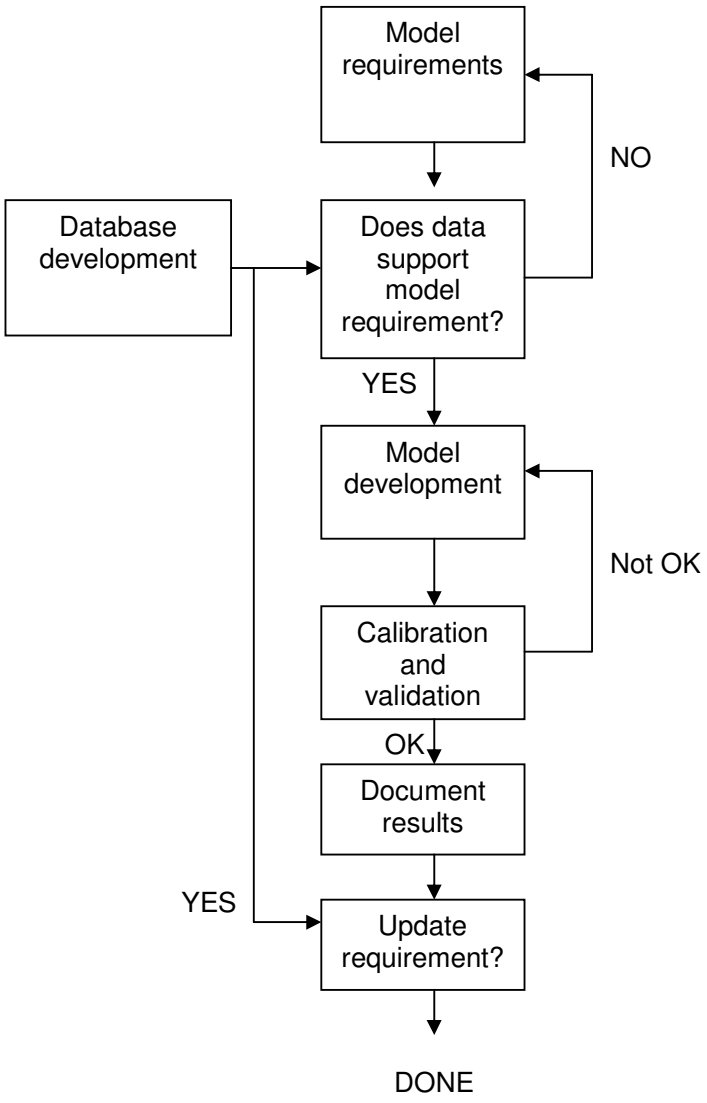


Figure 4.11: Flow chart of cost model development by the practitioner

Source: SCEA, 2005: 3

A CER is a mathematical relation and involves numbers, but otherwise can take several forms (Younossi, Areana, Moore, Lorell, Mason & Graser, 2002: 79). Two of the most common forms are algebraic equations and lookup tables. The most general expression for the algebraic equation is:

$y = f(x_i)$

Where:

y : a desired estimate (usually in currency, labour hours expended or periods of time consumed). Mathematicians will refer to “y” as a dependant variable.

f : represents some functional relationship that could be almost anything, including linear equations and a variety of non-linear equations such as polynomials, power laws, exponentials, and so forth. The key point about the selection of “f” is that the resulting equation must be a good fit to the supporting data.

x_i : represents the possibility of more than one independent variable. Most commonly, those independent variables are the parameters that the model builder has chosen as parameters driving the dependant variable. Model users initiate estimating by entering known or at least suspected values for these parameters.

A key aspect of model architecture is the choice of parameters. Younossi *et al.,* (2002: 79) point out that a prime requirement for use of a particular parameter is that it must be either a direct cause of the level or amount of the resource being estimated, or must strongly correlate with it. An example of a direct cause is the number of optical elements in a telescope. The more of them required, the higher the cost. Their optical quality is another direct cause, as is the combined surface area.

A requirement for the selected cost driving parameters considered as a set is that the amount of correlation between any two of them should be small (Vis, 2005: 1). Correlation is a statistical term. Nassar, Nassar and Hegab (2005: 1177) point out that the most used measure of it is the coefficient of variation (R^2). The coefficient measures the strength and the direction of a linear relationship between two variables.

Kapetanios and Marcellino (2009: 215) state that a commonly used parameter in estimating many types of hardware is its weight. In many cases, weight does correlate strongly with cost, but is seldom a direct cause. Attempts to reduce weight can increase cost significantly. Weight, however, is used because data for weight is almost always available. Reasonably accurate weights are normally available fairly early in the project, but when weight is used as a parameter, it will be necessary to use other parameters as well to prevent anomalous results as incorrect decreases in cost can occur when engineers attempt weight reduction programmes (Cocodia, 2008: 249).

When plotting data points on a graph, one can observe data scatter (Younossi *et al.,* 2002: 80). The most prominent reasons why data scatter occur are as follows:

- Poor choice of cost driving parameter – A parameter that is poorly associated with one project cost may be an excellent driver for a different project cost. For example, a driver that poorly predicts development labour hours could possible be a very good predictor of production labour hours.
- Presence of one or more other cost driving parameters – Most costs depend to some extent on more than one parameter.
- Presence of non-normalised parameter values – Inflation is one example of an effect that the economy can have on data from different time zones.
- Data collection errors – Data errors can occur when data is first recorded or when the analyst acquires it from wherever it has been stored.
- Inconsistent cost classification – Especially when data is sourced from different organisations with different accounting systems, data can be found to be inconsistent.
- Non-linearity of the x-y relationship.

3.5.2.2.1 Model calibration and validation

As mentioned, complex models are based on an organisation's historical data making them self-calibrating. The validation process, however, applies to all parametric estimating techniques. Validation is the process or act of demonstrating the complex model's ability to function as a credible estimating tool (Camargo *et al.,* 2003: 10). Validation ensures:

- The model is a good predictor of costs.
- Estimating system policies and procedures are established and enforced.
- Key personnel have proper experience and are adequately trained.

3.5.3 Cost estimating relationships (CER's)

A cost estimating relationship (CER) is the foundation of the art and science of estimating resources needed in projects using parametric estimating (Camargo *et al.,* 2003: 7). The parametric estimate comprises a collection of historical data, and reducing it to mathematical forms that can be used to estimate similar activities in future projects. These mathematical forms are called CER's. They are normally algebraic equations, but sometimes also tabulated data (Kwak & Watson, 2005: 1432). A CER is a mathematical expression which describes how the values of, or changes in,

a “dependent” variable are partially determined or “driven” by the values of, or changes in, one or more independent variables and describes how it behaves (Pratt *et al.,* 2005: 1252). Since a parametric estimating method relies on the value of one or more input variables, or parameters, to estimate the value of another variable, a CER is actually the quintessential parametric estimating technique (Camargo *et al.,* 2003: 6). In Figure 4.12 it is demonstrated how the number of cost drivers will influence the error margin of the parametric estimate.

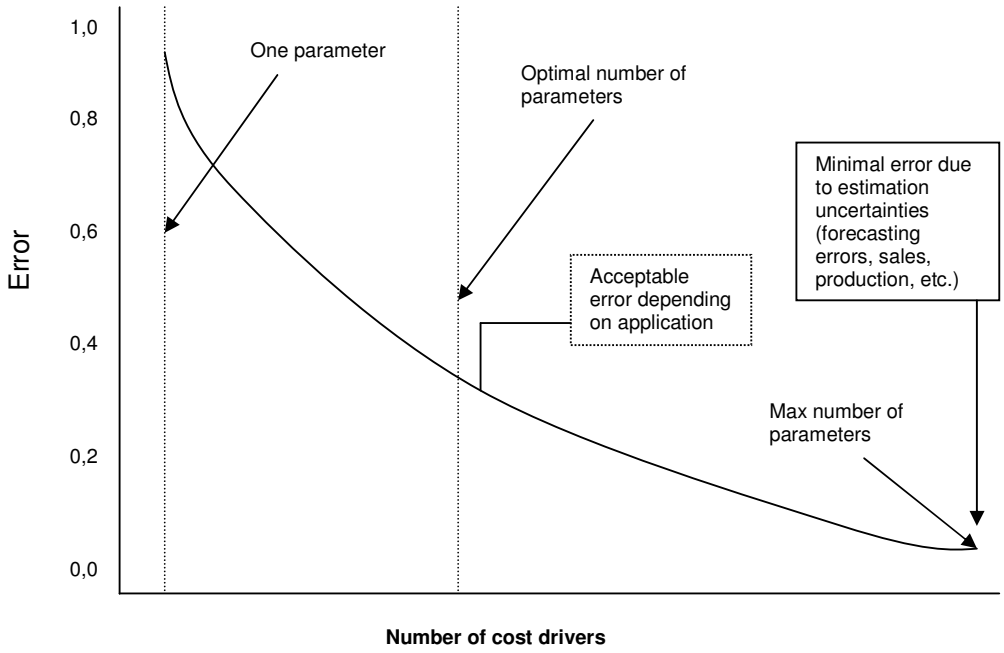


Figure 4.12: CER’s accuracy versus the number of cost drivers in the model

Source: Camargo *et al.,* 2003: 6

The dependent variable of a CER is cost or a closely related resource measure such as man hours. Younossi *et al.,* (2002: 75) state that the independent variable or variables are typically technical parameters that have been demonstrated to correlate with cost. In a cost-to-cost relationship, the independent variables are also cost, in other words, the cost of one element is used to estimate the cost of another. In a non cost-to-cost relationship, the CER uses a characteristic of an item to predict its cost. An example is where a CER estimates an item’s manufacturing cost based on its weight (Kapetanios & Marcellino, 2009: 208).

A CER is a valuable estimating tool and can be used at any time in the estimating process (SCEA, 2005: 3.2). For example, a CER may be used in the programme concept or validation phase to estimate costs when there is insufficient system

definition for more detailed approaches. CER's can also be used in a later phase in the programme as primary estimate or cross checks of non-parametric estimates. Camargo *et al.,* (2003: 6) indicate that parametric cost models comprised of several CER's can provide estimates at lower levels of definition. Before developing complex parametric models, analysts typically create simple CER's which demonstrate the utility and validity of the basic parametric modeling approach. Assiskumar (2008: EST.16.3) points out that the proper development and application of CER's depends on the collection and preparation of data on historical programmes and on applying appropriate mathematical and statistical techniques. Figure 4.13 is a schematic presentation of the CER development process.

3.5.3.1 Cost estimating relationship (CER) development

The structural foundation of modern cost analysis is the cost estimating relationship, statistically derived from historical cost data (Kaka, 1999: 260). CER's are usually expressed in the form of linear or curvilinear statistical regression equations that predict cost (the dependent variable) as a function of one or more cost drivers (independent variables). However, the CER only provides half of the information required to perform the estimate.

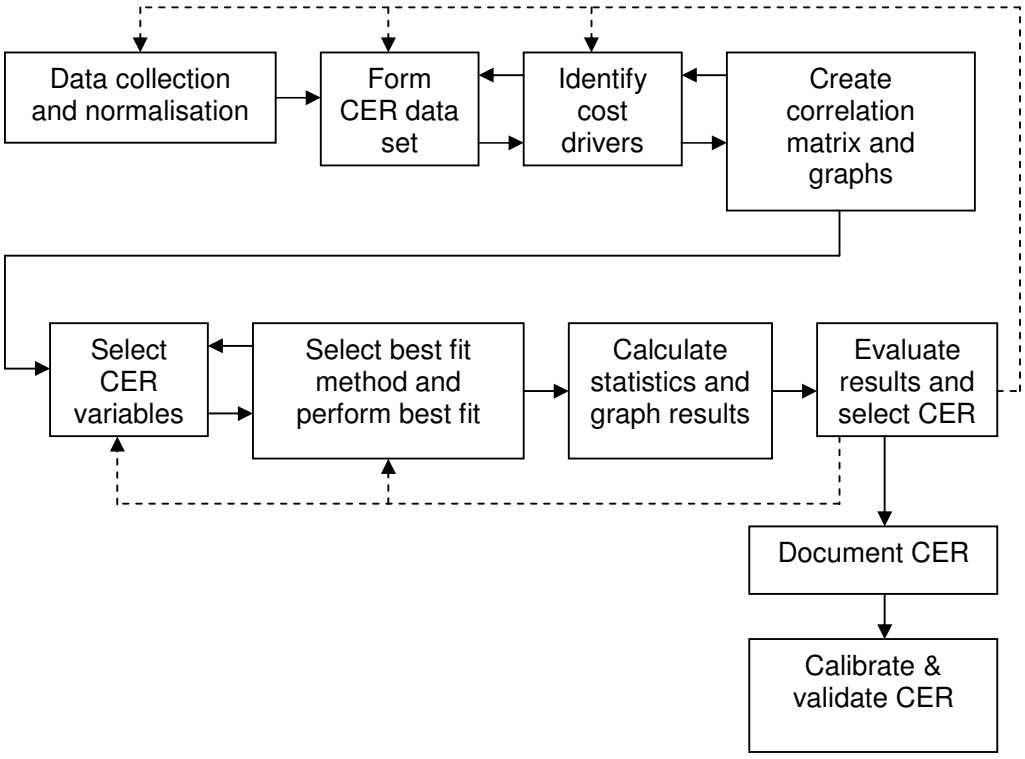


Figure 4.13: CER Development process

Source: SCEA, 2005: Appendix B, page 3

At the beginning of a cost estimating task lies the work breakdown structure (WBS), a list of everything that has to be paid to bring a system to its full operational capabilities (Kaiser, 2006: 255).

Classical least-squares regression (often referred to as "ordinary least squares" or "OLS"), developed by mathematicians in the 18th century, has in the past been the statistical procedure of choice in deriving CER's (Sonmez, 2004: 678). However, OLS has always imposed restrictions on an analyst who wants to derive functional relationships between dependent *y* and independent *x* variables, forcing him to model the error as additive when the relationship is linear ($y = a + bx$), logarithmic ($y = a + b\ logx$), or polynomialic, but as multiplicative when the relationship is exponential ($y = ax^b$) or power ($y = ab^x$) (SCEA, 2005: 3.5). "General-error regression", introduced some years ago to circumvent these problems, takes advantage of modern computing capability and advanced numerical analysis techniques, thereby offering the analyst the choice of optimising the CER's quality metrics by minimising additive or multiplicative error, regardless of the functional form of the relationship (Trost & Oberlender, 2003: 198).

4.0 IMPROVING CONCEPTUAL COST ESTIMATING PERFORMANCE

Conceptual cost estimating is a complex domain (Whiteside, 2004: EST.05.02) as it faces problems and restrictions. Zhang (2005: 4) and Zack (2006: 4) mention the need for continuous improvement in conceptual estimating. Whiteside (2004: EST.05.02) indicated that problems associated with estimating can be found in the following estimating functions:

- Scope definition,
- uncertainty evaluation and quantification,
- estimating generation and computing, and,
- estimate's expected accuracy and reliability assessment.

The first recognised characteristic of conceptual estimating is the fact that it is an inexact process based to a large degree on judgment and experience due to lack of information and the uncertainty at the conceptual stage (Kwak & Watson, 2005: 1430).

The experience of the estimator is probably the most important aspect when discussing conceptual estimate accuracy (Muscianesi, 2003: 2). Dysert (2005: 30) points out that the estimator studies construction projects undertaken by his company and while he is busy with these studies he acquires experience and knowledge which can be applied in conceptual estimating and which influence project cost performance. At the same time he becomes competent in carrying out the estimating function, leading to an improvement in estimating accuracy, especially if new projects are of the same kind and have the same characteristics as past ones. Yiu, Ho, Lo and Hu (2005: 108) studied the performance of estimators and found that experience allows estimators to better understand a new project based on previous ones, generate information that is not available by making sound assumptions, adjust existing knowledge and information according to current conditions, know where to look for relevant information and how to use it, and display other positive estimating capabilities.

When dealing with conceptual estimating, the estimator comes across two types of information – historical and current (Pickett & Elliott, 2007: EST.02.1). Of these two, historical is probably the most relevant. Information gives the estimator a reference from where to derive current cost figures. Lofton and Monteith (2004: EST.01.1) state that when estimating the cost of a current activity, actual data of previous similar activities is very helpful. However, data from previous activities must have enough visibility into the depth of the activity to be of use in producing estimates of similar depth. Getting this kind of information requires a suitable information system, capable of producing relevant estimating data (Rajpatty, 2008: DEV.12.2).

Having experience and information for conceptual estimating is useless if there is no processing system that applies these inputs to achieve the goal of determining the cost of the specific item (Perrott, 2004: EST.14.1). This system should provide greater consistency and accuracy to conceptual estimates. The processing system should support every conceptual estimating function. It must assist the estimator by offering advice when requested and by taking care of computing and offering the necessary values and answers (Kinney & Soubiran, 2004: EST.15.2). The idea is to have a system capable of emulating the performance of an experienced estimator (Muscianesi, 2003: 3).

4.1 Quality of conceptual cost estimating

For the decision maker, the quality of the conceptual cost estimate includes the expected accuracy and the reliability of the cost amounts provided by the estimate (Enshassi, Mohamed & Madi, 2005: 116). This estimate is carried out in a condition where an estimator has to determine an approximate value of the cost to accomplish a project based on a set of general information clues about what the project would be when finished. Some of these information clues include information on the project scope at the time of estimating, projected economic data, information about project technology and complexity, etc. (Chulkov & Desai, 2005: 140; Nassar & Hegab, 2006: 555). The quality and quantity of the clues will impact the capability of the estimator to accurately predict the cost of the future project (Trost & Oberlender, 2003: 202). Figure 4.14 demonstrates the level of accuracy of the estimate as time passes.

According to Boeschoten (2005: EST.20.2), the factors determining the accuracy and the reliability of conceptual estimates can be grouped into five major categories:

- scope quality,
- information quality,
- uncertainty level,
- estimator performance, and
- quality of the estimating procedure.

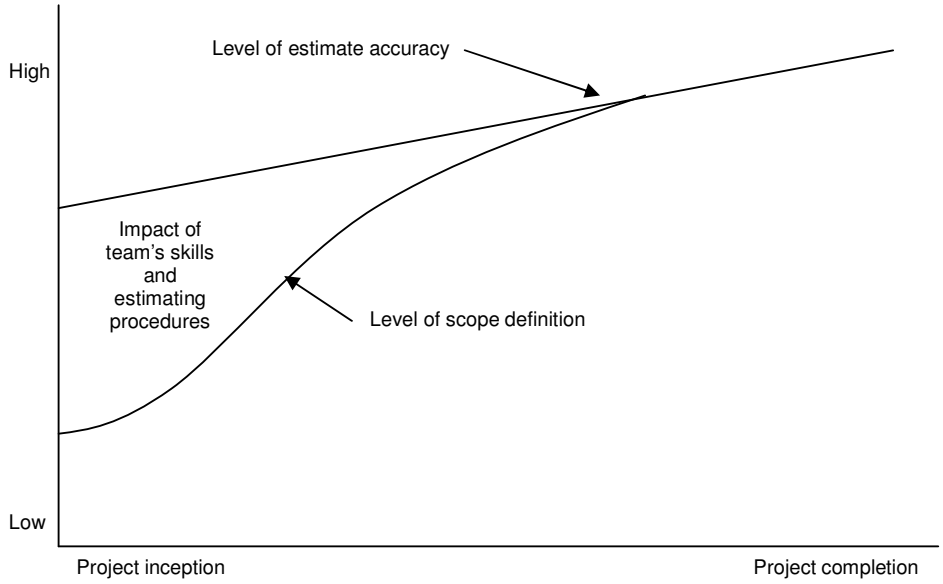


Figure 4.14: Estimate accuracy and project timeline
Source: Trost and Oberlender, 2003: 203

Generally each one of these categories implies adverse conditions for conceptual cost estimating. This means limited scope definition, restrictions of information, uncertainty of the construction project, insufficient experience available from estimators and significant errors or omissions (Kraus *et al.,* 2007: IT.01.1; Cheung, Wong, Fung & Coffey, 2008: 120; Ciccarelli & Murch, 2008: CDR.04.2). Improving these factors should lead to improving the accuracy of conceptual estimates. Table 4.10 shows a summary of factors affecting the accuracy and reliability of conceptual cost estimates. Using the information as indicated in Table 4.10, Serpell (2005: EST.13.2) developed an accuracy casual model for conceptual estimates as indicated in Table 4.11.

Recognising the importance of quality in conceptual cost estimates, the Construction Industry Institute (in America) formed the "improving early estimates research team" that investigated potential improvements (Serpell, 2005: EST.13.2). Serpell describes how the members of this team collected data of 67 construction projects around the world and identified 45 elements to measure the quality of early estimates. Among these there are 14 scope definition elements that could potentially impact the accuracy and 31 elements not directly related to scope definition, but that have the potential to influence the estimate's accuracy. Factor analysis and multivariate regression performed on the 45 elements identified five factors that exhibit a significant impact on an estimate's accuracy. Listed according to their significance, these five factors are as follows:

- scope definition,
- team experience,
- cost information,
- time allowed to prepare the estimate, and
- labour climate factor.

It is clearly established that a good scope definition is an imperative factor for the attainment of quality estimates (Gunner & Skitmore, 1999: 267). To obtain a high level of quality with a low level of scope definition and information, it is important to count on the estimator's experience. Serpell (2005: EST.13.2) points out that the influence of non-scope items on the estimate's accuracy over the life of a project may change as the project progresses from conceptual stage to completion. This statement was also proven by Trost and Oberlender (2003: 203). Figure 4.14 illustrates Trost and Oberlender's findings. This important need for experience at early stages also depicts

the reason why contingency is commonly assigned through experience (Gunham & Arditi, 2007: 495).

Scope	Information	Uncertainty	Estimator	Procedure
Quantities Definition Design approach State of design Completeness Detail Information quality Consistency Continuity Project nature Project technology	Processing Sought Availability Validity Completeness Relevance	Technology Project Environmental Productivity Market Construction Project nature	Talent/skills Experience Effort applied Expertise Judgment Knowledge Common sense Team ability	Mistakes Time available Measurements

Table 4.10: Summary of factors that affect the accuracy and reliability of conceptual cost estimates

Source: Serpell, 2005: EST.13.2

The availability of time to prepare the estimate is also an important factor. It is a well-known fact that progressive development of information technology tools is currently reporting remarkable benefits, i.e. improvements for design, procurement and construction for different sectors of the construction industry (Warszawski, 2003: 423)..

Figure 4.15 depicts an idealised picture of a cost forecasting programme. This figure indicates that at any point of a project's life, there are four elements of cost. The undefined elements, implied by the scope, can be covered by the contingency. Figure 4.15 shows the relationship of these four elements over time. Gradually, as the project progresses, the contingency, escalation and project growth become defined elements. At the end of the project the defined elements represent all costs, having replaced the other three completely (Boeschoten, 2005: EST.20.2).

4.2 Assessing the quality of conceptual cost estimating

Assessing or predicting the expected accuracy of an estimate is a difficult problem with no clear solution, a common characteristic of most prediction or forecasting problems (Park *et al.,* 2005: 164). Serpell (2005: EST.13.4) indicates that there are two basic categories of predicting methods that can be considered for assessing estimate quality:

- Data-based methods: Forecasts are made using historical data and quantitative models.
- Judgmental-based methods: Individual opinions are acquired and processed to derive predicted values.

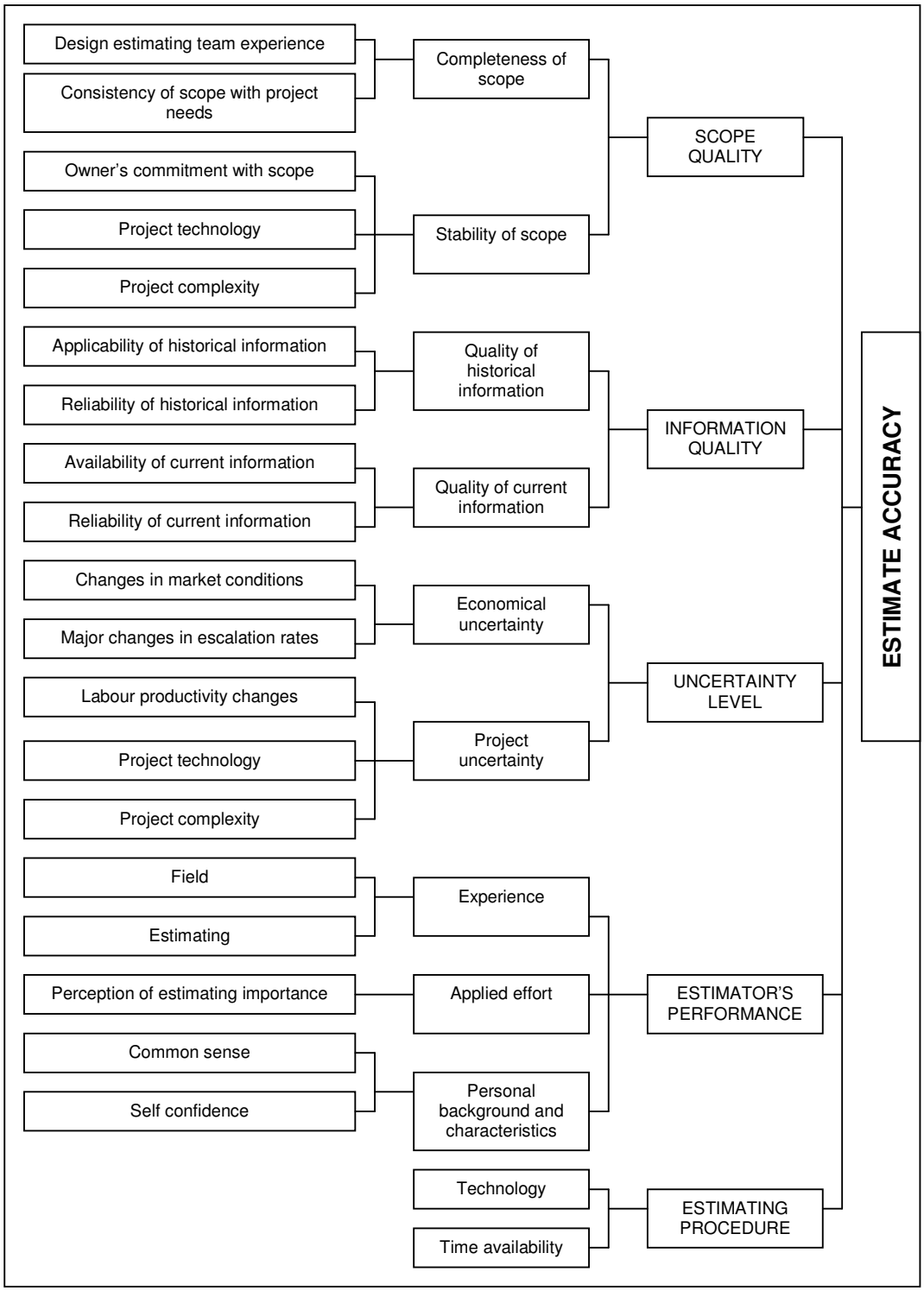


Table 4.11: Factors that affect the accuracy of conceptual cost estimates

Source: Serpell, 2005: EST.13.3

The data-based methods would require the availability of historical accuracy performance of estimate data and to use this data to predict future outcomes. This approach ensures that what happened in the past is applicable to similar situations in the future (Kaka, 1999: 260). Using the data-based approach, extrapolative or casual models can be used for predicting the future. Although these methods are well known and are used in many real situations, the assessment of estimate quality presents several limitations that preclude their application in this case (Serpell, 2005: EST.13.4).

The judgment-based approach corresponds to the acquisition and processing of individual or group opinions, normally from experts in the field of interest (Wilont & Cheng, 2003: 273). In this case experts have to assess the values of some critical variables looking at the value of the factors that impact them, using qualitative models, like the accuracy factor model. However, prediction models that use judgment also have some disadvantages for estimate quality assessment (Williams, 2005: 40). These disadvantages can be described as follows:

- They are difficult to validate because of the lack of hard data.
- They are subject to expert biases that can greatly reduce their efficiency.
- Their performance can be worse than the performance of quantitative methods in many cases.

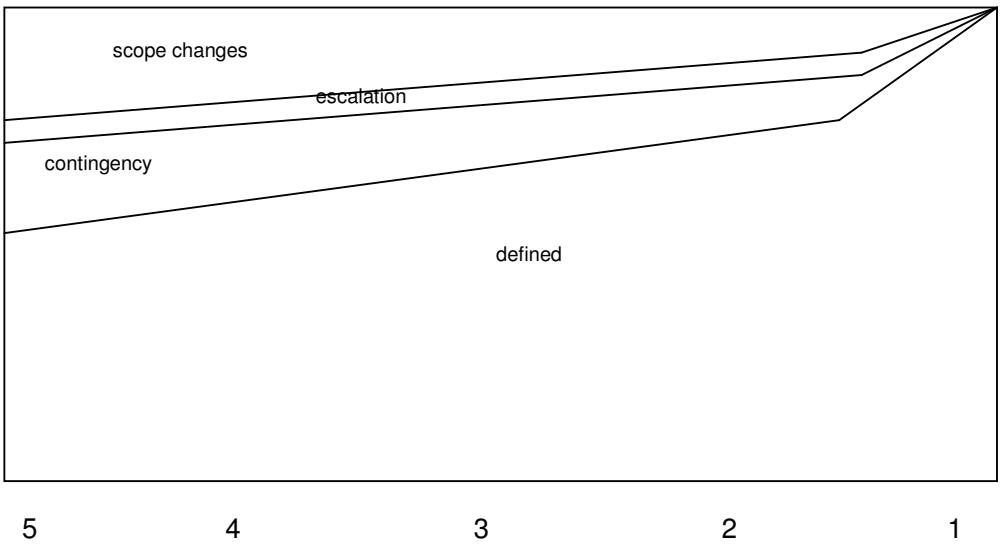


Figure 4.15: The relationship of scope changes, escalation, contingency and defined scope during the course of the project

Source: Boeschoten, 2005: EST.20.3

Although these limitations are important, they are offset by the more restrictive limitations faced by the data-based methods. Also, the complexity of the problem makes it more difficult to use a quantitative orientated model. Only when conditions are similar in practice can more accurate predictions using quantitative techniques be expected (Hua, 2008: 488). When the estimator is dealing with a limited number of observations, qualitative methods might be more appropriate (Vilela & Longo, 2008: INT.11.1). Unal, Keeting, Chytka and Conway (2005: 36) indicate that on average judgmental and quantitative predictions are equally accurate, while in certain circumstances judgmental predictions are significantly better. Al-Tabtabai, Kartam, Flood and Alex (1997: 273) had similar findings.

Fayek and Oduba (2005: 938) state that the proposed methodology is primarily based on experts' experience and judgment that can be complemented and expanded with feedback information generated after each project. This information will serve to validate experts' assessments, to correct biases of experts' assessments and to generate more objective assessment models (Al-Tabtabai *et al.,* 1997: 274).

The assessment of experts is based on the accuracy casual model illustrated in Table 4.11. Two simplifications are introduced in this model. First, due to the subjective nature and the difficulty of assessing the factors that impact the estimator's performance, it has been assumed that this can be considered a constant value (Yiu *et al.,* 2005: 109). This assumption will be reinforced if the estimator has a conceptual estimating system supported by information technologies. A computer based estimating system would also minimise or even eliminate the possibility of procedural and calculation errors and significantly reduce the time pressure (Karshenas, 2007: IT.06.1; Richards, 2005: EST.12.1). The quality of the estimating procedure can then be assumed to be constant (Masmoudi *et al.,* 2005: 300).

Karshenas (2007: IT.06.1) indicates that computer based estimates are based on the application of expertise and knowledge through a knowledge-based expert system approach. According to Serpell (2005: EST.13.5), the development of this assessment methodology requires the solution of the following problems:

- Determination of the assessment reasoning procedure.
- Acquisition of assessment knowledge.
- Representation of knowledge.

- Combination of experts' assessments.
- Determination of estimate reliability.

The assessment reasoning procedure has been designed to evaluate the quality of an estimate by providing a qualitative reasoning approach. Table 4.12 displays a general flow diagram of this procedure. Serpell (2005: EST.13.5) states that the first step in this procedure is to determine the conditions of the new project. These conditions correspond to the values on the most detailed level factors or raw factors of the model depicted in Table 4.11. They are determined by the user as he appraises the different factors for the project/estimate under study. The set containing all these values establishes the scenario under which the cost of the project is estimated (Serpell, 2005: EST.13.5).

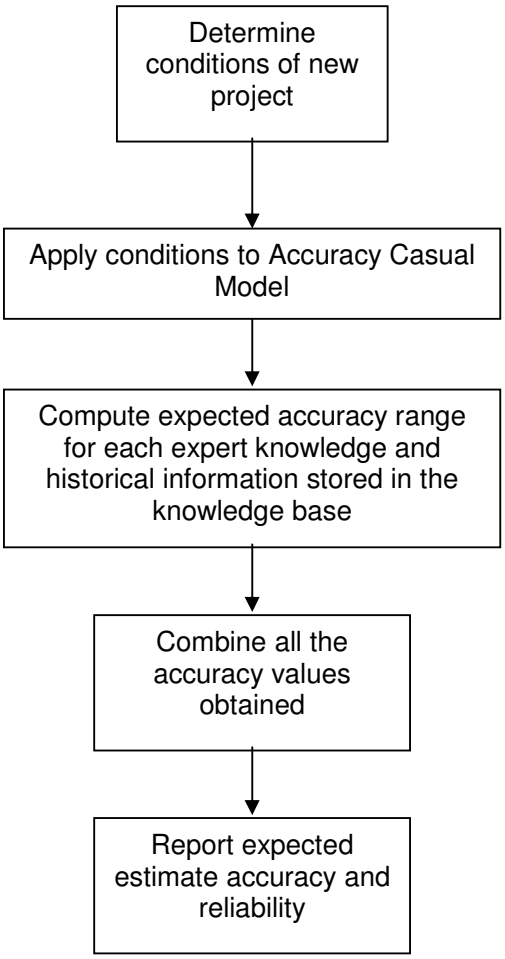


Table 4.12: Conceptual estimate quality assessment procedure

Source: Serpell, 2005: EST.13.4

Scope
Improve scope definition process (make it quickly and control changes).
Practice use of scope estimating.
Work with clients to make them understand what data is important for accuracy.
Develop a good understanding of clients' and designers' culture and philosophy.
Develop computer programmes to analyse a project and identify its parts from limited detail.
Get a written scope definition.
Spend more time and money in the definition phase.
Information
Keep better historical records.
Use computer programmes with quantitative inputs and historical data bases.
Improve feedback mechanisms.
Assure the availability of day-to-day cost data and systems.
Improve the availability of information.
Create a database for trends and rules.
Estimating
Incorporate risk management tools for estimating.
Develop better cost factors for estimating.
More case study about problems and successes.
Make more realistic assumptions.
Develop team work attitudes with owner and designer at early stage.
Develop checklists for items normally included in projects.
Develop a range of factors (worst to best cases) for components.

Table 4.13: Recommendations for improving conceptual cost estimating
Source: Serpell, 2005: EST.13.5

For accuracy assessment it is important to note the characteristics of the construction industry and the estimator's experience relevant for this problem. These characteristic are:

- Estimating expertise is specialised, normally by type of project and sometimes at even more specific levels (Fayek & Oduba, 2005: 938). As a

result of this, estimators are most of the time strongly biased in their assessments because they try to relate their experience in every case, even if they are assessing a totally different kind of project.

- It is very common that companies that construct similar kinds of projects approach estimating in very different ways. Also, the general attitude of the company's estimating team toward risk can be different. These two factors add new biases to the accuracy assessments.
- The lack of sharing of estimating information between companies in the construction industry contributes to the non-availability of global estimating data to perform assessments at this more general level.

Table 4.13 provides some recommendations for improving conceptual cost estimating in general.

5.0 SUMMARY

Conceptual estimates are generally based on scant project information. The accuracy of these estimates can depend on several factors such as the level of project definition, the quality of the past historical data and development of factors and algorithms, as well as judgment and experience of the estimator. These limitations impede on the accuracy of the conceptual estimating process. Conceptual estimates can, however, be quite reliable, especially in estimating repeat projects. Generally, the emphasis with conceptual estimates is not on detailed accuracy, but on obtaining a reasonable cost estimate of sufficient accuracy to ensure that the results are meaningful for management to make investment decisions.

The basic process in developing a conceptual estimate can be summarised as follows:

- Develop an estimating plan.
- Develop major equipment costs (MEC).
- Apply factored costs.
- Develop quantified costs.
- Develop indirect costs.
- Analyse risks, apply contingency and finalise estimate.

The assessment of project risks is probably the most important step in conceptual cost estimating. The allocation of costs to allow for risk can be done through an allowance for escalation as well as an allowance for a contingency. Specifics of these allowances follow in Chapter 6 of this study.

Some of the more well-known conceptual cost estimating procedures include the following:

- Probabilistic cost estimation.
- Ratio conceptual estimating.
- Regression analysis.
- Neural network analysis.
- Parametric estimating.

Irrespective of the type of conceptual estimate used, a good quality cost database will always be a requirement and the best way to improve conceptual cost estimates will always be to improve the cost database first. Other problems associated with estimating can be described as follows:

- Scope definition.
- Uncertainty evaluation and quantification.
- Estimating generation and computing.
- Estimate's expected accuracy and reliability assessment.

It is a good starting point to realise that the conceptual estimate is an inexact process and is to a large degree based on judgment and experience due to a lack of information during the early stages of the project.

The main difference between a conceptual estimate and a detailed cost estimate is that most of the work and effort to obtain a conceptual estimate is done before the estimate actually starts. With a detailed estimate most of the work is done only when specifications and drawings from the engineer have been received, making it a much longer process. As conceptual estimates are based upon historical data of past projects, considerable time will be spent to keep databases up to date and as accurate as possible. The following chapter comments on the importance of the historical database and how it is applied.

CHAPTER 5

DATA COLLECTION AND ANALYSIS

1.0 INTRODUCTION

Data collection and development for conceptual estimating require a significant effort. The quality of the resulting model can be no better than the data it is based upon. Both cost and scope information must be identified and collected. The level at which the cost data is collected will affect the level at which the model can generate costs, and may affect the derivation of the CER's (Cost Estimating Relationship) (Dysert, 2008: EST.03.2).

Cost data should be collected at a fairly high level of detail. The data can always be summarised later should an aggregate level of this information provide a better model (Martin, 2004: IT.02.1). The scope information should include all the proposed design parameters or key cost drivers for the model, as well as any other information that may affect costs (level of complexity, schedule type, etc.). The type of data to be collected usually is decided upon in coordination with the engineering and project control communities. Evrenosoglu (2008: CDR.16.1) recommends the creation of a formal data collection form that can be used consistently and revised if necessary.

After the data has been collected, it must be normalised before it can be analysed. Normalising the data refers to making adjustments to the base cost data to account for the differences between the actual basis of the data for each project, and a desired standard basis of data to be used in the estimating model (Musgrove, 2008: EST.07.2).

Typically data normalisation implies making adjustments for escalation, location, cost scope, site conditions, and system specifications. Costs for historical projects should be adjusted to common time frames and common locations serving as the standard basis for the model (Assiskumar, 2008:EST.16.1). Normalising for cost scope implies making adjustments for the unique scope that a specific historical project incurred but that is not included in the standard basis for the model.

Data analysis consists of performing regression analysis of costs versus selected design parameters to determine the key cost drivers for the estimating model (Kaka,

1999: 257). Reasoned hypotheses or expert opinion might be employed to identify and test the best cost drivers. The use of mathematical functions is a time-consuming process that takes some experimental efforts to determine the best possible result.

Good data underpins the quality of any estimating system or method. As the acquisition community moves towards estimating methods that increase their reliance on historical costs, the quality of the data cannot be taken for granted. Industry should find methods to establish credible databases that are relevant to the history of the specific organisation in question (Martin, 2004: IT.02.1). From this the estimator will be in a better position to reliably predict future costs.

2.0 DATABASE REQUIREMENTS

Taking advantage of lessons learned from past experiences and using this information to the estimator's benefit will give him an edge over his competitors when estimating future work (Pickett & Elliot, 2007: EST.02.1). Using historical project data to help make strategic business decisions can play a significant role in improving the competitiveness in the market (Shah *et al.,* 1996: 347). Historical data can assist in making decisions as to which projects are more favourable to undertake. It is therefore important that information be available to improve estimating, scheduling and control of future capital projects.

The world economy and domestic markets play an important role in the petrochemical industry, dictating to a large extent the construction of new plants. As work decreases, the availability of historical data also tends to decrease, probably because of the non-availability of resources (Shah *et al.,* 1996: 347). As times improve, more plants are constructed which lead to an increased availability of historical data which can be used in estimating and benchmarking of projects. Therefore future work cannot be improved if historical data is not analysed (Shah *et al.,* 1996: 348).

Resolving database problems to meet user needs is not an easy task. For example, cost analysis methodologies may vary from one analysis or estimate to the next and the data or information requirements for Cost Estimating Relationships (CER's) may not be constant over time. The current data requirements do not determine future needs as well, and should be periodically reviewed (Evrenosoglu, 2008: CDR.16.2). The routine maintenance and associated expense should always be a consideration.

An outdated database is of little use when forecasting future acquisition costs (Assiskumar, 2008: EST.16.1).

Pickett and Elliot (2007: EST.02.1) refer to the lack of sufficient data over the past 25 years in the Canadian construction industry due to a lull in activities in this market. In their opinion, this is largely due to an exodus of experience and an unwillingness of management to recognise database development as a necessity and not an unnecessary overhead. Pickett and Elliot (2007: EST.02.1) also refer to cost overruns on a range of projects in recent history in the Canadian sector which sparked an increased development of databases as the importance of such databases was reiterated. Lowe and Skitmore (2001: 490) point out that this has driven the need for greater upfront analysis of project cost and schedules. Many companies are realising that much more focus is needed in the area of benchmarking and the development of associated historical metrics that can be used to validate future projects (Assiskumar, 2008: EST.16.1).

Before beginning the data collection process, certain methodologies and systems (or enablers) must be put in place. Musgrove (2008: EST.07.2) mentions that one of the most important of these enablers is obtaining management support. Not only must company management support historical project data collection, they must understand and actively promote this effort as well. Many resources across the entire company hierarchy will be relied upon in order to retrieve and collect this data. Some other important enablers are:

- Personnel: Perhaps as important as management support, there should be well-trained staff to whom to entrust the database development. Lucena (2006: 321 – 322) indicates how engineering experience can influence the success of a project.
- Infrastructure: Regardless of what method is used to collect the data, a minimum infrastructure of networking capabilities and computer applications will be required to successfully support the database (Mähring, Holmström, Keil & Montealegre, 2004: 211; Moussourakis & Haksever, 2007: 601).
- Code of accounts: When attempting to collect project cost data, there must be a systematic method of categorising this information. In order to do this, most companies (whether the owner or contractor), will use a standard structure most often referred to as a code of accounts (Kohl & Wulke, 2004: IT.03.1). In layman's terms, the code of accounts represents a coded index

of project costs, resources and activity categories where codes are used to summarise, categorise and manage project information. The code of accounts has been discussed in more detail previously in this study.

- Cost control system: Establishing a code of accounts will be followed by ensuring that there is a means of capturing and storing estimated and actual project costs and resource data. Once there is an operational cost control system in place, it must be capable of collecting and reporting costs using the predefined code of accounts (Al-Jibouri, 2003: 144). Only then can costs be rolled up into the proper categories which will facilitate the transfer of data to the historical system.

3.0 COLLECTION OF ACTUAL PROJECT DATA

Conceptual estimating techniques require the collection of historical cost data and the associated non-cost information and factors that describe and strongly influence those costs (Kinney & Soubiran, 2004: EST.15.1). Martin (2004b: IT.02.2) points out that data should be collected and maintained in a manner that provides a complete audit trail with expenditure dates so that costs can be adjusted for inflation. While there are many formats for collecting data, one commonly used by industry is the Work Breakdown Structure (WBS), which provides for the uniform definition and collection of cost and certain technical information (Verveniotis, 2008: PM.02.1).

As mentioned, the establishment of the prerequisites will lead to the collection and normalisation of project data (Musgrove, 2008: EST.07.2). Standard project cost collection forms should be developed to capture data. Refer to Addendum B within this study as a standard sheet to be used for this purpose. As mentioned previously, the historical database serves an important purpose in deriving a budget for projects at an early stage of their development, as well as in the validating of estimates for new work. Assiskumar (2008: EST.16.1) indicates that almost every company in the construction business tracks down their own cost information in a format suited to their practice and needs.

Various factors play a key role in interpreting the data. Some of these include the size of the project, year being built, inflation rate, local market conditions, complexity of the project, procurement method, site conditions, etc. (Kuprenas & Nasr, 2007: 114; Shash, Assaf & Jannadi, 2007: 18). Hereafter follows a short discussion of the influences on costs of any given project that will be reflected in the collected data.

The collection point for cost data is generally the company's management information system, which in most instances contains the general ledger and other accounting data. All data used in conceptual estimating techniques should be consistent with, and traceable to the collection point. The data should also be consistent with the company's accounting procedures and generally accepted cost accounting practices.

Technical non-cost data describe the physical, performance and engineering characteristics of a system, sub-system or individual item. For example, weight is a common non-cost variable used in CER and parametric estimating models (Polla, 2007: 14). Other examples of non-cost drivers are horsepower, watts, thrust, etc. A fundamental requirement for the inclusion of a technical non-cost variable in a CER is that it must be a significant predictor of cost (Edwards, Holt & Harris, 1998: 25). Technical non-cost data comes from a variety of sources including engineering drawings, engineering specifications, certification documents and interviews with technical personnel (Postavaru, 2004: 3).

Once collected, cost data must be adjusted to account for the effect of certain cost factors such as production rate, improvement curve and inflation (Kallantzis, Soldatos & Lambropoulos, 2007: 485). This process is referred to as data normalisation. Relevant programme data including development and production schedules, quantities produced, production rates, equivalent units, breaks in production schedules (Khosrowshahi, 1997: 255), significant design changes, (Lee, Park & Cho (2007: 159), and anomalies such as strikes, explosions and other natural disasters are also necessary to fully explain any significant fluctuations in the data. Such historical information can generally be obtained through interviews with knowledgeable programme personnel or through examination of programme records (Arnold & North, 2008: 104).

3.1 Work breakdown structure (WBS)

A work breakdown structure is a tree-like structure that permits summing of subordinate costs for tasks, materials, etc. into their successively higher "parent" tasks, materials, etc. (Gordon, 2008). For each element of the work breakdown structure, a description of the task to be performed is generated. Biffi (2008: TCM.02.2) refers to a work breakdown structure as organised around the primary products of the project. As previously stated this means that the work breakdown structure is organised around

the planned outcomes rather than planned actions (Kauffmann, Keating & Considine, 2000: 13). Chapter 3 contains some general information on the WBS.

The term Work Breakdown Structure (WBS) is defined by the Department of Defense (2005: 5) in terms of aircraft weapon systems as:

a. A product-oriented family tree composed of hardware, software, services, data, and facilities. The family tree results from systems engineering efforts during the acquisition of a defense material item.

b. A WBS displays and defines the product, or products, to be developed and/or produced. It relates the elements of work to be accomplished to each other and to the end product. In other words the WBS is an organised method to breakdown a product into sub-products at higher levels of detail.

c. A WBS can be expressed down to any level of interest. Generally, the top three levels are sufficient unless the items identified are high cost or high risk. Then is it important to take the WBS to a lower level of definition.

Refer to Chapter 3 for more generalised definitions of a WBS. Figure 5.1 demonstrates a typical WBS evolution. This WBS evolution illustrates how a WBS would evolve on a typical development project. The Department of Defense (2005: 9) suggests this evolution model for WBS when dealing with defense contracts. This model can also be used when plotting any WBS in a particular project.

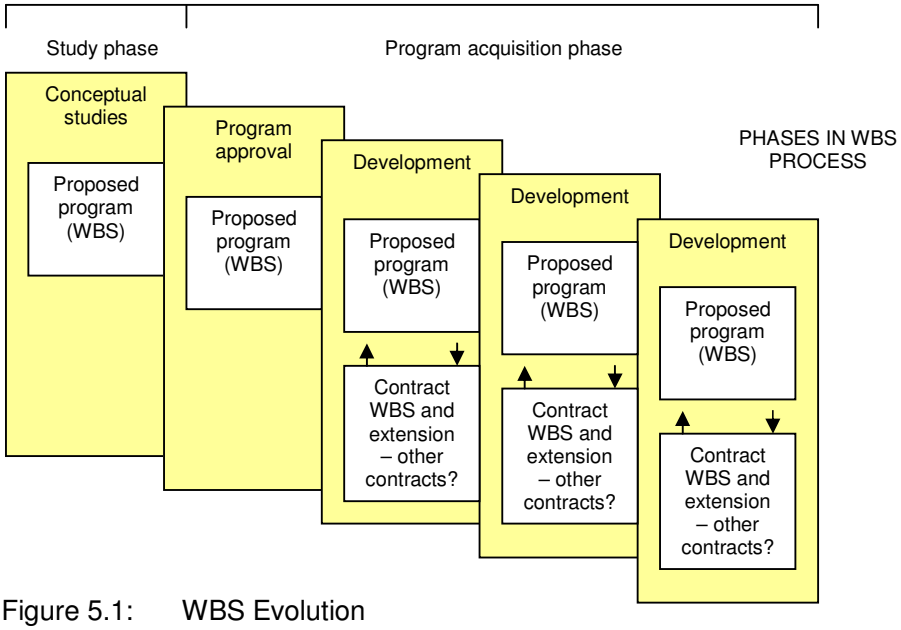


Figure 5.1: WBS Evolution

Source: Department of Defense, 2005: 9

3.2 Data sources

Kinney (2006: EST.21.1) states that the specification of an estimating methodology is an important step in the estimating process. The basic conceptual estimating methodologies are all data driven (Kinney & Soubiran, 2004: EST.15.1). Credible and timely data inputs are required to use any of these methodologies. Table 5.1 shows nine sources of data, and also whether they are considered a primary or a secondary source. Primary data sources will attract the most attention from the estimator.

Primary data is obtained from the original source and considered to be the best quality and the most reliable (Park & Peña-Mora, 2004: 630). Secondary data is derived from primary data, and is therefore not obtained directly from the source. Because of this, this form of data might be of lower overall quality or usefulness (Melamed *et al.,* 2007: RISK.06.2). The collection of the data necessary to produce an estimate and its evaluation for reasonableness is critical and often time-consuming. Collected data include cost, programme and technical and schedule information because these programmatic elements drive costs (Thurlow, 2009: 30 September). The bottom line is that the cost analyst and estimator are not solely concerned with cost data – they need to have technical and schedule information to adjust, interpret and support the cost data being used for estimating purposes.

A cost estimator has to know the standard sources of historical cost data. This knowledge comes both from experience and from those people capable of answering key questions (Van der Werf, 2004: EST.07.2). A cost analyst or estimator should constantly search new sources of data.

Musgrove (2008: EST.07.3) states that some sources of data may be external. These include databases containing pooled and normalised information from a variety of sources (Harris, 2004: CDR.13.1). Although such information can be useful, it may have the following weaknesses:

- No knowledge of the manufacturing and/or software processes used and how they compare to the current scenario being estimated (Vits, Gelders & Pintelon, 2007: 5).
- No knowledge of the procedures used by other contributors.
- No knowledge of the treatment of anomalies in the original data.
- The inability to accurately forecast future indices (Yu & Ive, 2006: 788).

Sources of data	
Source	Source type
Basic accounting records	Primary
Cost reports	Either (Primary or secondary)
Historical databases	Either
Functional specialist	Either
Technical databases	Either
Other information systems	Either
Contracts	Secondary
Cost proposals	Secondary

Table 5.1: Sources of data
Source: SCEA, 2005: Appendix B page 5

3.3 Type of data to be collected

Stenzel and Stenzel (2003: 2) define cost as follows:

> "*Cost is an outflow of a resource, whether in cash, as a payable, a rendered service, or a trade or barter that is consciously made with expectation of benefit to the organisation: goods, property, or service required."*

The estimator needs costs to complete his estimate and to submit a competitive price into the market. Especially in the case of conceptual estimates, it will be necessary to rely on data that support the above definition of cost, to enable the estimator to build a meaningful estimate.

3.3.1 Project description and scope

A clear description of the project scope (Sharma & Lutchman, 2006: EST.16.1) will enable the estimator to produce an effective estimate in the sense that similarities between plants or portions of plants can be identified more easily (Sonmez, 2004: 678). Technical data such as plant density, heights of structures, type of material used, access restraints, etc. will have to be stated.

3.3.2 Size of project

Economies of scale suggest a direct relation between the size of a project and the cost thereof (Shash *et al.,* 2007: 19). Larger projects will cost more than their smaller counterparts, but the individual unit rates for different sections will be less than that of a smaller project (Ashworth, 2004: 23; Cha & O'Connor, 2005: 241). It is therefore important to note the size of the project to make this adjustment.

3.3.3 Location and local market conditions

Martin (2004b: IT.02.1) comments that the construction industry is one of only a few industry types where the "production factory" is constantly moved to a different location according to where the next project is situated. Jansen-Rommijn (2008: EST.13.1) states that the work does not come to the factory, the factory goes to the work, and in most cases, to different locations. Oladapo *et al.,* (2008: 118) discuss the importance of

location adjustment factors. This makes dealing with the challenges of location difficult and almost every project is unique in this sense. Some of the considerations that will influence cost due to different locations and market conditions can be tabulated as follows:

- Added cost for transportation.
- Availability of skilled labour.
- Local labour union restrictions.
- Local by-laws and regulations and standards.
- Accessibility to other facilities.
- Security concerns.
- Safety and environmental considerations (Karam & Venter, 2007: 36).

3.3.4 Site conditions

Site conditions with respect to access, proximity of other structures and construction difficulties related to topographical, geological and climatic conditions are to be investigated (Deschenes & Greenstone, 2007: 355; Kaiser, Pulsipher & Martin, 2005: 120). As far as the season is concerned, winter construction is more expensive (Assisskumar, 2008: EST.16.3) and may cause costly delays. Production is less during winter time, especially in countries where extreme cold is experienced (Lapidow, 2007: 45 – 46). Nogueira and Paixão (2007: 455) indicate similar difficulties associated with locations where extreme heat occurs in summertime. Should the project be constructed in more favourable climatic conditions and at a different time of the year, less labour availability (O'Mahony, Robinson & Vecchi, 2008: 1438), increased cost of equipment such as scaffolding, etc. can be experienced due to the increased construction activities (Shapira & Goldenberg, 2007: 750; Shapira, Lucko & Schexnayder, 2007: 692).

3.3.5 Year of construction

The year in which the project is being constructed is important for two reasons, the first being the adjustment for escalation (inflation) to normalise the data to a common base and the second to identify specific market spikes that occurred in that year (Touran & Lopez, 2006: 855). The price of steel can, for instance, increase abnormally during a specific year which will lead to a market panic, causing contractors and sub-contractors

to increase prices by more than the suggested escalation to counter similar market movements during the construction phase of the project (Hagmann, Stoy & Terashima 2008: INT.07.2).

3.3.6 Overhead and profit

Ibbs and Nguyen (2008: 32) and Enshassi, Aziz and Karriri (2008: 38) point out that different sentiments exist regarding overhead and profit application to the general project cost. Normally, the smaller the project, the greater the percentage of overhead costs and profit (Ikpe, Potts, Proverbs & Oloke, 2007: PM.12.1). If data from other companies or sources are being used, the estimator should make sure that he understands the conditions as to which overheads and profit have been applied to. This will enable him to normalise the data to a common base (Dieterle, 2008: CDR.10.3).

3.3.7 Complexity of work

Jiao and Tseng (1999: 739) comment on the effect of the use of standard construction methodology versus that of non-standard methods. A great deal of process plant work can be considered as standard type construction work. Most clients make use of similar specifications and most clients have similar safety requirements and hold points (mandatory stoppage to allow inspection to take place) for inspections (McCarthy, 2004: 8). Should this not be the case, the estimator will have to adjust the data to allow for these additional costs. Pickavance (2008: CDR.15.1) discusses the effect of complex contracts and contract claims. A generalised discussion with the construction manager of a given project will reveal most of the information needed to make the necessary adjustments.

3.3.8 Procurement method

Contractor and consultant selection and appointment play an important role in the costing of the overall project. The type of contract used can also influence that ultimate pricing structure (El Wardani, Messner & Horman, 2006: 231). For instance, the implementation of the New Engineering Contract (NEC) in recent years caused uncertainties within the industry that influenced prices. The very nature of this contract is such that more resources are required to fulfill the contract's obligations which will also lead to increased costs. Procurement may also have an effect on project costs when specialised work is conducted (Leadre, Austeng, Haugen & Klakegg, 2006: 692).

In many cases, there are limited numbers of contractors/consultants to perform this type of work that may lead to abnormalities in pricing (Kuprenas & Nasr, 2007: 114).

3.4 Data normalisation

Data normalisation reduces inconsistencies and anomalies within the data. Data normalisation was also discussed in Chapter 4 of this study. Assiskumar (2008: EST.16.2) states that data must be adjusted to eliminate any bias or "unevenness" which other factors may have caused. This is referred to as normalisation and is intended to make the data set homogeneous, or consistent. The analyst should evaluate each data set and make sure that it is free from the effects of:

- the changing value of money over time,
- cost improvement as the organisation improves its efficiency over time,
- various production quantities and rates during the period from which the data were collected.

Figure 5.2 depicts the data normalisation process flow. This figure does not describe all activities in detail, but it does provide an illustration of the primary activities in data normalisation.

The first step in the normalisation process is to weed out any projects where the data is deemed to be unusable (Evrenosoglu, 2008: CDR.16.2). The following are some reasons why data might not be acceptable:

- Deviant accounting and/or project controls.
- Too small project.
- Direct equipment purchase (where the crux of the contract is mainly for equipment or material procurement).
- Ad hoc projects (where certain portions of the project are of a "once-off" nature making the data suspect since it cannot be considered to be the norm).

After removing the projects or portions of projects that should not be used in the database, the data should further be altered to make it comparable (Martin, 2004b: IT.02.2). The following steps will normally apply:

- Making the units of cost consistent.
- Making the year of economics consistent (common time frame).
- Account for missing cost items if possible.
- Remove cost items that are not applicable.
- Assigning a project classification.

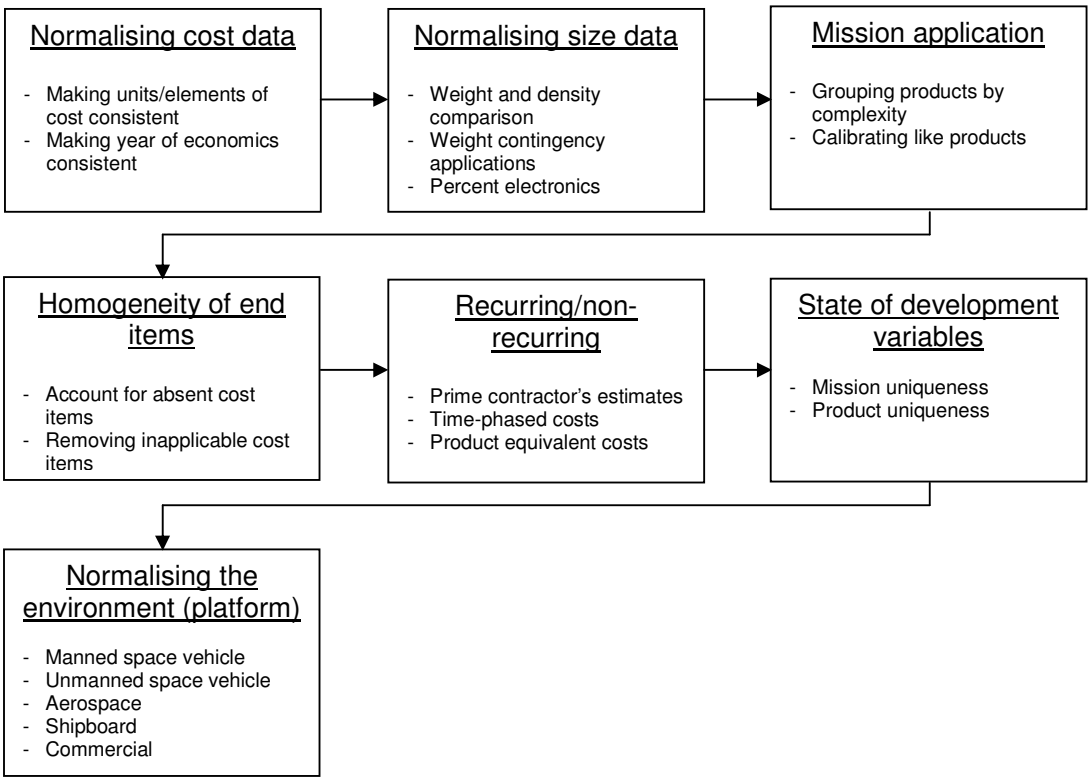


Figure 5.2: Data normalisation process flow (aerospace environment)

Source: SCEA, 2005: Appendix B page 7

3.4.1 Inflation adjustments

Inflation is defined as the rise in the general level of prices, without a rise in output of productivity (Karpetis, 2008: 208). There is no fixed way to establish universal inflation indices (past, present and future) that fit all possible situations. Inflation indices generally include internal and external information and factors (Faig & Jerez, 2006: 3). The Consumer Price Index (CPI) and Production Price Index (PPI) are examples of just two external factors that will influence inflation (Flemming & Koppelman, 2009: 22).

Inflation indices should be based on the cost of materials and labour on a unit basis and should not include other considerations such as manpower loading, or the amount

of materials used per unit of production (Hamood Al-Harthy, 2007: 280). The key to inflation adjustments is consistency. If cost is adjusted to a fixed reference date for calibration purposes, the same type of inflation index must be used in escalating the cost forward or backwards from the base date, or the date of the estimate (Lum, 2004: 32). More information on escalation and the effect thereof will follow in this study.

3.4.2 Cost improvement curve (learning curve)

Wong *et al.,* (2007: 476) point out that when first developed, cost improvement was referred to as "learning curve" theory, which states that as the quantity of a production item doubles, the manufacturing hours per unit expended producing it decrease by a constant percentage. The learning curve, as originally conceived, analysed labour hours over successive production units of a manufactured item, but the theory behind it has now been adapted to account for cost improvement (Zheng, Ng & Kumaraswamy, 2005: 82). Both cost improvement and the traditional learning curve are defined by:

$$Y = AX^b$$

Where:

Y = Hours per unit
A = First unit hours
X = Unit number
b = Slope of the curve related to learning

There are two interpretations concerning the application of this equation. In the unit interpretation, Y is the hours or cost of unit X only. In the cumulative average interpretation, Y is the average hours or cost of all units from 1 to X, inclusive. More information on the cost improvement curve was presented in Chapter 4.

3.4.3 Production rate

Mountney, Gao and Wisealls (2007: 1522) define the production rate as the number of items produced over a given period of time. The improved equation below modifies the basic formula to capture changes in production rate (Q^r) and organisational cost improvement (X^b):

$Y = AX^b Q^r$

Where:

Y = Hours per unit
A = First unit hours
X = Unit number
b = Slope of the curve related to learning
Q = Production rate
r = Slope of the curve related to the production rate

This improved equation is generally applicable when there is substantial production at various rates. The production rate variable (Q^r) adjusts the first unit dollars (A) for various production rates during the life of the production effort. The equation also yields a rate-affected slope relating to learning.

3.4.4 Consistent scope

Song and AbouRizk (2005: 362) suggest that only data of projects with similar scopes should be compared. If the scopes do not correspond, modifications should be incorporated to adjust the data to make the scopes comparable.

3.4.5 Anomalies (unusual events)

Historical cost data should be adjusted for anomalies when it is not reasonable to expect the new project estimates to contain these unusual costs (Kaka, 1999: 259). The adjustments and judgments used in preparing the historical data for analysis should be fully documented. Perfect cost data may not exist, but good judgment and analysis should supply reasonable results (Pickett, 2005: EST.10.3).

A contractor should use historical data and his estimating system should provide for the identification of source data and the estimating methods and rationale used to develop an estimate (Poh, Malcolm & Horner, 1995: 125). Therefore, all data, including any adjustments made, should be thoroughly documented by the contractor so that a complete trail is available for verification purposes. Pickett & Elliott (2007: EST.02.3) indicated some key questions that should be asked during the review of data collection and analysis include:

- Is sufficient data available to adequately develop parametric techniques?
- Has the contractor established a methodology to obtain, on a routine basis, relevant data on completed projects?
- Is cost, technical and programme data collected in a consistent format?
- Will data be collected in a manner that is consistent with the contractor's estimating practice?
- Are procedures established to identify and examine any data anomalies?
- Was the source data used as is, or did it require adjustment?
- Are adjustments made to the data points adequately documented to demonstrate that they are logical, reasonable and defensible?

4.0 IMPLEMENTATION OF A HISTORICAL DATABASE SYSTEM

With sufficient project cost and schedule information available, an automated system can either be purchased or developed to contain all the historical information (Musgrove, 2008: EST.07.3). This system will contain a database of historical project cost, schedule, resource and technical data from completed projects and should be capable of generating presentation reports. The goal of the project historical database system is to collect data and convert it into a strong knowledge base that can be used to drive improvements throughout the project process (Martin, 2004b: IT.02.3; Kaka, 1999: 257). It is also generally acknowledged that companies that use historical database systems can improve their overall project performance over a period of time.

Implementing a project historical database system will allow a company to provide the following:

- Cost estimate validation for formal estimate reviews.
- Generation of key benchmark data for estimate reviews.
- Cost estimate database calibration information.
- Front-end or strategic level cost estimates.
- Strategic level scheduling information.

The data contained in the historical database system can be used for various purposes, as described above. Martin (2004b: IT.02.3) indicates that the primary goals will be to improve current practices relating to estimating, cost control, strategic scheduling and standard project processes. This can be done by converting the

historical project data into a useful knowledge base that can identify deficiencies and highlight areas for improving the overall project performance (Kaka, 1999: 257). Some of the most important contributions of the historical database are as follows:

- Benchmarking: One of the primary benefits of the project historical database is to provide benchmarking data and factors that will be an invaluable aid for reviewing and validating estimates (Chan & Chan, 2004: 210). The estimate review should include a benchmarking report that compares ratios and factors from the estimate being reviewed with historical values from similar types of projects in the database.
- Database calibration: In addition to providing benchmark data for estimate reviews, the historical data that was collected can also be used to check and calibrate the estimating unit cost database. This is especially important during times when labour and material pricing are volatile (Mochtar & Arditi, 2001: 410). Comparing data from the database can assist the estimator in ascertaining the current market conditions by comparing current situations with similar historical situations (Olhager & Selldin, 2007: 1475).
- Conceptual cost estimating and scheduling: As previously mentioned in this study, the database can also be used to create conceptual cost estimates. By mainly using the expensive mechanical equipment as a major cost directive, the database can be used through means of factors to determine the cost of the rest of the project.
- Strategic project planning: Using historical project information related to work breakdown structures, schedule logic and account coding, the lessons learned from successful and failed projects can be applied during the front-end planning session, start-up, etc. (Popescu & Jerz, 2008: CSC.03.2).

4.1 Development of an international cost database

A good estimator can readily estimate the cost of a domestic project using cost data that he is familiar with on a daily basis. Estimating international projects, however, involves working in foreign currencies (Kapp, 2004: 3), using different resource rates and working with labour crews operating at different levels of productivity (Koehn & Jagushte, 2005: INT.3.1).

One method of generating conceptual estimates on international work is to take the costs of a similar domestic project and convert those costs using published location factors. Reliable location factors for the type of project or the applicable country may not exist. These location factors also become unreliable when the scope of work or mix of work varies from the base project they are compared against (Aibino & Odeyinke, 2006: 667).

Hewitt (2007: INT.05.1) comments that the cornerstone of developing an international cost database is to start with a comprehensive detailed domestic work breakdown and resource database covering a similar scope of work as the project that is being estimated in the foreign country. The domestic WBS and resource database should include resource rates for labour, material and sub-contractors (Biffi, 2008: TCM.02.2). The data should also include typical crew makeup with associated production rates and productivity worker-hour factors. Construction equipment rates should be developed from first principles and include current equipment values, depreciation and interest rate formula, parts and labour repair factors, and equipment fuel consumption (Shapira & Goldenberg, 2007: 750). Refer to Chapter 2 for productivity factors.

4.1.1 Resource database conversion

Hewitt (2007: INT.05.1) demonstrates five basic steps towards converting a resource database into something that can be used to estimate project costs in a foreign country. These include the following:

- currency exchange conversion,
- labour rate conversion,
- equipment rate conversion,
- productivity rate conversion,
- material rate conversion.

Most estimating systems have functions that allow you to convert or factor resource rates as well as production rates. To better understand Hewitt's database converting steps it will be necessary to elaborate on these below.

4.1.2 Currency exchange conversion

The first step is to convert all resource rates according to the exchange rate between the domestic and foreign country. Galf and Monacelli (2008: 117) point out that this converts the database into the currency of the estimate. This would also handle the conversion of construction equipment and process equipment values that are normally procured competitively on an international basis. For example, the base value of any particular piece of equipment, excluding freight, taxes and duties, would be the same anywhere in the world.

4.1.3 Labour rate conversion

At this stage, the labour rates would be in the correct currency, but not necessarily in the local currency. Local currency refers to the rates that will apply to a certain area within the country in question. The conversion of rates is mainly done in two steps; first, by converting the labour rates and then, the management rates. The “trade rate factor” is the ratio of a sampling of the foreign trade rates to a sampling of the domestic database (Hale, 2008: 34). The management rates are converted in a similar fashion. It is necessary to do this in two steps because there is normally a much more significant variance between management and trade labour rates in developing countries than the more industrialised countries. Hewitt (2007: INT.05.2) points out that this variation may be as high as 20/1 in developing countries and 2/1 in more industrialised nations.

The rates can be converted globally first and updated in detail down to the resource level depending on the level of detail required. The lower the labour rates, the less important it is to update down the individual resource level. Depending on the precision required, labour rates may be factored based on payroll burden adjustments such as holiday pay, workers compensation, union dues, government deductions, as well as travel and subsistence requirements (Horman & Thomas, 2005: 840).

4.1.4 Construction equipment rate conversion

The conversion of equipment values and parts costs based on currency exchange rates has been discussed. The construction equipment rate conversion should now be taken further and adjusted according to the local mechanic rate, fuel price, power rate, interest rate and typical equipment use for the location of the project. For example, use factors for equipment are significantly different in northern countries where excavation

equipment may only be able to work eight to nine months a year (Shapira & Goldenberg, 2007: 752). The maintenance and repair component of the rates is significantly influenced by the mechanic's labour rate.

4.1.5 Productivity rate conversion

Productivity is usually measured in two ways, either as a production rate or a worker-hour factor (Song & AbouRizk, 2005: 362). For equipment dominated activities such as excavation or pipeline work, productivity is usually measured as a production rate per unit of time. Examples would be m^3/hour or meter/day.

The "production rate conversion factor" is based on equipment driven production rates to a sampling of the foreign production rates in the domestic database (Squires, Reid & Jeon, 2008: 85). There is usually not a significant difference in these rates using the same equipment. Although there may not be a significant difference in the production rate per unit of time, there is usually a significant difference in the worker-hours per unit of measure (Thomas *et al.,* 2003: 255). This is normally due to a difference in crew sizes due to union rules, safety considerations, work habits and cultural differences. Chapter 2 contains more information on productivity analysis.

Converting production rates is in itself a two step process. Firstly, the production rates should be factored and secondly, the crew sizes should be adjusted to even out crew mixes (O'Connor & Huh, 2005: 1015). As mentioned above, productivity can also be measured as a worker-hour factor. For a labour dominated item such as set and strip formwork or process piping, productivity is usually measured as a worker-hour factor, such as worker-hour/m^2.

The "labour worker-hour conversion factor" is based on labour driven production rates and is the ratio of a sampling of the foreign worker-hour factors to a sampling of worker-hour factors in the domestic database. Hewitt (2007: INT.05.3) indicates that there is usually a significant difference in these factors and that they can vary by as much as 200 percent.

4.1.6 Material rate conversion

The conversion of database rates to the currency in question has been discussed. A factoring of basic material commodity rates should now commence. The basic

commodity rates include cement, timber, steel, etc. (Hewitt, 2007: INT.05.3). This step requires the estimator to determine the local price for these commodities and then compare these with similar commodities in the domestic database. For example, the price of grout and concrete are mainly determined by the price of cement. By determining the ratio of cement prices one can factor all cement based material rates to a common base.

4.1.7 Updating the database to allow for international costing

A common approach when bidding for international projects is to convert a similar estimate prepared on a similar type project by using location factors (Oladapo *et al.,* 2008: 119). This is considered to be a top down conversion whereas the methodology discussed earlier in the chapter is a bottom-up conversion. The top down conversion relies on converting labour based worker-hour factors and tends to ignore equipment based production rates and crews. The top down conversion method will not work for equipment dominated projects or any project where productivity is equipment driven.

5.0 DATABASE FOR THE PETROCHEMICAL INDUSTRY

Ratio conceptual estimating has been in use for a number of years (Sonmez, 2004: 680). To simply refer a cost per pound produced is not good enough and that is why ratio conceptual estimating originated (Page, 1996: xv). Management of all organisations concerned demand more reasoning behind the structure of the estimate in question.

When a project is in its planning and evaluating stages, the cost of a complete design and definitive estimate would be, in most cases, too great to justify the design and estimate (Vilela & Longo, 2008: INT.11.1). Therefore, it becomes apparent that a less expensive method is needed to determine the feasibility of the plant in mind. A very important part of conceptual estimating is the development of a historical database (Assiskumar, 2008: EST.16.1).

The second part of this chapter is dedicated to the development of such a database, based on actual historical data of South African petrochemical projects. No specific information such as plant name and location have been mentioned due to confidentiality constraints, but all data collected have been obtained from typical petrochemical projects within the borders of South Africa. Addendum D reflects the

sets of data that were obtained from various projects. The data has been grouped together not by project, but rather by engineering field. The reason for this is that in South Africa it will be difficult to find enough petrochemical projects that are similar in operation, but when broken down can provide valuable information. A maximum of 45 different data fields might have been used in some cases, but this depends on the availability of the data.

In some cases, the material (equipment, etc.) was supplied by the client and the contractor only had to allow for installation of this equipment. In such cases, ratios were developed based on the installation quantities and rates only. In each such event it has been clearly stated that the specific portion of the database only includes for installation and not the supply of the equipment. This mostly occurred with the installation of mechanical equipment and piping.

The purpose of the database is to provide ratios for both quantities and rates of the most commonly used engineering fields that carry the most cost when constructing a petrochemical plant. The ratios are set out in such a way that it can be interactively applied if only limited information of a proposed new plant/addition to a plant is known. This is the essence of conceptual cost estimating as has been described in Chapter 3 and 4.

6.0 BASIC STRUCTURE OF DATABASE

The development of the data as contained within Addendum D was derived from several petrochemical projects that were constructed during recent history. Detail of the specific projects cannot be provided due to secrecy agreements, but the information required to build the data within the database was sufficient to draft adequate data.

An important consideration is that only final quantities (as built quantities) have been used. These quantities refer to the quantities as agreed between the contractor and the client at completion of the work. The rates used in the database are those that have been agreed between the contractor and the client. Considering the free market principle, one can then accept that the quantities and rates are market-related (Kuprenas & Nasr, 2007: 114). In other words, the ratios contained within Addendum D are based upon quantities and rates that would have been used by any competitive able contractor for that specific project at that point in time.

Data normalisation for the data contained in Addendum D for quantity based data was done in the sense that only data from ISBL (in-side battery limits) areas was used. If the data from OSBL (outside battery limits) areas were used, the ratios derived from this data would be skewed because the type of work between these areas normally differs quite a lot.

The rates to each of the 45 projects used to obtain data from have been kept the same (refer to Addendum D). Normalisation takes place in the form of “mean” and “median” adjustment which will be discussed in Chapter 8. Musgrove (2008: EST.07.3), however, points out that although data normalisation is important, it should be minimised. Once a certain project’s data requires too many adjustments it will also become suspect since it is very difficult to forecast some adjusting factors and in some cases these factors rely to a large extent on the estimator’s experience. Figure 5.3 illustrates how rates data can be normalised to suit the project’s needs.

The adjustment of rates as set out in Figure 5.3 is calculated by adjusting the percentages in columns A to F. The symbol “A”, for instance, represents “Escalation factor”, “B” represents “Size-of-the-project factor” and so forth. As the percentage allowance against each base rate gets adjusted, the rate contained in the “Total” column will alter. The effect of each percentage gets calculated on the original base rate. The total influence of all factors will in other words be calculated against the base rate and the net effect will be added to the original base rate.

The influence of each factor as stated in Figure 5.3 and the effect it has on the rate will be calculated according to the prevailing conditions (physical or economical) when the project in question was constructed. These adjustments can be made either by means of formulas applying published factors, as the case will be when adjusting escalation. In some cases there will be no published factors available and the estimator will have to rely on his judgment based on experience.

Civil rates data normalization										Date	Jan-10
Escalation factor	A										
Size-of-the-project factor	B										
Market conditions factor	C										
Location factor	D										
Complexity factor	E										
Productivity factor	F	Labour only									
Overhead and profit factor	G										
Procurement factor	H										
Description	**Unit**	**Base rate**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Total**
			%	%	%	%	%	%	%	%	
Site clearance	m^2	R 5.00	15%	2%	0%	10%	0%	11%	-1%	3%	R 7.00
Demolish concrete	m^3	R 1,200.00	15%	2%	0%	10%	0%	11%	-1%	3%	R 1,680.00
Bulk excavation	m^3	R 70.00	20%	2%	0%	10%	0%	11%	-1%	3%	R 101.50
Excavation	m^3	R 100.00	20%	2%	0%	10%	0%	11%	-1%	3%	R 145.00
Imported backfill and compact	m^3	R 300.00	20%	2%	0%	10%	0%	5%	-1%	3%	R 417.00
High tensile rod reinforcement	t	R 8,650.00	30%	2%	0%	10%	0%	2%	-1%	3%	R 12,629.00
Concrete - supply and place	m^3	R 1,150.00	25%	2%	0%	10%	0%	4%	-1%	3%	R 1,644.50
Pile augering	m	R 1,750.00	18%	2%	0%	10%	0%	11%	-1%	3%	R 2,502.50
80mm Concrete interlocking block paving	m^2	R 200.00	22%	2%	0%	10%	0%	5%	-1%	3%	R 282.00
Brickwork	m^2	R 550.00	20%	2%	0%	10%	0%	4%	-1%	3%	R 759.00

Figure 5.3: Civil rates data normalisation; base rates – 2003

The effects of escalation will be discussed in Chapter 6 of this study. The data as set out in Addendum D has been set up in such a way that escalation to the rates will not be necessary as it will not influence the ratios. The ratios derived from rate data only indicate the ratio between the rates. If a ratio conceptual estimate is being conducted, the principle rates, which will be the current market related rates, will be used together with the ratios to determine the new rate. Chapter 7 can be consulted for examples of how the ratio conceptual estimate will be executed.

The size of the project will influence the rates when considering economies of scale. It is common knowledge that the more one has to manufacture or construct of the same item, the less the unit cost becomes. Should a graph be drawn based on such data, the graph will not form a straight line, but a parabolic curve. Allowances for adjustments to

rates based on economies of scale can only be done based on experience and expert judgment, but the overall effect on the rates in general will not be that significant since mostly bigger sized project's (green field projects) date are being used to populate the database (Gerber, 2008: personal interview). In Figure 5.3 an allowance of 2% has been made to increase the rates slightly since the project from which the data was drawn was slightly smaller than the norm.

Market conditions also influence labour and material prices. The normal increase in rates is covered in the escalation allowance, but certain specific market or economic conditions may have influenced rates at the time that the project in question was constructed. The availability of labour, for instance, might have been very poor or it might have been difficult to obtain a certain material due to strikes or high demand elsewhere. The adjustment of market conditions is also based on experience and normally requires a collective effort from the project team. There were no special market conditions that required a change in the rates based on the data that was set out in Figure 5.3.

Oladapo *et al*., (2008: 118) comment on the development of location adjustment factors for the construction industry. In other parts of the world similar factors have been developed, but not much has been done in this regard in South Africa. Expert judgment will therefore be required to make the necessary alterations to the rates. This judgment will be driven by factors such as:

- added cost for transportation,
- availability of skilled labour,
- local labour union restrictions,
- local by-laws and regulations and standards,
- accessibility to other facilities,
- security concerns,
- safety and environmental considerations.

To determine the extent of the location factor the rates for projects in the same location of the proposed new project for which the estimate is being done need to be divided by the base rates of the project that is used as a base project. The calculation will be as follows:

Description	Unit	Rate X	Rate Y	% change
Site clearance	m²	R 5.00	R 5.50	10%
Demolish concrete	m³	R 1,200.00	R 1,320.00	10%
Bulk excavation	m³	R 70.00	R 77.00	10%
Excavation	m³	R 100.00	R 110.00	10%
Imported backfill and compact	m³	R 300.00	R 330.00	10%
High tensile rod reinforcement	t	R 8,650.00	R 9,515.00	10%
Concrete - supply and place	m³	R 1,150.00	R 1,265.00	10%
Pile augering	m	R 1,750.00	R 1,925.00	10%
80mm Concrete interlocking block paving	m²	R 200.00	R 220.00	10%
Brickwork	m²	R 550.00	R 605.00	10%

Rate X - Rate of project which is used as a basis for new rate
Rate Y - Rate of project in same location as estimated project

Table 5.3 Rate adjustment based on project location

The percentage calculated here correlates with the percentage used in Figure 5.3.

Complexity is difficult to measure and normally requires the project team to compare the complexity level of a specific project to that of the norm. The question might be raised as to what exactly is the “norm”? Over years of experience engineers acquire the ability to judge the level of complexity for each project. Because of the fact that only similar projects or engineering fields within projects are compared to each other, the necessity to adjust rates due to complexity are minimised.

Productivity differs according to the time in which it was measured as well as the location of the project (Enshassi, Mohamed, Mustafa & Mayer, 2007: 245). Different factors are published that can assist the estimator to adjust the productivity from one project to the next. In America, for example, the US Gulf Indexes are used (Thomas & Sakarcan, 1994: 230). In South Africa the available data is limited. Stats SA does, however, publish a productivity index (Stats SA, 2010: online available – 03 March 2010). Productivity, however, only applies to labour so the allocated percentage adjustment for productivity should only be applicable to the labour content of each rate. Figure 5.3 illustrates the data of a particular project. Although the productivity adjustment for the total trade will be the same, the allocation to each different item will vary depending on the labour content.

“Site clearance”, for example, has a 100% labour content. In this case the full productivity adjustment factor will apply. “Concrete – supply and place” on the other hand has a partial labour content of 35% (Williams, 1996: 118). The productivity index

will therefore only affect this portion of the rate. The adjustment of the data as contained in Figure 5.3 has been based on a base rate of 2003 and an adjustment to a target date of 2006.

Industry	**2003**	**2004**	**2005**	**2006**	**2007**
Printing and publishing	100.00	104.46	82.06	90.53	87.32
Industrial chemicals	100.00	77.62	70.94	67.12	55.40
Other chemicals	100.00	112.72	112.75	67.12	55.4
Petroleum and related products	100.00	104.49	90.04	85.82	114.17
Plastic products	100.00	103.74	89.82	104.30	131.66
Iron and steel	100.00	107.86	122.20	129.49	109.89
Non-ferrous metals	100.00	112.11	130.16	129.45	146.65
Non-electrical machinery	100.00	97.43	90.73	118.00	106.60
Electrical machinery	100.00	85.98	87.68	83.58	73.40
Transport equipment	100.00	95.76	85.50	79.48	80.84
Professional and scientific equipment	100.00	93.92	84.38	97.01	84.19
R&D intensive industries	100.00	99.65	95.12	100.95	106.07
Food products	100.00	90.38	109.31	125.00	150.78
Beverages	100.00	100.34	113.16	116.26	138.65
Tobacco	100.00	100.64	99.08	99.85	129.61
Textiles	100.00	87.89	117.75	89.06	128.92
Wearing apparel, except footwear	100.00	117.39	107.23	118.10	115.91
Leather and fur products	100.00	108.21	155.97	154.57	192.92
Footwear, except rubber or plastic	100.00	114.02	115.92	110.86	147.34
Wood products, except furniture	100.00	102.72	96.40	79.62	83.42
Furniture and fixtures, excluding metal	100.00	92.32	82.70	82.14	87.88
Paper and products	100.00	104.57	97.91	97.89	85.03
Rubber products	100.00	110.67	112.79	118.17	124.43
Non-metallic mineral products	100.00	87.89	89.87	97.78	79.99
Glass and products	100.00	121.02	149.95	116.42	128.10
Fabricated metal products	100.00	103.65	94.73	81.81	89.58
Other manufacturing industries	100.00	91.64	109.88	110.99	74.53

Table 5.2: Labour productivity index: 2003 – 2007 (2003 = 100)

Source: Stats SA, 2010: online available – 03 March 2010

Using the data as set out in Table 5.2 an adjustment of 11% (rounded off) has been made, based on the factor for “Other manufacturing industries”. Items with a lesser labour content attracted a lesser percentage increase.

The database has been developed in such a way as to represent the typical modern petrochemical plant that is currently being designed and built in South Africa. All the typical construction methods and typical plant and equipment used have been taken into account. The breakdown of the structure of the database is shown below. Drawings and photographs have been added to illustrate the typical design details of the structures at hand. The sources from which these drawings and photographs have been obtained can, however, not be revealed due to secrecy agreements.

A CIVIL WORKS

- A Site clearance and demolitions
- B Bulk earthworks
- C Piling
- D Road works
- E General paving and bunded areas
- F Manholes, valve boxes, catch basins and sumps
- G Pump and pipe support bases and plinths
- H Tank bases and bunding
- I Pipe and cable rack foundations
- J Simple structural foundations
- K Complex structural foundations
- L Concrete pipe racks and foundations
- M Concrete structure including concrete columns and beams
- N Major equipment bases with blast proof walls
- O Major equipment bases and elevated concrete structure
- P Buildings – concrete frame
- Q Buildings – steel
- R Canopies – steel
- S Weighbridge
- T Pump house
- U Cooling Tower
- V Emergency dam
- W Heavy duty cable tunnel

B STRUCTURAL STEEL

- A Basic platform
- B Pipe rack
- C Complex structure
- D Stack
- E Walkway
- F Cable gantry

C PIPING

- A ½ Inch
- B ¾ Inch
- C 1 Inch
- D 1 ½ Inch
- E 2 Inch
- F 3 Inch
- G 4 Inch
- H 6 Inch
- I 8 Inch
- J 10 Inch
- K 12 Inch
- L 14 Inch
- M 16 Inch
- N 18 Inch
- O 20 Inch
- P 36 Inch
- Q 42 Inch

D NDE TESTING

E MECHANICAL INSTALLATION

F PAINTING AND INSULATION

G ELECTRICAL AND INSTRUMENTATION

H PRELIMINARIES AND GENERAL

6.1 CIVIL WORKS (Item A in database – Addendum D)

6.1.1 Site clearance and demolitions (Item AA in database – Addendum D)

No specific allowance for site clearance and demolition works has been made in the database because in most cases these items differ from project to project. Demolition work is especially an item of variance from project to project and it will be dangerous to try and pin it down by means of ratio allocation. It will be best to make specific allowances for site clearance and demolitions when the estimate is being conducted.

6.1.2 Bulk earthworks (Item AB in database – Addendum D)

Bulk earthworks normally include soil replacement in areas with poor soil conditions and will in most cases be 2 to 4m deep depending on the structural requirements. The sides of the excavations are normally sloped and trimmed. In-situ beds needs to be ripped and compacted and the excavated soil will be carted away to a dump site.

6.1.3 Piling (Item AC in database – Addendum D)

The ratios for the allowance of piling include for the site establishment of the piling rig, setting-up of the rig at each piling position and drilling of the pile. The average pile diameter is 600mm. Piles will be on average 20m deep and of 35MPa concrete with a bulbous base. Pile rod reinforcement is included and each pile's integrity will be tested. A limited percentage of the piles will be load tested. Allowances can also be made for raking piles should the need arise.

6.1.4 Road works (Item AD in database – Addendum D)

Road works in petrochemical plants normally consist of bitumen surfaces with interlocking block paving or in-situ concrete at the intersections. Normal pre-cast kerbing is used and in most cases standard signage and road markings. The ratios allow for some basic sleeves, but the storm water drainage, manholes, etc. are provided for elsewhere.

6.1.5 General paving and bunded areas (Item AE in database – Addendum D)

When referred to in the process engineering context, paving refers to concrete paving to prevent soil contamination and to provide a safe and durable working platform. These areas will normally include the general areas under and around the structures and will in most cases cover the complete plant. Bunded areas refer to concrete finishing to areas that are enclosed with a concrete wall and a spill basin/catch pit. Bunding will occur when plants or portions of plants handle dangerous chemicals. The purpose of the bunding is to contain and collect any possible future spillage that might harm the environment.

6.1.6 Man holes, valve boxes, catch basins and sumps (Item AF in database – Addendum D)

All man holes, valve boxes, catch basins and sumps are covered by this section. Sundry items such as water stops are also included. Underground storm water pipe work is included here.

6.1.7 Pump and pipe support bases and plinths (Item AG in database – Addendum D)

These bases will only be the small bases and plinths that will support stands or some pieces of small equipment.

6.1.8 Tank bases and bunding (Item AH in database – Addendum D)

Almost every petrochemical project has some form of storage facilities and most of these come in the form of tanks. These tanks are (in most cases) constructed on site from metal sheeting on pre-constructed concrete bases. Depending on the tank capacity, there might be soil replacement and/or piling, but these items will be included in the relevant section. The bunding of the bases will also be included in these ratios. Figure 5.4 and Figure 5.5 show a plan and section of a tank base.

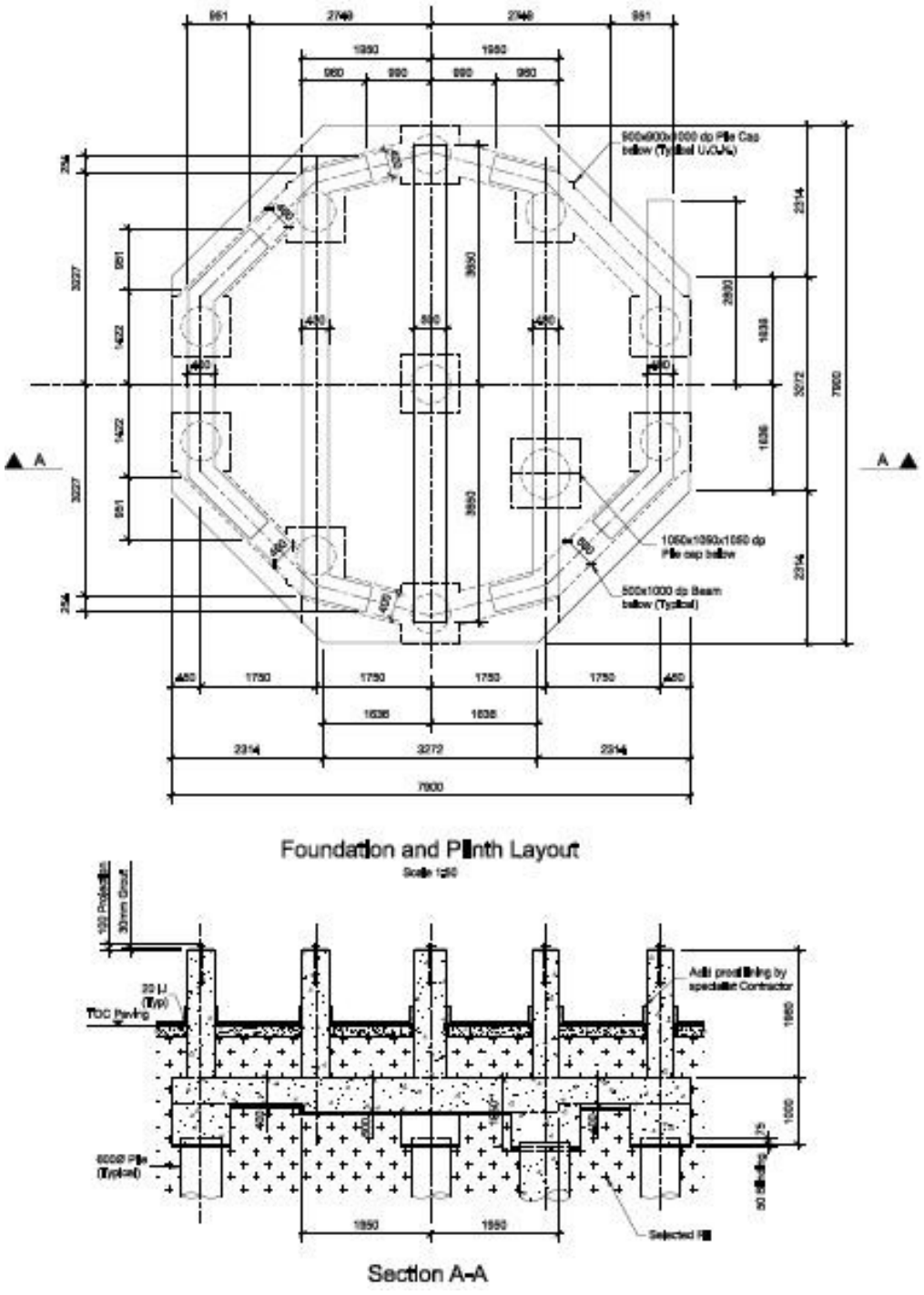


Figure 5.4: Large concrete tank base with cross walls to allow human access for inspection

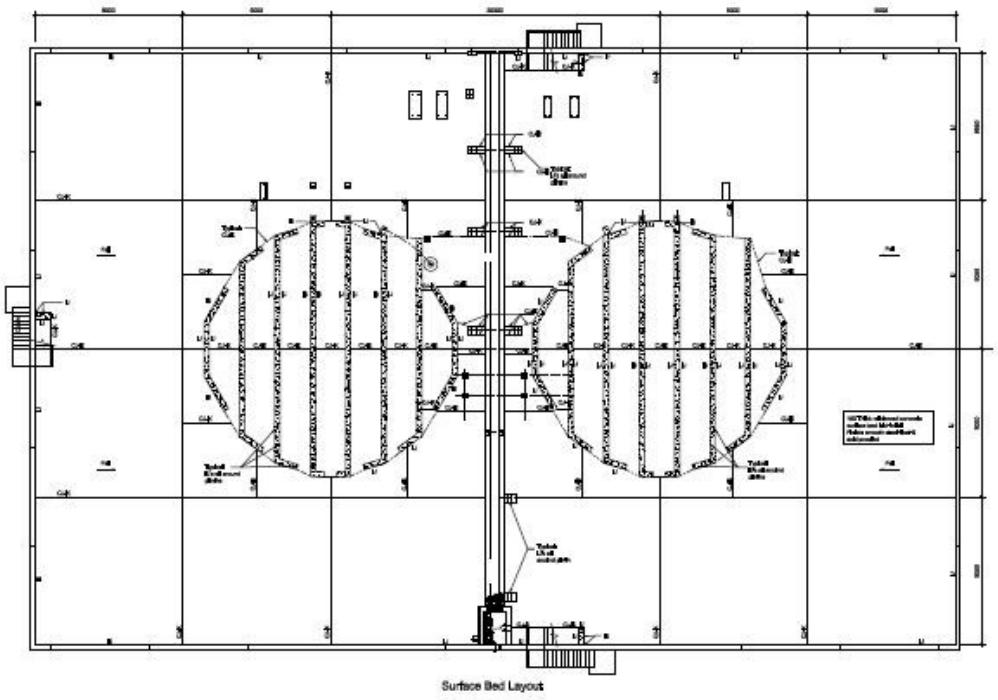


Figure 5.5: Plan of large tank bases with surrounding bunded area

6.1.9 Rack foundations (Item AI in database – Addendum D)

Figure 5.6 gives a plan of a typical lay-out of rack foundations which also forms the basis for the calculation of the ratios in Addendum D. In stable soil conditions, rack foundations will normally be simple foundations, but where ground conditions are suspect, piles are normally used.

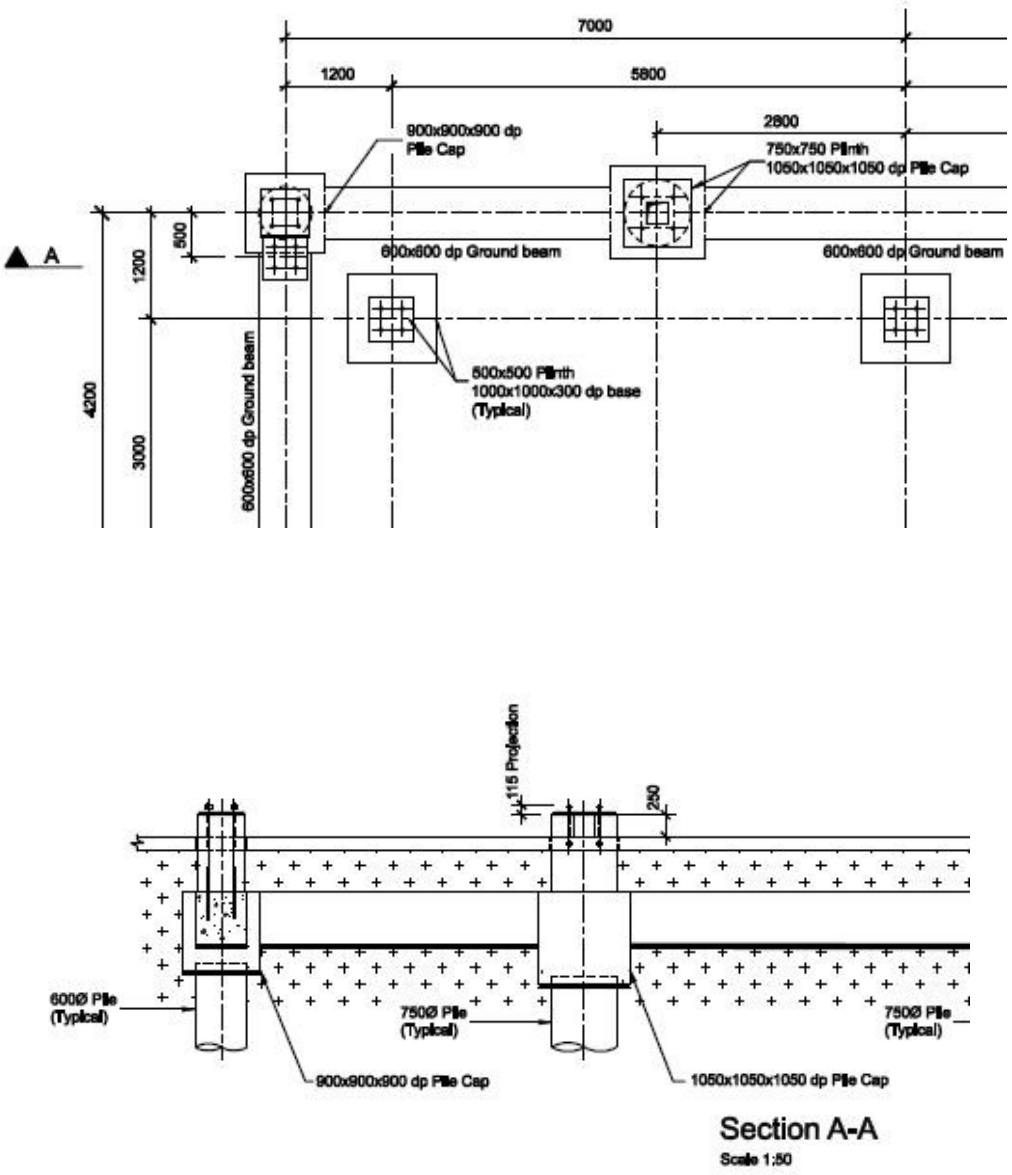


Figure 5.6: Typical pile cap and ground beam foundation

6.1.10 Simple structural foundations (Item AJ in database – Addendum D)

Figure 5.6 and Figure 5.7 show a typical pile cap/ground beam configuration.

6.1.11 Complex structural foundations (Item AK in database – Addendum D)

Photo 5.1 shows a complex concrete structure indicating cable racks and interconnecting structural steelwork. Photo 5.2 shows a close-up of complex concrete structures showing typical concrete beams and columns. Figure 5.6 depicts part of a plan of a typical foundation for a more complex structure.



Photo 5.1: Complex concrete structures indicating cable racks and interconnecting structural steelwork



Photo 5.2: Close-up of complex concrete structures showing typical concrete beams and columns.

6.1.12 Concrete pipe racks and foundations (Item AL in database – Addendum D)

Figure 5.7 illustrates the plan of a typical rack foundation. In most cases the racks will be structural steel with concrete foundations. Good soil conditions may not require piled foundations, depending on the structural loading of the foundations. Photo 5.1 and Photo 5.2 indicate the typical concrete super-structure where concrete columns and main beams are utilised. Addendum D contains the ratios of quantities and rates of concrete top structures with the foundations.

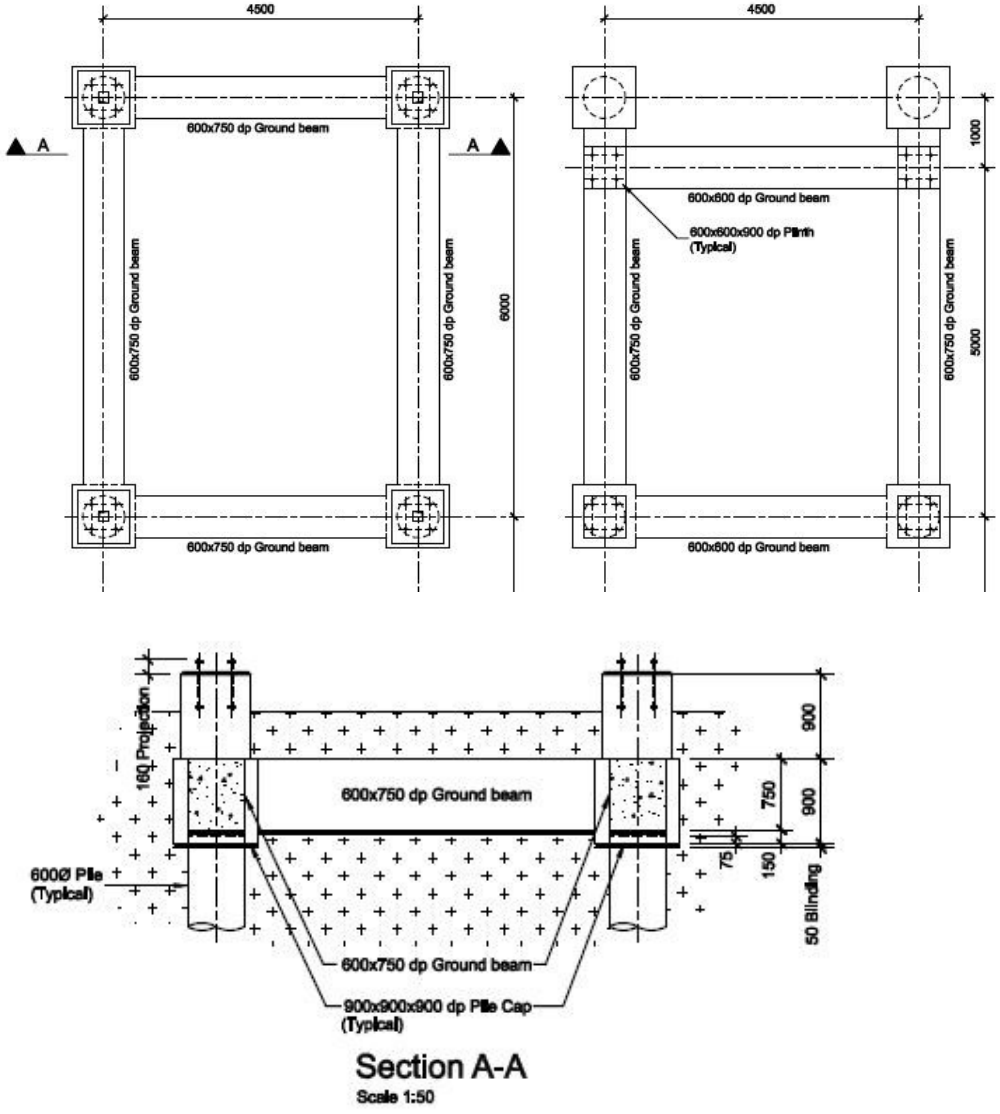


Figure 5.7: Plan of rack foundations indicating pile caps and ground beams

6.1.13 Concrete structure including concrete columns and beams (Item AM in database – Addendum D)

This type of structure is similar to concrete pipe structures (item AL in database), but it normally supports intricate equipment with high corrosion characteristics that will corrode steel structures. Photo 5.1 and Photo 5.2 demonstrate such structures. Structural steel members are connected to concrete members by means of cast-in steel plates welded to the steel members.

6.1.14 Major equipment bases with blast proof walls (Item AN in database – Addendum D)

Photo 5.3 shows a view of a large foundation type with blast proof walls. Blast proof walls are normally added to a structure if there is a possibility that the equipment will cause major damage to the surrounding structures if the blast (should it explode) is not at least partially contained.



Photo 5.3: Large foundation with blast proof walls

6.1.15 Major equipment bases including elevated structure (Item AO in database – Addendum D)

These types of bases will be used in conditions where heavy equipment must be placed and where aggressive chemicals are present.. Concrete beams and columns are used to prolong the corrosion on the material as shown in Photo 5.1, Photo 5.2 and Photo 5.4.



Photo 5.4: Typical large equipment base. Bolt pockets and bolts can be seen.

6.1.16 Buildings – concrete columns with brick in-fill (Item AP in database – Addendum D)

Most of the buildings constructed on petrochemical projects consist of a concrete frame with brick in-fill panels, steel roof construction and sheet metal roof covering. Photo 5.5 shows a typical sub-station building with transformer bays in the forefront. Figures 5.8, 5.9, 5.10, 5.11 and 5.12 illustrate typical sections, elevations and plans of such buildings.

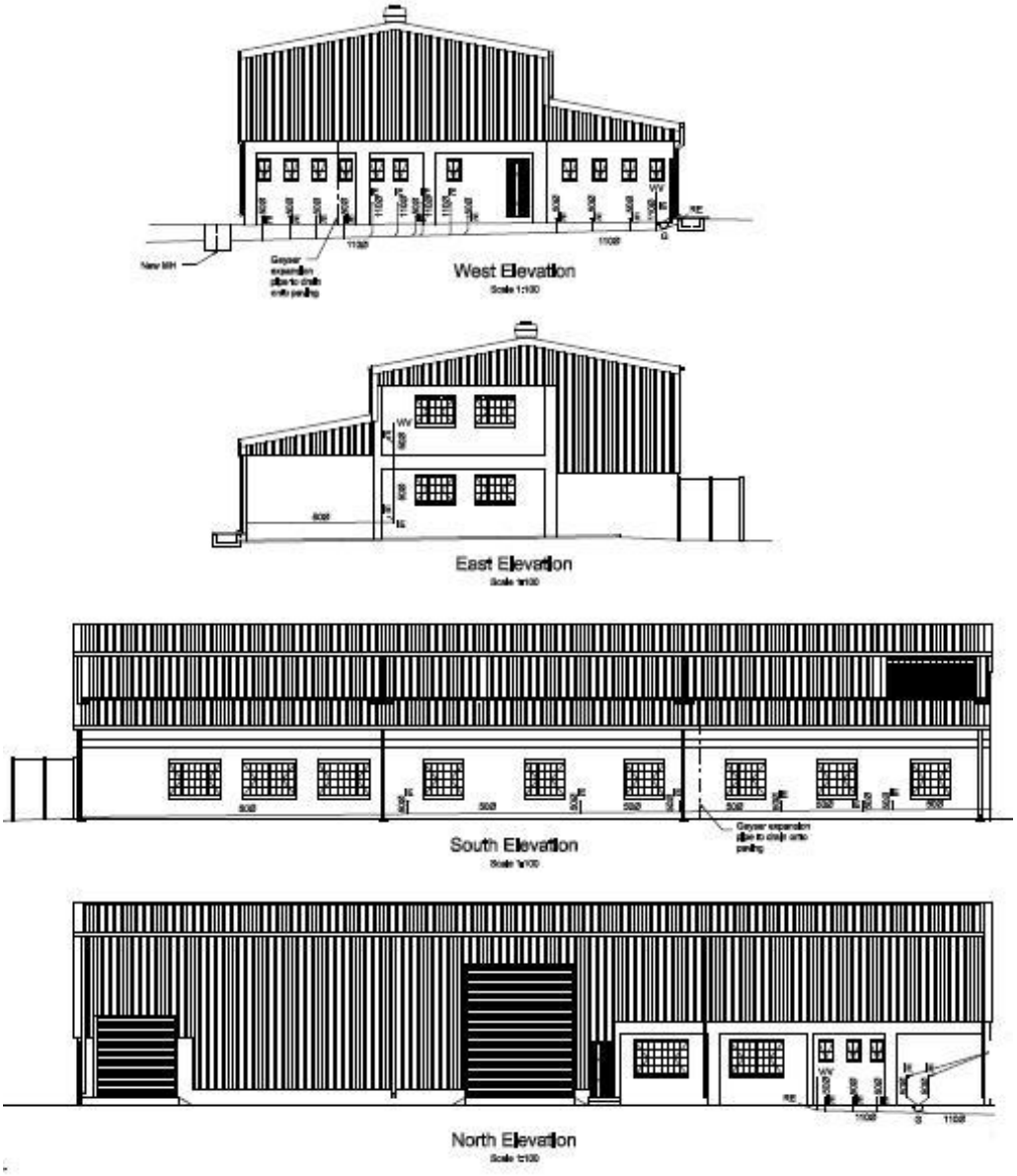


Figure 5.8: Elevations of a typical store/workshop building

6.1.17 Buildings – Structural steel frame with metal roof sheeting and side cladding (Item AQ in database – Addendum D)

Workshops and stores are generally constructed in this fashion. Figure 5.13 and 5.14 indicate a plan view and some elevations of the typical structures in question. The foundations of the structures are included in the ratios and form part of the total cost for the structures.

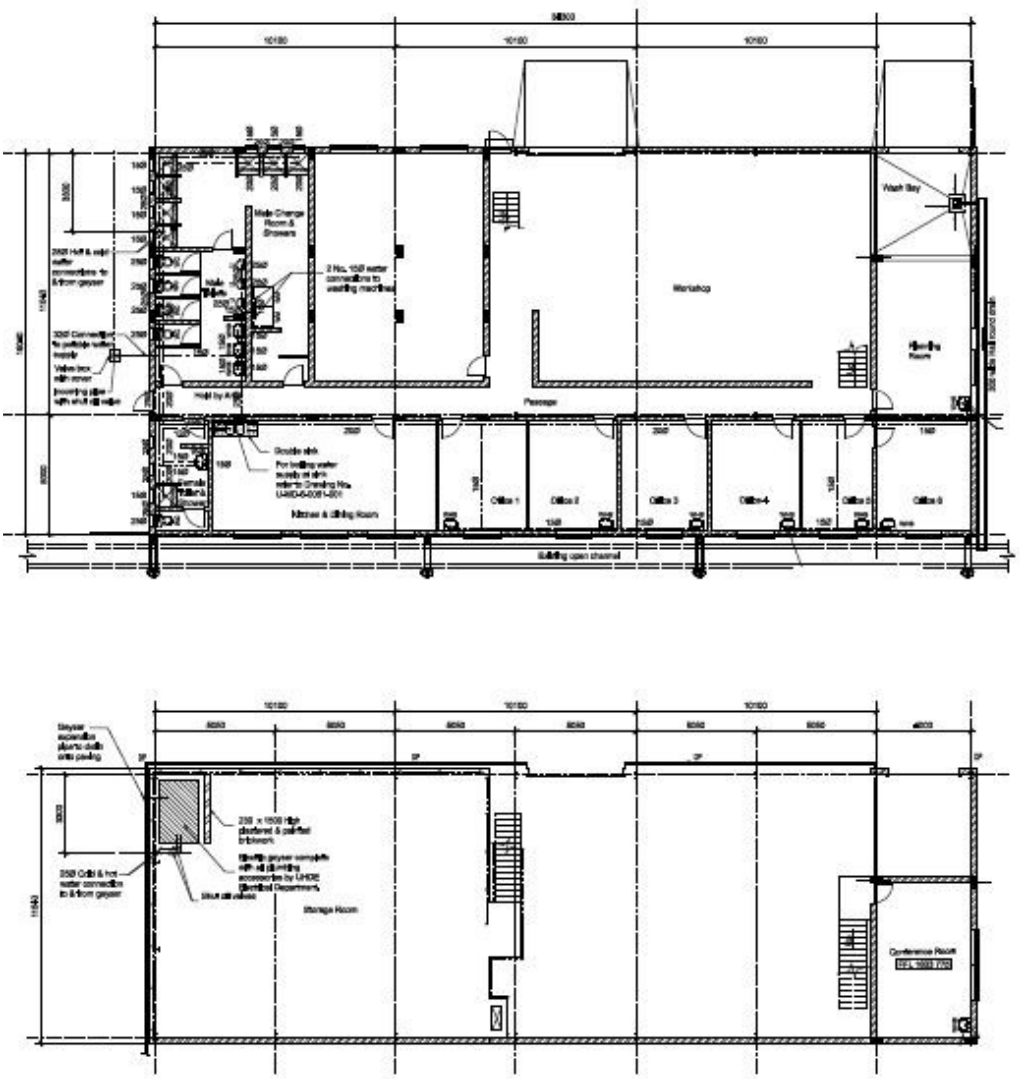


Figure 5.9: Plan and basic footprint of store/workshop building



Photo 5.5: Typical sub-station building

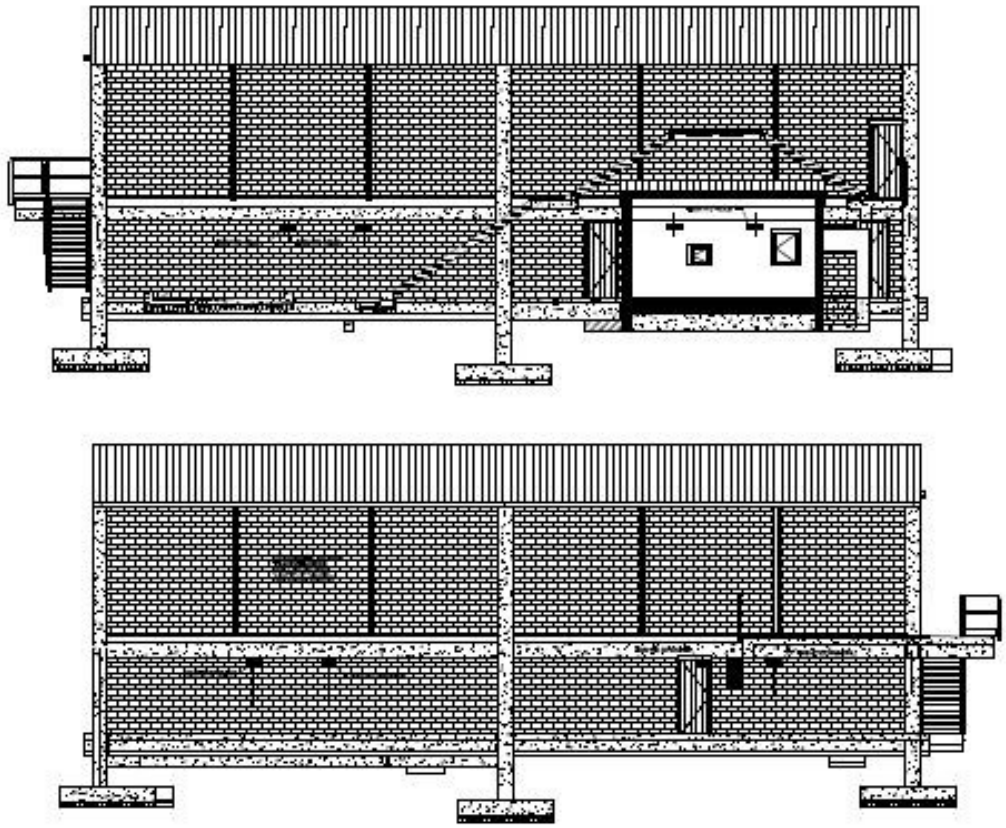


Figure 5.10: Typical elevations of concrete frame structure with brick in-fill panels

6.1.18 Steel canopy (Item AR in database – Addendum D)

Steel canopies are generally erected over equipment that must be protected from direct sunlight and rain. It consists of a steel structure with a roof and no side cladding. Figure 5.15 and 5.16 demonstrate a typical steel canopy structure. The ratios include civil works to allow for the complete cost associated with this type of structure.

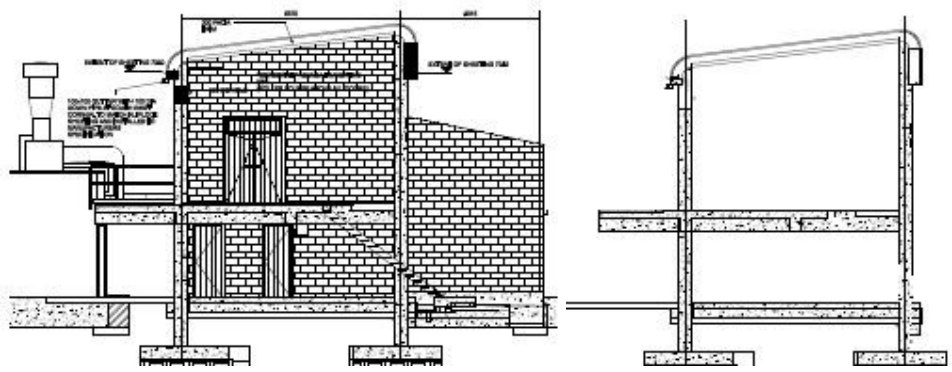


Figure 5.11: Sections through concrete frame with brick in-fill

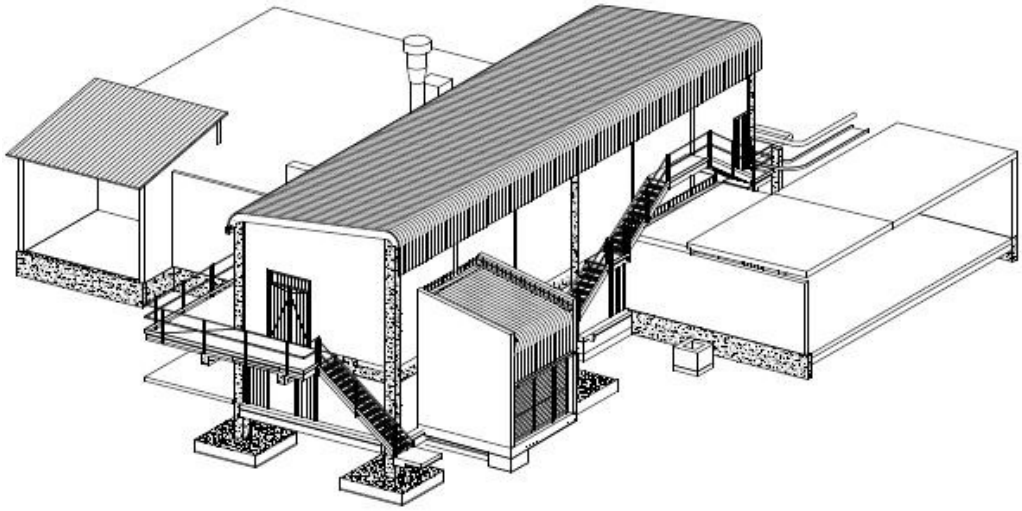


Figure 5.12: Three dimensional view of a typical brick building

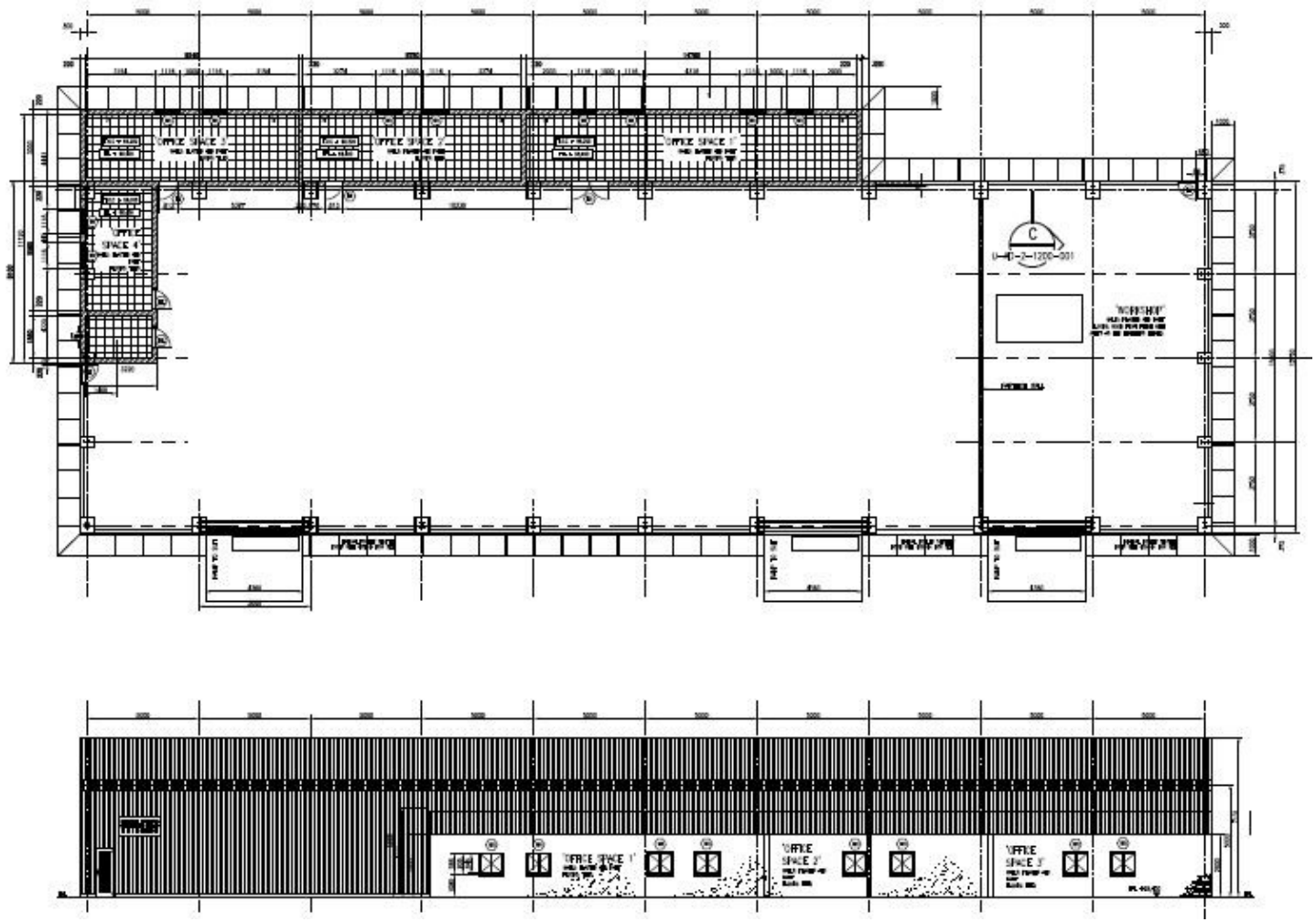


Figure 5.13: Plan and elevation of a structural steel frame building with metal roof and side sheeting and limited brickwork

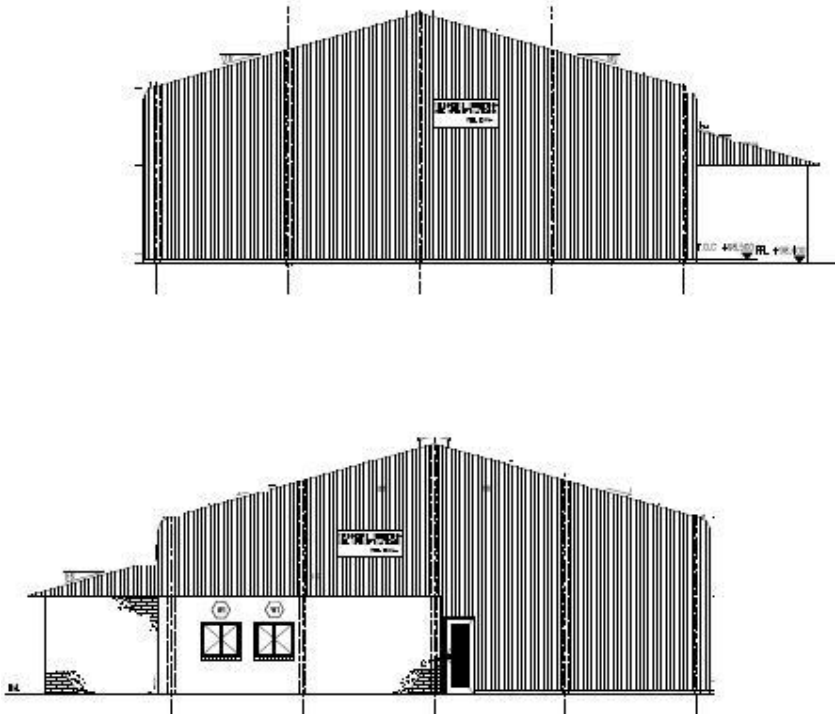


Figure 5.14: End elevations of structural steel building with steel roof and side cladding and some limited brick usage

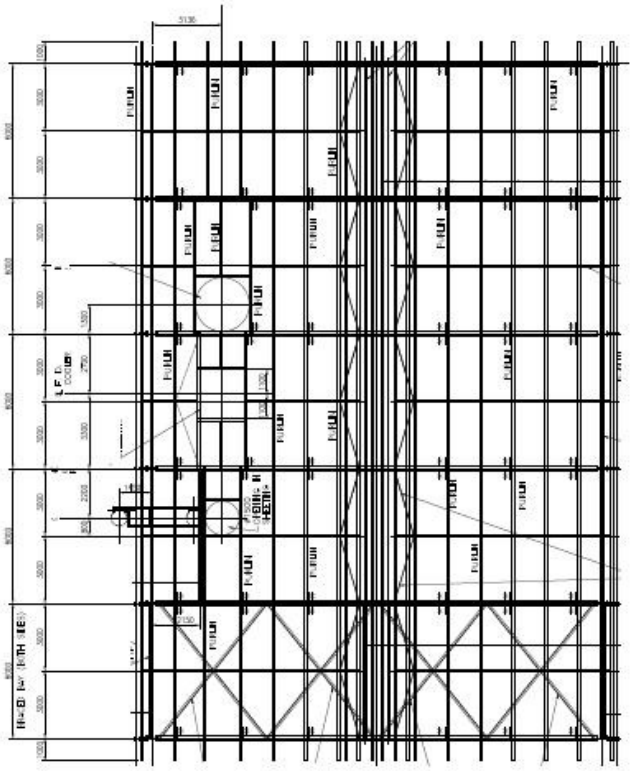


Figure 5.15: Plan view of steel canopy structure

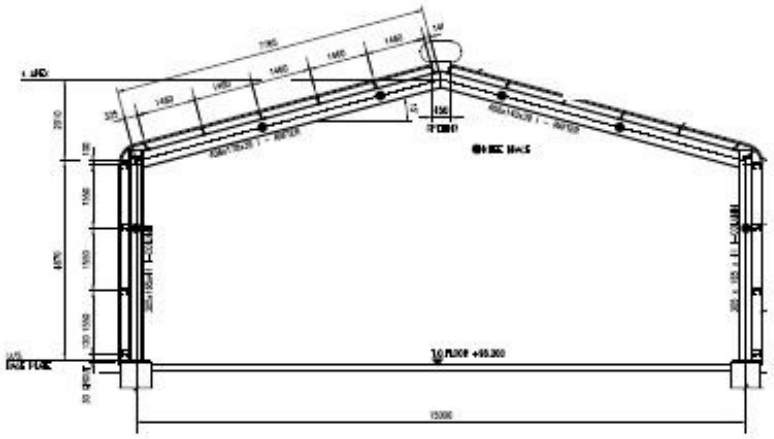


Figure 5.16: Section through steel canopy structure

6.1.19 Weighbridge (Item AS in database – Addendum D)

Figure 5.17 and 5.18 illustrate a typical weighbridge and office. The mechanical equipment (load cells, etc.) are housed in the concrete void and are not included in these calculations.

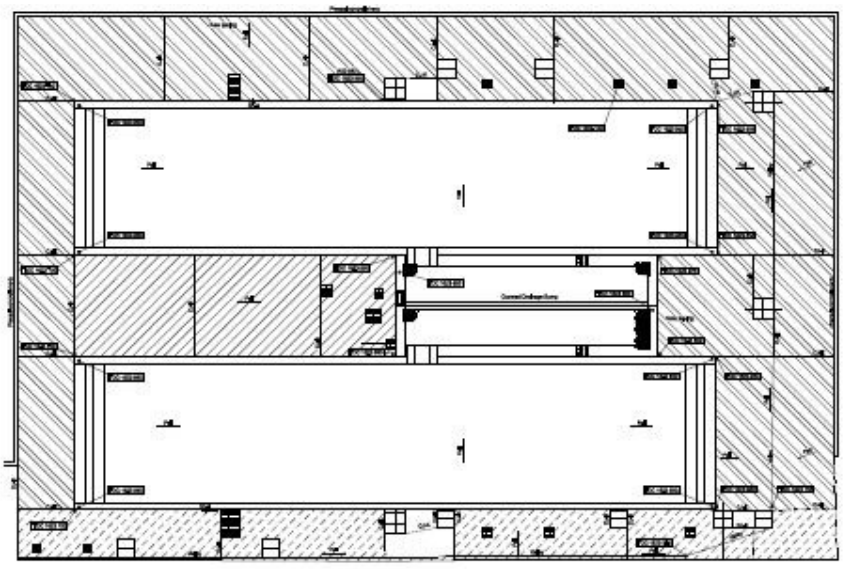


Figure 5.17: Typical weighbridge plan

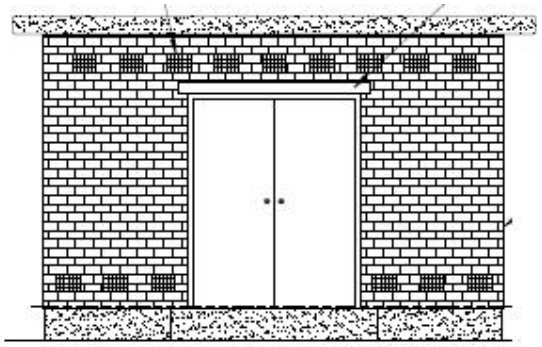


Figure 5.18: Typical weighbridge office

6.1.20 Pump house (Item AT in database – Addendum D)

Pump houses are generally constructed from a mixture of concrete and brickwork.

6.1.21 Cooling tower (Item AU in database – Addendum D)

Photo 5.6 illustrates a typical concrete cooling tower. Industrial cooling towers can be used to remove heat from various sources such as machinery or heated process material. The primary use of large, industrial cooling towers is to remove the heat absorbed in the circulating cooling water systems used in power plants, petroleum refineries, petrochemical plants, natural gas processing plants, food processing plants, semi-conductor plants, and other industrial facilities.

6.1.22 Emergency dam (Item AV in database – Addendum D)

The emergency dams in question are earth dams with liners and paving to prevent any seepage into the underground. These dams are normally empty and only act as spill-ways in case of emergency to prevent environmental damage.



Photo 5.6: The preferred water cooling tower design (vertical draft) in the petrochemical industry

6.1.23 Heavy duty cable tunnel (Item AW in database – Addendum D)

These cable tunnels are actually underground concrete service tunnels that house high voltage electrical cables. The ratios can be applied to any concrete service tunnel. Figure 5.19 indicates a longitudinal section and a cross section through such a tunnel.

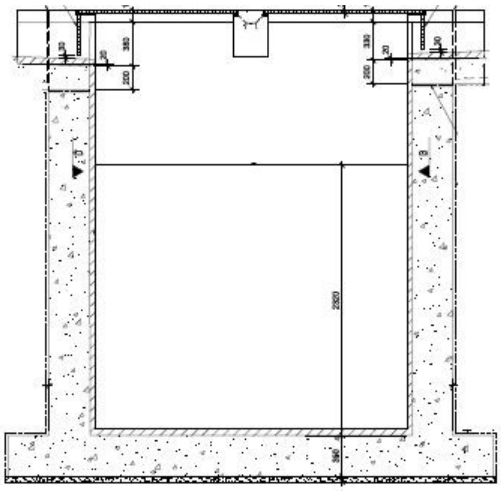


Figure 5.19: Cross section through typical cable tunnel

6.2 STRUCTURAL STEEL (Item B in database - Addendum D)

6.2.1 Basic platform (Item BA in database – Addendum D)

Figure 5.20 demonstrates the typical basic steel platform. These platforms normally consist of structural steel members (beams and columns) bolted onto concrete bases. The civil work is not included in the ratios. Steel grating provides a service platform and the hand railing is normally a purpose made steel railing.

6.2.2 Pipe rack (item BB in database – Addendum D)

Figure 5.21 shows some typical details of steel pipe racks. Pipe racks may have some limited access platforms and service platforms with cat ladders, but the bulk of the structure will consist of steel columns and beams.

6.2.3 Complex structure (Item BC in database – Addendum D)

Figures 5.22, 5.23 and 5.24 provide some images of how the typical complex steel supporting structure may look. Equipment can be accessed by means of steel stairs and cat ladders which spill out on grating.

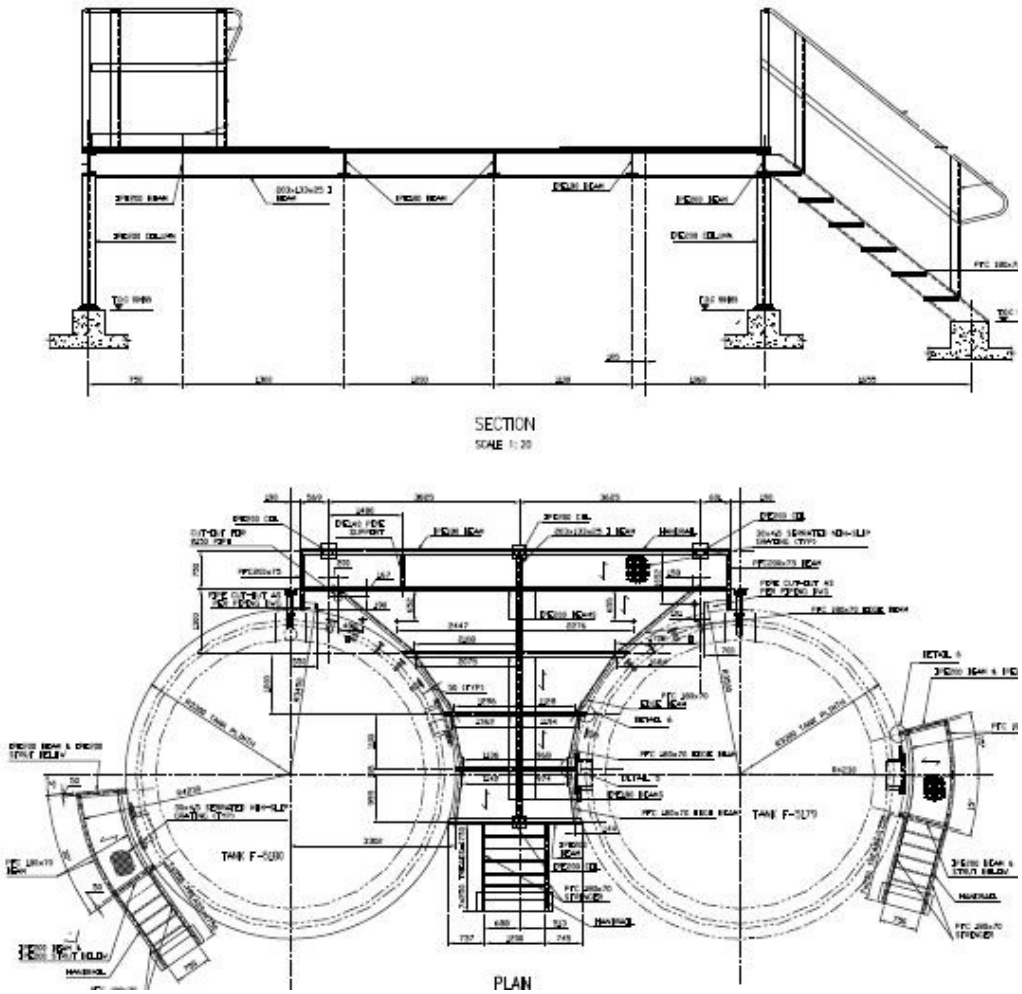


Figure 5.20: Basic steel platform

6.2.4 Stack (Item BD in database – Addendum D)

Figure 5.25 shows some typical elevations and sections of a steel supporting structure for a stack.

6.2.5 Walkway (Item BE in database – Addendum D)

Figure 5.26 demonstrates some details for a typical steel walkway.

6.2.6 Cable gantry (Item BF in database – Addendum D)

Elevations and sections of a typical steel cable gantry can be seen in Figure 5.27.

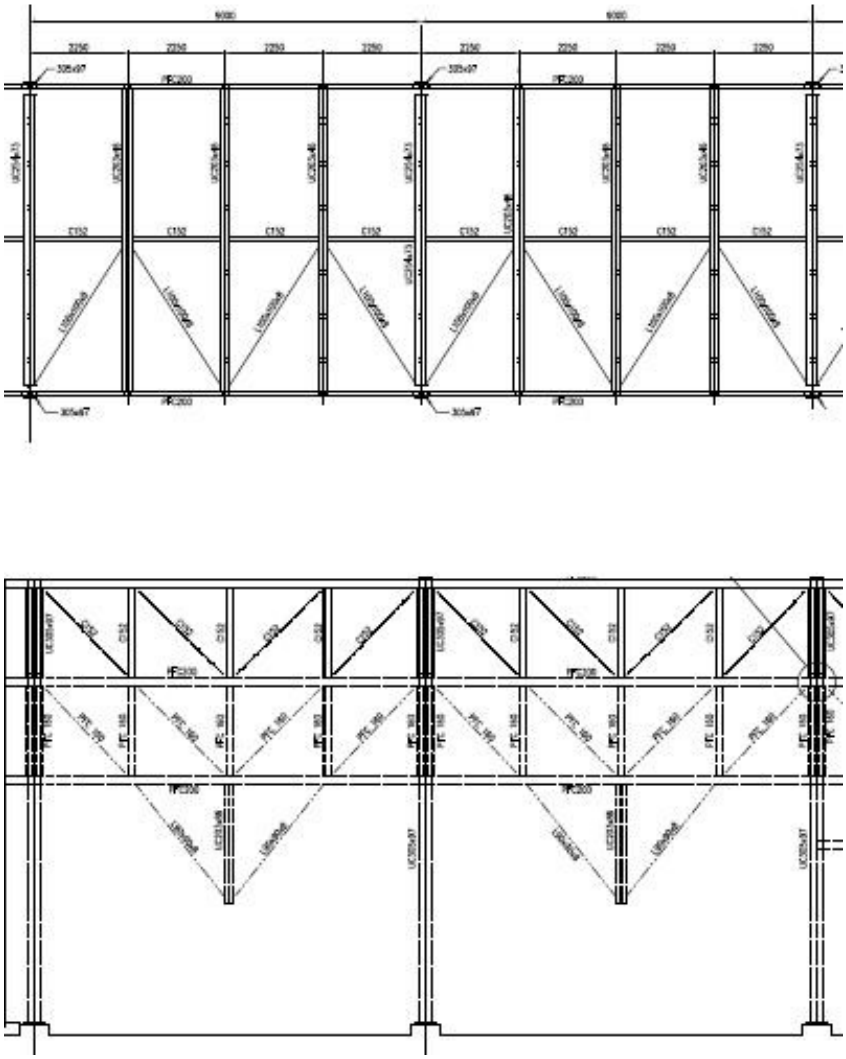


Figure 5.21: Plan of a typical steel pipe rack

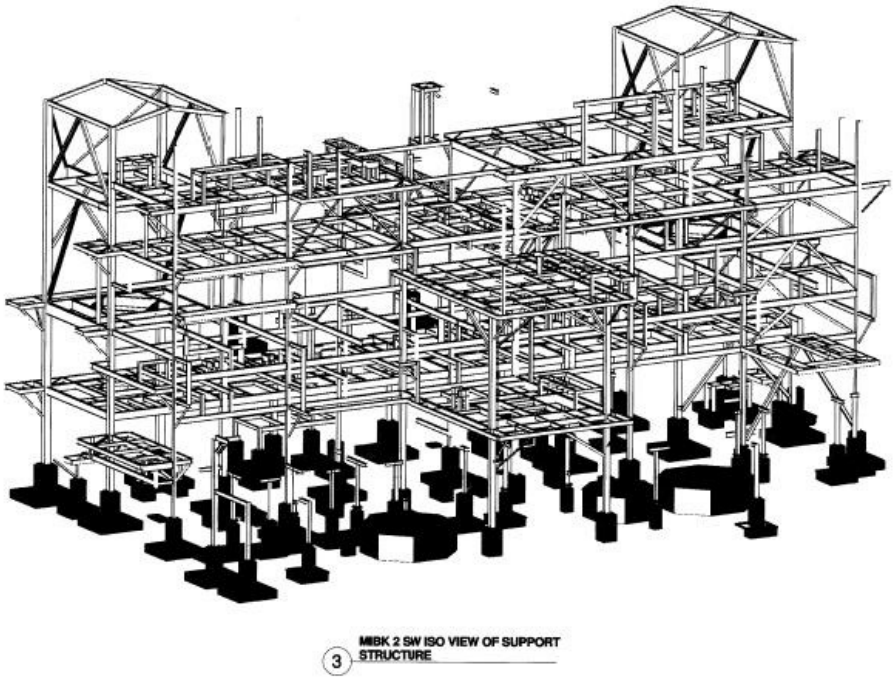


Figure 5.22: Three dimensional view of a typical complex steel supporting structure

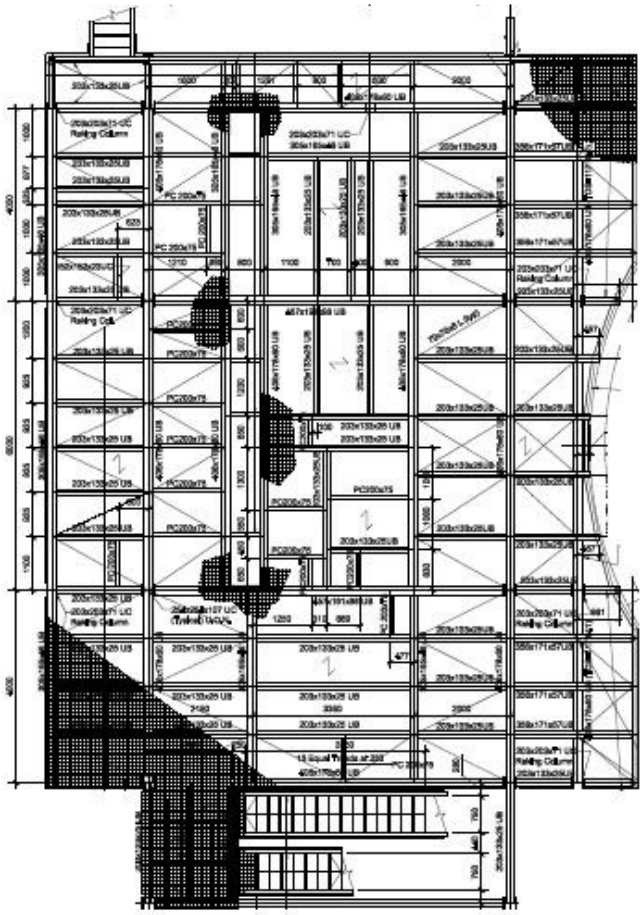


Figure 5.23: Plan of a typical complex steel supporting structure showing the stairwell

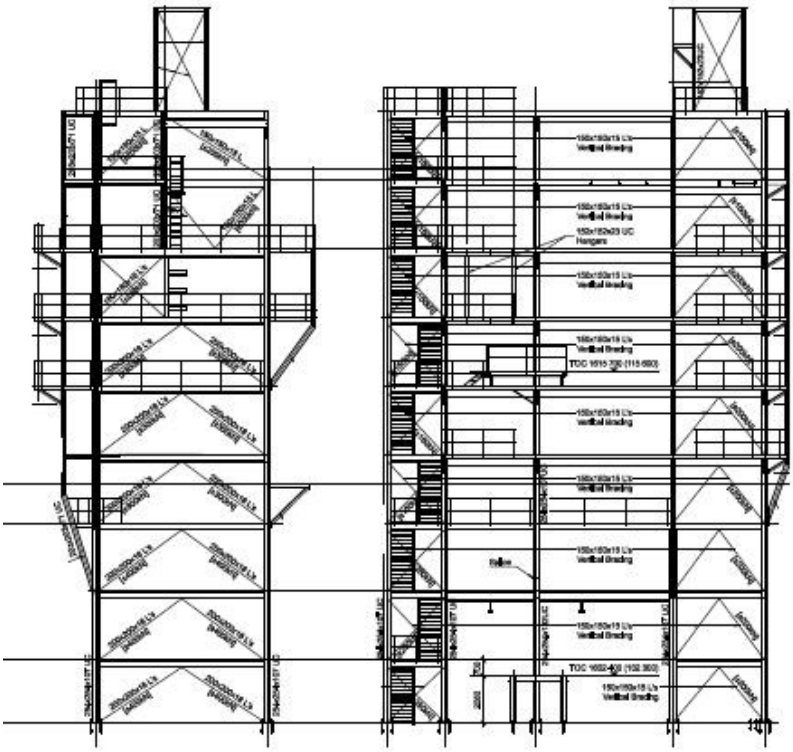


Figure 5.24: Section through typical complex steel supporting structure

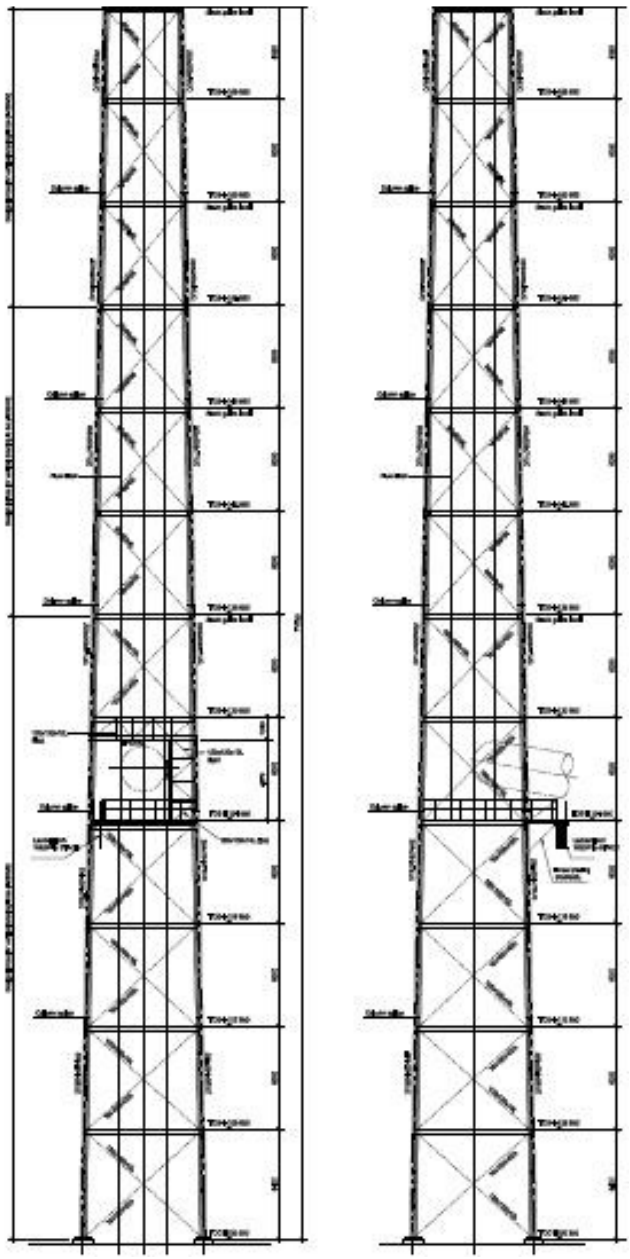


Figure 5.25: Longitudinal section through typical structural steelwork for stack

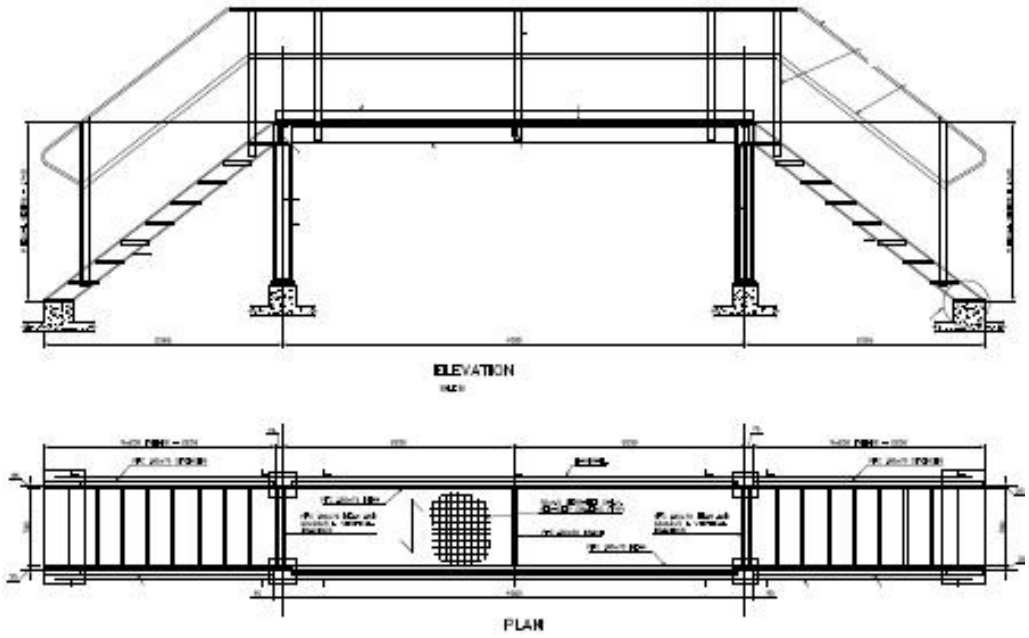


Figure 5.26: Elevation and plan for structural steel walkway

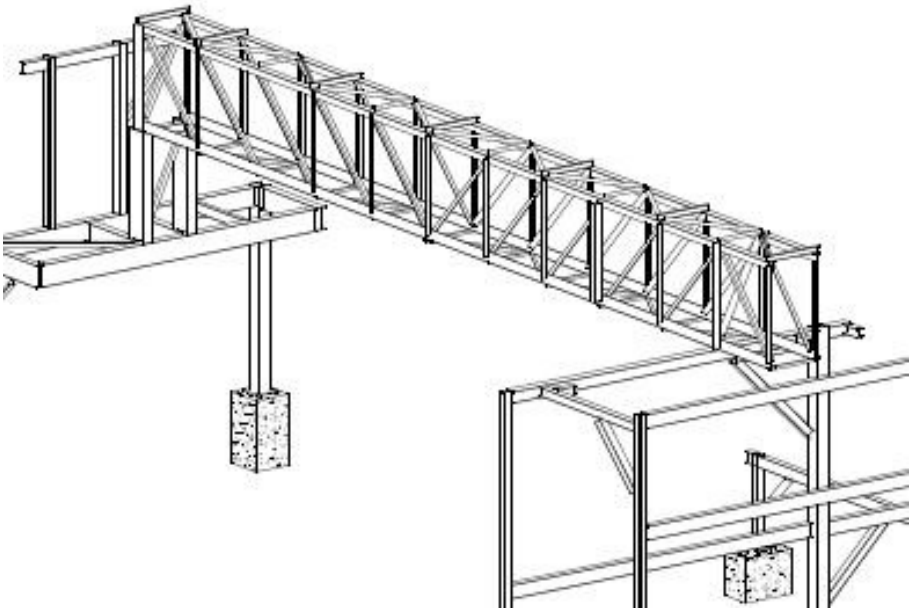


Figure 5.27: Three dimensional view of supporting steel for a cable rack

6.3 PIPING (Item C in database – Addendum D)

6.3.1 Piping – (sizes as per section CA to CQ contained in Addendum D)

Piping normally constitutes quite a sizable portion of the total cost involved in a process plant. The piping material is in most cases free issue material which will be procured by the client, but installed by the contractor. For this reason, the supply cost of the piping material has been ignored in this study, and only the installation of the piping material has been taken into consideration.

A popular method of measuring the labour content in the total piping installation is by making use of work units. One work unit includes all the direct labour (excluding supervision), small tools, scaffolding, cranage, etc. to complete, for example, 2,5 hours of work. Every item in the piping installation is then measured according to standard work unit allocations of which an example can be viewed in Addendum C. All pipe sizes and all work associated with the piping installation is covered by pre-determined company standards such as the ones illustrated in Addendum C.

6.4 NDE TESTING (Item D in database – Addendum D)

Non-destructive testing (NDT) is a wide group of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage. Because NDT does not permanently alter the article being inspected, it is a highly valuable technique that can save both money and time in product evaluation, troubleshooting, and research. Common methods used include radiographic testing (RT), dye penetration testing (DP), magnetic particle testing (MPT), post weld heat treatment and material hardness testing (MHT).

6.5 MECHANICAL INSTALLATION (Item E in database – Addendum D)

Mechanical equipment are almost always “free issued” to the contractor, meaning the client procure the equipment and will then officially hand it over to the contractor for safe keeping to be installed at a later stage. The installation will form part of the estimate and is normally measured in weight and priced per ton.

6.6 PAINTING AND INSULATION (Item F in database – Addendum D)

Painting and insulation (hot and cold) will be measured as the net area to be covered. It is normally measured in square meters except where the insulation of valves or other equipment on lines is necessary. The insulation of such items might be measured in number. Painting to structural steel is normally measured in tons.

6.7 ELECTRICAL AND INSTRUMENTATION (Item G in database – Addendum D)

Electrical wiring in general refers to insulated conductors used to carry electricity and associated devices. Electrical equipment includes any machine powered by electricity. They usually consist of an enclosure, a variety of electrical components, and often a power switch. The electrical scope normally includes all cabling, racking, equipment, etc. necessary to take the plant to production.

Instrumentation plays a significant role in both gathering information from the field and changing the field parameters, and as such is a key part of control loops. An instrument is a device that measures or manipulates variables such as flow, temperature, level, or pressure. Instruments include many varied contrivances which can be as simple as valves and transmitters, and as complex as analysers. Instruments often comprise of control systems for varied processes. The control of processes is one of the main branches of applied instrumentation.

Control instrumentation includes devices such as solenoids, valves, circuit breakers, and relays. These devices are able to change a field parameter and provide remote or automated control capabilities.

Transmitters are devices which produce an analog signal, usually in the form of a 4 to 20 mA electrical current signal, although many other options using voltage, frequency, or pressure are possible. This signal can be used to control other instruments directly, or it can be sent to a PLC, DCS, SCADA system, or other type of computerised controller, where it can be interpreted into readable values and used to control other devices and processes in the system.

6.8 PRELIMINARIES AND GENERAL (Item H in database – Addendum D)

All indirect costs associated with the construction of the plant will be allowed for in the Preliminaries and General. These include items such as management and supervision, on-site facilities, communication facilities, plant and equipment and ablution.

7.0 SUMMARY

The use of historical data to assist in making strategic decisions and to conduct cost estimating may play a significant role in improving competitiveness in the market. Before the data collection process can begin, certain methodologies and systems must be in place. Not only must company management support historical data collection, but they must also understand and actively promote this effort.

Conceptual estimating techniques are especially reliant on historical data. Good data normalisation and good sources of data will lead to better quality data. Improving the quality of the data will without doubt improve the quality of the estimate. Normalising the data, in other words adjusting the data to make it comparable to other sets of data, will include adjusting it for economic differences, site conditions, etc.

Data from in-house sources are preferable. Each organisation has its own methodology of construction with its own management styles. These aspects can influence the outcome of the data and eventually the outcome of the estimate. Given the global nature of chemical processes and clients/owners offering operating licenses to international companies, much of the data that is available is of an international nature. In cases like these, even further data normalisation is required. Currency exchange conversions, productivity rate conversions and international costing are but a few anomalies that need to be taken into account.

The typical database structure of a petrochemical plant has been depicted in this chapter. Brief descriptions of important notes have been entered to accompany Addendum D which contains the ratios of a typical process plant.

Construction risk has quite a significant influence on the price tendered and must be addressed. Depending on the nature of the project at hand, the project contingency can be a sizable amount. Arbitrary allowances of contingencies are dangerous and in the current competitive market cannot be allowed. Chapter 6 covers the theory behind

contingency analysis and the effect of and calculation of escalation which can have a serious effect on the total price, especially on projects with a long duration.

CHAPTER 6

COST ESCALATION AND CONTINGENCY ANALYSIS

1.0 INTRODUCTION

Cost escalation forecasting and contingency calculation and management are probably the most difficult concepts to quantify and to manage during the life of a construction project (Blyth & Kaka, 2006: 89). These two risks have a large probability of occurring, and they have an impact or consequence, making them typical construction risks. Mismanaging these risks can have a serious effect on the success of the project.

Prasad (2008: EST.S02.1) points out that risks will occur during the total life span of the project. When the probability and/or consequences related to these risks are reduced to the point that it is no longer a threat to the success of the project, the risk is eliminated (Koller, 2005: 4). It is therefore important to note what the effect or consequences of risk will be. This process is known as assessment and has to take into consideration the complete process of risk identification, risk analyses and risk evaluation (Garlick, 2007: 3).

A handy method to achieve a range of solutions when conducting risk analysis is the Monte Carlo analysis process (Vargas, 2004: CSC.16.2). This technique is generally used to solve problems for which the definition of specific solution equations to calculate a specific answer is either too complex or too cumbersome to be practical. In a sense a Monte Carlo analysis is a form of a repeatable experiment whose accuracy can be increased should the number of tests be increased (Patterson, 2006: IT.05.03). Monte Carlo analysis is, however, not a substitute for good quality historical data and the use of historical data should always be promoted (Whiteside, 2008: EST.04.2).

Construction escalation is an effect of inflation. The general increase of prices does not necessarily constitute inflation (Ball & Petrowski, 2007: EST.09.1). The costs of commodities should rise fairly rapidly to be classified as inflation. The definition of inflation should therefore be that the rise of prices occurs over a relative short period of time. Two main types of inflation are identified, cost-push and demand-pull; the latter almost always having more extreme effects than the first (Flemming & Koppelman, 2009: 22).

The effect of inflation is not distributed evenly, and as a consequence there are hidden costs and benefits to others from this decrease in purchasing power. Lum (2004: 32) states that with high inflation, purchasing power is redistributed from those on fixed incomes, such as pensioners, towards those with variable incomes. The redistribution of purchasing power will also occur between international trading partners. The best counter measures to restore a sound growth rate in the economy are to increase the amount of resources available and the efficiency of their use (Gransberg & Carlisle, 2008: EST.09.1).

Inflation is considered to be a general change in prices caused by the debasement of the value of the currency (Lum, 2004: 32). Construction cost escalation includes the effect of inflation, but reflects changes in price drivers such as productivity and technology, as well as changes in market conditions such as high demand, labour shortages and profit margins. Construction escalation varies for different capital components such as office and field labour, bulk material and equipment. It also varies by region and procurement strategy (Olhager & Selldin, 2007: 1470).

Hassanein and Khalil (2008: 20) indicate that forecasting escalation rates can play an important role in project profitability or viability especially for large multi-year construction and development projects. The estimator must predict the cost for goods and services that must be procured in the future, perhaps many years from now (Hollmann & Dysert, 2007: EST.01.4). Some of the more important factors influencing cost escalation can be described as follows: major natural disasters, increase in material cost, bid market disruptions, high volume of construction work, and the regulatory climate.

Measuring and tracking cost escalation requires a reasonably accurate index based on information that is reliable and captures a wide enough spectrum of data that all aspects of escalation are covered (Touran & Lopez, 2006: 855). Engineering construction indices such as SEIFSA and PPI are two examples of escalation indices that are used in South Africa to calculate the effect of escalation on construction costs. Each index should be evaluated on how it is intended to be used for a particular project or process calculation. Indices which are based on statistical information are more likely to be objective than those based on the opinions or views of individuals.

Cost indices should, however, be used with caution since these indices are only approximations intended to represent the average trend for a large group of projects in

a broad region (Butts, 2007: EST.08.1). The indices are generic and conceptual in nature, and judgment must be applied in using them in any given situation. The dominant escalator in the current market is poor allocation of risk. To manage cost escalation and minimise the impact of future cost increases or other factors which will arise to put additional pressure on the market, project owners need to change how they think about, and handle projects.

Escalation is not controlled and driven by the management of a company. It is macro-economics driven and largely beyond the control of the estimator (Gransberg & Carlisles, 2008: EST.09.1). Even the best defined and managed projects will face price increases driven by underlying economic conditions. Escalation has, however, become a "politically correct" hiding place for contingency as many estimators find it difficult to provide proper reasoning as to why they made certain contingency allowances. The "un-scientific" nature of escalation forecasting makes it a vulnerable entry within the estimate.

Contingency is, however, not an allowance for escalation, but is intended to mitigate the adverse impacts of unforeseen events (Whiteside, 2007: EST.04.1). It is a reserve against risk or estimate assumptions and a function of design, definition, estimating method, estimator's experience, time frame, schedule probability, new technology, remoteness of job site, engineering progress at the time of estimate and material commitment at the time of the estimate.

Typical contributors to cost overruns on projects in the oil and gas industry can be summarised as:

- change orders,
- level of scope definition,
- bid process,
- contract risk,
- market conditions,
- risk management issues, and
- performance.

Contingency funds are widely accepted budgeting tools for affording projects acceptable levels of cost reliability (Blyth & Kaka, 2006: 87). However, a global

contingency pool can be misleading early in the project. Risk associated with initial project definition can consume a disproportionate amount of contingency, exhausting the available reserve funding prior to project completion.

The majority of projects set their contingency using techniques that can be grouped into one of three categories: predetermined percentage, expert's judgment, and risk analysis. Irrespective of the method used to determine contingency, it should be managed (Prasad, 2008: EST.S02.1). Contingency funds are included in development budgets to provide managers with the flexibility required to address uncertainties and deviations that threaten achieving the objectives. Improving contingency management requires an understanding of how managers make budget contingency decisions and the impacts of those decisions on performance (Ripley, 2004: CSC.08.1).

2.0 RISK MANAGEMENT

Garlick (2007: 3) points out that managers in all organisations have to make decisions and act bearing future uncertainty in mind. Koller (2005: 4) took the loose connotation of risk and uncertainty and broke it down into four categories: risk, uncertainty, probability, and consequence. To him, there seems to be a propensity to confuse probability and/or uncertainty with risk. These four entities are, however, distinct and should not be confused. Garlick (2007: 3) and Khan (2007: 14) mention that risk management is the knowledge that the future cannot be predicted with certainty, but steps can be taken that will favour preferable outcomes over less attractive ones.

Garlick (2007: 3) defines risk management as:

> *"Risk management is the discipline for making decisions and acting whilst demonstrably taking account of this potential for different future outcomes."*

A manager applying risk management should be able to understand risk in all its forms. Koller (2005: 4) describes risk as follows:

> *"A pertinent event for which there is a textual description."*

Risk is typically associated with at least two parameters:

- Probability of occurrence
- Consequence (impact) of occurrence

About each of these attributes, one could be sure. For example, if one were to flip a coin, one can be sure that the probability of the coin landing “heads-up” is 50%. You might also be sure about the prize of winning. In such a case there is no uncertainty about the probability or consequence. However, in most business situations one cannot state with 100% certainty just what the probability will be, nor what the consequence will be if the risk is realised. This creates uncertainty (Koller, 2005: 5).

Uncertainty can at least be related to probability and impact of risk (Lee & Halpin, 2003: 432). Uncertainty is typically, but not always, represented by a range of values that encompasses the range of possibilities. Uncertainties related to construction may include the following:

- Uncertainty regarding the probability of an abnormal amount of foul weather.
- Uncertainty about the probability of a union strike during the cause of the project.
- Uncertainty regarding the possibility that permit delays might be experienced.

Koller (2005: 6) mentions that the cost of these uncertainties can be calculated by the percentage change between what is considered to be normal and what is conceived to be abnormal, multiplied by the number of days and the cost per day. When all risks and uncertainties have been identified, steps can be taken to mitigate these risks and uncertainties (Odeyinka, Lowe & Kaka, 2008: 10). Whenever uncertainty is involved, a Monte Carlo analysis is normally used that allows combinations of distributions. More will follow in this study on Monte Carlo analysis.

Picken and Mak (2001: 318) indicate that there are different types of risk at different stages in the project life cycle. From the tendering stage (Wong & Hui, 2006: 426) until late in the project life cycle, risks will be experienced. At the feasibility and inception stages, for example, the client may not have decided exactly on the floor area that is required, or the amount of additional floor area over what the basic may be in abeyance. Such matters will create uncertainty from an estimator’s point of view. The depth of piling for foundations is another typical example of uncertainty. Some of the

uncertainties will be eliminated or clarified as the planning of the project develops towards the detailed design stage.

When the probability and/or consequence related to risk is reduced to the point that it is no longer considered to be a threat to success, the risk is eliminated. Koller (2005: 6) states that one should not strive to minimise risk, but rather to eliminate risk. The reduction in probability and consequence should, however, be an aim for management to strive towards (Jha & Devaya, 2008: 340).

When estimating risk it is important to understand what risk entails and what the consequences of risk might be. Garlick (2007: 6) describes the three major business risks as follows:

- Systematic under-estimation of the cost and time to carry out activities.
- Systematic under-estimation of the management resources and managerial talent needed to achieve objectives successfully.
- The essential unpredictability of the future environment.

Arrow (2008: RISK.01.1) demonstrates in Table 6.1 the “hard” and “soft” benefits of risk management.

“Hard benefits”		“Soft benefits”	
1	Enables better planning, scheduling and budgeting.	1	Improves corporate experience and general communication.
2	Increases the likelihood of a project adhering to its schedules and budgets.	2	Leads to common understanding and improved team spirit.
3	Leads to the use of the most suitable type of contract.	3	Helps distinguish between good and bad management.
4	Allows a more meaningful assessment of contingency fund.	4	Helps develop the ability of staff to assess risks.
5	Discourages the acceptance of financially unsound projects.	5	Focuses project management attention on the real and most important risks.

"Hard benefits"		"Soft benefits"	
6	Contributes to the build-up of statistical information for better decision making.	6	Facilitates greater risk-taking, thus increasing benefits gained.
7	Enables a more objective comparison of alternatives.	7	Demonstrates a responsible approach to clients.
8	Identifies and allocates responsibility to the best Risk Owner.	8	Provides a fresh view of the personnel issues on a project.

Table 6.1: The "hard" and "soft" benefits of project risk management
Source: Arrow, 2008: RISK.01.1

2.1 The risk management process

Figure 6.1 emphasises the broad scope of risk management compared with just risk assessment. In particular, it emphasises the importance of implementation. Risk management is an active (or pro-active) continuous activity (Garlick, 2007: 16).

Garlick (2007: 14) defines risk management as follows:

> *"Risk management is the culture, process and structures that are directed towards realizing potential opportunities whilst managing adverse effects."*

2.2 Risk assessment

Garlick (2007: 13) defines risk assessment as follows:

> *"Risk assessment is the overall process of risk identification, risk analysis and risk evaluation."*

Starting the risk analysis process will be the identification of the risks involved. Risk analysis is dependent on what risks have been identified. The standard method is generally to engage in some sort of brainstorming session with the intention of

promoting comprehensiveness by systematically considering what can go wrong with each element of a project or system. People from different functions should sit together and understand the activity and share their perspectives on the risks and opportunities involved in their projects and what should be done about them (Kubitscheck, 2000: 39).

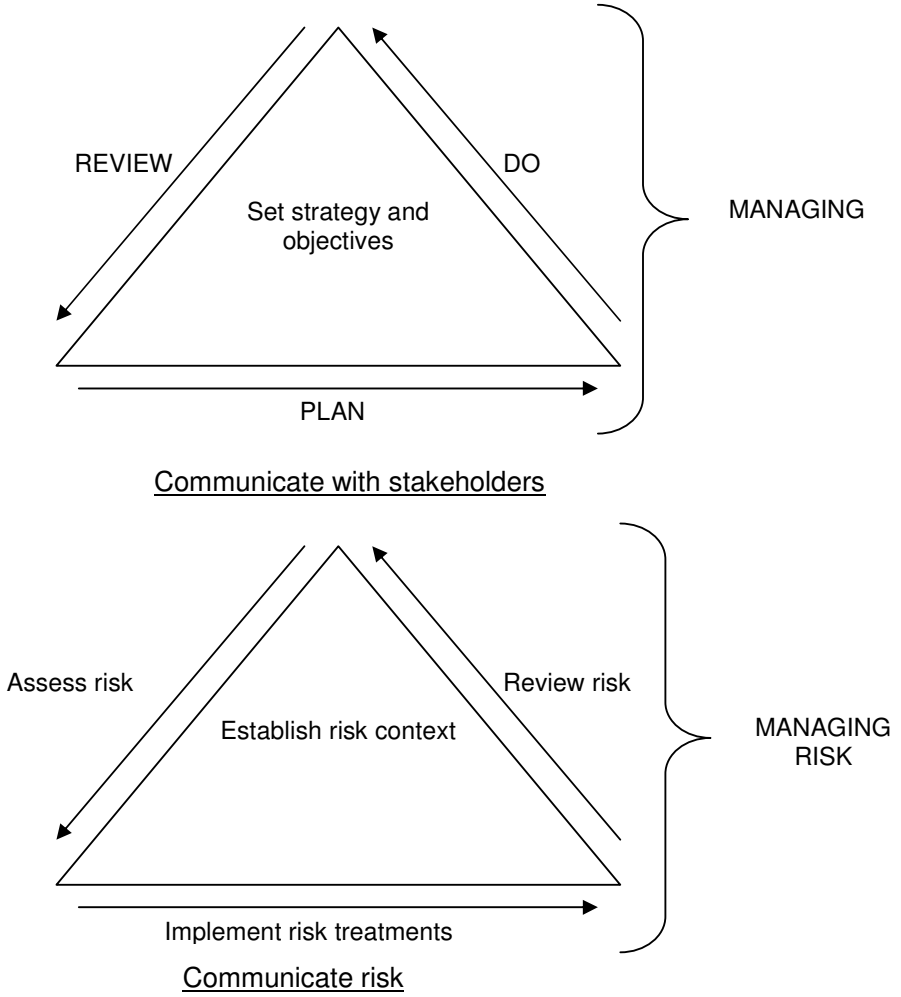


Figure 6.1: The risk management process
Source: Garlick, 2007: 16

Caddell, Crepinsek and Klanae (2004: RISK.01.1) have broken down the risk assessment process into the following categories:

Step 1 - Review: Key activities in this step include familiarisation of the project, formal review of the cost estimate and/or schedule and kick-off meeting (Jambhekar & Weeks, 2007: OWN.02.1).

Step 2 - Identify: All project risk should be identified as well as the project's key cost elements (Carlos & Formosco, 2006: 76). This process step is most important in setting the appropriate foundation for subsequent modelling and simulation.

Step 3 - Model: Although the risk analysis consists of applied probability and statistics, the creation of a cost or schedule model is the "art" of the effort (Sakka & El-Sayegh, 2007: 124). Herath & Kumar (2007: 307) point out that the model must define all the key dependent and independent variables and how the project risks affect them.

Step 4 - Range: The results of the risk analysis are influenced by the range of possible variation in cost elements and schedule activity durations (Borysowich, 2007: 06 June 2008). The objective of this step is to gather sufficient knowledge for the project participants to adequately define the optimistic, most likely and pessimistic view of variations to cost elements or schedule activity durations.

Step 5 - Simulate: Computer software packages are available to simulate risks, mostly making use of the Monte Carlo analysis process (Vargas, 2004: CSC.16.2). More detail is given on this process later in this study.

Step 6 - Summarise: The ultimate deliverable of the risk assessment process is to be able to produce a report that summarises the sensibility and simulation results, as well as an expert interpretation of the results.

Ker-Fox (2004: 2) comments on the risk management process followed by the Pebble Bed Modular Reactor (PBMR) in the planning of the nuclear power plant at Pelindaba (South Africa). Figure 6.2 depicts the process. Here risk and opportunity are identified within the project scope. To mitigate risk, the development, implementation and monitoring of control strategies are implemented and systems for communicating risk information within the organisation are developed.

2.3 Risk analysis

Risk analysis occurs after risk assessment so that when dealing with risk analysis, the risks should be well developed, but unprioritised. Patterson (2006: IT.05.1) points out that the key aspect of risk analysis is to be able to assign likelihood and consequence to each specific risk. There are two choices: either do it qualitatively, or with numbers (i.e. quantitively).

Lofton and Coppo (2007: RISK.05.1) point out that risk analysis is important to be able to consistently predict the final costs in projects. Estimates are developed in various stages of the project. The earlier in a project an estimate is developed, the more incomplete the information will be. With the incomplete information comes risk (Humphreys, 2004: 5).

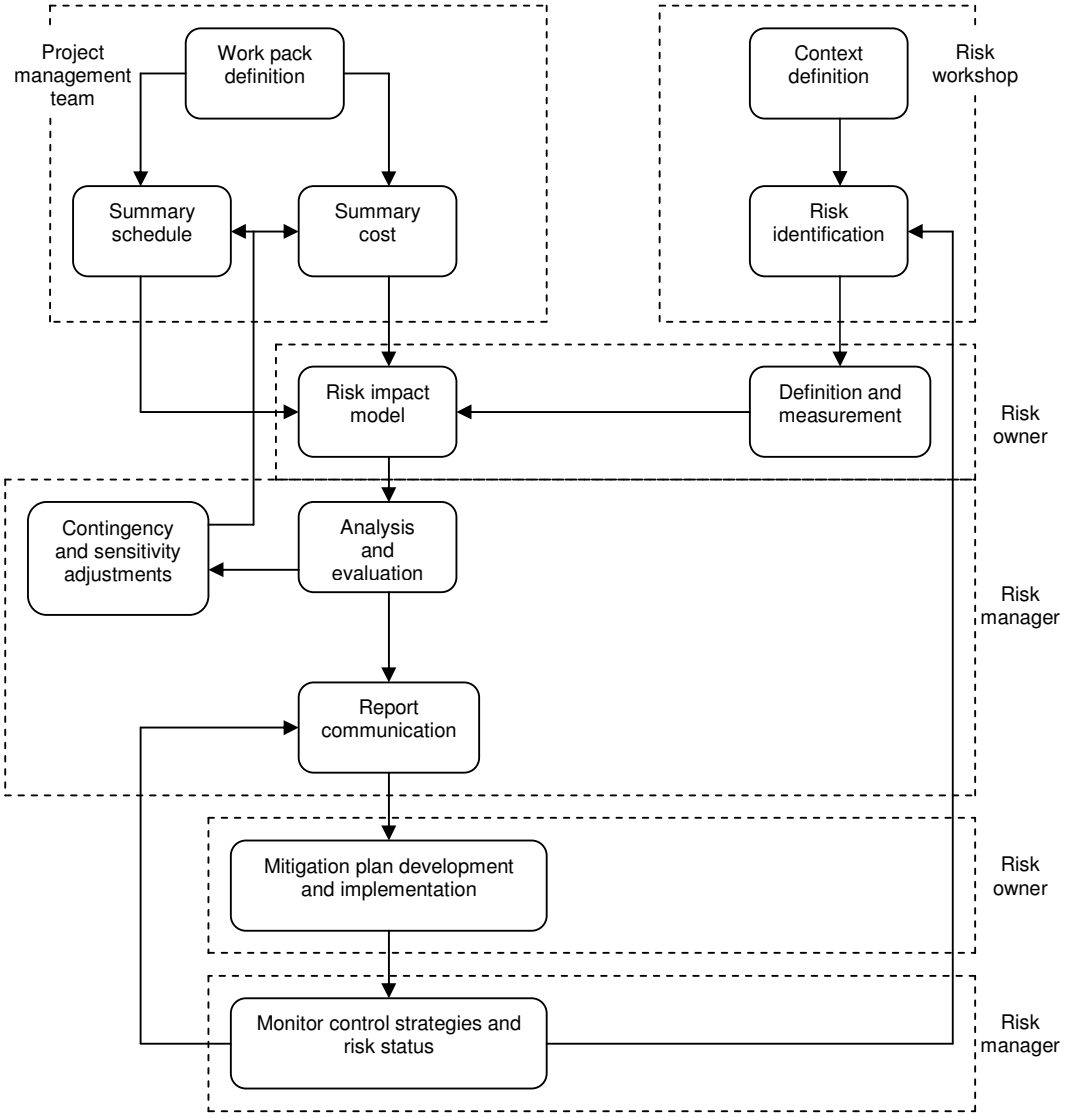


Figure 6.2: PBMR risk management process
Source: Ker-Fox, 2004: 3

Many of the pitfalls and difficulties in developing and interpreting risk analysis can be overcome by using an interview risk analysis (Lofton & Coppo, 2007: RISK.05.1). This type of risk analysis utilises answers to questions to drive the statistics. The questions that are asked relate to the ultimate risk exposure on the project. In the traditional risk

analysis, a question might be asked, e.g. “How much higher could the piping quantities be?” In an interview risk analysis, the question would be asked in a way that relates to scope, with a definite answer (Mulambya, 2007: RISK.08.1). It may be asked as multiple questions, such as, “Does the project have Issued for Construction (IFC) drawings, and/or does the project have IFC plot plans?” The answers to these questions have definite “yes” or “no” answers. The answers to these questions determine the potential for increase or decrease from the estimated value. Risks will be derived from these questions and these risks can be tabulated in a “risk register” as illustrated in Figure 6.3.

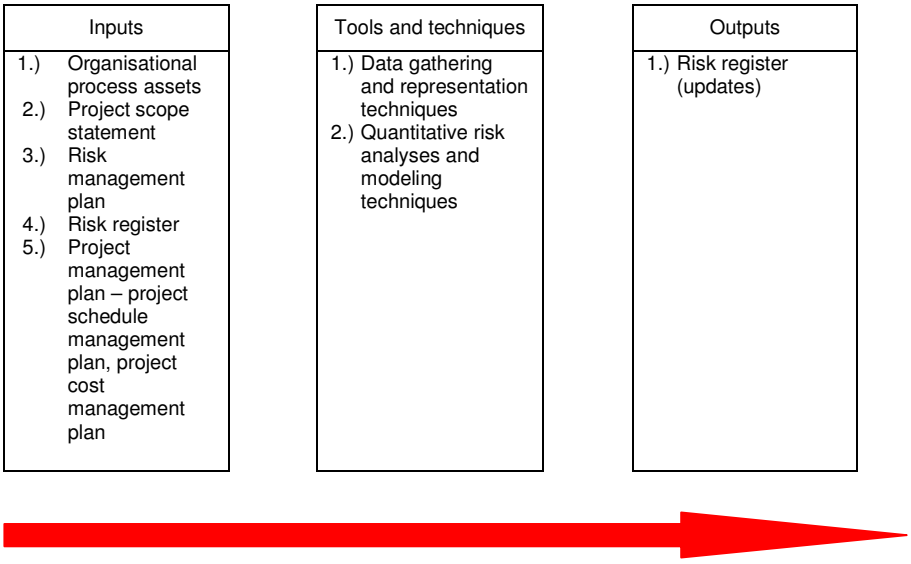


Figure 6.3: Quantitive risk analysis: Inputs, tools and techniques, and outputs

Source: Mulambya, 2007: RISK.08.1

Patterson (2006: IT.05.03) refers to the drivers of cost risk and how these drivers influence cost and why they should be considered when assessing the risks involved. Patterson states that controlling project cost is a science unto itself and a highly sought after project management skill. Add to this the complexity of risk and uncertainty and the situation becomes even more involved. Miscalculate cost estimates at the bidding phase and the enterprise runs the risk of entering into a loss-making venture. Mismanage cost overruns due to uncertainty during the execution of the project and “…the best laid plans fall to the wayside…” The following can be seen as general risks when pricing a project:

Duration of tasks – Lu and Anson (2004: 218) state that normally loaded resources, i.e. rate-based resources that are assigned to tasks, are going to incur varying costs to the project as the task duration changes. If a task takes twice as long as planned, the cost of the task is going to double if it has been assigned a rate-based resource (Chau, 1998: 42). Fixed cost resources are not impacted by varying task durations.

Resource rate/cost – Both fixed and rate-based resources costs are dependent on their respective cost values (Templeton, 2006: IT.03.1). A task with a rate-based cost is going to vary in cost not only due to variations but will also be dependent on the value of the resource rate.

Resource burn rate and number of resources required – Burn rate risk is typically driven by the need for more resources to complete planned work than originally expected (Voss, Sirdeshmukh & Voss, 2008: 155). If two bricklayers have been assigned to a task and it turns out that three are required in order to complete the task before a given deadline, then further costs will be incurred.

Uncertainty of scope – Poorly defined and managed scope is the most significant reason for project failure. To further add to the complexity of cost uncertainty due to the above drivers, uncertain scope can lead to further cost overruns (Wallwork, 2007: CDR.07.1).

2.4 Monte Carlo analysis

Monte Carlo analysis uses the process of simulation to achieve a range of solutions to a problem (Koller, 2005: 157). This technique is generally used to solve problems for which the definition of specific solution equations to calculate a specific answer is either too complex or too cumbersome to be practical (Verschoor, 2005: RISK.10.1). In Monte Carlo analysis, input variables are typically represented as distributions of values. Values comprising these distributions represent the range and frequency of occurrence of possible values for the variables. Monte Carlo analysis is a statistical procedure based upon random selection or chance (Whiteside, 2008: EST.04.2). The name Monte Carlo is taken from the city Monte Carlo (in Monaco) made famous by the games of chance.

Monte Carlo analysis or distribution sampling was arguably first presented formally by Student in the early 1900's. At first, Monte Carlo analysis was treated as being distinct

from experimental sampling or model sampling, both of which involve random selection from populations. Vrijland (2005: DEV.06.1) points out that the term Monte Carlo was restricted to processes in which weighted or importance sampling was used to increase the efficiency of the sampling process. The restricted use of the term later faded because high-speed computers lessened the importance of an efficient sampling process (Al-Sudairi, 2007: 112).

Koller (2005:157) states that today, the term Monte Carlo analysis can be applied to any procedure that uses distribution-based random sampling on approximate solutions to probabilistic or deterministic problems. These types of problems were exemplified by the first practical use of Monte Carlo analysis – addressing the probabilistic aspects of particle diffusion associated with the design and construction of the first atomic weapons at Los Alamos during World War II. Monte Carlo analysis was also used in the development of nuclear weapons.

2.4.1 The concept of Monte Carlo analysis

In a sense, Monte Carlo is a form of a repeatable experiment. Garlick (2007: 195) offers the following basic procedure that predicts the outcome of a Monte Carlo analysis.

- Take a sample from each of the input distributions.
- Work out the output(s) from the set of inputs.
- Do this as many times as needed.
- Turn the set of outputs into a distribution and estimate the properties needed, such as mean, variance, percentile, etc.

The strength of Monte Carlo lies within the fact that should one require a more accurate answer, the number of samples can be increased (Anjaneyulu, 2009: 12). If the goal is to calculate, for instance, the expected value of a total project cost, the mean of the values obtained from each simulation can be calculated.

Whiteside (2008: EST.04.1) also comments on the use of Monte Carlo analysis. Extrapolations or forecasting beyond or outside the known data realm has challenges, unless the data follows a normal trend or pattern (Whiteside, 2008: EST.04.1). It will be safe to use a trend line to calculate the next point past the last known data point

because it is still close to the known data. However, there is a need to forecast and make a reasonable prediction far beyond the last data point in many business decisions (Vargas, 2004: CSC.16.1). Predicting a point that is well beyond the last data point requires a good extrapolation routine. This numerically-based routine should be combined with other parameters to produce a range of probable outcomes that can be individually evaluated to assist with the decision-making process (Guggemos & Horvath, 2006: 188).

It is a basic tenet of forecasting that forecast data is always wrong because it is not "actual" data (Lowe & Skitmore, 2001: 488). A forecast may only be correct if the base assumptions continue to exist in the future. However, most people treat a forecast as nearly factual without updating the basis. Lowe, Emsley and Harding (2007: 18) point out that forecasts generally should guide and educate decision-makers about how the market reacts when certain assumptions and data (independent variables) are considered. Skitmore and Drew (2003: 38) state that a reliable forecast tool should include the following factors:

- Establish forecasting principles.
- Use of parameters to characterise the historical data.
- Near-term market conditions.
- Data-driven methods.

Probability is a way to bracket the volatility of short-term forecasts (seemingly random data). Monte Carlo analysis is a specialised probability application that is no more than an equation where the variables have been replaced with a random number generator (Noor & Tichacek, 2004: RISK.04.2). Skitmore (1986: 33) and Barraza, Back and Mata (2004: 27) state that the downside of Monte Carlo is that is more trusted than historical data. This misplaced trust is rooted in the idea that if a person has no historical data, then the Monte Carlo forecast can be anything that is believed plausible. It must be remembered that a Monte Carlo analysis is nothing more than an approximation. Few companies have the data available to support the distributions applied to the contingency elements (Whiteside, 2008: EST.04.1).

Hollmann (2007a: RISK.03.6) provides three main reasons why Monte Carlo techniques for contingency fund estimation sometimes do not work:

- Users are not addressing dependencies between model variables.
- They are not modelling the relationship risk drivers to cost outcomes.
- They fail to recognise the differences between systematic and project-specific risks.

3.0 INFLATION

3.1 Definition of inflation

Inflation may have positive and negative effects on an economy (Lundberg, 1977: 23). Negative effects of inflation include loss in stability in the real value of money and other monetary items over time, uncertainty about future inflation that may discourage investment and saving, and high inflation that may lead to shortages of goods if consumers begin hoarding out of concern that prices will increase in the future (Karpetis, 2008: 208). Positive effects include a mitigation of economic recessions and debt relief by reducing the real level of debt (Atkeson & Kehoe, 2007: 65).

Economists generally agree that high rates of inflation and hyperinflation are caused by an excessive growth of the money supply (Faig & Jerez, 2006: 3). Views on which factors determine low to moderate rates of inflation are more varied. Low or moderate inflation may be attributed to fluctuations in real demand for goods and services, or changes in available supplies such as during scarcities, as well as to growth in the money supply. However, the consensus view is that a long sustained period of inflation is caused by money supply growing faster than the rate of economic growth (Anwer & Sampath, 2001: 412).

Today, most mainstream economists favour a low steady rate of inflation (Hansen, 2007: 5). Low (as opposed to zero or negative) inflation may reduce the severity of economic recessions by enabling the labour market to adjust more quickly in a downturn, and reduce the risk that a liquidity trap prevents monetary policy from stabilising the economy. Phelps (2007: 454) states that the task of keeping the rate of inflation low and stable is usually given to monetary authorities. Generally, these monetary authorities are the central banks that control the size of the money supply through the setting of interest rates, through open market operations, and through the setting of banking reserve requirements (Lorenz & Lützkendorf, 2008: 483).

Inflation originally referred to the debasement of the currency. According to Hsieh and Klenow (2007: 563), when gold was used as currency, gold coins could be collected by the government, melted down, mixed with other metals such as silver, copper or lead, and reissued at the same nominal value. By diluting the gold with other metals, the government could increase the total number of coins issued without also needing to increase the amount of gold used to make them. When the cost of each coin is lowered in this way, the government profits from an increase in seigniorage. Seigniorage is the net revenue derived from the issuing of currency (Hsieh & Klenow, 2007: 563). This practice would increase the money supply but at the same time lower the relative value of each coin. As the relative value of the coins decrease, consumers would need more coins to exchange for the same goods and services. These goods and services would experience a price increase as the value of each coin is reduced.

By the nineteenth century, economists categorised three separate factors that cause a rise or fall in the price of goods: a change in the “value” or resource costs of the goods, a change in the “price of money” which then was usually a fluctuation in metallic content in the currency, and currency depreciation resulting from an increased supply of currency relative to the quantity of redeemable metal backing the currency (Olivei & Tenreyro, 2007: 637). Chen, Imrohoroglu and Imrohoroglu (2006: 1850) indicate similar findings. Following the proliferation of private bank note currency printed during the American Civil War, the term "inflation" started to appear as a direct reference to the currency depreciation that occurred as the quantity of redeemable bank notes outstripped the quantity of metal available for their redemption (Weiman & James, 2007: 276). The term inflation then referred to the devaluation of the currency, and not to a rise in the price of goods.

Parkin and Swoboda (1977: 4) believe that the question of what actually causes inflation is in all probability an unanswered one. O’Brien (2002: 12) also reports on this statement. He says that the reasons for this are firstly that the term inflation is too ill-defined and secondly, that there are too many links in the probable cause of inflation leading to the proposition of “everything depends on everything else”. Frisch (1977: 109) attempts to describe inflation as follows:

> *“…inflation is a monetary phenomenon for the explanation of which the quality of money is fundamental.”*

Eder (1979: 7) quotes the words of William Cobbett, who wrote in his book *The Curse of Paper Money* (1833); "Of all the instruments of mischief that the Devil ever invented, nothing was ever equal to the paper money". Eder (1979: 8) refers to "money illusion". He states that when it comes to inflation, there seems to be an illusion that prices are going up, but in reality it is the value of money that decreases (Davis & Figgins, 2009: 196). Eder makes the following strong statement:

> *"The problem is not one of rising prices, but the debasement of the currency."*

Eder (1979: 8) makes mention of the changing of the price of gold by Franklin Roosevelt from $20.67 an ounce to $35 an ounce. This changed the intrinsic value of the dollar from 1/20 of an ounce to 1/35 of an ounce. Presidents Nixon, Ford and Carter followed suit. This forced the dollar's value down, and thus it could buy less.

Lodewijks (2002: 122) refers to Professor Irving Fisher of Yale, whom many consider to be the greatest American economist who ever lived, who wrote a book under the title *The Money Illusion*. In it, Fisher described his 1922 visit to Germany at a time when the German mark had dropped to 1/50 of its former value. No one he met seemed to be conscious of the fact that the value of the mark had been dropping at a vertiginous rate. Everyone spoke of the unconscionable rise in prices (Karanasos & Schurer, 2008: 266).

It was easy enough for foreigners to see that the mark was being depreciated, but to the Germans a mark was a mark. Businessmen figured their costs in marks and sold their goods at what they thought was a profit (Arize, Malindretos & Nam, 2005: 462). They failed to realise that the marks they got for their goods were only one fiftieth of the marks that they had paid for it. It was not until the mark began to drop to one millionth and finally to a trillionth part of its former value that they began to realise that a mark in itself was no longer a mark (Rusek, 2008: 192).

Frankel and Burdzy (2005: 1) state that recessions and expansions often occur without any large precipitating shocks. An explanation for this is that with externalities, there can be multiple equilibria, so the path followed by the economy can depend on agent's expectations. These expectations can shift unexpectedly when payoff-irrelevant variables are observed, causing a recession or expansion. Baliamoune-Lutz (2008:

424) mentions specific cases in North Africa of how expectations can shift, and the effects thereof.

When dealing with inflation it is important to note that the increase in prices does not necessarily constitute inflation. Eder (1979: 10) puts it as follows: "No one is concerned with the facts that some 600 years ago one could buy a cow for a shilling, or that two loaves of bread could be had for a farthing." He stresses that the costs of commodities should rise rapidly to be classified as inflation. To Eder inflation can be described as follows:

> *"Inflation, then may be defined as an increase in the general price level for goods and services occurring over a relatively brief period of time."*

In every country where inflation has become deep rooted, businessmen have complained of a shortage of working capital and investment capital (Lomax, 2005: 252). They have failed to realise that the profits they show on their books are not truly profits and that when they have paid out dividends from these pseudo-profits, they have been eating into their capital – all because of the debasement of the currency. For the individual, inflation robs him of all incentive to save and to provide for the future (Karpetis, 2008: 206). Yet thrift is the basis of investment and investment is the foundation of economic growth and prosperity (Clemens, 2008: 181; Anwer & Sampath, 2001: 413).

Eder (1979: 38) states that there is no connection between employment and inflation, but there is a distinct connection between government deficit spending and a rise in prices. The more the government spent, to the extent that the extra spending came from government borrowing and was not taken from the citizens through taxation, the greater the money supply and hence the demand for goods, and the higher the prices would rise – demand-pull inflation (Lomax, 2005: 253). Fearon (2009: 122) supports this statement.

Six centuries ago, William of Ockham (1285 – 1349) laid down as a rule of logical reasoning the "law of parsimony," the principle that no more causes or forces should be assumed than are necessary to account for the facts (*pluralites non est ponenda sine necessitate*) – complexity must not be assumed without necessity. If there are several possible explanations of any fact or phenomenon, the simplest and most obvious explanation is most likely to be the valid one.

Facts show that, except in times of war or war's aftermath, there is no correlation between a rising price level and low unemployment (Eder, 1979: 39). From the beginning of recorded history, war has always brought scarcities, high prices and high employment – a correlation that is obvious, simple, logical and "parsimonious" (Ye, Zyren, Blumberg & Shore, 2009: 38).

3.2 Kinds of inflation

Eder (1979: 11) describes two kinds of inflation: wage-push or cost-push inflation and demand-pull inflation. With cost-push inflation, wages and other costs go up faster than the increase in labour productivity (Gupta, 2007: 337). Cost-push inflation is nearly always gradual and never reach the extremes that demand-pull inflation sometimes attains.

Demand-pull inflation is generally described as too many dollars chasing too few goods. In other words, there is too much money to spend and very little increase in the quantity of goods or services. In part, demand-pull inflation stems from wage increases (Gransberg & Diekmann, 2004: RISK.08.1). Wage earners have more money to spend and they spend it. This causes a spiral and in the economy any spiral (up or down) is vicious. Bojanic (2008: 501) and Jones (2001: 2) state that the general effect of wage increases on demand-pull inflation is seldom serious. It can almost always be rectified by an increase in production on farms, mines and factories. It is when demand-pull inflation is the result of government spending and deficit budgets financed with printing-press money that it can come with such extreme rapidity that it totally disrupts a nation's economy (Faig & Jerez, 2006: 4).

3.3 Historical methods used to fight inflation

Jacques Rueff (1963) was a French economist and adviser to the French government. He was considered to be an influential French conservative and free market thinker. He made the following statement regarding West Germany's post-war economic recovery:

> "*The suddenness of Germany's recovery was even more striking than its scope. It was not spread out over months or even weeks, but it had a specific date… the day the currency reform went into effect. Only those who were on the spot can bear witness to the literally instantaneous*

effect it had upon the reappearance of merchandise and customers in the stores."

This instantaneous end to inflation and the beginning of economic recovery in West Germany, pointed out by France's leading economist of the time, has been true in every country that has dared to face squarely the problem of uncontrolled inflation (Jones, 2001: 2). A gradual approach, the slow tapering off of inflationary pressures, has never worked, and indeed has only tended to make matters worse.

Eder (1979: 72-73) refers to people like Hjalmar Horace Greeley Schacht in Germany after World War I and Ludwig Erhard under the inspiration of his mentor, Dr. Wilhelm Röpke, after World War II, in describing how inflation was conquered almost overnight. Insights from the accomplishments of other people like Charles de Gaulle with the assistance of his economic adviser, Jacques Rueff; and those of Finance Minister Hayato Ikeda in Japan; of Gesualdo A. Costanzo, the United States Treasury adviser in Greece (1947); and of Princeton Professor Edwin Walter Kemmerer in eleven countries of the world, directed future dealings with inflation.

Following World War II, Dr. Ludwig Erhard was prohibited from altering the price controls imposed by the occupation economists. During a meeting with General Lucius Clay, head of the American mission, Erhard suggested the complete abolishment of all price controls in West Germany. This would have meant that prices would sky-rocket, but was nevertheless accepted.

The result was that Germany, on a free market basis and with a balanced budget, achieved one of the most remarkable eras of economic recovery that the world has ever seen, and as the late Dr. Rueff pointed out, the recovery was practically instantaneous. Economists of Keynesian beliefs argue that economic stabilisation only occurred because of the fact that excess money was withdrawn but the retirement of paper money, in Germany as elsewhere, was merely the final step in the stabilisation process (Villar, 2003: 2; Johnson & Cate, 2006: 115; Kates, 2002: 464).

The government exchanged one new Deutschmark for 100 old Reichsmarks and retired the old bank notes completely from circulation, precisely as Schacht had done a generation earlier when he exchanged one new Rentenmark for one trillion old marks. This was merely a matter of convenience, because adding machines and pocketbooks

were not big enough to accommodate the hundreds or thousands or trillions of old money. It had nothing to do with the process of stabilisation.

To prove that the buying up of paper money is not the cure for inflation, one should look at the findings of American economists who have analysed the German miracle. This quote by Dr. Röpke is so pertinent to inflation today that it is worthy of inclusion here:

> *"… the German accomplishment was nonetheless – in economic terms – no miracle at all, if the essence of the reform of 1948 is clearly understood. The real miracle lay in the fact that, in this particular country and in a world still under spell of inflationism and collectivism, it proved possible politically and socially to return to the economic reason of the market economy and to monetary discipline…".*

Nelson (2005: 1) refers to the Great Inflation of the Seventies in the United States of America. He mentions the overestimation of the degree of productive potential in the economy. Monetary policy did not intentionally target either high inflation or a positive output gap, but nevertheless pursued what *ex post* appears to be an excessively expansionary policy, because policymakers were too optimistic about the economy's supply side.

Gibbons (2009: 3) and Zaborowski (2009: 42) refer to the current poor worldwide economic situation and why economic change is necessary. Stiglitz (2009: 281) makes the following statement regarding the current poor state of the American economy:

> *"These are exciting times: the worst economic crisis since the Great Depression, the first global recession in the new era of globalization, and a new president committed to restructuring national priorities, reforming our education, health, and energy sectors, eliminating some long standing distortions arising from corporate welfare, and restructuring our tax code."*

Boero, Smith and Wallis (2008: 1108) comment on the influences of such factors as mentioned by Stiglitz on inflation. Chow and Shen (2006: 131) comment on the influence of education on the economy of China.

3.4 Reasons for inflation

Jackson (2008: INT.S01.1) stresses that in recent years "drastic" price changes for certain commodities, such as steel and cement, have upset not only financial markets, but integrated economic entities along the value chain as well. China's appetite for resources to feed its rapidly expanding and transitioning economy is probably the most dominant factor in observed commodity price hikes of late.

Razzak and Timmins (2008: 74) state that the ratio rise in wage inequality (between skilled and unskilled labour) can be explained by the supply and demand for skills. The shortage of skills is driving up labour prices and the gap between skilled and unskilled wages has increased by 25% from 1979 to 1995.

In 1801 Thomas Jefferson wrote the following:

> *"What is necessary to make us happy and prosperous people? A wise and frugal government, which shall restrain men from injuring one another, which shall leave them otherwise free to regulate their own pursuits of industry and improvement, and shall not take from the mouth of labour the bread it has earned."*

Eder (1979: 169) found Jefferson's advice to be true in the sense that in modern times, government deficit spending and printing-press money outweigh all other factors combined in contributing to inflation. Gil-Alana (2009: 144-145) also refers to the effects of government funding on the economy. Eder mentions some contributors to inflation. They are:

Waste – Waste is the besetting sin of the modern way of life. New car models every year, new fashion on a frequent basis, full garbage pails at home, expensive throwaway wrappings, boxes, bottles, cans, etc. All these add to the cost of living (Yahya & Boussabaine, 2006: 6; De Silva & Vithana, 2008: 190).

Protective tariffs – Protective tariffs, like customs duties, are so high to bar many potential imports and thus produce no revenue. These tariffs, for example, make it possible for manufacturers to maintain high prices on goods produced in a certain country (Coenen, Orphanides & Wieland, 2004: 1).

Monopolies – Politicians and economists like to blame the iniquity of big business – the monopolies and oligopolies – for higher prices. In actual fact, collusive price rising is a rare exception (Kraay & Ventura, 2002: 1). Violations are widely publicised and denounced. As an example, one can look at General Motors, Ford and Chrysler – the typical examples of oligopoly. These companies will keep their prices as close as possible to their estimated costs. The industry is highly competitive and knows that a 10% price increase means an approximate 10% decrease in sales, hence lower profits **(**Chung, 2007: 65).

The cost of dying – Improved medicine and medical practices prolonged human life. This means that there are more elderly people today than some years ago (Kopczuk & Slemrod, 2005: 5). These people do not contribute to the economy and are in actual fact putting additional strain on the economy (Robson & Kaplan, 2007: 492).

Restrictions on production – Union regulations restricting the number of bricks a bricklayer can lay in one day or limitations on agriculture production placed on farmers by the government and paying them for not producing will increase prices (Donoghue & Wright, 2002: 219; Ruffo & Hague, 2007: 1586; Sommers, 2008: 353).

Unnecessary labour – Labour union requirements and government requirements cause millions of man hours to be wasted annually due to unnecessary administration and bureaucratic governance (Hanna & Gunduz, 2004: 728). These man hours are being drained from the capital market that could otherwise be channeled into new productive capacity with corresponding benefits in the form of higher employment, lower prices and increased economic activity (Tsai & Tsay, 2008: 130).

High wages – High wages do not mean high prices as long as labour works as hard and as well as it can and so long as wage increases do not outstrip the innovation, invention, good management and capital investment that add to labour's productivity (Horman & Thomas, 2005: 836). To a large extent, wage increases have been the consequence and not the cause of modern inflation.

High profits – High profits do not have a serious effect on inflation. Eder (1979: 172) mentions the example of the major oil companies in the 70s. Companies like Exxon, Mobil, Gulf and Texaco would have lain off

at least 630 000 employees if they did not make the 1½ cents per gallon of fuel sold as net profit. During the same time, Americans had to pay at least 14 cents per gallon of fuel in federal, state and local taxes (Varila & Sievanen, 2005: EST.19.1). Profits are essential as a stimulus to investment in new and more modern plants and hence a major factor in keeping down the cost of living (Grubb, 2007: 281).

Minimum wages – Union and government action to fix minimum wages makes for higher prices and unemployment which in turns mean higher taxes to care for the unemployed (Galloway & Jozefowicz, 2008: 292).

Corruption – One empirical fact about corruption readily suggests itself – that it is inversely related to a nation's per capita income and inflation (Osborne, 2006: 289).

3.5 Effects of inflation

An increase in the general level of prices implies a decrease in the purchasing power of the currency (Cohen & Einav, 2007: 747). That is, when the general level of prices rises, each monetary unit buys fewer goods and services. The effect of inflation is not distributed evenly, and as a consequence there are hidden costs to some and benefits to others from this decrease in purchasing power (Whalen, Gopal & Abraham, 2004: 774). For example, inflation lenders or depositors who are paid a fixed rate of interest on loans or deposits will lose purchasing power from their interest earnings, while their borrowers benefit (Zhang, 2005: 333). Individuals or institutions with cash assets will experience a decline in the purchasing power of their holdings. Increases in payments to workers and pensioners often lag behind inflation, especially for those with fixed payments (Fehr & Goette, 2007: 299).

Fisher (2002: 215) points out that increases in the price level (inflation) erodes the real value of money (the functional currency) and other items with an underlying monetary nature, that are priced in terms of money (e.g. loans, bonds, fixed pension payments). However, inflation has no effect on the real value of non-monetary items, items without a fixed price in terms of money (e.g. goods and commodities, like cars, gold, real estate).

3.5.1 Negative effect of inflation

Kydland (2006: 1373) points out that high or unpredictable inflation rates are regarded as harmful to an overall economy. They add inefficiencies in the market, and make it difficult for companies to budget or plan long-term. Inflation can act as a drag on productivity as companies are forced to shift resources away from products and services in order to focus on profit and losses from currency inflation (Squires, Reid & Jeon, 2008: 83). Uncertainty about the future purchasing power of money discourages investment and saving. Inflation can impose hidden tax increases as inflated earnings push taxpayers into higher income tax rates (Gravelle & Smetters, 2006: 2).

With high inflation, purchasing power is redistributed from those on fixed incomes such as pensioners towards those with variable incomes whose earnings may better keep pace with the inflation (Davig & Leeper, 2007: 610). This redistribution of purchasing power will also occur between international trading partners. Where fixed exchange rates are imposed, rising inflation in one economy will cause its exports to become more expensive and affect the balance of trade. There can also be negative impacts to trade from an increased instability in currency exchange prices caused by unpredictable inflation (Galf & Monacelli, 2008: 120). These are:

Cost-push inflation – Rising inflation can prompt employees to demand higher wages to keep up with consumer prices. Rising wages in turn can help fuel inflation (Johnson & Cate, 2006: 117). In the case of collective bargaining, wages will be set as a factor of price expectations, which will be higher when inflation has an upward trend. This can cause a wage spiral. In a sense, inflation begets further inflationary expectations (Akerlof, 2007: 7).

Hoarding – People buy consumer durables as stores of wealth in the absence of viable alternatives as a means of getting rid of excess cash before it is devalued, creating shortages of the hoarded objects.

Hyperinflation – Arize, Malindretos and Nam (2005: 462) refer to the case of Germany in the post-war era. If inflation gets totally out of control (in the upward direction), it can grossly interfere with the normal workings of the economy, hurting its ability to supply.

Allocative efficiency – A change in the supply or demand for a good will normally cause its price to change, signalling to buyers and sellers that they should re-allocate resources in response to the new market conditions (Meyerhoefer & Zuvekas, 2008: 23). But when prices are constantly changing due to inflation,

genuine price signals get lost in the noise, so agents are slow to respond to them. The result is a loss of allocative efficiency.

Shoe leather cost – High inflation increases the opportunity cost of holding cash balances and can induce people to hold a greater portion of their assets in interest paying accounts. However, since cash is still needed in order to carry out transactions, this means that more "trips to the bank" are necessary in order to make withdrawals, proverbially wearing out the "shoe leather" with each trip.

Menu costs – With high inflation, firms must change their prices often in order to keep up with economy-wide changes. But often changing prices is itself a costly activity whether explicitly, as with the need to print new menus, or implicitly.

Business cycles – Krebs (2007: 665) shows that, according to the Austrian Business Cycle Theory, inflation sets off the business cycle. Austrian economists hold this to be the most damaging effect of inflation. According to the Austrian theory, artificially low interest rates and the associated increase in the money supply lead to reckless, speculative borrowing, resulting in clusters of mal-investments which eventually have to be liquidated as they become unsustainable (Smets & Wouters, 2007: 587).

3.5.2 Positive effect of inflation

The following can be considered positive effects of inflation:

Labour market adjustments – Keynesians believe that nominal wages are slow to adjust downwards. This can lead to prolonged disequilibrium and high unemployment in the labour market. Since inflation would lower the real wage if nominal wages are kept constant, Keynesians argue that some inflation is good for the economy, as it would allow labour markets to reach equilibrium faster (Johnson & Cate, 2006: 117).

Debt relief – Debtors who have debts with a fixed nominal rate of interest will see a reduction in the "real" interest rate as the inflation rate rises. The “real” interest on a loan is approximately the nominal rate minus the inflation rate (Geweke, 2007: 61). Banks and other lenders adjust for this inflation risk either by including an inflation premium in the costs of lending the money by creating a higher initial stated interest rate or by setting the interest at a variable rate.

Room to maneuver – The primary tools for controlling the money supply are the ability to set the prime rate, the rate at which banks can borrow from the central bank, and open market operations which are the central bank's interventions into the bonds market with the aim of affecting the nominal interest rate (Eschenbach & Cohen, 2006: 13). If an economy finds itself in a recession with already low or even zero nominal interest rates, then the bank cannot cut these rates further (since negative nominal interest rates are impossible) in order to stimulate the economy – this situation is known as a liquidity trap (Kojima, 2007: 1028). A moderate level of inflation tends to ensure that nominal interest rates stay sufficiently above zero so that if the need arises the bank can cut the nominal interest rate.

Tobin effect – The Nobel Prize economist, James Tobin, at one point argued that a moderate level of inflation can increase investment in an economy, leading to faster growth or at least higher steady state level of income. This is due to the fact that inflation lowers the return on monetary assets relative to real assets, such as physical capital (Kraus, 2007b: 3). To avoid inflation, investors would switch from holding their assets as money (or a similar, susceptible to inflation, form) to investing in real capital projects (Anwer & Sampath, 2001: 414).

Gerald E. Ford, Jr. (1974) made the following statement regarding inflation at the time (Eder, 1979: 259):

> *"Inflation is our domestic Public Enemy Number One. A Government big enough to give you everything you want is a Government big enough to take from you everything you have."*

Eder (1979: 259 – 260) stresses the effect of overspending, over taxation and government borrowing. He states that any government engaging in these activities will follow in the footsteps of England, which since the inception of the dole and the national health insurance and other welfare schemes, has deteriorated into a fifth-rate power economically, after Russia, Germany, Japan and the United States, with the Arab states and China looming on the horizon. Eder goes on to say that should countries not learn from Germany, Japan, France and Switzerland, and realise the folly of expecting the government to provide everything (Meza & Quintin, 2007: 1), they will have to face the consequences.

Bruno, Di Tella, Dornbusch and Fisher (1988: 401) comment on two basic fundamentals in restoring a sound growth rate in the economy: the amount of resources available and the efficiency of their use.

In general, inflation causes a decrease in the purchasing power of the currency. The effects of inflation are, however, not distributed evenly and as a consequence there are hidden costs to some and benefits to others. The effects of inflation can have serious consequences for the profitability of a project, should it be misjudged.

4.0 CONSTRUCTION COST ESCALATION

In order to measure or manage escalation on construction projects, it is firstly important to understand the driving forces behind it (Morris & Wilson, 2006: CSC.06.1). The most important factor is that construction must be viewed as a commodity in itself, not a collection of commodities. Butts (2007a: EST.08.1) states that the selling price of a project is not the result of the sum of its inputs plus a profit, except in the very rare cases where all work, including sub-contracts, is procured through a cost-plus contract (Rossetti & McKeeman, 2008: 6). In all other cases, the selling price of a contract is determined by the bidders based on their opinion of the competition. At a very basic level, it simply needs to be $1 less than the next bidder. The sum of the input cost will provide a floor below which the bidder is normally unwilling to go, and so changes in input costs will influence bids to some degree. The ceiling is, however, set by the bidder's opinion of the competition (Smith, 2008: 08 February).

During the course of the estimate certain questions will be asked. Will materials be available during time of construction and at the price allowed for in the estimate? Will labour productivity match that of the estimate? Will sufficient labour be available? Ibbs (2005: 1219) comments on labour productivity and Fleishman (2004a: 19) on labour availability. As risk increases so too does the floor below which bidders are unwilling to go. Risk is difficult to estimate and few bidders do it systematically. Risk assessments are usually influenced by short term perceptions based on the latest news (Gransberg & Carlisle, 2008: EST.09.1).

Morris and Wilson (2006: CSC.06.1) suggest that escalation comes from the interplay of changes, real or anticipated, in input costs, perceptions of risk, and perceptions of the competition. In some cases it comes from real information, such as actual changes in the cost of critical materials like steel and copper. More often than not, it comes from

the formation of market opinions, which may or may not have a basis of fact. Olhager and Selldin (2007: 1470) indicate that, ultimately, the ability for contractors to raise prices depends entirely on the market conditions and the expectation that all bidders are increasing their prices. Increased input pricing and increased risk can influence that expectation and ultimately increase the prices. Van der Merwe (2008) comments on the escalation in price of the construction work at the O.R. Tambo Airport in South Africa and how the aforementioned escalation causes also plagued this project.

Hollman and Dysert (2007: EST.01.1) define escalation as changes in price levels driven by underlying economic conditions. According to Jackson (2008: INT.S01.1), escalation is a pronounced and continued increase in the cost basis of certain, specific economic production factors over time. Escalation reflects changes in price-drivers such as productivity and technology, as well as changes in market conditions such as high demand, labour shortages and profit margins (Graves & Sexton, 2006: 362). Escalation also includes the effects of inflation, but differs from inflation which is a general change in prices caused by the debasement of the value of the currency (Adams, 2004: PM.08.2). From an estimator's perspective, escalation is a unique "risk" cost that must be estimated. To further complicate the issue, price escalation varies for different capital components such as office and field labour, bulk materials and equipment. It also varies by region and procurement strategy. Labuske and Streb (2008: 66) researched the effect of technology on the competitiveness of German mechanical engineers in the pre-World War I theatre and how improved technology put the Germans in a better position than the engineers of the Allied Forces.

Touran and Lopez (2006: 853) suggest that the more realistic way to estimate escalation is to consider the uncertainty in the value of escalation factors. This uncertainty is a major contributor to the overall cost uncertainty and can be modelled using appropriate probabilistic models. This becomes even more apparent when modelling the escalation uncertainty in large multi-year construction projects (Marsh, 2007: 778).

Probabilistic approaches are the best for estimating escalation. Construction professionals are generally poorly equipped to estimate escalation (Scott & Harris, 2004: 730). This is probably because escalation is driven by macro-economic conditions, the study of which is a core skill of economists (Welfe, 2008: 169).
Butts (2007a: EST.08.1) comments that accurately forecasting escalation rates can play an important role in project profitability or viability, especially for large multi-year

construction and development projects. The estimator must predict the cost of goods or services that must be purchased in the future, perhaps many years from now (Wong, Cheung & Hardcastle, 2007: 477). If the prediction is wrong, it will lead to equitable adjustments due to contractor cost increases which will cause profitability to suffer.

The most difficult part of any cost estimation process is to determine how much escalation to apply to the estimate. The South African construction industry recently has seen a rapid escalation in prices, leaving estimators wondering whether this is a trend that will continue or merely a temporary aberration (Jordaan, 2004: 2).

Hollman and Dysert (2007: EST.01.1) discuss the recent changes in escalation rates and indicate in Table 6.2 how commodity prices in America have increased since 2003.

Commodity items	Price increase (06/03) to (06/06)
Diesel fuel	121%
Iron and steel	60%
Iron ore	41%
Non-ferrous metals	85%
Industrial chemicals	55%
Cement	32%
Metal tanks	29%
Heat exchangers	40%
Pumps and compressors	15%
Wire and cable	81%
Motors and generators	15%
Process control instruments	7%

Table 6.2: Price increases for selected commodities in the United States from 2003 - 2006
Source: Hollman and Dysert, 2007: EST.01.1

The increase in commodity prices made the owners react by immediately pulling every mining metallurgy and oil and gas project proposal off their shelves. Despite the

memories of the 1986 oil industry capital spending collapse, engineering of these projects added to the backlogs of the engineering and procurement contractors.

During 2004 and 2005, many estimators were at a loss as to how to price project cost items. Bid prices from fabricators, suppliers and contractors varied widely but were almost always higher than expected (Kashiwagi & Savicky, 2003: 290). Suppliers quickly became unwilling to provide fixed price quotations, and those who did, included high risk premiums in their prices. Escalation clauses became more standard in contracts. Adding to the problem, owners and procurement and contracting departments regularly changed their minds about strategies for dealing with the situation. Hollmann and Dysert (2008: EST.08.1) point out that in late 2003 and throughout 2004, process industry CAPEX investment and prices increased dramatically. Increases in Asian demand and limited global supply after years of under-investment were the primary causes.

Given the volatility and uncertainty, many estimators threw up their hands and prepared their estimates using 2003 prices and put all “price risk” costs in an escalation account, and few managers could agree with the appropriateness. Other estimators included pricing risk in the contingency account which further muddied this already contentious cost account (Kohl & Wulke, 2004: IT.03.1). Aggravating the confusion, the costs of many projects-in-progress started to rise and in 2006 news reached the press that increases of 50% could be expected (Butts, 2007a: EST.08.1). During this time business managers did not know what to believe anymore and fearful of escalation increases, they began to lean toward excessive escalation funding knowing that project returns (such as the Internal Rate of Return) would still look reasonable if they could bring the capacity on-line while sales prices were near their peak (Cesarone, 2007: 40).

4.1 The problem in using cost indices

Cost indices are frequently used in predicting escalation. The cost index devised by G. R. Carli in the 18th century in Italy compares the cost between periods for a fixed quantity of goods or services (Butts, 2007a: EST.08.1). The concept of the index may be useful in some industries, but of the many cost indices in use today, no single index completely represents the construction industry. These indices have the same problem – they are lagging indicators since they measure cost changes that have already occurred (Evensmo & Karlsen, 2004: CSC.14.4).

In addition, these indices cannot account for the substitution of one product with another. For example, contractors may buy aluminum wire when the price of copper wire rises dramatically, or when regional shortages cause soaring prices (Rad & Levin, 2004: PM.07.2). Since cost indices track specific goods or services, if others are substituted, the rate of escalation measured by the index will be incorrect.

Hollmann and Dysert (2008: EST.08.2) state that periodically in 2005 through 2006 economists and the press reported that general pricing levels were about to level off or decline based on the assumption that asymptotic trends cannot be sustained for long (i.e. markets will correct over time). Hollmann and Dysert (2008: EST.08.2) point out the "short sightedness" of many in the construction industry during the time was evident in reports such as "…construction's inflationary cycle turned the corner during 2006 and will continue heading downhill through 2007 and 2008".

Mandel (2007: 23 April) was one of the economists who suggested that escalation will occur. In his article, Mandel suggests that the "…antiquated government statistics…" be overlooked and that the American economy should revert to consulting capital spending overseas.

4.2 Putting CAPEX indices to work

Process plant CAPEX (capital expenditure) is a micro-economy in which many prices are disconnected from what the government agencies and economists track (Hollmann & Dysert, 2008: EST.08.3). The prices that have become disconnected are for items and services whose prices are usually based on competitive bidding (usually with very few bidders in a tight market). Economists in general have trouble surveying bid pricing, especially where the product is not a constant (Roncaglia & Goodacre, 2008: 107). These bids include risk premiums, allowance for productivity changes, and other markups that are difficult to reliably measure or survey but can be reasonably predicted (Hollmann & Dysert, 2008: EST.08.3).

Hollmann and Dysert (2008: EST.08.3) suggest that the approach to the market challenge should be to adjust available wage and commodity pricing indices with a CAPEX market adjustment factor. For example, if CAPEX increases in a region by a drastic percentage in a year, then fabricators and contractors in the region will be able to increase their bid prices by a factor that is greater than the percentage increase in their underlying wages and commodities. Just how much they can raise their prices

depends on their market power. Hollmann and Dysert (2008: EST.08.3) use a simple exponent applied to the CAPEX increase. For example, if the underlying wages and other costs to a contractor increase by 8% (1,08), the market CAPEX increases by 25% (1,25), and the CAPEX exponent (or market power) factor is 0,5, then the typical price increase in the contractor's bid is calculated as follows:

Bid price increase = $1,08 \times 1,25^{05} = 1.08 \times 1.12 = 1.21$ or 21% increase.

The CAPEX exponent or factor may vary from zero (many suppliers just pass through costs) to 0,5 or 0,6 (few bidders). Each fabrication, contract, or other type of cost will have its own CAPEX factor that must be determined empirically or estimated based on experience.

The selection of indices will vary depending on the circumstances. First, the regional coverage of the selected CAPEX index must be applicable to the regional nature of the cost. Engineering and major equipment items are typically sourced overseas and are therefore driven by global CAPEX. Additionally, the CAPEX factor will vary by project size. For example, small projects will likely draw more competitive bids than mega-projects and therefore the CAPEX market factor will be lower for the small projects (Huot, 2008: OWN.04.2).

Figure 6.4 illustrates a comparison between how a traditional government based index such as the American Chemical Engineering Plant Costs Index - CHEPCI, with and without CAPEX adjustment, compares to the IHS CERA index (indicated here in annual cost factor format). The method described above requires the input of economists to provide base forecasts of traditional indices.

4.3 Construction escalation factors

Escalation or inflation is broadly defined as the change in the cost of a good or service over time (Gransberg & Diekmann, 2004: RISK.08.1). From an owner's perspective there is a problem with this definition, since it does not specify whose cost – the owner's or the contractor's? Most cost indices measure the cost to the contractor over a large geographical area and also fail to account for the difference in costing and pricing. Pricing is broadly defined as the cost the contractor bids for the project (Mochtar & Arditi, 2001: 405).

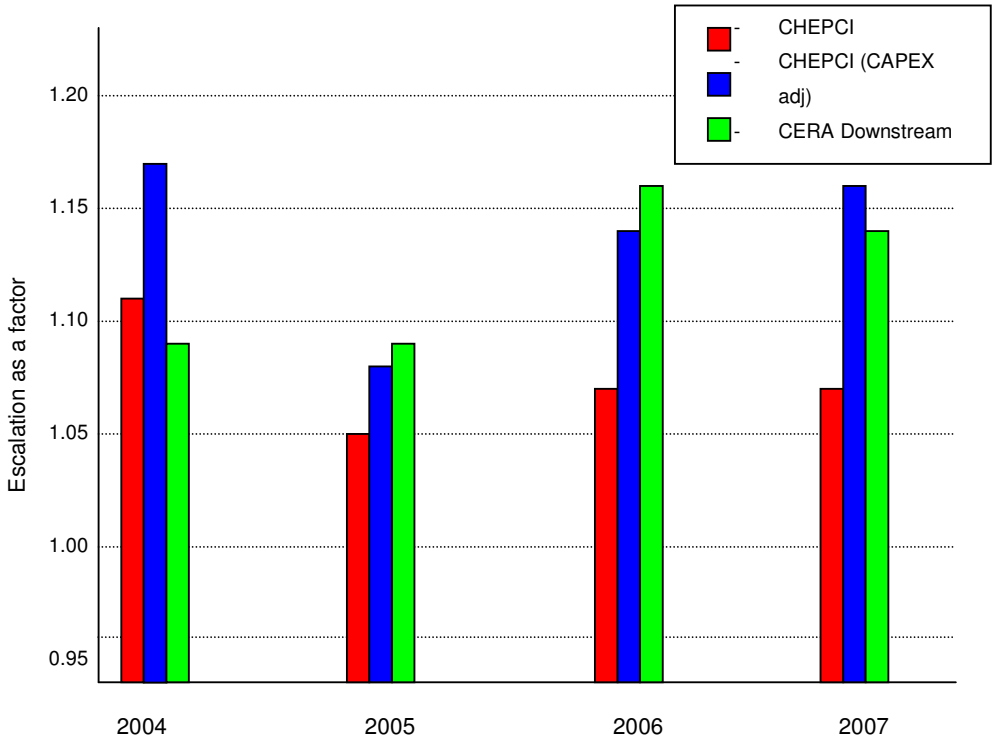


Figure 6.4: Comparison of the CHEPCI, CHEPCI (CAPEX adjusted) and the CERA Indices

Source: Hollmann and Dysert, 2008: EST.08.4)

This is why escalation should not be confused with local market conditions or demand surge as the insurance industry classifies it (Erasmus, 2004), although they both affect cost. Market conditions are generally additives to escalation. Categorised by specific local cost drivers like fear factors or opportunity cost increases, market conditions are usually limited to a local area or region. For example, market conditions may substantially increase local costs after a natural disaster; or during regional booms when contractors have more work than they need (Oo, Drew & Lo, 2007: 452; Schelling, 2006: 923).

An index is usually expressed as a percent change in price over a given time period, or as a representative of the price level at a given time (Hassanein & Khalil, 2006: 18). The primary source of historical price indices is government agencies. Economists study these historical trends and build econometric models that forecast future price index values, generally at a disaggregate level (Skitmore, 1991: 32). The models of price change for specific commodities are usually tied to macro-economic models that define the underlying economic conditions that drive all prices to some extent (Garratt, Koop & Vahey, 2008: 1129).

Morris and Wilson (2006: CSC.06.1) discuss a number of factors influencing construction cost escalation. They point out that the major drives behind current escalation surges are major natural disasters, increase in material cost, bid market disruptions, high volume of construction work, and the regulatory climate. Upcoming issues which will increase the pressure on cost even further include coherence in the global economy, a growing demand for construction work, and a shortage of labour as more and more skilled workers retire without new workers replacing them (Buettner & Rincke, 2007: 537).

The hurricanes in America in 2005 damaged or destroyed roughly three times as much property as during a typical year (Morris & Wilson, 2006: CSC.06.2). This created a high demand for construction materials and labour. The total cost of reconstruction is in the range of 10 to 15% of the annual construction market in the United States. Recognising that reconstruction will take several years, the anticipated annual impact on construction activity due to reconstruction work is likely to be in the range of 2 to 3% per annum. Given that much of the work may not show up as an increase in construction volume, but as a displacement of other planned work, the overall impact of the hurricanes on construction cost is expected to be relatively small (Swanson, 2005: 64).

The effect is likely to vary by region within a country. In the gulf region of the United States of America, there is a high demand for construction services, leading to market increases in the cost of labour and materials and competition between contractors (Tirasirichai & Enke, 2007: 368). The effect has been less in other parts of the United States, however, most parts of that country can expect to experience shortages of labour and material as the reconstruction process ramps up. Touran and Lopez (2006: 853) proved this statement.

While it is expected that such disruptions are likely to be transient, the uncertainty over price and availability as well as the actual delays or difficulty in obtaining necessary materials can have a marked effect on schedule and productivity for projects, and thus lead to increases in overall project costs (Ciccarelli & Murch, 2008: CDR.04.2; Al-Gahtani, 2007: RISK.10.1).

Morris and Wilson (2006: CSC.06.2) point out that in the past few years a number of strategic materials like steel, wood, cement, copper, PVC pipe and oil have seen significant increases in cost, sometimes more than doubling in less than a year. Norrbin, Pipatchaipoom and Bors (2008: 188) also make mention of the cost of natural

resources and how this can influence prices. While much of the escalation leading up to 2006 had been blamed on these material cost spikes, it is worth noting that even a dramatic increase such as the steel price increase in 2004 had a relatively small impact in aggregate (Adilov & Smavati, 2009: 51).

The world price for raw steel more than doubled in price in less than a year in 2004, rising from around $300/TN to around $600/TN (Mayo & Nuryeva, 2006: EST.06.1). Even with the doubling in price, the overall direct impact on total building construction cost was actually small (Hagmann, Stoy & Terashima, 2008: INT.07.1). Taking into account all the steel in a building (typical American construction of high rise buildings include structural steel frames) - the structure, studs, doors, frames, ductwork, pipe work, etc. - buildings usually only use about 20 to 30 pounds of steel per gross square foot (GSF). For an increase of $300/TN, this translates into an increase of only about six dollars per square foot, or roughly 2 to 4% of a typical building. This alone cannot be enough to account for the dramatic rise in construction project bids seen during this time (Lomax, 2005: 252).

A frequently overlooked escalation factor is changes to code and practice in design and construction. Pulaski, Horman and Riley (2006: 84) discuss the correlation between design and construction. This includes changes in plant codes, changes in regulations, and controlling activities within plants. An example would be the changing requirements for bio-safety performance in research facilities and changes in the way buildings are used. While these changes can increase and decrease construction cost, studies show that these changes typically add only 1% per annum to the cost of construction in the long run (Morris & Wilson, 2006: CSC.06.2). Bilec, Ries and Matthews (2007: 266) point out the added cost due to green design.

While direct changes in the cost of material and labour have a relatively small impact on the cost of construction, the uncertainty over prices has created some disruption in the bidding environment (Nutakor, 2007: 10). Traditional bidding approaches place all risk of material and labour pricing at the sub-contractor level, where there is very little room to accommodate price movements (Acharya, Lee & Im, 2006: 548). Returning to the steel price increase in 2004 as an example, while a $300/TN increase created an increase of only 2 to 4% on the bottom line cost of construction, it was a 25 to 30% increase in cost to reinforcing steel contractors.

When material prices are fluctuating wildly, bidders cannot lock in prices at bid time. Suppliers are unwilling, or unable, to provide any price assurance for anything other than short term orders (Koushki & Kartam, 2004: 127). Delivery schedules are often extended because material demand is so high, as a result of high construction volume as well as panic-induced stockpiling of materials by contractors (Carbone & Tippett, 2004: 29). Contractors often have to pay premiums to expedite supplies, but to counteract the possibility of shortages or delays some bidders double or triple book orders, which only compounds the material shortages. Contractors are understandably nervous since typical bidding processes ask them to submit fixed prices for work that often may not even start for up to a year or more after the bidding period (Fang, Li, Fong & Shen, 2004: 853). Suppliers are sometimes even more nervous since they are asked to adhere to prices for materials which may cost more to obtain once construction actually starts (Williams, 2007: 343). Volatility therefore makes contractors more likely to build risk premiums into their bids to cover potential increases in material prices, and suppliers more likely to wrap material quotes with an additional premium to ensure that they will still be able to make a profit in case of spikes in material cost (Odeyinka, Lowe & Kaka, 2008: 7). These premiums are usually higher than the expected increase in overall material cost, making volatility a far greater cost inflator (Fang, Fong & Li, 2004: 862).

The current high volume of construction is creating a high demand for skilled construction workers (Esposto, 2008: 101). Townssend and Charles (2008: 65 – 65) had similar findings in the military sector. In cases where there is a severe shortage, there will be a reduction in the skills levels as a result of this. Even where demand for labour is not that high, worker availability is affected by the drawing of workers into the high demand areas (Srour, Haas & Borcherding, 2006: 1054). The shortages of skilled labour increase the contractor's risk by increasing the likelihood of delay and more punch list (snag list) and remedial work (Addison *et al.,* 2008: 116).

Where construction activity is high in a specific area, there usually is a high demand for construction services. If similar increased construction activities are experienced in neighbouring regions, it makes it difficult to draw contractors into the region from other areas. Premiums must then be paid to obtain contractors. These additional costs will influence the final cost of any development.
Hollmann and Dysert (2007: EST01.1) mention some additional factors influencing construction escalation:

Global demand – The global demand for commodities is greater than any other time in history (Stein, 2008: IT.02.2).

Energy costs – The costs of oil, natural gas, coal and electricity are major components of construction cost. Claasen (2008b: 04 July) mentions that costs are expected to continue to rise substantially as a result of the following:

Utility deregulation: Rates, which have been locked at an artificial low level for a number of years, are opening up to market pricing and large increases are expected.

Environmental regulations: Fears of global warming are driving retrofits of power plants, use of cleaner fuel, and pollution controls on new diesel equipment – all of which are expensive (Kulatunga, Amaratunga, Haigh & Rameezdeen, 2006: 60; Hao Hills & Huang, 2007: 15).

Aging infrastructure – Many of the power distribution systems in many countries are beyond their life expectancy. Replacement will be expensive (Park, Hwang, Seo & Seo, 2003: 27).

Instability in the Middle East – Crude oil and natural gas are used in the mining, production and transportation of many construction materials (Ye *et al*., 2009: 43).

Security requirements – New security requirements for background checks limit the available pool of workers.

Climatic changes – Worldwide increases in weather anomalies will consume certain regions' available resources. The explosion in development along the United States coastline can make the effect of a hurricane so much worse (Deschenes & Greenstone, 2007: 355).

Immigration policies – Illegal immigrants make up a large share of the labour pool (especially in America) in the construction industry. If there is a decrease in the use of illegal labour for construction, the competition for labour from legal sources will drive up costs.

Large scale expansion – A sudden dramatic increase in construction activities draw large portions of the available skilled labour, and will therefore drive up costs.

Hollmann and Dysert (2008: EST.08.1) state that escalation reflects changes in pre-drivers such as productivity and technology as well as changes in market conditions

such as high demand, labour shortages, profit margins, etc. Technological progress (such as information technology) and the influence it has on the economy change market conditions and may have an effect on escalation (Chung, 2007: 63; Jorgenson & Vu, 2007: 126).

5.0 MEASURING ESCALATION

Measuring inflation in an economy requires objective means of differentiating changes in nominal prices on a common set of goods and services, and distinguishing them from those price shifts resulting from changes in value such as volume, quality, or performance (Botti, Conte, Di Cagno & D'Ippoliti, 2008: 3). For example, if the price of a 10 oz. can of corn changes from $0.90 to $1.00 over the course of a year, with no change in quality, then this price difference represents inflation. This single price change would not, however, represent general inflation in an overall economy. To measure overall inflation, the price change of a large "basket" of representative goods and services is measured (Ball & Petrowski, 2007: EST.09.1). This is the purpose of a price index, which is the combined price of a "basket" of many goods and services. The combined price is the sum of the weighted average prices of items in the "basket". A weighted price is calculated by multiplying the unit price of an item with the number of those items the average consumer purchases (Flemming & Koppelman, 2009: 22). Weighted pricing is a necessary means to measure the impact of individual unit price changes on the economy's overall inflation. The Consumer Price Index (CPI), for example, uses data collected by surveying households to determine what proportion of the typical consumer's overall spending is spent on specific goods and services, and weights the average prices of those items accordingly. Those weighted average prices are combined to calculate the overall price (Flemming & Koppelman, 2009: 22). To better relate price changes over time, indices typically choose a "base year" price and assign it a value of 100. Index prices in subsequent years are then expressed in relation to the base year price (Hamood Al-Harthy, 2007: 280).

Inflation measures are often modified over time, either for the relative weight of goods in the basket, or in the way in which goods and services from the present are compared with goods and services from the past (Leishman & Watkins, 2002: 40). Over time adjustments are made to the type of goods and services selected in order to reflect changes in the sorts of goods and services purchased by "typical consumers". New products may be introduced, older products disappear, the quality of existing products may change, and consumer preferences can shift. Both the sorts of goods

and services which are included in the "basket" and the weighted price used in inflation measures will be changed over time in order to keep pace with the changing marketplace (Lum, 2004: 32).

Inflation numbers are often seasonally adjusted in order to differentiate expected cyclical cost shifts (Skitmore, Runeson & Chang, 2006: 777). For example, home heating costs are expected to rise in colder months, and seasonal adjustments are often used when measuring for inflation to compensate for cyclical spikes in energy or fuel demand. Inflation numbers may be averaged or otherwise subjected to statistical techniques in order to remove statistical noise and volatility of individual prices (Ramey & Vine, 2006: 1878).

Measuring and tracking cost escalation requires a reasonably accurate index based on information that is reliable and captures a wide enough spectrum of data that all aspects of escalation are covered (Bureau for Economic Research (BER), 2008b: 20 November 2008). There are several indices that can be used to measure construction cost escalation in South Africa. Several of these are specifically for the building construction industry and will not be discussed in this study. The indices mostly used in the engineering industry in South Africa include the Steel and Engineering Industries Federation of South Africa (SEIFSA) indices (SEIFSA, 2009: 06 August 2009).

SEIFSA (2009: 06 August 2009) points out that SEIFSA is the industry's voice in the Trade and Industry Chamber of the National Economic Development and Labour Council (NEDLAC). Most companies in the industry do not sell directly to consumers, but to national, provincial or local governments, private corporations or other companies in the industry, requiring inputs for their own production. Lead times between tender, order and delivery can be considerable – often a year or more (Hassanein & Khalil, 2008: 20). Therefore, and especially in times of high inflation, it is important for tendering companies to have a way of adjusting their contract prices to compensate for unforeseen cost increases in the period between tender and delivery (Hudson & Hudson, 2004: PM.22.2).

SEIFSA consults on Contract Price Adjustment (CPA) formulas and escalation calculations which allow tenderers to adjust delivery prices in line with unforeseen cost increases. This SEIFSA service assists companies to allow for price adjustment provisions that are fair and equitable to them as well as their clients. The value of this

service to companies is in excess of R7 billion a year in escalation claims on contracts (SEIFSA, 2009: 06 August 2009).

The monthly SEIFSA Price and Index Pages publish 140 indices that measure changes in the costs of manufacturing inputs in the industry. By including data from these indices in a CPA formula, a company can calculate the average changes in costs of labour, steel, transport and other inputs affecting the final cost of manufacture. SEIFSA regularly reviews the make-up of the various indices it generates in order to ensure that they remain relevant and accurate (SEIFSA, 2009: 06 August 2009).

Jackson (2008: INT.S01.2) states that the Production Price Index (PPI) data are commonly used in escalating purchase and sales contracts. These contracts typically denominate specific dollar amounts to be paid at some point in the future. It is often desirable to include an escalation clause that accounts for changes in input prices. For example, a long-term contract for steel may be escalated for changes in scrap metal prices by applying the percent change in the PPI for wheat to the contracted price for steel.

The PPI is a family of indices that measures the average change over time in selling prices received by domestic producers of goods and services. PPI's measure price changes from the perspective of the seller (Faig & Jerez, 2006: 4). This contrasts other indices, that measure price change from the purchaser's perspective, such as the Consumer Price Index (CPI). Sellers and purchasers' prices may differ because of government subsidies, sales and excise taxes and distribution costs.

It is important to evaluate cost indices to determine which provide the clearest and most consistent method of tracking what is happening to costs. Lomax (2008: 252) states that the evaluation criteria to consider include the following:

- Correspondence with true inflation – does it accurately reflect changes in construction cost?
- Cost to administer – what does the index cost to maintain?
- Objectivity – is the data free from subjective interpretation?
- Self-correcting – will the index be correct from year to year?
- Contribution of costs such as materials, labour, general conditions, market conditions, and codes and practices to the total calculated index.

Each index should be evaluated not only on the aforementioned criteria, but on how it is intended to be used for a particular project or process calculation. Those which include input not just from materials and labour prices, but also from general and market conditions, and code of practice impacts, can be reasonably expected to be more reliable (Jackson, 2008: INT.S01.2). Indices which are based on statistical information are more likely to be objective than those based on opinions or views of individuals. Saito (2004b: INT.01.2) points out that indices which track larger numbers of items or projects can be expected to achieve a greater accuracy and level of reliability since it is more likely that they will take into account a wider range of the variables that impact cost escalation in the current world market. However, these indices are often more complicated and costly to administer (Saito, 2004a: INT.02.3).

Hollmann and Dysert (2007: EST.01.4) provide the following criteria in selecting and developing price indices for use in escalation estimating:

- They should be based on industry or government sources that are generally recognised as reliable and are readily available.
- They should be generally applicable to the subject industry in the primary regions where a company performs or will perform capital projects.
- They should be specific to the major cost types.
- They must be easily updated, modified and maintained as an ongoing reference source.

In the long run cost escalation is passed on to the end-consumer in the form of higher prices and thus ultimately it “bleeds” into inflation and the CPI (Jackson, 2008: INT.S01.2). In order to adequately capture project cost information over time and ensure comparability among projects, some companies have established proprietary projects systems to track costs according to an established Cost Breakdown Structure by project type. Figure 6.5 illustrates the developing process of an appropriate index to track escalation.

5.1 Applying price indices to project costs

Elementary level price forecasts are relatively easy in the sense that after choosing the correct index, a current index is divided by a base index and then multiplied by the base rate (Al-Jibouri, 2003: 146). It is more of a challenge to determine the best way to

apply disaggregated indices to elements of the overall plant cost (for which no reliable aggregated forecast index is available).

The historical and forecast indices available are usually in a disaggregated format. In other words, there are separate indices for each of the major resources that go into or make up a project's cost structure (Musgrove, 2008: EST.07.2). The indices supplied by the Steel and Engineering Industries Federation of South Africa (SEIFSA) is a typical example. Here the price increases for copper, steel, etc. are shown separately in different index tables.

The estimator must then break down the project cost estimate into categories of cost of which applicable price indices are available (Ball & Petrowski, 2007: EST.09.3). This is not always a straightforward task. For example, a typical process plant has significant pipe material cost. Most of the piping material cost is for piping spools from the fabricator. The spool price includes for pipe, fittings and shop labour costs. The available disaggregated indices do not cover spool prices; therefore the estimator must create an aggregate or "proxy" index for the shop fabricated pipe that includes a weighted mix of pipe cost, fitting cost and the cost for shop labour (Hassanein & Khalil, 2006: 183).

Economists can provide hundreds of wage price and other price indices. As the estimator builds up weighted indices, or otherwise lines up cost categories with indices, there is the risk of going overboard with detail that can complicate the effort without adding real value or increased accuracy. For example, there may be wage increases for many different crafts, but in general they follow the same trend (Hassanein & Khalil, 2006: 183). Using one of these indices as a proxy measure for all crafts may be appropriate.

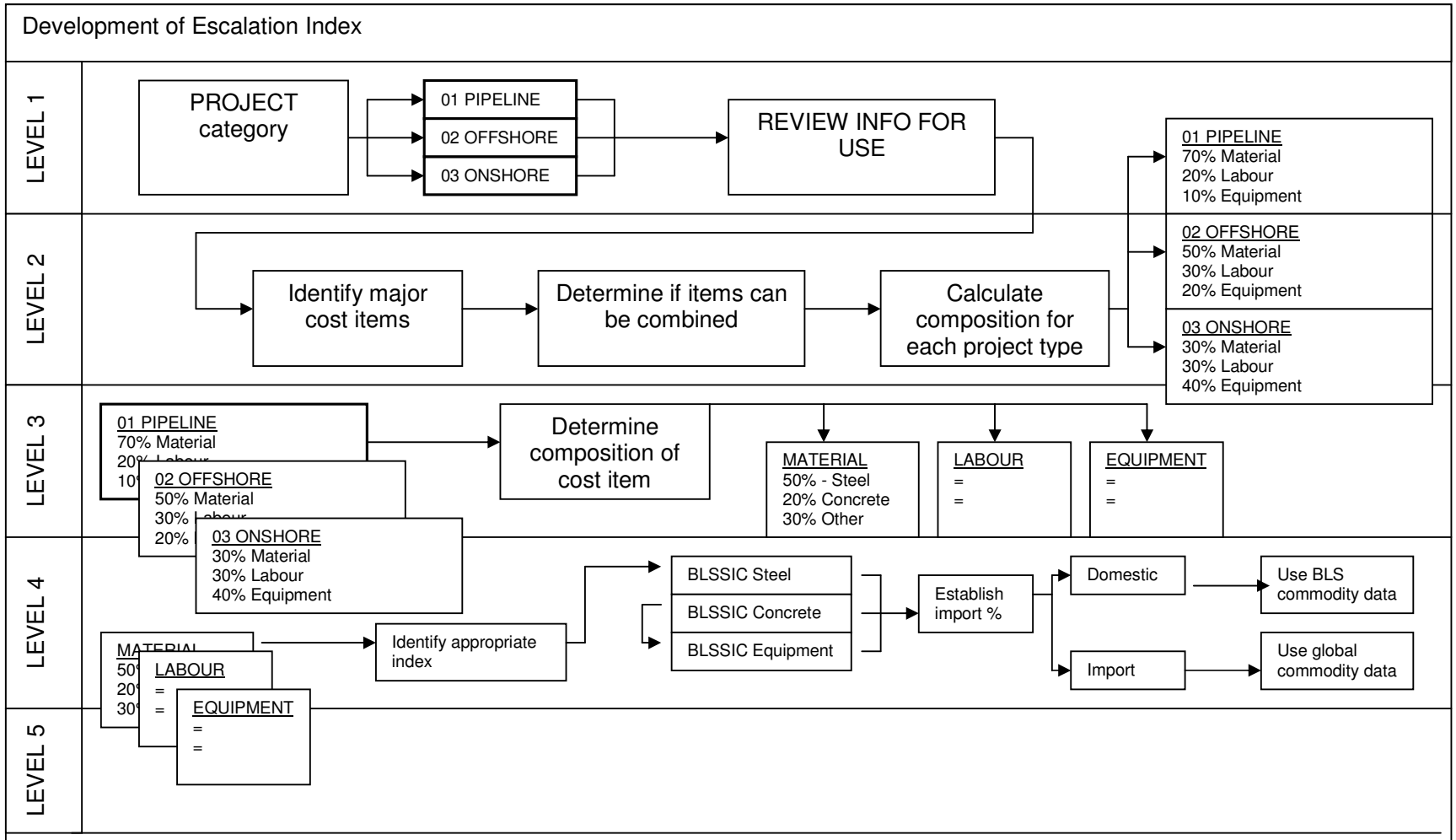


Figure 6.5: Index development chart

Source: Jackson, 2008: INT.S01.2

5.2 Required index components

Many escalation models fail either because of lack of appropriate detail and applicability to the business case, or too many complex routines for maintaining the escalation model (Jackson, 2008: INT.S01.3). In other words, the model needs to deliver the appropriate amount of information without becoming a burden and overweighing its benefits. Figure 6.6 is taken from several American projects to show their relevant cost composition.

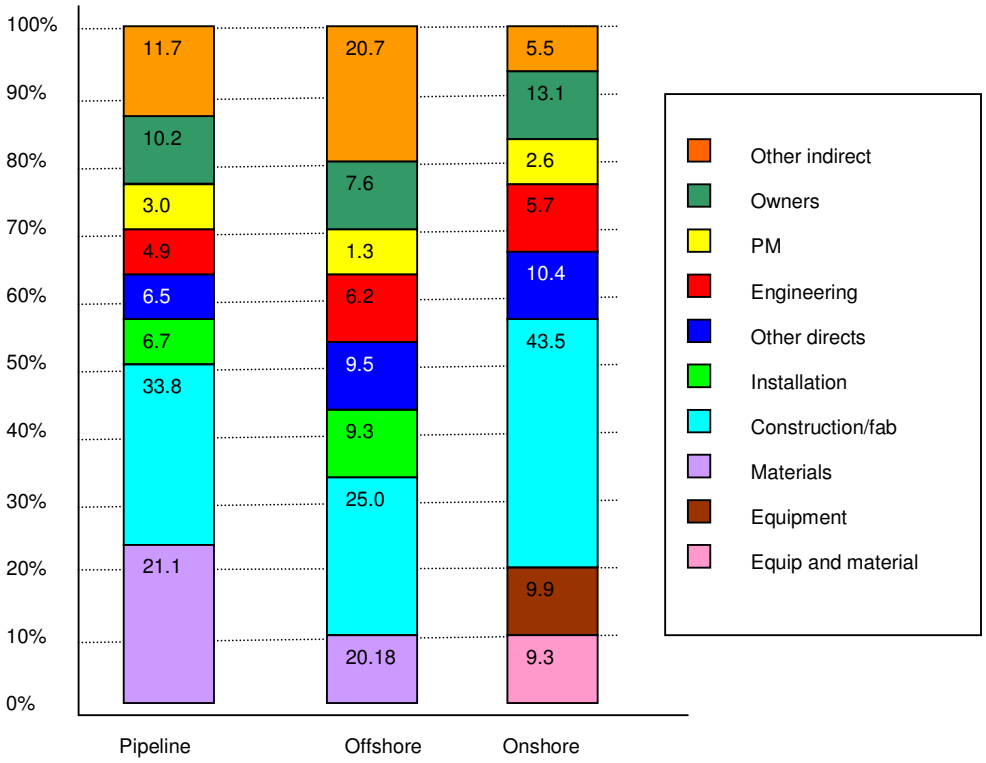


Figure 6.6: Cost composition by project type

Source: Jackson, 2008: INT.S01.3

Jackson (2008: INT.S01.3) identifies about ten distinct project cost types. Each of these cost types can be broken down into very specific categories. However, the level to which these costs should be broken down must be weighed against the perceived benefit that is gained from applying a more detailed set of escalation indices to an increasing number of cost types. In fact, several main cost types may actually be combined if the nature of their sub-costs suggests strong congruency.

Figure 6.7 illustrates a combination of “installation” and “fabrication” with labour being the main common sub-type. Table 6.3 displays the basic sources to arrive at

escalation factors. It is, however, recommended to consider adjustments to this model based upon specific requirements.

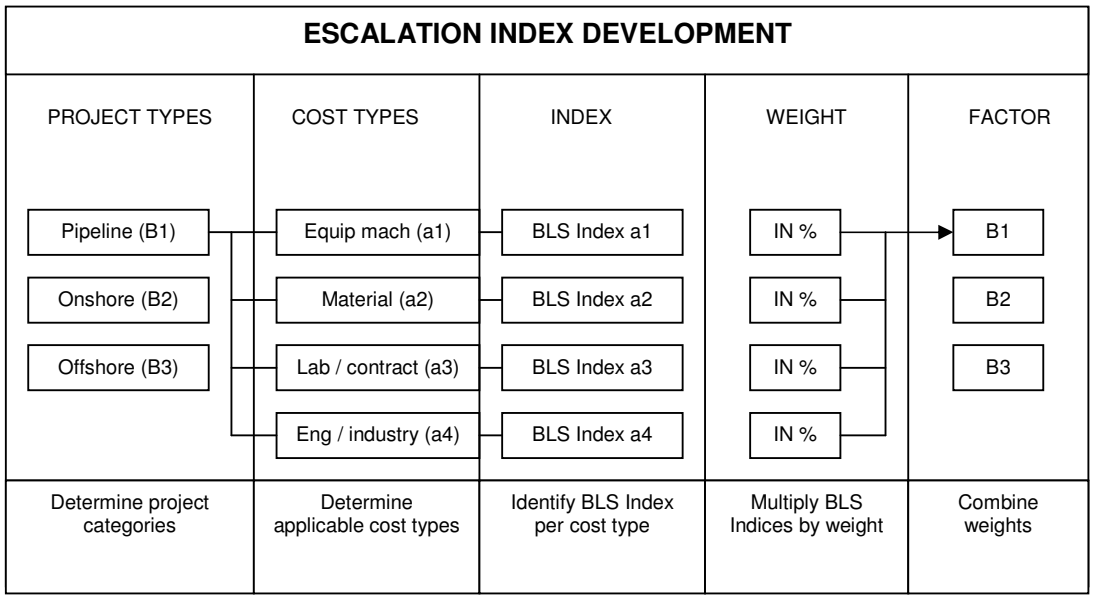


Figure 6.7: Simplified Index Development Model

Source: Jackson, 2008: INT.S01.4

COST	PIPELINE	ONSHORE	OFFSHORE	INDEX
Equipment and material + ODC	30%	30%	30%	50% Material IC332312-5 for pipeline (331210-0) 50% Equipment IC 333132
Construction, installation and fabrication	33%	42%	33%	BLS Index of hourly compensation costs for production workers
Engineering	5%	6%	6%	BLS IC 54133
Indirects	32%	22%	31%	Same as “Engineering”
TOTAL	**100%**	**100%**	**100%**	

Table 6.3: Tabular index weights and source

Source: Jackson, 2008: INT.S01.4

The indices in Table 6.3 are displayed in Figure 6.8. It is noticeable that a significantly directional change occurred in 2004 with cost increases in many major cost components but most visibly in steel or metal related commodities. The CPI does not display a considerable change in the degree of escalation for that particular time period, which may be the cause for disproportionate comparative results when assessing multiple time periods.

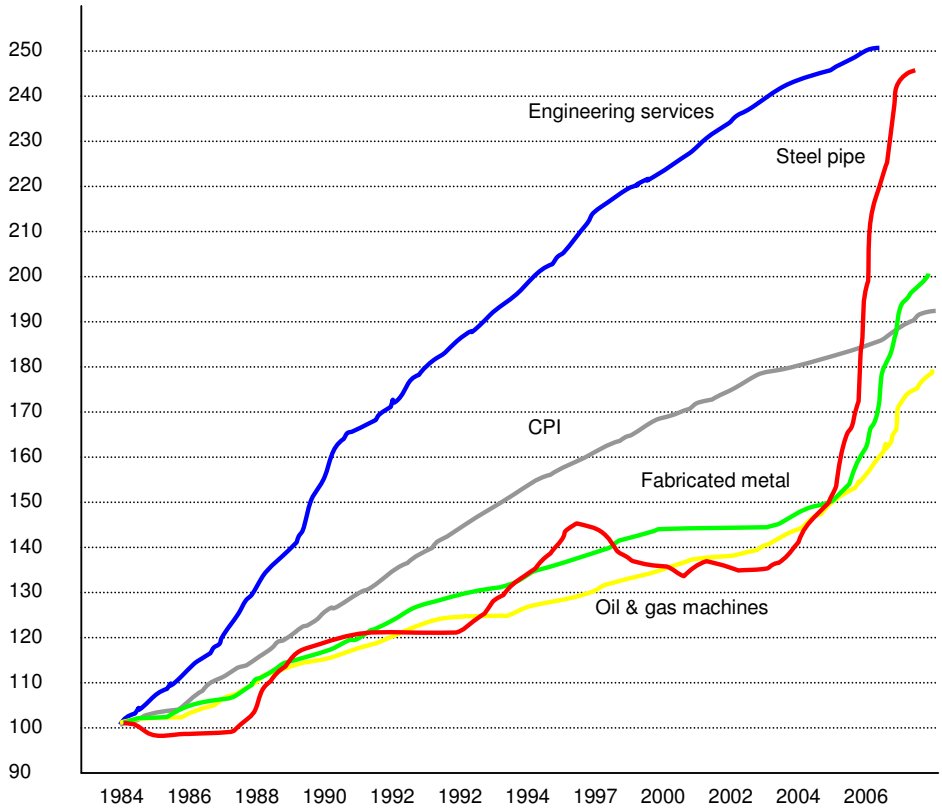


Figure 6.8: CPI versus Component PPI indices
Source: Jackson, 2008: INT.S01.05

Construction rates are made up of some components to cost the full complement of work relating to that specific activity. Labour, material, consumables and profit can be seen as the main contributors to cost on a project. Depending on the formula that is employed to calculate escalation, these components might be split up (kept separate) and then be escalated separately as there are different indices for the different material types and for the labour involved in the activity.

5.3 Modelling of a cost escalation factor

Touran and Lopez (2006: 855) define the cost escalation factor as the rate of change in the cost escalation indices form year to year and they propose the following formula to calculate this rate:

$\Delta_I = [(I_i / I_{i-1}) - 1] \times 100\%$

Where:

Δ_I - is the percent of change of period,
I_{i-1} - is the index of the previous period (i – 1),

A positive value of Δ_I is an indication of increase in cost. In contrast, if the value of Δ_I is negative, that is because period (i) has experienced a deflation. They compound the average value for Δ for a given period by using the following formula:

$r = [(I_e / I_b)I/n - 1] \times 100\%$

Where:

r - is the average rate of change,
I_e & I_b - are the index values for the beginning and end periods, and
N - is the number of periods between $_e$ and $_b$.

5.4 The effect of interest rates on escalation indices

Interest rates appear to have an inverse relationship with construction cost increases. Figure 6.9 indicates this tendency. When interest rates increase, the cost of financing construction rises, and the number of new projects gradually declines (Elizandro & Matson, 2007: 99). With less work, there is more competition for the available projects and a reduced demand for raw materials. Increases in interest rates generally precede a slowdown of the general economy, making companies less likely to fund large capital projects. On the other hand, if interest rates are reduced, the cost of financing construction is reduced, and the economy is generally poised for an upswing (Sanchez, 2008: 46).

5.5 The effects of EPC capital markets on cost indices

A challenge not mentioned before which also comes into play and that cost indices do not take cognizance of is the micro-economy. For example, the Engineering, Procurement and Construction (EPC) form of contracting is a micro-economy where the labour prices have increased more than the engineering and construction that the government agencies and the economists track. This is because contractors' prices include mark-ups such as risk premiums, productivity factors, etc. (Squires, Reid & Jeon, 2008: 82). No one tracks EPC bid prices per se. In the long run, underlying costs (such as wages) drive trends, while market strength can be the dominant driver in the short run (Hollmann & Dysert, 2007: EST.01.5).

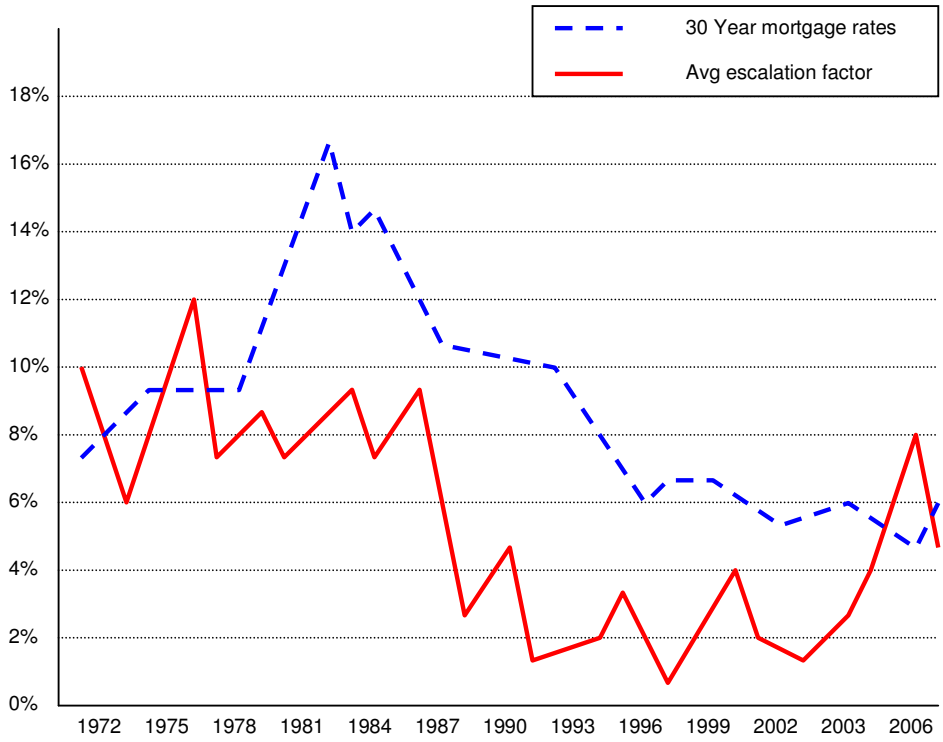


Figure 6.9: Cost indices compared to rates for 30 year fixed-rate mortgages
Source: Butts, 2007a: EST.08.2

Hollmann and Dysert (2007: EST.01.5) adopted the method of specific construction knowledge to that of the economist's macro-economic knowledge. They propose the adjustment of existing available labour pricing indices with additional factors that reflect the relevant level of capital expenditure in the EPC market. For example, if EPC investment increases substantially in a year, EPC contractors will be able to exert their

market strength and raise bid prices in some proportion to which the rate of capital spending increases.

Figure 6.10 illustrates how EPC engineering and construction prices for small and large projects tend to vary with the level of capital spending for process plants (which is a micro-economy).

Note that small project price trends vary less and EPC pricing level changes tend to lag changes in the economy. Hollmann and Dysert (2007: EST.01.05) make the following statement:

> *"There is no doubt that labour pricing is linked to the relative level of CAPEX in the process industries (and construction employment)."*

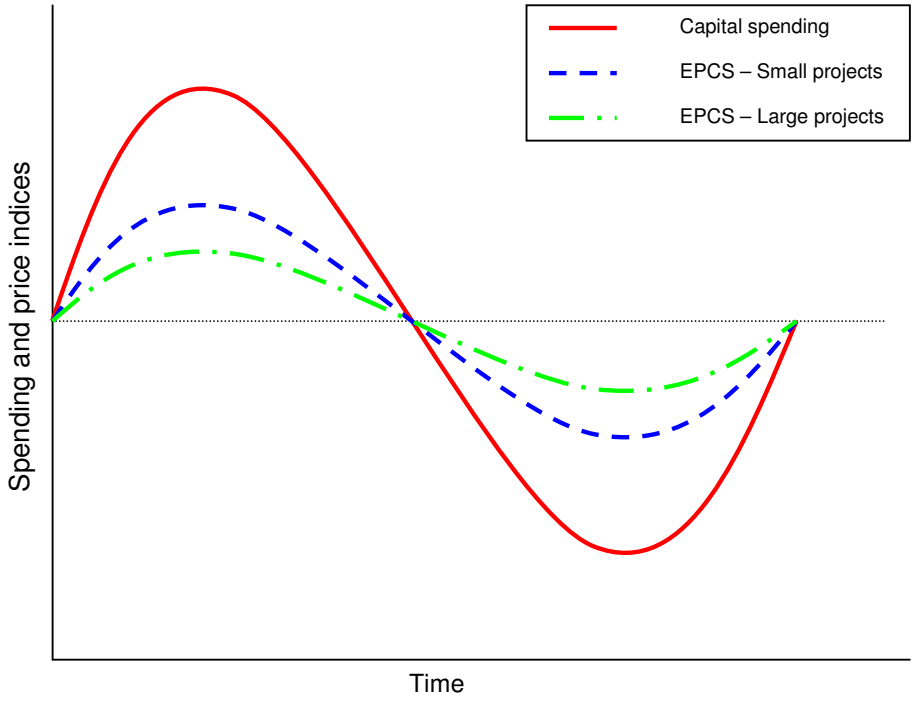


Figure 6.10: EPC labour prices vary with trends in capital expenditures
Source: Hollmann and Dysert, 2007: EST.01.04

The only uncertainty is the extent to which CAPEX affects labour price on a given project in a given region. Furthermore, the CAPEX effect is less on small projects using local contractors with long standing relationships. The effect is greatest on large projects – particularly those in more isolated areas with smaller labour pools. Hollmann and Dysert (2007: EST.01.05) mention Alberta in Canada as an example.

Factoring market demands into labour price indices is not yet common practice. However, it is necessary that this be done because published indices only cover compensation which tends to be fairly stable. They typically do not track the prices owners pay. Hollmann and Dysert (2007: EST.01.05), for example, make mention of *Chemical Engineering* magazine's Plant Cost Indices. These indices have been stable since 2000, indicating that labour prices have been more or less constant since 2000. In practice, however, this is not the case. Global engineering and construction firms have commanded increasing prices since 2003, particularly for large projects.

5.6 Some ideas in the development of an escalation tool

Hollmann and Dysert (2007: EST.01.6) offer the following steps in developing an escalation estimating tool:

- Get buy-in on the approach from the engineering and business communities.
- Decide on the cost account breakout to use for escalation estimates (preferably based on the standard code of accounts).
- Obtain the services of an economics firm that can provide the historical and forecast indices required.
- Obtain the up-to-date indices from the economist and develop weighted indices for each of the project's estimate cost accounts.
- Make adjustment to the weighted indices as needed, particularly for capital demand trends.
- Determine the estimated project cash flow by cost account.
- Apply the indices appropriately to the cash flow for each cost account.
- Decide how to handle escalation on contingency fund and escalation risk.

Cost estimators are, however, cautioned not to expect too much accuracy from cost indices (Lofton & Coppo, 2007: RISK.05.1). These indices are approximations intended to represent the average trends for a large group of projects in a broad region. The indices are generic and conceptual in nature and judgment must be applied in using them in any given situation. Escalation estimates should always be considered a Class 5 estimate. Refer to Chapter 3 of this study for estimate classification.

6.0 MANAGING ESCALATION

As mentioned previously, cost escalation in the construction market is a cumulative effect of a number of different factors (Abi-Karam, 2004a: DEV.04.2). While each of them may only contribute a small amount to the overall cost of a project, when combined they are a driving force behind the rising costs of constructing a new plant (Butts, 2007a: EST.08.1). Because there are so many factors contributing to escalation, managing escalation requires a variety of strategies.

The increases of hard prices are a reality. It is worth noting that over a ten year period, construction material escalation is broadly in line with the broader measures of escalation (Morris & Willson, 2006: CSC.06.1). It should also be realised that as long as construction volume remains high and the pool of skilled workers does not grow to accommodate the demand, bidders will always have options (O'Mahony *et al.,* 2008: 14380). Jansen-Rommijn (2008: EST.13.1) and Nassar and Hegab (2006: 556) point out that projects which are perceived as difficult, whether for the complexity of the design, the level of regulatory requirements, the location of the project, or even the reputation of the project owner, are less likely to attract bidders, and those who are willing to bid on these projects are more likely to increase their bids to cover their risk.

Noor *et al.,* (2006: OWN.05.2) state that the estimator should realise the volatility of bidding. Material prices will continue to fluctuate, although perhaps not to the extent seen in recent years (Morris & Willson, 2006: CSC.06.1). Bidder's interest will continue to fluctuate, based on the amount and type of work available at any given time.

Touran and Lopez (2006: 854) reveal that the dominant escalator in the current market is poor allocation of risk. Yiu and Tam (2006: 478) state that traditional bidding methods place the bulk of the risk on those who are least able to absorb any fluctuations in cost. To manage cost escalation and minimise the impact of future cost increases or other factors which will arise to put additional pressure on the market, project owners need to change how they think about, and handle projects (Hollmann & Dysert, 2008: EST.08.2). The party who will have to accept the risk involved in the project will charge a premium (Arrow, 2008: RISK.01.2). By passing the risk to the contractor, they will put premiums in their bids and by requiring contractors to submit hard money bids for long term projects, the risk is passed to the vendors who will also build a premium into their bids. Perhaps the best option for project owners to minimise

the impact of the volatile construction market is to become partners in the risk (Autiero, 2000: 52; Babusiaux & Pierru, 2009: 104).

The first step is for project owners to take more responsibility for the risk associated with material price fluctuations (Cicmil & Nicholson, 1998: 98). Because the owner is more diversified, he is better able to handle the risk. This can be done in a number of ways at each level of the design and construct process (Carbone & Tippett, 2004: 29). To help and absorb the risk for contractors, project owners can:

- Include fluctuation clauses (Cheng & Yang, 2001: 295) which will allow for shifts in material costs; in other words, the owner agrees to cover the cost of materials and does not require the contractor to submit a fixed price for something they may not be able to purchase for quite some time.
- Pre-purchase materials to limit the impact of future price fluctuations (Formoso, Soibelman, De Cesare & Isotto, 2002: 319).
- Provide dedicated float for slippage by understanding that, due to current market and transient material shortages, some scheduling delays may be inevitable (Nassar, Gunnarsson & Hegan, 2005: 1258).
- Reduce the bid award period to accommodate shorter price locks.
- Delay the bidding of non-essential packages so that when those items are bid, prices can be closer to actual costs at the time they are needed.
- Negotiate sub-contracts along with the contractor.
- Use Cost-Plus contracts (Rossetti & McKeeman, 2008: 7).

At all levels of the project, the key aspect for the project owner is to actively manage design and cost by ensuring that all participants in the design process are fully aware of budgetary constraints as well as the impact of any changes or delays on overall project cost (Morris & Willson, 2006: CSC.06.1). This will likely require a departure from the usual method of designing and constructing projects and takes committed leadership, freedom of action at project level, and most importantly, more work and commitment from all members of the project team to meet higher performance expectations (Singh, 2003: 316).

A challenge of escalation estimation, by any method, is the reliability or accuracy of the forecasts (Vargas, 2004: CSC.16.3). The first step will be to obtain indices from economists that correspond to the markets of interest, particularly local wage rates and

regional and global CAPEX for the subject industries (Yisa, Ndekugi & Ambrose, 1996: 52). The advantage of probabilistic methods is that even if the resulting forecast is inaccurate, management will have the opportunity to really understand the risks and make an informed decision on how to address that risk (Sorenson & Lavelle, 2008: 43).

As with all estimating, management tends to have unrealistic expectations of escalation estimate accuracy (Chen, O'Brien & Herbsma, 2005: 671). It can also be expected that the use of CAPEX indices to develop proxy factors will be challenged. This methodology has not been covered by extensive literature which might be the reason why proxy factors have not been a popular method.

7.0 ESCALATION VERSUS CONTINGENCY FUND

As stated previously, escalation is defined as underlying economics-driven changes in price levels. Escalation is not controlled and driven by any company's management (Hollmann & Dysert, 2007: EST.01.3). It is macro-economics driven (Akerlof, 2007: 16) and largely out of the control of the estimator. Project cost increases are normally the result of poor project practices of which escalation is but one factor (Devine, 2006: INT.06.2). Escalation in itself is not doubling or tripling project costs. Poor project practices are a well-known cost risk driver that should be addressed by the contingency fund, not escalation (Ford, 2002: 30; Sonmez, Ergin & Birgonul, 2007: 36).

Even the best defined and managed projects will face price increases driven by underlying economic conditions (Faig & Jerez, 2006: 4; Waara & Bröchner, 2006: 799). Poorly defined and poorly managed projects are, however, more likely to be affected by increased costs. These increases can be seen as contingency risk and not escalation. The contingency fund has a negative connotation, in the sense that management believe it to be "fat", and they are not receptive to the idea that their own poor practices is what is causing much of the cost growth (Whiteside, 2007: EST.04.1; Rothwell, 2005: EST.18.2).

Another principle to understand is that escalation is not costs that result from the manager's project scope and execution strategies (Robinson, 1996: 8). For example, if an owner selects a high price bidder just because he can deliver his equipment first to site, the difference in tender prices between this bidder and the second bidder cannot

be seen as escalation (Butts, 2007a: EST.08.1). Similarly, choosing to offer contractors incentives such as overtime and bonuses is an owner's management choice (Singh, 2003: 315). The portion of the price that is "contractor's risk premium" is affected by owner's choices. Specifically if the owner chooses to push all risks to the contractor by using fixed price contracting, then the higher prices are the result of the owner's choice, not escalation (Singh *et al.,* 2007: 22).

8.0 CONTINGENCY

Contingency project performance is frequently measured in cost, time, and the value of the constructed facility (Skitmore & Ng, 2002: 457). Blyth and Kaka (2006: 87) point out that a traditional approach to mapping multiple objectives applies a zero-sum-gain perspective in which the aggregate performance in these three dimensions is assumed to be fixed and trade-off decisions are used to achieve better performance in more important dimensions at the cost of poorer performance in less important dimensions.

Accepting increased cost to reduce project duration by paying for overtime is perhaps the most common application of a zero-sum-gain approach to managing construction projects (Ford, 2002: 30). This approach forces managers to choose among lower cost projects, shorter project duration, or better facilities and contrasts sharply with their desire to satisfy all three of these project objectives. Strategies are being sought that can simultaneously improve project performance in multiple dimensions (Ford, 2002: 30).

Project budgets are one of the most important and widely used project management tools (McDuling, Horak & Cloete, 2004: 2). Project complexity and the inherent uncertainty of the financial performance of constructed facilities, development funding, and the control of costs and schedules make exact budget needs impossible to forecast accurately. These same characteristics also cause projects to deviate from plans (Nepal, Park & Son, 2006: 185). Therefore, contingency funds are included in development budgets to provide managers with the flexibility required to address uncertainties and deviations that threaten achieving objectives (Nima, Abdul-Kadir, Jaafar & Alghulami, 2004: 316). The contingency fund is important in realising project objectives and can represent a large portion of the project budget (Noor & Tichacek, 2004: RISK.04.2). The effectiveness of contingency management can therefore have a strong influence on project success. Large contingency fund sizes, the challenges of managing a contingency fund, and the central role of budget contingency fund in

determining project success, make contingency management an important project management issue (Ford, 2002: 30).

Bonhomme-Delprato (2008: 13) demonstrates that contingency fund is defined as the amount to be added to the competitive base estimate, prepared realistically for the known scope assuming typical site/market conditions/oversights/unknows, and is free of excessive allowances and mark-ups, as per historical experience so that the final project cost estimate has an equal chance of falling above/below the actual cost or the initial quantifiable estimate (Prasad, 2008: EST.S02.1). Retief and Ker-Fox (2004: 1) suggest that the contingency fund is intended to mitigate the adverse impact of the unforeseen events. It is a reserve and hedge against risk for estimate assumptions. These risks can include budget estimates, activity durations and sequencing, resource requirement, historical benchmarking or database inputs being repetitive, resource availability, vendor co-operation, strikes, etc. The risk allowance is not for scope growth increase or interest rate changes. Ripley (2004: CSC.08.1) recommends a combination of factors to be considered when deciding on a contingency fund. They are design definition, estimating method, estimator's experience, time frame, schedule probability, new technology or proto-type engineering, remoteness of job site, engineering progress at the time of estimate, and material commitment at the time of estimate. It is not a function of changes in the defined scope of a project or the unforeseeable circumstances beyond management's control. Rather it is money that is expected to be spent, hence, controlled (Prasad, 2008: EST.S02.1). Figure 6.11 shows combined cash flow and contingency fund requirements.

8.1 Bid risk and contingency analysis

The exact amount to bid is a taxing decision for the contractor from the viewpoint of accuracy, primarily because of the inherent risks involved in projects and work packages (Carr, 2005: 1165). These risks, which vary from nearly every item that is a project expense, can range from being significant to insignificant, and result in either cost overruns or profit opportunity.

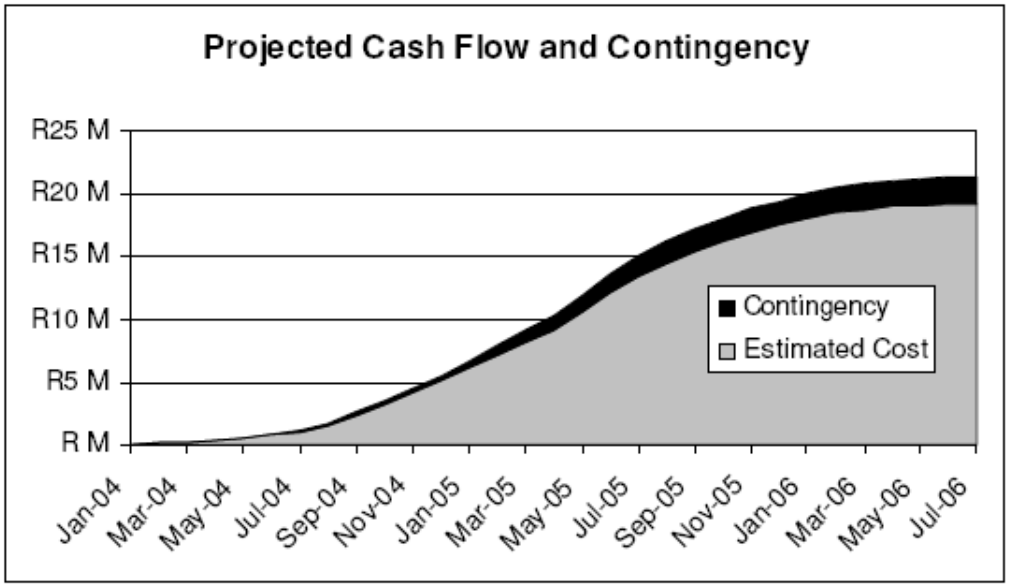


Figure 6.11: Combined cash flow and contingency requirements

Source: Retief and Ker-Fox, 2004: 4

Project expense items have a range of possible costs. These costs can be optimistic enough such that the contractor can afford to either bid low or bid normal and charge high profits or else can be pessimistic enough, such that the contractor is compelled to bid high and face lower profits (Berends, 2006: 37). However, before contractors decide on making an investment, they need to inevitably analyse the risks and profitability of the investment if they hope to submit a reliable estimate (Carr, 2005: 1165). If the risks and profitability do not fulfill the expectations of the contractor after analysis, the investment is not likely to be pursued (Lo, Lin & Yan, 2007: 410).

Nutakor (2007: 10) indicates that one of the most common methods of awarding construction projects is the lowest bidder system. It is a competitive system through which most vendors obtain their work with price being a predominant factor or sole criterion (Tebin, 2009: 8). While the awarding of contracts for construction work on the basis of competitive bids offers certain advantages to both owners and contractors, it is believed that many of the construction industry's problems can be traced back to making price the sole criterion (Kassab, Hipel & Hegazy, 2006: 1045). Furthermore, though the lowest bid may be attractive, it may not be the lowest final cost (Lo *et al.,* 2007: 410).

8.1.1 Data analysis procedures

Table 6.4 demonstrates the extent of possible factors that can influence the bid price and will ultimately have an influence on the level of contingency fund (Nutakor, 2007: 11). Nutakor (2007: 16) further determined that there are seven main contributors to cost overruns on projects in the oil and gas construction industry:

- change orders,
- level of scope definition,
- bid process,
- contract risk,
- market conditions,
- risk management issues, and
- performance.

The factors mentioned in Table 6.4 are more influential at the beginning of the project. As the project draws to a close, nearing plant commissioning (Bosch, 2004: 9) these factors will be less influential or will completely fall away (Noor *et al.,* 2006: OWN.05.2). Figure 6.12 illustrates this point.

Primary coding category	Secondary coding category
Change orders	- Number and magnitude of changes - Change order administration/management - Changes in work condition or situation - Variation in quantity
Level of scope definition	- Design or engineering completeness - Differences in opinion as to scope - Changes in scope of work - How well responsibilities are defined - Thoroughness of risk analysis on design - Inconsistent documentation (quality of bid package) - Right contractual terms
Bid process	- Time to bid - Clarity of request for bids - Mistakes in sub-contractor's bids - Omissions by bidder - Completeness of bid package - Thoroughness of pre-award interview - Bid clarification
	- Higher contract administration costs - Litigious nature of owner

Contract risks	- Litigious nature of sub-contractor - Litigious nature of designer/consultant
Market conditions	- Change in wage rates - Change in material prices - Quality and availability of work force
Risk management items	- Job location - Contractor's construction management expertise - Owner's construction management expertise - Risk allocation to the right party - Whether bidder has assessed the difficulty of the work correctly or not
Performance	- Rework (because of quality by contractor or sub-contractor) - Rework because of late changes by owner or designer - Failing to meet specifications due to interpretation differences - Owner's influence on contractor or sub-contractor (schedule effect) - Effect of site productivity - Field supervision costs

Table 6.4: Data coding categories of all cost factors

Source: Nutakor, 2007: 11

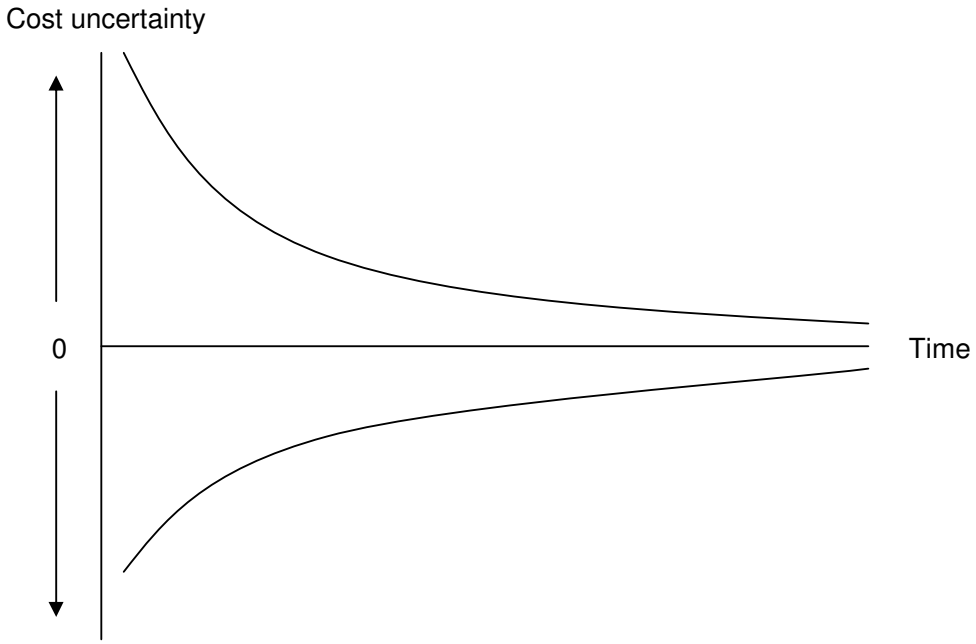


Figure 6.12: Variation of cost uncertainty with project execution/bid timeline

Source: Noor *et al.,* 2006: OWN.05.2

During the process of determining risks, two main tasks are accomplished. The first task is the identification of potential risks that may influence the base estimate. This list can be obtained from experiences on past projects (Lo *et al.,*2007: 411). Once the list of risks is compiled, the risks are grouped into categories as displayed in Table 6.4. If the bidding information is properly compiled, the client/contractor can displace much of the risk on the project to the bidder. These risks will be allowed for in the bidder's price/rates.

8.1.1.1 3 Point price estimates

It is customary on projects to obtain three estimates for all material, equipment, labour and sub-contractor items (Thomas & Ellis, 2007: 542). In addition, before probabilistic cost analysis is performed, there should be no doubt that the scope of work and specifications need to be adequately fulfilled. Estimators need to understand the methods involved in construction. Getting the three estimates ensures that ups and downs are covered and that the price is representative and reliable, enabling the contractor to make an informed decision on the final selection.

As the contractor receives more and more estimates for work packages, these estimates can be subdivided into three parts – a most likely range, a pessimistic range and an optimistic range (Thomas & Ellis, 2007: 543). For the amount of uncertainty and risk associated with costs, subdividing into additional ranges beyond the three above is unnecessary work that does not yield further information of much value. Considering three ranges is simplistic, accurate and representative.

8.1.1.2 Work packages

Construction projects usually have hundreds of thousands of work packages. Singh, Shiramizu and Gantam (2007: 20) demonstrate a technique of risk and contingency analysis by using only three work packages as an example. They refer to A, B and C, which are respectively foundations, civil works and structural works. Overhead costs, personnel costs and indirect costs can also form part of these work packages.

Various factors, such as variability in project activities, material and labour costs, will influence the probability of cost overrun or under run of the project (Ling, Chan, Chong & Ee, 2004: 76). Work packages costs can fluctuate for a large number of reasons, including slow worker production rate, lost work days because of sickness, injuries or

accidents, material shortages, delays in material arrival, faulty material, compressed schedules, rework due to poor quality, weather problems, crisis situations, misleading drawings, owner interference, terrain difficulties, poor estimating, lack of equipment performance, poor worker morale, etc.

Identifying and understanding risks is important to obtain a reliable estimate (Hannon, 2005: EST.09.2). However, risk analysis does not simply stop at identification and understanding of risks. The identification and understanding needs to be reverted to actual costs to get a solid grip on the budget ramifications of risk (Ling *et al.,* 2004: 77).

8.1.1.3 Price probability

Singh *et al.,* (2007: 20) expand on their work package example of A, B and C. Say, for example, that for work package "A" the contractor only gets three prices – $5, $7 and $10 (in thousands of dollars). The probability of obtaining a $5, $7 or $10 price on the project is therefore 33% each. If the contractor gets two quotes for $5, three quotes for $7, and one quote for $10, the probability of achieving $5 on the project is 33%, for $7, 50%, and for $10, 17%. Such a procedure for evaluating probabilities is valid when one has histograms to represent the frequency of prices.

8.1.1.4 Triangular distribution

One approximation that simplifies the analysis of the frequency distribution created above, as well as allows a continuous analysis, is the use of the triangular probability distribution as a surrogate for normal distribution (Singh *et al.,* 2007: 20). If one considers low, medium and high frequency levels, it is possible to obtain triangular distributions for commensurate optimistic, most likely and pessimistic prices.

For example, a triangular distribution could be as seen in Figure 6.13. A polyline could ensue such as in Figure 6.14 where an extreme price (the pessimistic price in this case) is expected to occur with some medium level of frequency. Fundamentally, the triangular shape is the expected distribution profile for data within the range of prices.

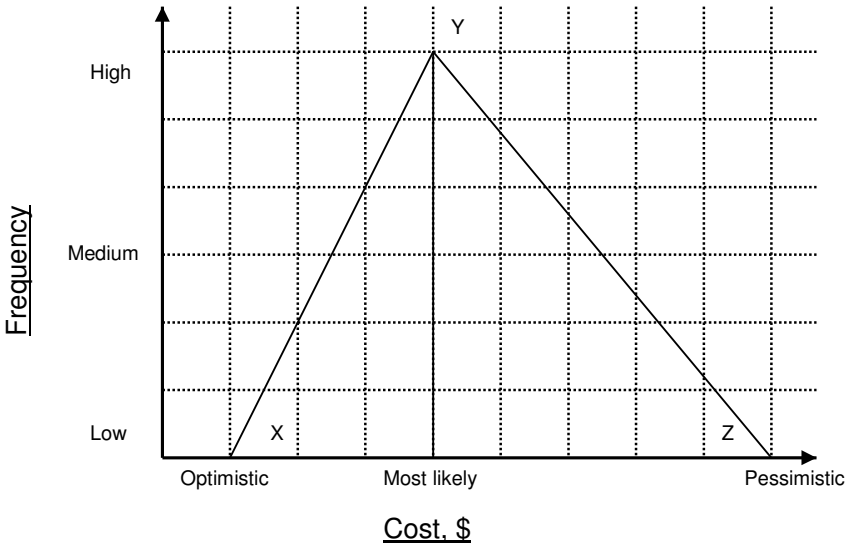


Figure 6.13: Triangular distribution of costs

Source: Singh *et al.,* 2007: 23

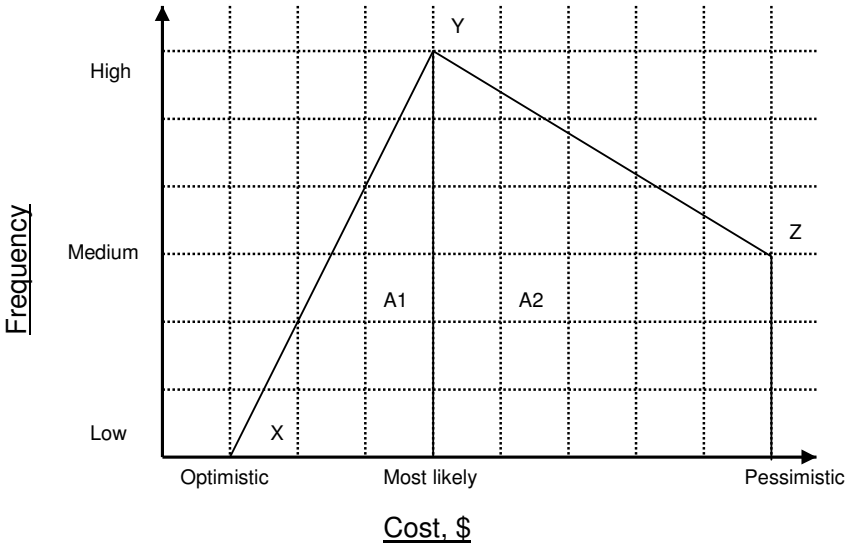


Figure 6.14: Polygonal distribution of costs

Source: Singh *et al.,* 2007: 23

8.1.2 Obtaining prices

Depending on how the pricing is being done, it is not necessary to obtain market prices for any particular work item if the estimator has enough experience. Combined with some feel for the under run or overrun, he can assign appropriate frequencies to the prices and arrive at a triangular or polyline distribution (Williams, 2006: 40). Thus the estimator can determine the absolute minimum price of a project as well as the

absolute maximum cost of as project, with potential prices ranging in between those extremes.

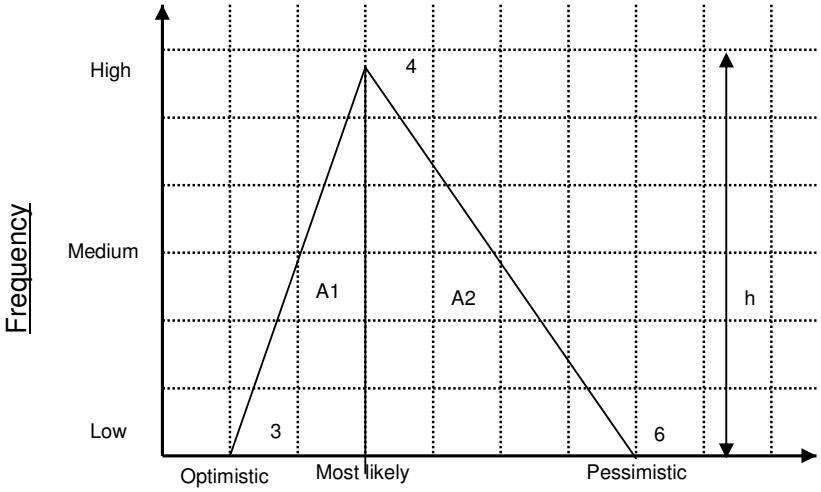
Estimators have different ways of determining prices. Whether the rates are based on market prices, or on historical data, or calculated from first principles – the bottom line is that the prices must be divided into three categories: optimistic, most likely, and pessimistic (Yiu & Tam, 2006: 476).

8.1.2.1 Frequency approximation by triangular distribution

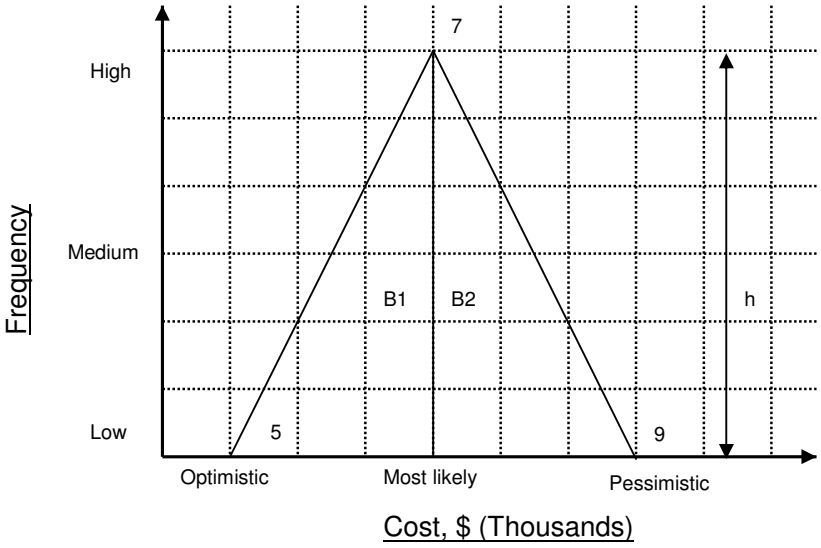
Triangular distribution uses graphing, calculating triangular areas under the "curve" and probabilities in order to organise contractors' bids. The basic assumption required for using triangular distribution is that the area under the "curve" represents the probability of cost. Each work package contains different elements of the project. A computer with specific software is recommended when this exercise has to be done on a real project, but for discussion purposes the following example can be used.

Singh *et al.,* (2007: 23) point out that if there are three different ranges of bid prices for a project consisting of three work packages (WP), namely work packages A, B and C, after the basic data has been collected and organised, each work package needs to be analysed individually. Figure 6.15 illustrates the triangular distributions for the three work packages. The areas under the graph represent the infinite number of possibilities that exist for specific work package prices occurring at a specific frequency. If an infinite number of bids can be obtained, the distribution plot can be approximated to the triangular distribution graph of Figure 6.15.

Work Package A



Work Package B



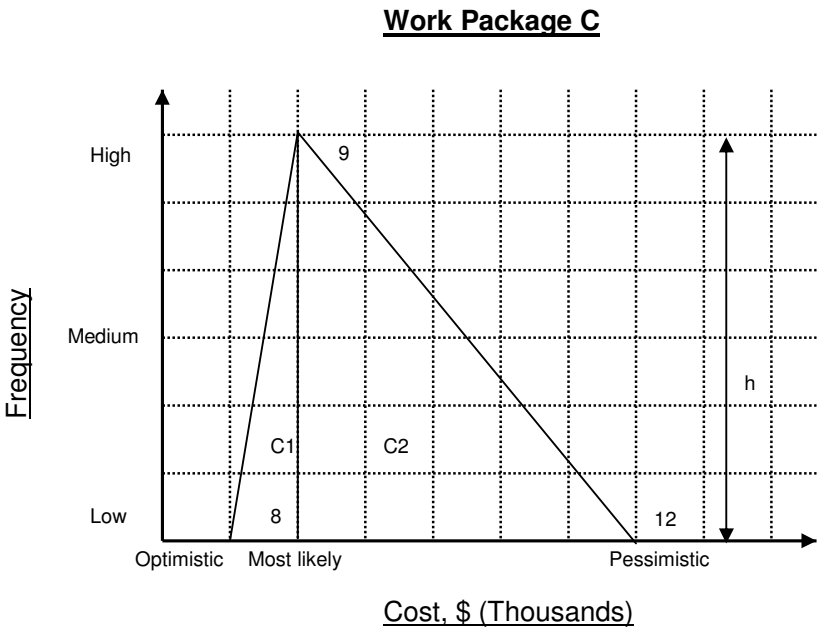


Figure 6.15: Triangular distribution costs of three work packages A, B and C
Source: Singh *et al.,* 2007: 22

To determine the probability of occurrence of any range of any work package, one must find the area under the curves. The areas of the respective triangles under each range must be calculated. The total area under the graph represents 100% probability of occurrence. Thus for work package A:

Area of Triangle A1 = ½ x 1 x h = 05.h

Area of WP Triangle A2 = ½ x 2 x h = h

Total area of work package A = Area of A1 + Area of A2 = 0.5h + h = 1.5h

Where h is the height of the most likely frequency, the areas for other WP ranges are found similarly. These are presented in Table 6.5.

Triangle	Area	Probability of Occurrence (P)
A1	0.5 x (4 - 3) x h = 0.5h	A1 / (A1 + A2) = 0.5h / 1.5h = 0.33
A2	0.5 x (6 - 4) x h = 1.0h	A2 / (A1 + A2) = 1.0h / 1.5h = 0.67

B1	0.5 x (7 - 5) x h = 1.0h	B1 / (B1 + B2) = 1.0h / 2.0h = 0.50
B2	0.5 x (9 - 7) x h = 1.0h	B2 / (B1 + B2) = 1.0h / 2.0h = 0.50
C1	0.5 x (9 - 8) x h = 0.5h	C1 / (C1 + C2) = 0.5h / 2.0h = 0.25
C2	0.5 x (12 - 9) x h = 1.5h	C2 / (C1 + C2) = 1.5h / 2.0h = 0.75

Table 6.5: Probability of occurrence
Source: Singh *et al.,* 2007: 24

Subsequently, the probability of occurrence of the zone represented by A1 is:

Prob. (A1) = Area of A1 / Total area of WP A = 0.5h / 1.5h = 0.33

Similarly, the probability of occurrence of the zone represented by A2 is:

Prob. (A2) = Area of A2 / Total area of WP A = h / 1.5h = 0.67

To obtain the probability of the overall costs on the project and to determine the final bid price, the individual probabilities of occurrence for the triangles in Table 6.5 need to be combined. The target cost is defined as the sum of the most likely costs for each work package. Figure 6.16 indicates a confidence of 29% at a value of $20K. The contractor might not feel comfortable to bid his work package with this price if he has a 70% chance of an overrun. This seems to be a risk situation where only the contractor can make a decision. A reasonable decision involves ascertaining the confidence limit with which the contractor feels satisfied.

Assume the contractor feels safe with either a target price or 80% confidence. Figure 6.16 indicates that the 80% confidence level represents a price of $22.10K, which is higher than the target cost. Should the contractor choose this value, he will be able to meet the target price and will be able to set aside a contingency fund.

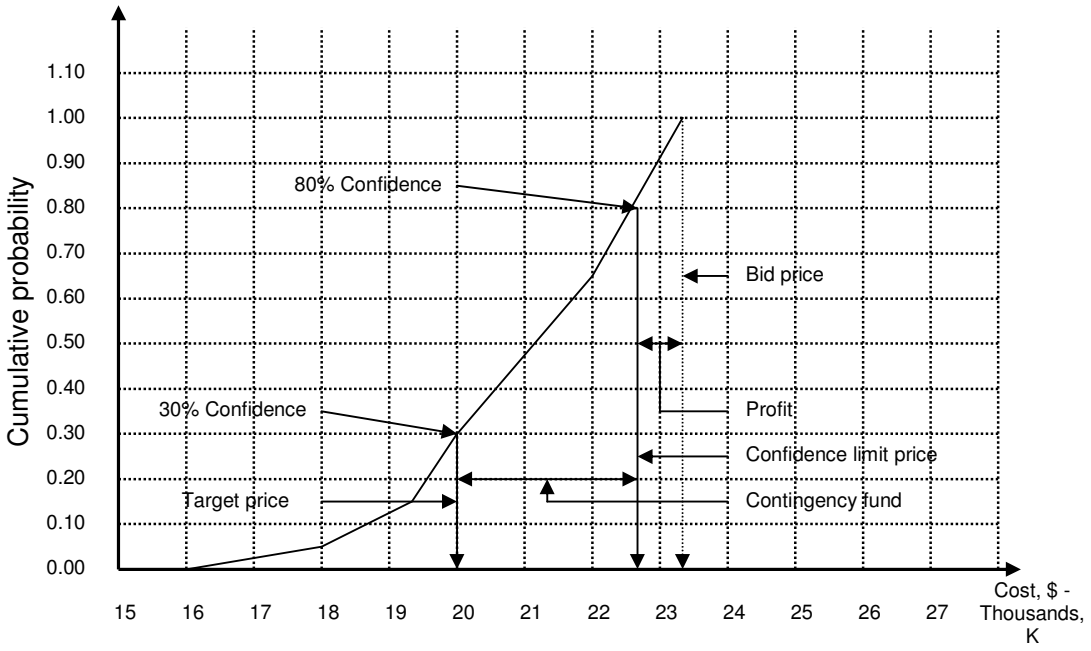


Figure 6.16: Confidence limits, bid price, and profit and the project

Source: Singh et al., 2007: 23

8.1.3 Beyond-contractual reward (BCR)

In the competitive bidding system, price is the decisive criterion so contractors may win the bid by tendering an abnormally low bid, accidentally or deliberately (Lo *et al.,* 2007: 409). When contractors begin construction under an unfavourable condition in terms of price, they often adopt some strategies to compensate for the deficit, such as using inferior material/labour and bringing up claims against the employer (Oyegoke, 2006: 98). All compensations gained beyond the contract are called beyond-contractual reward (BCR).

In general, contractors tender an abnormally low bid due to insufficient professionalism or cursory calculations. Such situations are referred to as “winner’s curse”, by which the contractor who wins the bid undertakes the construction at a sacrifice (Lo *et al.,* 2007: 410). The main factor that might cause serious problems for the construction market is contractors’ deliberate low-bidding behaviour. Certain bidders will extensively review the bidding documents, noting mistakes and ambiguities that will lead to loopholes in the contract and will pave the way for future in-contract claims. These bidders can lower their bid prices with the knowledge that they will be able to recover any “losses” in future change orders/claims (Yiu & Tam, 2006: 478).

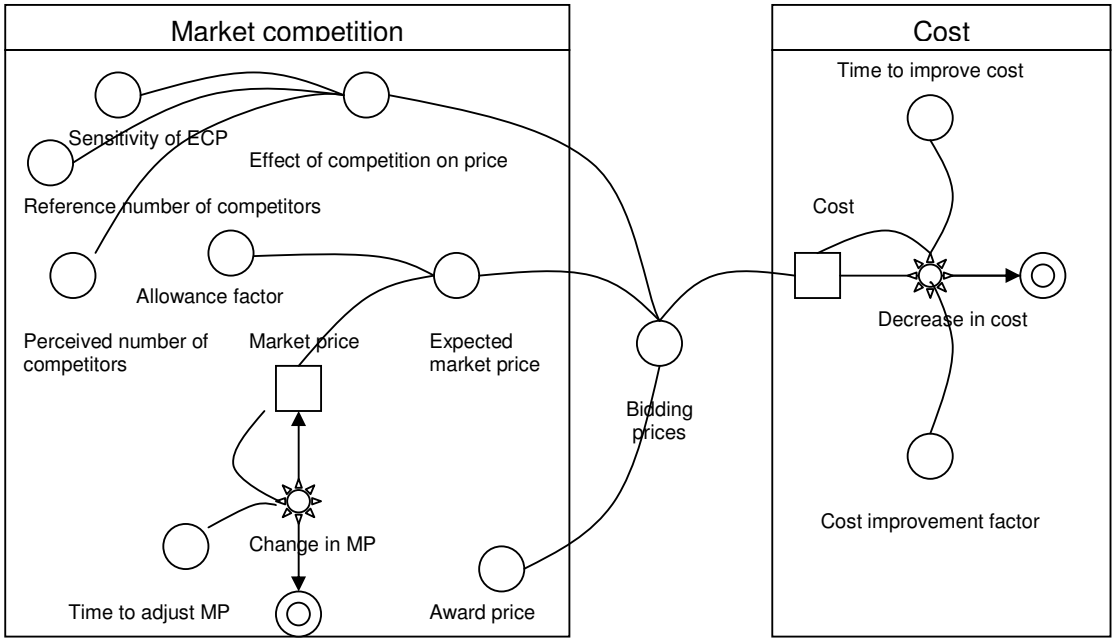


Figure 6.17: Contractor's pricing without consideration of BCR

Source: Lo, Lin and Yan, 2007: 411

Figure 6.17 indicates that a contractor's bidding price is influenced by interdependent variables from two dimensions of cost and market competition. According to the aforementioned assumptions, historical award prices and the number of competitors are the two fundamental considerations in the dimensions of market competition (Struts & Griffis, 2005a: 623).

8.2 Contingency fund calculation

Retief and Ker-Fox (2004: 1) indicate that contingency funds are widely accepted budgeting tools for affording projects acceptable levels of cost reliability. However, a global contingency pool can be misleading early in the project. Risk associated with initial project definition can consume a disproportionate amount of contingency, exhausting the available reserve funding prior to project completion.

Prasad (2008: EST.S02.1) points out that the concepts of contingency formulation is based primarily on the contract type being fixed fee (lump sum) or cost-plus (where a normal contingency fund is applied as required for budget restraints, engineering, etc.). Contingency setting remains one of the key areas of concern for a company's project system as the assignment of reliable contingency allowances in project cost estimates can make or break a project (Burroughs & Juntima, 2004: EST.03.1).

Over the years various contingency setting techniques have been developed in an ongoing search for reliable approaches. These techniques vary from simple to complex in their development and use, but all have the objective of improving the accuracy of the project estimate.

Burroughs and Juntima (2004: EST.03.1) describe contingency as an amount of money that experience has demonstrated must be added to the base estimate to provide for uncertainties related to (a) project definition and (b) technological uncertainty. Contingency is money that is expected to be spent. The contingency account is not to provide for changes in the defined scope of a project, or for unforeseeable circumstances beyond management's control. Contingency should also not be viewed as a reserve or slush fund that the project team cannot spend without upper management's approval. Likewise, management should not have the expectation that if a project team does its job well contingency will not be spent. Burroughs and Juntima (2004: EST.03.1) comment on an approach of setting a contingency at an amount that achieves a 50% probability of overrun. At a 50% probability the project system, on average, is expected to spend its entire contingency.

The previous discussion assumes that the base estimate is a realistic and competitive estimate of the known scope and also assumes typical site and market conditions. A competitive base estimate is free of excessive allowances and markups for general unknowns. Allowances to cover specific, but uncertain items are within the base estimate. The competitiveness of the base estimate is a key factor to consider in contingency setting (Burroughs & Juntima, 2004: EST.03.1).

The majority of projects set their contingency using techniques that can be grouped into one of three categories: predetermined percentage, expert's judgment, and risk analysis.

8.2.1 Predetermined percentage

Burroughs and Juntima (2004: EST.03.1) point out that most companies using this form of contingency setting would allow 5 to 10% of their base estimate as a contingency. This form of allowance may seem arbitrary, but this allowance is a reasonable average for contingency use in the process industry.

The advantage of this method is its ease of use and its consistency. Using a consistent percentage removes subjectivity from the process. Because of its ease of implementation, a fixed contingency percentage is often the technique applied to smaller projects. The disadvantage of the method is that it removes specificity and subjectivity from the process; it is inflexible to potentially important risk drivers, such as process complexity, use of new technology, and level of project definition. Because of this, this method tends to under-estimate contingency needs for complex or poorly defined projects and to over-estimate for simple or well-defined projects. By failing to take project risk drivers into account, the pre-determined percentage method produces large variations in the probability of overrun or under run from project to project.

8.2.2 Expert's judgment

A more advanced and flexible methodology for determining contingency is to use educated judgment of experts to assist in setting a contingency level (Unal *et al.,* 2005: 34). In this technique, skilled estimators and project team members use their experience and expertise to assign a level of contingency that they believe is appropriate for the project at hand. Unlike the pre-determined percentage method, expert judgment considers specific risk factors and base estimate competitiveness.

The degree of structure to this form of contingency setting process varies widely. Typically, the experts must consider bounds or norms (formal or informal) for contingency outcomes. These bounds may be expressed by using an expanded version of the pre-determined contingency approach whereby the experts must select from contingency that are pre-determined for discrete risk levels. If the process is more highly structured than this, it tends to be classified as a risk analysis (Humphreys, 2004: 3).

By using specificity and subjectivity in setting each project's contingency level, a project system is more likely to have more accurate estimates (Kasprowicz, 2004: 2). However, subjectivity is also the main disadvantage of this method in that the skill, knowledge and motivation of the experts may vary widely. Typically, only a few experts are available whose understanding of project cost risk and estimate competitiveness can be relied on. This experience is not easily transferable, which makes turnovers a primary concern (Al-Tabtabai *et al*., 1997: 283).

8.2.3 Risk analysis

Risk analysis techniques examine risk factors in a more structured way than expert judgment and apply specific quantitative methods of translating the assessed risk into contingency values (Humphreys, 2004: 2). The quantitative methods are usually probabilistic and allow the statistical confidence level of cost outcomes to be considered (Touran, 2003: 281).

The most commonly used form of risk analysis employs Monte Carlo analysis as the quantitative method. In this technique, a probability distribution is assigned to each estimate line item or subtotal, and the simulation tool randomly selects a possible outcome from each item's distribution and aggregates the item outcomes into a total expected project cost outcome (Vrijland, 2005: DEV.06.1). This process is repeated many times to obtain an average total cost. The distribution of the iterative outcomes can then be used to select a contingency value that provides the level of statistical confidence desired (Whiteside, 2008: EST.04.2).

The main advantage of risk analysis techniques is that they are probabilistic in nature. They allow confidence levels to be explicitly considered and they are flexible (Hollmann, 2007a: RISK.03.6). Monte Carlo analysis can be applied to any estimate or cost analysis that can be totalled or modelled in a spread sheet.

Koller (2005: 3) states that risk analysis techniques have another advantage if the risk assessment step is done in a group setting wherein the project team reviews the entire estimate from a risk perspective. This is often the only review of the estimate, and the outcome of the review is almost always an improved base estimate, as well as a probabilistic contingency value.

Kubitscheck (2000: 40) proved that a disadvantage of risk analysis techniques as typically applied can be that the estimate items for which probable outcome distributions are being assigned are not, in themselves, risk drivers. The distributions assigned, therefore, tend to be somewhat meaningless. For example, the typical cost model is a spread sheet tabulation of estimate elements such as piping and electrical line items. Lapinski, Horman and Riley (2006: 1086) mention that the estimator is expected to assign a probability distribution to "piping". However, if the major risk driver is the level of project definition, few estimators will have a really good idea of how project definition will affect any particular line item (Kraus, 2008: 3).

Risk analysis also requires more time and resources to implement when compared to predetermined percentages or expert's judgment (Lavingia, 2004: PM.09.1). The Monte Carlo technique is also deceptively complex (Lin & Shen, 2007: 6). For example, it requires that dependencies be established between elements of the cost model. The complexity also allows outcomes to be easily manipulated, thus the results are often inconsistent. The time and complexity of risk analysis techniques often mean that they are reserved primarily for larger projects or projects of increased business importance (Garlick, 2007: 3).

8.3 Significance of work breakdown structure in contingency modelling

Zhao (2006: RISK.05.2) suggests an improved contingency management tool by breaking the contingency allowance down into the work breakdown structure (WBS) of the project. In the qualitative risk assessment process, the risk breakdown structure (RBS) offers "a source orientated grouping of project risks that organises and defines the total risk exposure of the project" in a hierarchical structure.

Each WBS account bears different types and degrees of risks, therefore the variability of uncertainty can be a wide swing between accounts (Verveniotis, 2008: PM.02.2). An unbalanced WBS could skew the simulation results because the variations of risks could be generalised instead of specific. Zhao (2006: RISK.05.3) states that the main advantages of WBS usage to help break down the estimate are the following:

- Future changes can be attributed to the associated WBS accounts.
- Human errors can be traceable back to appropriate WBS home domains.
- Responsible individuals can be accountable for respective WBS contingency.
- Potential savings can be recognisable in corresponding risk-free WBS.

The whole process of modelling risks goes to the heart of cost management (Singh, Oh, Labi & Sinha, 2007: 220); Cullen, 2004: CSC.01.1). Appropriate allocation of the contingency funds to risk-affected WBS accounts also increases the project manager's accountability following the risk allocation principle (Groth & Kinney, 1994: 55). Furthermore, the contingency, derived from the simulation process, must be properly scaled and dispersed into WBS accounts following the approved project execution schedule. Hamilton (2004: CSC.12.3) points out that this dispensation of contingency

funds over time is referred to as a contingency drawdown management plan. All contingency budgets should be tied to specific risks (Guizhi, 2004: 3). The advantage of locking contingency into WBS based risk accounts not only provides project managers with certain flexibilities in managing their cost forecasts, but also prevents borrowing contingency money from other accounts or advancing from future timeline (Zhao, 2006: RISK.05.5).

8.4 Contingency misuse

According to Noor and Tichacek (2004. RISK.04.1), estimates are conducted with certain assumptions in mind - resources will be available, vendors will co-operate, there will be no strikes and inclement weather, etc. These assumptions can all lead to risks. The allowance for such risk is being dealt with by means of a compensation for these risks (Lenard, 2004: 2). This funding is referred to as “contingency”. Portions of the overall contingency are assigned against specific project activities or work packages.

Allowances for specific items or “known committed costs” differ from contingency in the sense that they are not risk based or dependent. Allowances are derived from elements that are expected to occur, and are within the scope of the project. Should the contingency not be utilised for the assigned activities it can lead to the misuse of the contingency allowance that might result in cost overruns on the project.

8.5 Contingency management

Construction project performance is frequently measured in cost, time, and value of the constructed facility (Ford, 2002: 30). A traditional approach to managing multiple objectives applies a zero-sum-gain perspective. The aggregate performance in the three dimensions (lower cost, shorter project duration, and better facilities) is assumed to be fixed. Trade-off decisions are used to achieve better performance in more important dimensions at the cost of poorer performance in more important dimensions (Oyegoke, 2004: 2). Accepting increased costs to reduce project durations by paying for overtime is perhaps the most common application of a zero-sum-gain approach to managing construction projects (Tichacek, 2005: CSC.11.2). This perspective forces managers to choose amongst lower cost projects, shorter project durations, or better facilities and contrasts with their desire to satisfy all three of these project objectives (Barraza & Bueno, 2007: 140).

Project budgets are one of the most important and widely used project management tools (Verster, 2004: 5). Project complexity and the inherent uncertainty of the financial performance of constructed facilities, development funding, and the control of costs and schedules make exact budget needs impossible to forecast accurately. These same characteristics also cause projects to deviate from plan (Barraza & Bueno, 2007: 141). Therefore, contingency funds are included in development budgets to provide managers with the flexibility required to address uncertainties and deviations that threaten achieving objectives (Evensmo & Karlsen, 2006: EVM.06.1). Large contingency sizes, the challenges of managing contingency, and the central role of budget contingency in determining project success make contingency management an important project management issue (Ford, 2002: 30).

Improving contingency management requires an understanding of how managers make budget contingency decisions and the impact of those decisions on performance (Kadir, Lee, Jaafar, Sapuan & Ali, 2006: 415). Several questions must be answered to model and understand contingency management. What cost, time and value objectives do managers seek to achieve with budget estimates?

Few formal theories of project budgeting and cost control are available. Kohl and Wulke (2004: IT.03.1) state that cost estimating tools facilitate developing budgets but do not address the management of budgets for contingency during projects. Most of the accounting systems record and report historical costs but do not facilitate management by forecasting monetary requirements or directly influencing future performance (Barraza & Bueno, 2007: 141).

The primary role of contingency is to counterbalance the risk of spending beyond the project's monetary resources due to deviations from project plans. Ford (2002: 32) identifies four contingency management objectives:

- Resolve emergencies: Protect against spending more than the budget by providing funds for future required unforeseen expenses.
- Control the schedule: Assure completion by the project deadline by accelerating progress.
- Improve the facility: Add value to the constructed facility, typically by design and scope changes or by adding to marketing or leasing programmes beyond minimum project requirements.

- Return excess contingency: Return contingency that remains after project is completed.

The first two objectives identify many of the risks identified in the literature that contingency are used to manage. Objective three directly impacts on the constructed facility and reflects the traditional project management performance measures of cost to deliver the facility (Mattheys, 2004: 5). In contrast, the fourth objective of contingency management is related to managerial performance but not directly to project performance.

Ford (2002: 32) mentions that exhausting contingency funds before the project is complete is considered a serious and grave condition. The speed at which managers are willing to reallocate funds to lower priority uses, and thereby increase the risk of exhausting contingency funds, distinguishes contingency management strategies (Atkin, Akintoye & Skitmore, 1993: 13). Consistent with the priority of the accounts, management efforts early in the project focus on reducing uncertainty by discovering the unexpected problems on the project and protecting their ability to meet project objectives by preserving contingency funds (Berends & Dhillon, 2004: 329).

Managers respond to decreasing uncertainty as projects progress by decreasing the funds considered necessary to address future emergencies (Kharbanda, Stallworthy & Williams, 1987: 87). As uncertainty decreases and deadlines approach, a majority of managers shift from primarily protecting contingency for later use to a willingness to use contingency to assure the timely completion of the project (Burroughs & Juntima, 2004: EST.03.1). Therefore, funds held to address emergencies decrease but total contingency spending increases as projects approach their deadlines. This increases the risk of exhausting contingency fund, because the contingency fund remaining is shrinking while the rate of contingency use is increasing.

Contingency management strategies are either aggressive or passive (Retief & Ker-Fox, 2004: 1). An aggressive strategy re-allocates funds quickly, uses contingency funds to correct schedules before many emergencies have been discovered and resolved, and applies funds early to improve the facility. In contrast, passive strategy re-allocates slower, postpones using contingency funds until it must be used to meet critical objectives, and uses little funds for improvement until emergency and schedule objectives are met.

Rowe (2005: CSC.14.1) demonstrates in Figure 6.18 the downward sloping channel that represents total project contingency over the construction period of the project. Typically, the baseline project budget is set at some point in the project life cycle (Alexopoulos, Mourtzis, Papakostas & Chryssolouris, 2007: 1688) and project managers must live within that contingency budget. Ideally, the baseline budget should not be set until the project manager has a good handle on the remaining project risk and can determine a sufficient value of contingency to include in the budget to cover that risk (Fang *et al.,* 2004: 855).

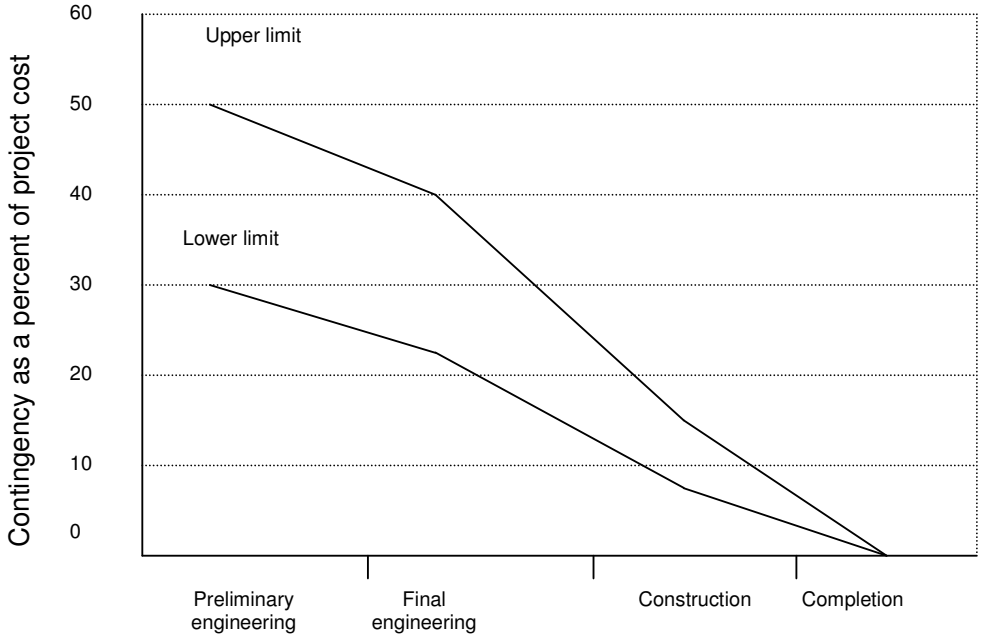


Figure 6.18: Project contingency should decrease over the construction period
Source: Rowe, 2005: CSC.14.2

During the construction phase, the estimate at completion of the contract packages changes more quickly than at any other phase of the project (Nutakor, 2007: 13). Potential contingency shortfalls need to be addressed to either re-deploy contingency, or to re-build the contingency allowance. By the start of the construction phase, final design should be complete and most, if not all, risk associated with each contract should result from change order growth occurring after contract award (Hanna, Camlic, Peterson & Nordheim, 2002: 59; Molly, 2007: 12). Since the estimate for a construction project is only intended to predict the bid price of the contract (Burrows, Pegg & Martin, 2005: PS.14.3), contingency fund must be included in the contract budget to account for change order growth.

Guidelines should be established to govern the amount of change order contingency to be assigned to each contract (Clare, 2008: EST.02.2). A survey of past experience with change order growth on completed contracts can provide a good basis for setting these guidelines. Doyle, Molnar and Brown (2008: OWN.02.2) state that typically, since different types of contracts contain different levels of change order risk, initial contingency guidelines should take the contract type into account. Table 6.6 shows an example set of guidelines by contract type.

Contract type	Initial change order contingency (as a % of contract cost)
Procurement only	5%
Typical construction	10%
Special construction:	
Tunnels	15%
Very small contracts	20%

Table 6.6: Guidelines for initial contingency assignment – example
Source: Rowe, 2005: CSC.14.2

Once construction contracts have been awarded, accurate forecasts are needed to track contingency consumption. The forecast should include the original contract price, the approved change orders, pending change orders, and all other identified cost issues. The cost of quality can be noted here (Abdul-Rahman, 1997: 465; Abdul-Rahman, Kwan & Woods, 1999: 594) as well as the indirect effect of construction delays (Abdul-Rahman, Berawi, Berawi, Mohamed and Yahya, 2006: 128; Aibino and Odeyinke, 2006: 667). A well-maintained forecast will change from day to day as issues are identified, negotiations are completed, and costs are agreed upon. It will, however, be impossible to accurately forecast the end-of-job cost just by allowing the known changes (Cheung, Yiu & Yeung, 2006: 807; El-Adaway & Ezeldin, 2007: 365). There will always be a certain amount of unknowns/risk items that will have to be catered for in the contingency allowance. The tracking of the contingency fund is another managerial function.

For simplicity, one could assign retained contingency funds based on the assumption that risk drops linearly as a contract is completed and is inversely related to the percent complete. As an example, at 80% complete, 20% of initial contingency fund

would be retained to account for changes that have not yet been identified. For each monthly forecast (F) reading, the Value of Changes Forecast (Δ_t) at the time was calculated by subtracting the Original Contract Amount (C_0) (Rowe, 2005: CSC.14.2).

$\Delta_t = F - C_0$

Once each contract is complete, the Final Contract Amount (CF) is known and the Final Value of Changes (Δ_F) can be calculated as follows:

$\Delta_F = C_F - C_0$

Rowe (2005: CSC.14.4) indicates that should a graph be drawn based on the actual data of historical projects, it will not follow a straight line, but will curve and taper off towards the end. Typical historical data for such a graph can be seen in Table 6.7.

Ripley (2004: CSC.08.1) notes the difference between “estimating contingency fund” and “management reserve”. The term “contingency” has been previously defined in this chapter and can be utilised for the following:

- Quantitative growth over and above the base quantities including the allowances in the Bills of Quantities (Diano & Cao, 2004: 2). These are associated with design development.
- Material costs – these are associated with quantitative growth, commodity pricing, shop loadings, equipment pricing, and other factors that impact on material cost (Menches & Hanna, 2006: 1286).
- Mechanical equipment and costs – these would be impacted by the timings of freezing the equipment list (Hanna, Camlic, Peterson & Lee, 2004: 765).
- Craft labour costs – these are associated with craft labour performance, quantitative growth, labour environments, craft availability, and other elements (Squires, Reid & Jeon, 2008: 85).
- Other factors that might be considered include items such as indirect field costs, home office labour, errors and omissions, schedule slippage, etc. (Simon & Sohal, 1995: 14 – 16).

Contingency management is an ongoing process, and a contingency management plan should be implemented early on (Barraza & Bueno, 2007: 143). This plan should

address how often the contingency fund will be re-evaluated, how the contingency fund draw downs will be handled in the intervening period, techniques to be utilised, and other issues. A periodical re-evaluation of the contingency fund should be the key feature of the process.

Percent complete (P)	Percent of final changes included in contract forecast
10%	8%
20%	36%
30%	52%
40%	63%
50%	72%
60%	80%
70%	86%
80%	91%
90%	96%
100%	100%

Table 6.7: Value of the ratio between Value of Changes Forecast and Final Value of Changes

Source: Rowe, 2005: CSC.14.4

Ripley (2004: CSC.08.3) recommends that the contingency fund be distributed across the contingent accounts in line with the risk assessment used to set the level of contingency fund. He also refers to the use of a draw down curve that relates contingency to the amount of activity completed. A similar approach using milestones could be used for the management of allowances.

The management reserve can be described as an amount added to an estimate to allow for discretionary management purposes outside of the defined scope of the project as otherwise estimated, in other words, for additional scope over and above the estimated scope. The management reserve is not expected to be spent unless management so directs, and is generally not included in all estimates (Ford, 2002: 38).

9.0 SUMMARY

Quantifying the risks associated with an estimate or cost forecast is one of the tasks which carries the most uncertainty and which can result in a substantial portion of the total construction cost. Mitigating this risk is a task that will necessitate a sound knowledge of risk analysis and risk management. Risk should be identified early in the project to cater for uncertainty, probability and consequences; allowing sufficient fund allocations on each specific risk.

The quantification of risk is done through risk analysis. Estimates are developed throughout the stages of the project. There are normally not a lot of project information available during the early stages of a project.. With incomplete information comes risk and it is this risk that is being addressed in the contingency fund.

Contingency funds are included in development budgets to provide managers with the flexibility required to address uncertainties and deviations that threaten achieving objectives. The amount of contingency that should be allowed is dependent on the level of scope definition, etc. Contingency management requires an understanding of how managers make budget contingency decisions and the impact of those decisions on performance. A popular method to perform contingency analysis is by means of a Monte Carlo analysis.

Monte Carlo analysis is normally used to allow for combinations of distributions. This technique is generally used to solve problems for which the definition of specific solution equations to calculate a specific answer is either too complex or too cumbersome to be practical. The use of Monte Carlo analysis can also be applied to escalation analysis.

Escalation comes from the interplay of changes, real or anticipated, in input costs, perceptions of risk, and perceptions of the competition. More often than not, it comes from the formation of market opinions, which may or may not have a basis of fact. Ultimately, the ability for contractors to raise prices depends entirely on the market conditions and the expectation that all bidders are increasing their prices. Increased input pricing and increased risk can influence that expectation, but cannot on its own increase prices.

As mentioned, price escalation and the contingency fund can amount to a substantial portion of the total cost of the project. The importance of the financial forecast lies in the fact that should fairly accurate data be available at the beginning of the project, management will be able to steer clear of possible pitfalls in unprofitable projects and improve their financial planning. A forecast is only correct if the base assumptions continue to exist in the future, however, most people treat the forecasts as nearly factual without updating the basis.

The following chapter deals with the development of a cost forecasting model. The combination of cost estimating and financial forecasting assists management in making purposeful decisions, and to consider important financial management decisions.

CHAPTER 7

LITERATURE REVIEW ON FINANCIAL FORECASTING MODELS

1.0 INTRODUCTION

Modern construction budgets are getting tighter, and owners and clients are demanding and expecting more from the contractor (Bredehoeft, 2004: EST.06.1). The importance of financial planning and forecasting cannot be overstressed. Several examples of international projects that cannot be considered financial successes are available. Broad (1990: The New York Times – June, 10), for instance, commented on the United States of America's Freedom Space Station. The initial budget for this project was $8 billion. The estimated final cost in 1990 was $120 billion and counting.

The management of a corporation needs to make financial decisions based on the forecasted profit that the business will accumulate on the projects it is currently busy with (Brooks & Coleman, 2003: 32). These decisions are deciding to the business' future and cannot be stalled until the project is completed. Most engineering projects run over a couple of years, so methods should be derived to properly report all costs on the project as well as to forecast possible future costs on the project (Carson, 2007: PS.02.1).

Chan, Scott and Chan (2004: 153) mention that there will most likely be time constraints in obtaining an estimate for scope changes. In most cases (especially in a design-and-construct environment) several designs will have to be tested and cost to obtain an optimum design (Cheng & Li, 2006: 831). This, together with constant additions and omissions to the current scope will make it almost impossible for the estimator to price, if he does not have a special set of skills and tools. These tools come in the form of Ratio Conceptual Estimating (RCE) which can be employed quickly and effectively (Chung & Skibniewski, 2007: IT.S07.1).

It is therefore important to understand the importance of the time and the influence it will have on costs should the project be delayed. Time also plays an important role in setting the financial forecast in the sense that the earlier the project team is made aware of substantial financial increases or decreases in the estimate final cost, the better this situation can be managed (Love *et al*., 2005: 187).

Project planning is therefore crucial in the success of the project. Several project scheduling techniques have been developed over the years (Verveniotis, 2008: PM.02.2). The project plan is developed in accordance with the phases of a project and in similar manner as project costs. These schedules should tie into the budgets and should be constantly updated through the life of the project to be able to apply proper cost control (Hyari & El-Rayes, 2006: 11).

As part of the cost control that will be necessary to manage the project at a financial level, it will also be necessary to create and update a cash flow model for each project (Louw, 2002: 218). Park *et al*., (2005: 172) states that a good cash flow technique needs to include both a historical trend-based data method and competent judgments based on construction experience. The availability to have access to cash is considered by some a luxury and should be obtained as far as possible (Odeyinka *et al*., 2008: 6).

Probably the most important aspect of cash flow analysis is the ability to forecast the projected final cost of a project to enable the project team to resource the project accordingly. The forecast of the estimated final cost begins during the pre-tender period (Skitmore & Drew, 2003: 36). The pre-tender forecast is updated during the construction phase of the project as new and improved scope detail surfaces.

A valuable tool when conducting financial forecasts is Ratio Conceptual Estimating (RCE). The basic methodology of this form of estimating has been discussed earlier in this study. By applying the historical database (Addendum D) one can perform quick and fairly accurate estimates of additions and omissions to the scope of work.

2.0 FINANCIAL FORECASTING

2.1 The value of time

Time is part of the measuring system used to sequence events, to compare the durations of events and the intervals between them, and to quantify the motions of objects (Duff, Okun & Veneziano, March 2002). Time has been a major subject of religion, philosophy and science, but defining it in a non-controversial manner applicable to all fields of study has consistently eluded the greatest scholars.

In physics as well as in other sciences, time is considered one of the few fundamental quantities. Time is used to define other quantities – such as velocity – so defining time in terms of such quantities would result in circularity of definition (Heathcote, 2004: 4). An operational definition of time, wherein one says that observing a certain number of repetitions of one or another standard cyclical event (such as the passage of a free-swinging pendulum) constitutes one standard unit such as the second, is highly useful in the conduct of both advanced experiments and everyday affairs of life (Lim, Huang, Puncher & Chen, 2007: 1832). The operational definition leaves aside the question whether there is something called time, apart from the counting activity just mentioned, that flows and that can be measured. Investigations of a single continuum called space time bring questions about space into questions about time, questions that have their roots in the works of early students of natural philosophy (Liverpool & Bryant, 2004: CDR.09.1). Time is (as in so many other cases) just as important in construction. Tompkins (1985: 54) puts the effect of time in construction in the right perspective when he states that "…few actually realize and utilize the true meaning of time".

Chassiakos and Sakellaropoulos (2005: 1115) point out that construction projects typically require time and effort to complete, several resources to be used, and a large amount of capital investment to spend. A particular objective for every project team will be to optimize the project duration. Gardiner and Stewart (2000: 251) indicate that projects are seldom completed in time and on budget. They mention values of "typically between 40% and 200%" of construction projects. Delays can have serious financial implications and can attract possible penalties, price increases, etc. which the contractor did not allow for initially. Figure 7.1 illustrates a typical project time management overview. Sappe (2007: 21) provides an example of the positive effects of an early finish on a construction project in the savings that were shown when the Hartsfield-Jackson Atlanta International Airport was delivered 11 days early and under budget by $102 million. The airport handled 976,000 flights and 88 million passengers in 2006 alone. It is easy to see the effects that even a one day early operational start will have on the income of such a facility.

Jiao and Tseng (1999: 739) comment on how improved time management can result in lowering product costs. Jenkins, Babuk and Mohitpour (2005: PM.13.1) express similar views. Zayed (2005: 667) and Zayed and Halpin (2005: 779) point out how increased productivity can enhance product value. The influences of productivity on construction cost have been discussed earlier in this study

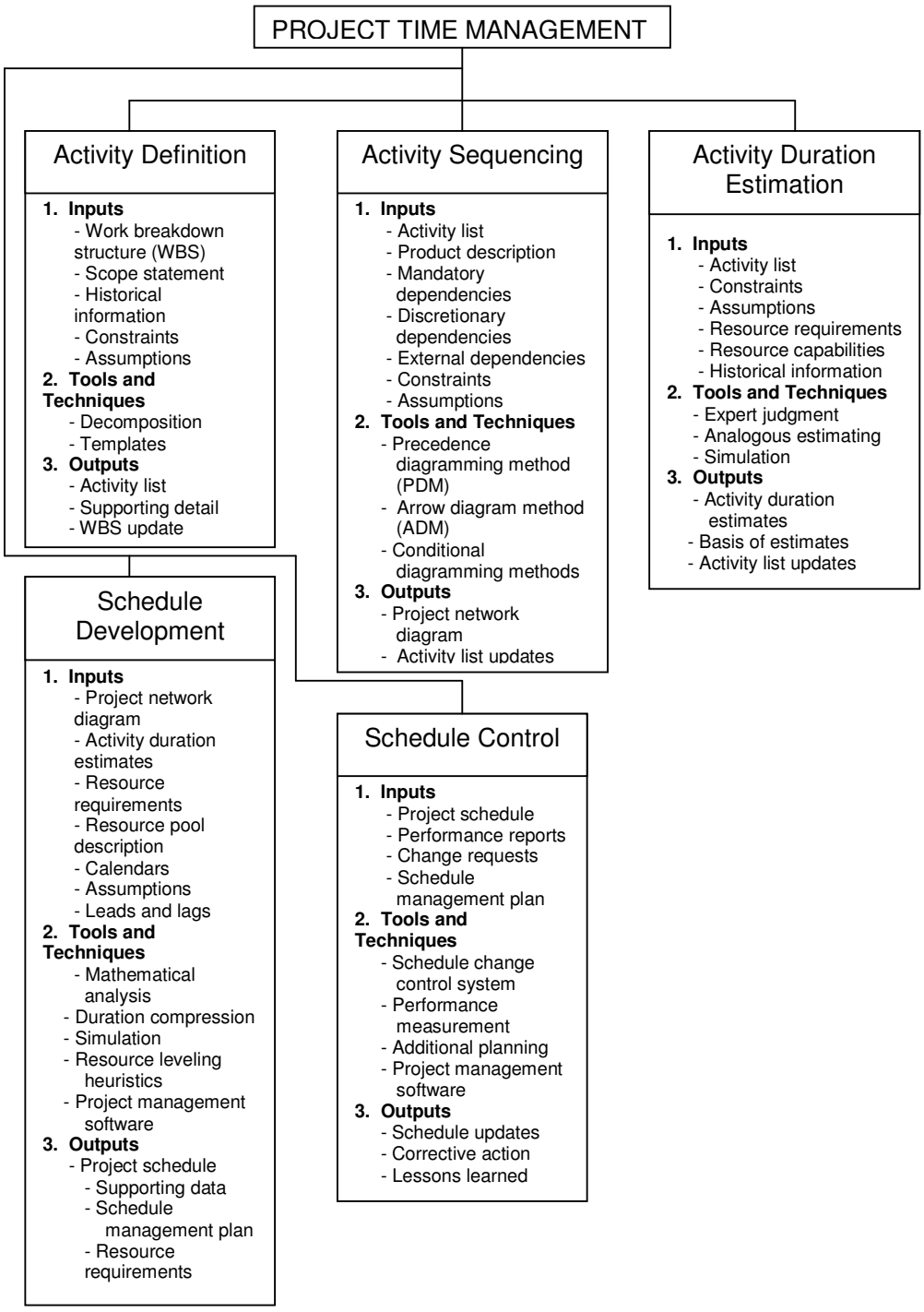


Figure 7.1: Project time management overview

Source: PMI , 1996: 60

Kim and De la Garza (2003: 510) state that the impact of time on construction cost necessitate good time management on the project and all necessary steps should be in place to capture any costs pertaining to extension of time (construction program) and acceleration. Farrow (2004: 1) and Farrow (2007: 218) demonstrate the importance of dealing with the cost implications for extension of time, and Singh (2003: 312) refers to the effect of acceleration due to efficiency losses either due to non-productivity or under-manning.

2.2 Time-cost optimization

Love *et al.*, (2005: 187) point out that cost has proven to be the most significant predictor of construction time. They recommend a simple equation which can be used to determine construction time. The equation proposed can be described as follows:

$T = KC_b$

Where:

T = duration of construction period from date of site possession to practical completion in working days
K = a constant describing the general level of time performance for a $1 million project
C = final cost of structure in millions of dollars adjusted to constant labour and material prices
b = a constant describing how the time performance is effected by project size as measure by cost

Horman and Kenley (2005: 52) describe the effect of wasted time in construction and Mazouk and Moselhi (2004: 878) comment on the effect of travel time for material and labour in construction. These are just some examples of what influence time has on construction cost.

With the rapid proliferation of the use of alternative project delivery systems, construction stakeholders are no longer focusing merely on minimizing cost alone, since time could also be a crucial variable in the bid evaluation and construction processes (Zheng *et al.*, 2005: 81). Compression in project duration would inevitably result in direct cost escalation, as extra labour and plant resources would be required

to expedite the works (Mitchell & Klastorin, 2007: 960). Time-cost optimization is a process to identify suitable construction activities for speeding up, and for deciding "by how much" so as to attain the best possible savings in both time and cost.

Hastak, Gokhale, Goyami, Hong and Safi (2007: 435) point out that since there is a hidden trade-off relationship between project time and cost, it might be difficult to predict whether the total cost (i.e. the direct and indirect costs) would increase or decrease as a result of the schedule compression. In reality, although the direct cost would increase as the project duration reduces, the indirect (overhead) cost, being a fixed daily cost, could fall. Zheng *et al*,, (2005: 81) hereby imply that there is a possibility that the lowest cost and the shortest time can be located synchronically.

2.3 Schedule forecasting and earned schedule analysis

Tompkins (1985: 54) refers to the generalized usage of the phrase "time is money", which is very relevant in construction. Since the cost of project time in the later phase of a project (e.g. the construction phase) is far greater than during the initial construction phase (e.g. the design phase), it is important to project cost success to have thorough planning at the beginning (Checkley, 1994: 21). He indicates that some project analysts have estimated the completion/start project time-cost ratio to be as much as 300 to 1. This ratio indicates that the time spent at the end of a project is approximately 300 times more expensive than time spent at the beginning of a project.

Changes later on during the project's life, impacts a greater number of personnel and also a greater number of hardware characteristics that may have already been designed, manufactured and/or fabricated (Kaka, Lewis & Petros, 2003: 16). The cost of design change has been discussed previously in this study. Tompkins (1985: 55) indicates that an equitable balance in initial planning and a healthy initial project inertia resulting from a quick start will achieve optimum project cost results. Figure 7.2 illustrates the process flow of a project and indicates how activities overlap to optimize project schedule.

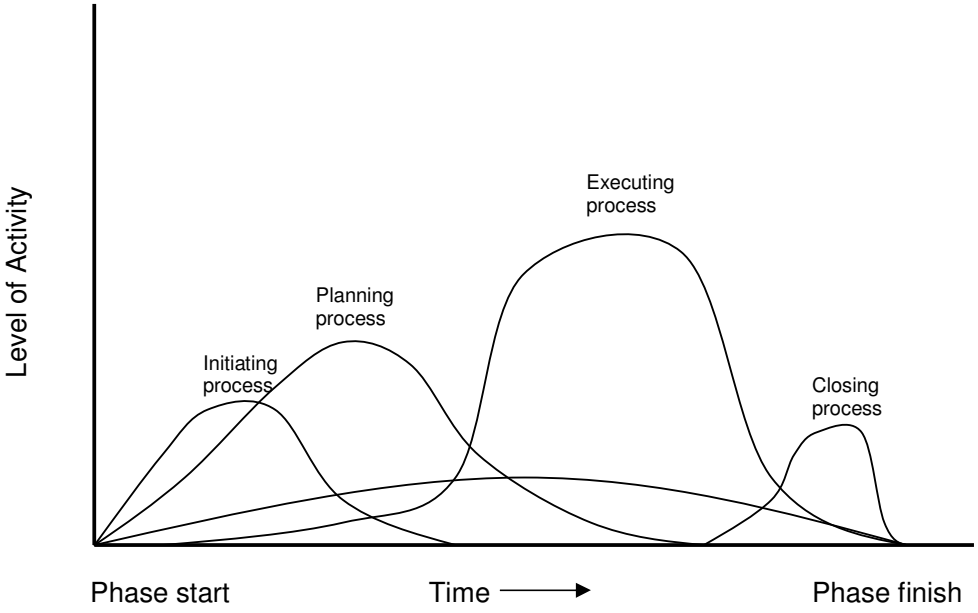


Figure 7.2: Overlap of activities in a project

Source: PMI, 1996: 29

Several project programming and scheduling techniques have been developed. Some are simple, such as the bar chart, and have been in use for the last century (Verveniotis, 2008: PM.02.2). While the more sophisticated methods were developed in the 1950s in America as a result of the advent of larger, more sophisticated industrial projects and the acceptance of computers. Consequently, present day management has several planning and scheduling techniques from which to choose (Winter & Calvey, 2008: PS.03.2). This, in itself, is a problem in that each technique has an optimum and it is possible to waste much of the project's budget in selecting and applying an inappropriate technique. Table 7.1 compares these techniques in the sequence they evolved.

Suggested plan / schedule technique	**Primary characteristics**	**Advantages / disadvantages**	**Example optimum application**
Bar chart	Use of graphically illustrated bars to control task time	- Project planning and scheduling and progress are graphically shown together making a	Repetitive type projects with low engineering contents or smaller one-of-

Suggested plan / schedule technique	Primary characteristics	Advantages / disadvantages	Example optimum application
		clear, simple account of the project. - Cannot show sufficient detail on long duration tasks to avoid schedule slippage - Task dependency relationships cannot be clearly shown - Manually updated	a -kind projects
Arrow diagram (activity-on-arrow)	Use of arrows to represent project tasks (activities) arranged so as to show task inter-dependency	- Project planning may be separate from scheduling unless the network is illustrated on a time scale - Greater project task detail available than bar chart - Clearly shows task interdependency - Changes in the duration of one task may require movement of following tasks on a time scale, thereby causing significant	Production planning or other applications where clarity of conflicting requirements is of primary importance; or projects of an intermediate size

Suggested plan / schedule technique	**Primary characteristics**	**Advantages / disadvantages**	**Example optimum application**
		redrawing time - Simpler than the precedence diagram	
Node diagram (activity-on-node)	Use of nodes to represent project tasks interconnected by arrows; reverse of the arrow diagram	- Eliminate the need for dummy arrows in the arrow diagram to connect false dependencies - More efficient and compact than the arrow diagram and easier to learn - More involved computational procedure than arrow diagram	Production planning or other applications where clarity of conflicting requirements is of primary importance; considered secondary in preference to the arrow diagram except when used on construction type projects where many activities are concurrent
Preceding diagram (Extension of Activity-on-node or Node Diagram)	Extension of the node diagram; Addition of elements such as lead / lag times	- Same as node diagram - Modifications provide greater flexibility and use than the node diagram	Production planning or other applications where clarity of conflicting requirements is of primary importance;

Suggested plan / schedule technique	**Primary characteristics**	**Advantages / disadvantages**	**Example optimum application**
			considered secondary in preference to the arrow diagram
Project evaluation and review technique (PERT)	Description of project event sequence and interdependency allowing determination of probability of meeting schedule	- Requires establishing project objectives and a method for determining how to achieve these reducing the risk of oversights - Provides clear documentation for communicating project plans and progress - Establishes interim objectives - Emphasizes the concept of management by exception - Allows determination of numerical probabilities associated with variances in project completion times	Applied research and development projects or other projects compromised primarily of activities whose duration times are subject to considerable variation
Critical path	Description of	- Similar to those	Design and

Suggested plan / schedule technique	Primary characteristics	Advantages / disadvantages	Example optimum application
method (CPM)	project event sequence and interdependency allowing determination of project time-cost tradeoff's	listed for PERT since both are considered critical path techniques - Allows determination of project task completion times which minimize total project cost	construction projects and maintenance programs
Graphical evaluation and review techniques (GERT)	A generalized arrow diagram incorporates techniques for network branching and looping	- Same as arrow diagram - Allows the evaluation of alternatives	Projects such as research which involves testing and recycling if testing results in failure; maybe used for project startup where rework may be necessary

Table 7.1: Comparison of scheduling techniques in sequence of evolvement
Source: Tompkins, 1985: 56

The project plan and schedule are developed in accordance with the phases of a project and in a similar manner as project costs. Initial project planning and estimating may be as coarse or as detailed as time permits during proposal development in accordance with the level of risk acceptable to management (Van der Horst, nd: 41). Project schedules and budgets developed later in the project must be detailed and thorough in order to succeed in project cost control (Stoy, Dreier & Schakher, 2007: 55). Figure 7.3 illustrates the logical evolution of project schedules and costs.

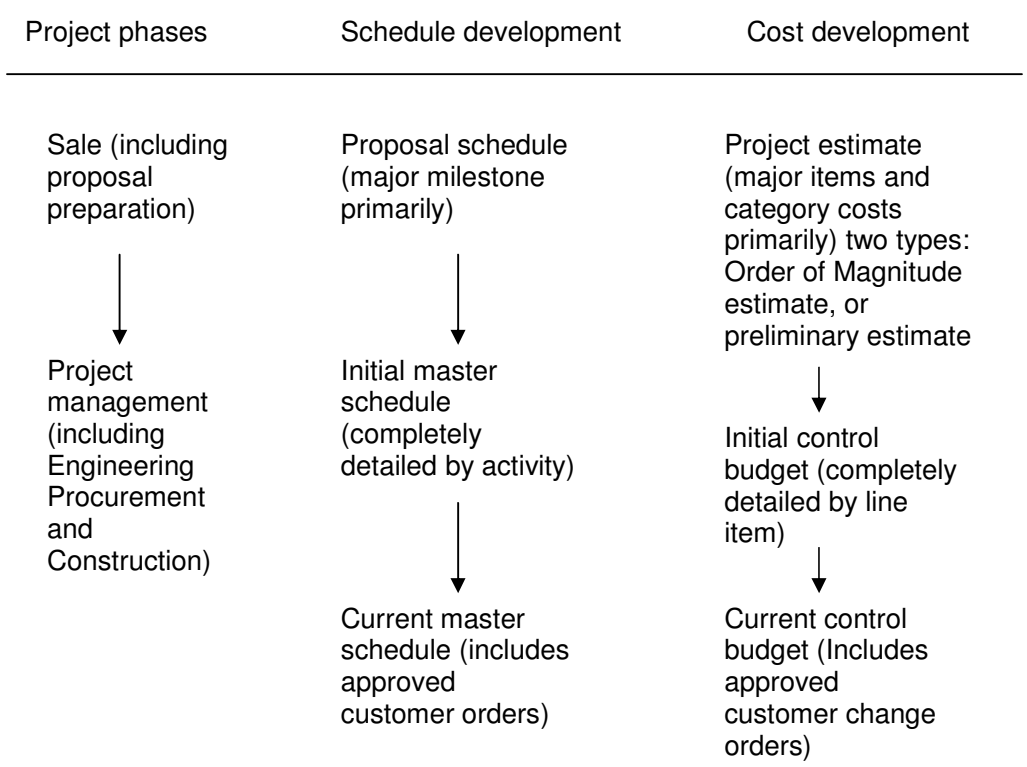


Figure 7.3: Project plan/schedule and estimate/budget development

Source: Tompkins, 1985: 59

3.0 HUMAN FACTORS IN FINANCIAL FORECASTING

Forecaster experience has long been believed to have a significant effect on the accuracy of construction contract price forecasts, and, therefore, on the development of the expertise that underlies professional judgment (Lowe & Skitmore, 2001: 485). Lowe and Skitmore (2001: 485) found that experience and expertise in price forecasting were perceived to be related to:

- The ability to select relevant price/cost data
- The ability to establish price/cost relationships and design parameters
- Intuitive abilities necessary for adjusting rates acquired through familiarity with projects

There exist a clear link between forecasting accuracy and the number of previous similar forecasts made by the forecaster (Burlton, 2001: 213). There is a relationship between several attitudinal variables and measures of forecasting bias, consistency and accuracy when performing forecasts.

Lowe and Skitmore (2001: 485) mention that when considering the possibilities for developing an expert system for price forecasting, there should be a clear link between forecaster experience, professional expertise and professional judgment. They also state that the “expert” is to use imagination, knowledge and experience to “fill in the gaps” within incomplete project information. Love, Ghoneim and Irani (2004: 312) indicate that in modern construction the availability of detailed project information (especially during the early stages of a project) is fast becoming a luxury. This puts increasing strain on the forecaster to rely more and more on his experience rather than project information to produce a reliable cost forecast (Rad, 2008: TCM.S01.2).

4.0 CASH FLOW FORECAST

Louw (2002: 218) states that the only way to properly perform cost control on a project is by means of a cash flow forecast. This is done as early as the first cost estimate and it is a natural action following cost estimating and project planning. The cash flow forecast will assist management to make important financial decisions should there be an indication of limitations to the periodic cash flow available (Le Roux & Cloete, 2007: 1; Checkley, 1994: 22). It may be necessary to revise the time schedule as a consequence of this or to increase the amount of period funding available. Chen (2007: PM.02.1) indicates that cash flow is where project costs meets the schedule. Cash flow models should be updated as soon as new/improved information becomes available.

As previously mentioned in this study, cost control should start as early in the project as possible. Louw (2002: 218) makes an important statement when he state that one is only able to control funds that have not yet been committed, thus it is clear that cost control should start during the conceptual design. This is because many of the costliest components of most projects are decided upon during the earliest stages of design (Brigham, Gapenski & Daves, 1999: 243).

The basis of the cost estimate should be critically examined by the project team for overdesign, excessive scope, duplications and omissions, and over- or under-estimation of contingency. Brigham *et al*., (1999: 244) indicate that this process of checking by the project team is sometimes referred to as ”squad checking”, and at the same times serves to communicate the scope of work as well as the basic philosophy about the project to the team members.

4.1 Cash flow models

Park *et al*., (2005: 172) state that essentially, a good forecasting technique needs to include both a historical trend-based data supported method and competent judgments based on construction experience. Park *et al.* (2005: 164) mention that cash is the most important resource in any construction business. More construction companies fail due to a lack of liquidity to support their daily activities than because of inadequate management of other resources (Chen *et al*., 2005: 669).

Different opinions on cash flow forecasting exist. It is better to engage in financial forecasting, even in the early stages of the project. There are many factors that exist during construction that may affect the cash flow including time delays, cost overruns, unconfirmed earned values, change orders and changes of cost plan elements. Odeyinka *et al*., (2008: 6) point out that the key points of cash flow forecasts lie in how accurate, flexible and comprehensive they are to be calculated and how effectively they consider uncertain factors such as time delay, cost overrun, variation of cost, and earned value between plan and actual. Even when construction is in progress, cash flow forecasts cannot be determined precisely. As a result, most models and techniques are found to have the following problems:

- they are not based on the construction stage, but rather on the planning or preliminary stages in the project delivery process;
- they do not consider time lags for the costs and earned values in forecasting cash flow, and;
- with regards to integration of cost items and activities, they are not compatible with each item and are rather complicated depending on when change factors occur in the subsequent construction stage.

4.2 Typical cash flow of a general contractor

Most construction projects are individual profit centres, each with its own cash cycle based on the costs of activities related to the project and on payments from a client, both of which are prescribed by a contract (Carlos & Formoso, 2006: 76). Typical cash flow on a construction project consists of:

- cash out - such as bid costs, preconstruction costs (engineering, design, mobilization, etc.), materials and supplies, equipment and equipment rentals, payments of subcontractors, labour and overhead, and;
- cash in - such as billings (less retention), claims and change orders.

Chen (2007: PM.02.1) illustrates in Figure 7.4 the difference between cumulative expenses and cumulative income. Chen describes the basic process of cash flow for a contractor in that the contractor takes time to put forward an invoice with the appropriate backup. The client will have to assess this invoice and certify payment. In the meantime, the contractor has to finance the project and interest is payable. This interest is normally recovered through overheads, fees or large upfront mobilisation charges.

The factors that affect cash flows are the duration of the project, the retention conditions, the times for receiving payments from the client, credit arrangements with suppliers or vendors, equipment rentals, and times of payments to subcontractors. The increasing difficulty to obtain credit is stressed by Beech (2006: 18).

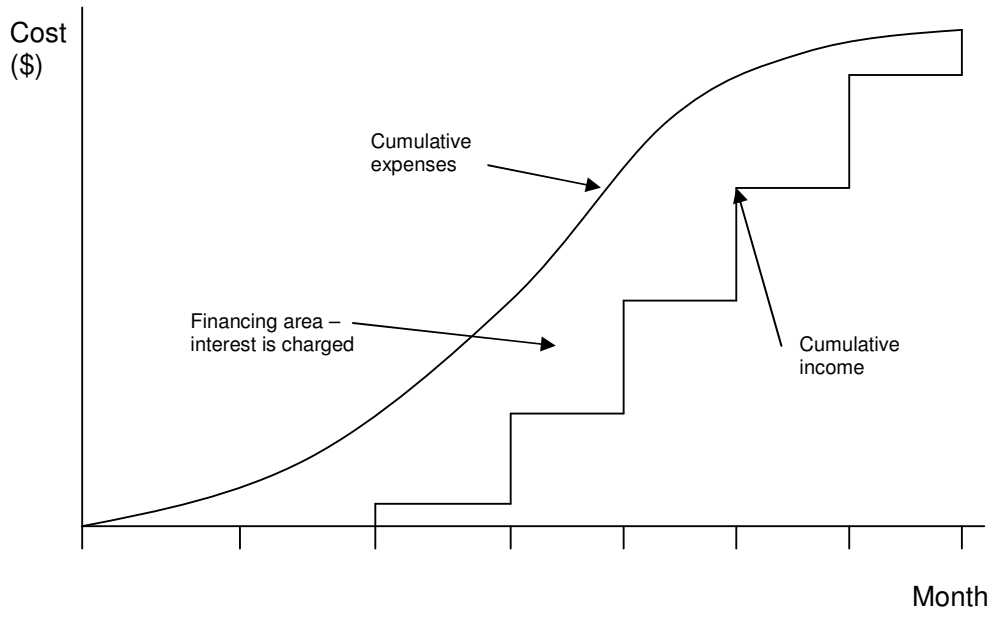


Figure 7.4: Contractor's project cash flow
Source: Chen, 2007: PM.02.1

Park *et al.*, (2005: 165) indicate that cash flow at project level consists of a complete history of all cash disbursements and all earnings received as a result of project execution. Many construction projects have a negative net cash flow until the very end

of construction when the final payment is received or advanced payment is received before starting the project. This is a typical situation when the final payment consists of retention money and the retention percentage is greater than the profit percentage of the project.

Probably the most important aspect of cash flow forecasting is to have the ability to determine or project the Estimated Final Cost (EFC) of the project. There are several variables affecting the EFC, such as time extension, etc. Chen (2007: PM.02.2) demonstrates how a typical man-loading on a petrochemical project will look. This situation is illustrated in Figure 7.5. The involvement of people on the project can clearly be seen in this graph. The trapezoidal approximation can be applied to most projects, except shutdown turnaround projects.

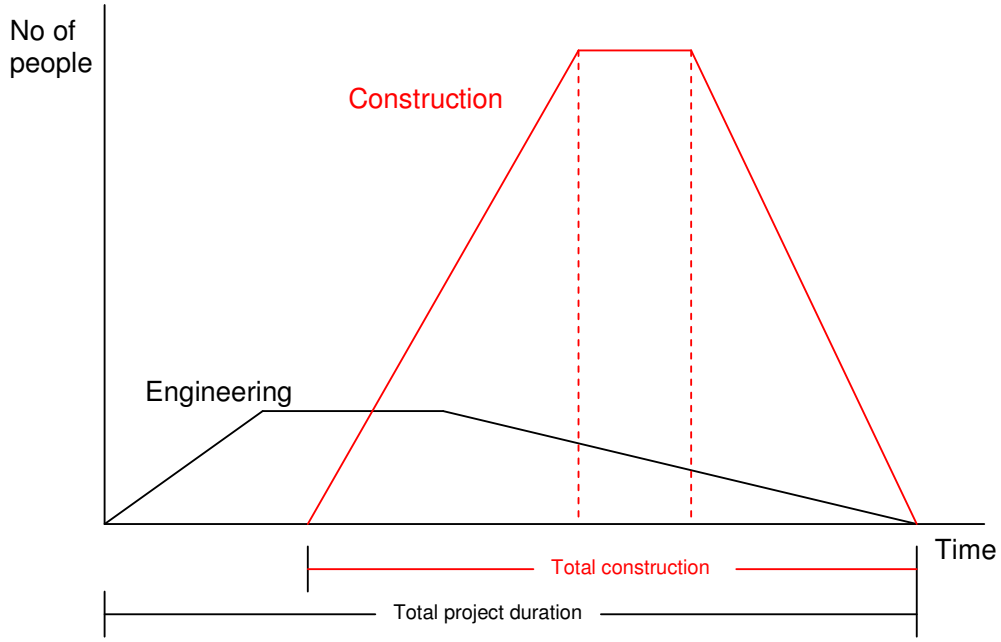


Figure 7.5: Engineering and construction resource profile approximation
Source: Chen, 2007: PM.02.2

5.0 DEVELOPMENT OF A PRICE FORECASTING MODEL

Newnan *et al.*, (2004: 39) point out that estimating or price forecasting is difficult because the future is unknown. It is sometimes impossible to forecast future economic trends and consequences of political actions or environmental occurrences. There also

exists a fine line between the trade-off between the costs of producing an estimate versus the accuracy of the estimate. Figure 7.6 illustrates this point.

Estimated parameters can be one-of-a-kind or first-run projects. The first time something is done, it is difficult to estimate costs required to design, produce and maintain a product over its life cycle. Newnan *et al*., (2004: 40) refer to projected cost estimates that were developed for the first National Aeronautics and Space Administration (NASA) missions. Initially the US space program had no experience with human flight in outer space; thus the development of the cost estimates for design, production, launch, and recovery of the astronauts, flight hardware and payloads was a "first-time experience". There are, however, few one-of-a-kind estimates to be made in engineering design and analysis. Nearly all new technologies, products and processes have been derived from similar concepts which led to their development.

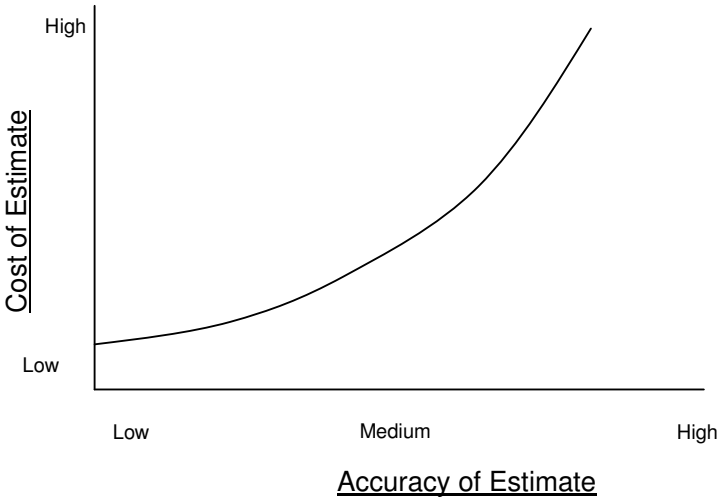


Figure 7.6: Accuracy versus cost trade-off in estimating
Source: Newnan *et al.,* 2004: 39

The ability to develop engineering estimates is constrained by time and personnel availability (Figure 7.6). To optimize the tendering procedure and maintain an acceptable strike rate when bidding on new work, the method of tendering or estimating should be such that all of the mentioned constraints are kept in mind. A similar chain of thought is applicable when dealing with projects that are currently being constructed should one need to determine the EFC of such a project.

Newnan *et al*., (2004: 40) used the axiom "*the past is our greatest teacher…*" when referring to the estimator's experience. This phrase is especially true when considering

ratio conceptual estimating which is based on historical data derived from completed projects. Throughout the financial forecasting process one would continually update the EFC to represent the latest available information. The use of the estimating principles, as set out in this study, must be employed here as well as when tendering on new work.

5.1 Pre-tender construction price forecasting

Skitmore and Drew (2003: 36) point out that pre-tender construction price forecasting refers to price estimating. Thus far, the bulk of this study has been dedicated to the principles of construction estimating (price forecasting) and the influences on estimate accuracy. The focus of this study is more towards conceptual price forecasting (estimating) and how this form of forecasting can be implemented, not only at inception of a project, but also during the course of the project's life.

Addendum E depicts a proposed format for a basic financial forecast on a specific contract within a project. This summary of costs on a dummy contract can be initiated even in the conceptual stages of the project. The estimated costs will then be listed and will be updated as the project evolves. The pre-tender construction price forecasting will therefore be represented by the estimating document. Firstly, the conceptual estimate and then at a later stage the detailed estimate will be used in this forecast.

5.2 Construction price forecasting

Construction price forecasting can commence as soon as the contract for the specific scope of work has been agreed on with the sub-contractor in question. This is normally when the contract with the sub-contractor has been signed. Price forecasting before this point in time would have been done, but it would be based on estimates. These estimated costs will be replaced during the construction period with actual contract amounts and other relevant increases. The following possible increases to the contract amount can occur:

- Contractual scope of work – Referred to in Addendum E as "measured work" is the amount for which the contract is signed and for which the contractor has agreed to conduct the scope as set out in the works information of the contract. In the case of a re-measureable contract, the

value of this work can increase or decrease depending on the extent of the remeasure. The remeasure gets done as the contract progresses.

- Extras – The example shown in Addendum E specifically refers to the New Engineering Contract (NEC) as this contract gets used more often in the engineering field. Terminology such as "Early Warnings" and "Compensation Events" is used in the NEC. These references are similar to the traditional variation orders. All these specific extras to the contract are listed and a cost is allocated against the item. All the costs add up and the total gets added to the overall total.
- Known Committed Costs (KCC) – KCC allowances are made in cases where no specific instruction has been given, but there is a likelihood that an event which might result in additional (or less) cost, can occur. Estimates are made, listed and added to the total.
- Contingency – Contingency analysis has been discussed in Chapter 6 of this study. The contingency will be added to the EFC to allow for unforeseen costs. This amount will be increased or decreased as the contract progresses, depending on the risk associated with the contract at a given point in time.
- Payment assessments – Addendum E shows the chronological sequence of the payment assessments and also depicts the percentage change between progressive payments and the original contract value, as well as the extended contract value.
- Contract status – Shows a summary of the aforementioned, briefly summarizing the EFC breakdown.

Detail of all the events is logged and the status of each event is indicated. When using modern spreadsheet software, formulas can be inserted to group all events according to status (Butts, 2007b: IT.07.1). By doing this, the "approved" extras can be added to the original contract value to calculate the extended contract value. The "pending" extras and the KCC's will be added together and be seen as future costs.

By adding the data for the previous report, one could determine the movement for the current report. There will always be the possibility that certain work should be back charged to another party. The back charge might have resulted due to mistakes made by the contractor in question due to incompetence or misinterpretation of the scope of work. These back charges are also logged on the summary sheet (as indicated in

Addendum E). Back charges are then reimbursed by deducting money from the total EFC for the specific contract.

6.0 RATIO CONCEPTUAL ESTIMATING IN FINANCIAL FORECASTING

The importance of continuously updating the EFC on the project has already been discussed. The emphasis of this study is to demonstrate the use of ratio conceptual cost estimating in the financial forecasting process. It is the very purpose of ratio conceptual cost estimating to provide early cost data, based on limited scope (Cheung & Skitmore, 2005: EST.14.1).

The first estimated final cost of the project will therefore be based on a ratio conceptual estimate. Thereafter it will evolve into a more detailed estimate and finally into a full detailed estimate. The process of estimating has been described earlier in this study.

Ratio conceptual estimating (RCE) also can be very useful during the course of a project to determine the EFC. There are several instances during the life of a project where certain scope has to be omitted or added, and in most cases the information available for this scope is limited. Should RCE be employed in these cases, the project team will be able to have an early benchmark which will allow them to improve their financial planning.

As previously stated in this study (Chapter 3), probably the most important aspect of cost estimating in any form is the scope definition of the work that needs to be estimated. To ensure that the correct scope is assessed in the RCE it is essential to make sure that all stakeholders are in agreement with the proposed scope of work. Addendum H illustrates a typical scope definition breakdown of a portion of a specific project. The basis of this breakdown is drawn from Addendum A and will be adjusted from project to project depending on the specific project requirements. Addendum I provides a simple estimate stakeholder scope agreement which needs to be signed off by all the relevant stakeholders to ensure that the complete scope as set out in Addendum H has been covered.

Chapter 5 of this study described the data collection process in petrochemical construction projects. If there is a proper database of relevant data on which RCE calculations can be based upon, this method of estimating can be used with good results, whether complete comprehensive additions are added to the plant (such as a

new sub-station building), or only relative small changes such as an additional gas line. Addendum D can prove as an example of such a database.

A petrochemical project is normally split into several major sections to divide the scope of work in manageable portions and to allow different contractors to tender on the work. A typical breakdown might look as follow: civil works, structural steelwork, mechanical and piping, electrical and instrumentation, and painting and insulation. Together with these smaller contracts there might also be things like MV switchgear, hazardous area classification, etc. as well as some professional services contracts.

Addendum F illustrates the use of RCE at the inception stage of a project. In this particular case only the civil works are detailed.

Even though the abovementioned breakdown of the RCE will serve as the basis for the EFC during the early stages of a project, it will be regularly updated as better information becomes available. During the course of the project, individual RCE's are done to determine the cost of possible additions or omissions. Figure 7.7 indicates how a fairly accurate estimate can be done in a matter of minutes, based on ratios and historical project data. This specific estimate is for an additional steel support structure.

RATIO CONCEPTUAL ESTIMATE – STRUCTURAL STEEL – REACTOR SUPPORT				
Project name:	XYZ Refinery			
Location:	Gauteng – South Africa			
Client:	ABC Petroleum		Date:	06-02-2010
Project detail:				
	Structural steel volume		4500	M3

	STRUCTURAL STEEL COST			11,764,939.13
	STRUCTURAL STEEL - COMPLEX STRUCTURES		8,403,527.95	
	Preliminaries and General	40%	3,361,411.18	

	Description	Unit	Quantity	Rate	Cost	Total
A	**STRUCTURAL STEEL - COMPLEX STRUCTURES**					**8,403,527.95**
	Structural steel – supply	T	133.02	32,608.70	4,337,609.27	
	Structural steel – erect	T	133.02	12,391.30	1,648,290.73	
	Handrail – supply	M	554.25	911.30	505,088.03	
	Handrail – erect	M	554.25	772.03	427,897.63	

	Grating – supply	M2	532.08	1,385.24	737,058.50	
	Grating – erect	M2	532.08	317.72	169,052.46	
	Cat ladder – supply	M	35.57	2,431.67	86,494.02	
	Cat ladder – erect	M	35.57	681.14	24,228.15	
	Stair treads – supply	No	166	435.48	73,160.64	
	Stair tread – erect	No	166	100.35	16,858.80	
	Kick plates – supply	M	492.60	336.07	165,548.08	
	Kick plates - erect	M	492.60	430.86	212,241.64	

Figure 7.7: Summary of Ratio Conceptual Estimate (RCE) for an addition to existing scope of a complex steel structure on a typical petrochemical project

In both cases depicted in Addendum F and Figure 7.7, the estimator only needs to complete the "Project detail" portion and the rest of the estimate will be computed automatically, based on the ratios as set out in Addendum D.

In this example, the only quantity that needs to be taken off the drawings will be the volume of the steel structure (4,500m³). The rest of the quantities are calculated by means of applying the ratios determined in this study. Similar estimates, as shown in Figure 7.7, can be done for any addition or omission to the scope. All the relevant ratios are set out in Addendum D. The application of the ratios and how quantities are derived from it is set out in detail in Chapter 8.

To determine the rates for the individual items a rate calculation can be done. This calculation is based on base rates (refer to Figure 7.8) and various independent influencing factors such as escalation. The adjusted base rate then is manipulated by using cost factors to calculate the required rate. The influencing factors are adjusted based on the facts and findings earlier in this study relating to these issues.

The information contained within Figure 7.8 will be adjusted on a regular basis as base rates change. This figure is similar to the one used in Chapter 5, but with the difference that this calculator is utilised to adjust base rates that will suffice under normal circumstances to suit the needs of the specific project in question. A complete example of how a RCE will be conducted and integrated into the financial forecasting system will be demonstrated in Chapter 8 of this study.

Base rate calculator - Ratio Conceptual Estimate (RCE) Date Jan-10

Escalation factor	A	
Size-of-the-project factor	B	
Market conditions factor	C	
Location factor	D	
Complexity factor	E	
Productivity factor	F	Labour only

Description	Unit	Base rate	A	B	C	D	E	F	Total
			%	%	%	%	%	%	
Site clearance	m^2	R 5.00	0%	3%	0%	5%	2%	5%	R 5.75
Demolish concrete	m^3	R 1,200.00	0%	3%	0%	5%	2%	5%	R 1,380.00
Bulk excavation	m^3	R 70.00	0%	3%	0%	5%	2%	5%	R 80.50
Excavation	m^3	R 100.00	0%	3%	0%	5%	2%	5%	R 115.00
Imported backfill and compact	m^3	R 300.00	0%	3%	0%	5%	2%	2%	R 336.00
High tensile rod reinforcement	t	R 8,650.00	0%	3%	0%	5%	2%	1%	R 9,601.50
Concrete - supply and place	m^3	R 1,150.00	0%	3%	0%	5%	2%	1%	R 1,276.50
Pile augering	m	R 1,750.00	0%	3%	0%	5%	2%	5%	R 2,012.50
80mm Concrete interlocking block paving	m^2	R 200.00	0%	3%	0%	5%	2%	2%	R 224.00
Brickwork	m^2	R 550.00	0%	3%	0%	5%	2%	1%	R 610.50

Figure 7.8: Civil base rate calculator

7.0 SUMMARY

The importance of time and the effect it has on society is evident in our daily lives. A construction project is similarly bound to the effects of time, especially from a financial point of view. The quicker the contractor can get off site and still maintain a good quality standard, the better for him. He will be better off financially in the sense that he does not have to keep on applying his resources to the project he is currently busy with, and he will be able to utilise the same resources on another project. Turnaround time is therefore important for any contractor. Proper planning, project management, quality control, etc. are all important aspects that should be kept in mind in order to reduce the time spent on site to complete the project. A further aspect which might come into play when delays are experienced on a construction site is the possibility of paying penalties. Such penalties are especially severe in the case of a plant that forms part of a critical chain of processes, or that is of environmental importance (Yang, 2007: 26).

The only way to keep track of the financial progress on a project is by means of a proper financial forecast and part of this forecast is the cash flow analysis. The

standard cash flow model reports on the in- and out flow of money for the project in question. The contractor should realize that on most projects he will operate on a negative cash flow, since the cumulative income will always be less than the cumulative expenses and he will only reverse this situation close to the end of the project. Negative cash flow is expensive as the contractor will have to finance the project to some extent.

An integral part of the financial forecast is the plotting of an estimated final cost. This cost represents the projected final account value. In many cases this is a complicated exercise because of the non-availability of scope detail. Fast track turn-key projects force the contractor to adopt methods that lend themselves to minimum scope definition and still produce a reliable financial forecast. One such method, Ratio Conceptual Estimating (RCE), is a method which, if applied correctly, can produce quick and fairly accurate estimates which can be used in calculating the estimated final cost of a project.

To apply Ratio Conceptual Estimating (RCE) it is required to make use of reliable ratios which are based on a database. The development of such ratios and the application thereof in the estimate gets discussed in the next chapter.

CHAPTER 8

PRACTICAL APPLICATION OF RATIO CONCEPTUAL COST ESTIMATING

1.0 INTRODUCTION

Ratio Conceptual Estimating (RCE) is a quick form of cost estimating based on a historical database and ratios derived from this database. The better the quality of the database, the better the end result of the estimate.

It is however not only at the beginning of a project where RCE is utilised to conduct estimates. There are many instances during the course of a project where RCE can be used to conduct estimates to check budgets or to determine budgets for certain additions to the project. The use of RCE in the financial forecast is one such example. The purpose of the financial forecast is to report to management the forecasted financial commitments for each project. New scope should therefore be cost in such a way that it is quick, but also accurate enough to fall in line with a Level 4 estimate (refer to Chapter 2 of this study).

As mentioned previously, RCE can only be done if a proper database exists. To proof the value of RCE in the petrochemical industry, a database has been developed and included in this study. Refer to Addendum D. It is however necessary to analise this data and to put it in such a format that can be used in RCE. The practical application of RCE can be much enhanced by the use of computer software and if based on a proper database, can provide fairly accurate estimates quickly.

2.0 FINANCIAL FORECASTING AND RATIO CONCEPTUAL COST ESTIMATING (RCE)

It is clear from theory discussed in Chapter 2 that proper cost control during the course of a project is not a “nice to have” but a necessity. Project profit forecasting is, however, an important management function that needs to be performed to guide the project team as to what returns may be expected from the project in question. Profit forecasting begins at project level where historical project expenditures and predicted future commitments are scheduled. It will be the general aim of such a forecast to strive

towards predicting the final account value of each individual contract, and to attempt to get these values as accurate as possible.

The layout of a typical financial forecasting summary is set out in Addendum E where project progress can be followed through current expenditures. Minimisation of cost overruns can be done through early detection and redirection. Chapter 7 demonstrates the use of financial forecasting. The use of Ratio Conceptual Estimating (RCE) in financial forecasting is unavoidable since the speed of the financial forecasting process does not allow for more detailed estimating methods.

2.1 Improving the financial forecast by applying RCE

Scope definition is considered to be the most important aspect when doing any cost estimate. It is essential that the estimator is well aware of the scope of work, in other words what needs to be allowed for in the cost estimate. Addendum A has been included in this study to demonstrate what a typical generic scope breakdown would look like. The information contained within Addendum A was gathered over many years and will serve as a good guide for any estimator working specifically in the petrochemical industry.

The use of Addendum A and additions to this document will to a large degree eliminate some problems that might arise during scope definition. Grey areas and interfacing between certain portions of the plant will be minimised. Most importantly, incomplete scope definition due to overlooked elements of the scope will be reduced to such an extent that should there be any items that have been omitted during scope definition, the cost impact of those items should be minimal. Furthermore, Addendum A will also be helpful in the case of scope expansion or scope changes which occur in every project.

Ratio Conceptual Estimating (RCE) can be used throughout the lifespan of the construction project. Even smallish scope adjustments can be included by means of micro RCE's where portions of the database get applied. The size of the estimate does however not dictate the process of the estimate. The basic process of this form of cost estimate remains the same irrespective of the application thereof. The next portion of this chapter deals with the practical use of this form of cost estimation.

3.0 RATIO CONCEPTUAL COST ESTIMATING – THE PRACTICAL APPLICATION

Chapter 5 of this study refers to the collection of data and how to build a data base that can be used as a basis of a RCE. Addendum D contains the quantity and cost data of 45 projects in the petrochemical industry.

3.1 Discussion on data as contained in Addendum D

Addendum D contains the raw data taken from 45 actual projects' final accounts. These projects have been chosen as typical petrochemical construction projects and represent the norm throughout the petrochemical industry. Due to secrecy agreements, the detail of these projects (names, whereabouts, clients, etc) can not be revealed.

The bulk of Addendum D contains summaries of the quantities and rates for 45 different projects. Each project's detail has been listed in a similar fashion starting with "Bulk earthworks" and ending with "Electrical and Instrumentation". The quantities and rates used were taken from the individual agreed final accounts of each contract.

Also shown in each Project Summary are the ratios which have been calculated. These ratios can either be "quantity ratios" or "rate ratios". Each individual ratio has been given a specific name and this name is the same for all 45 projects. If one for instance refer to Project 1 (Addendum D – page D24), the ratio "AB-Q1" has a value of 1,35 and refers to the quantity ratio between "Bulk excavation" and "Trimming of sides". In other words; item "AB1.1" and "AB1.2". The simple formula for this calculation is shown on the right hand side of each ratio. The answer (ratio) has been rounded off to the second decimal place. All ratios for each project have been calculated in this fashion.

The ratios calculated in the individual project summaries as described above, have been transferred to a summary which is shown on page D1 to D22 of Addendum D. These quantities have been derived from the raw data and will be statistically adjusted for inclusion in the actual ratio database. Please refer to this adjustment process elsewhere in this chapter.

Page D23 of Addendum D is a summary of the variable conditions on each of the 45 projects from which data has been collected. Fourteen variables had been chosen based on the theory contained in earlier chapters of this study. They are as follow:

- Material (Type of material used)
- Labour (Availability of labour and skills at the time of construction)
- Engineering design (Complexity of the engineering design)
- Current economic conditions (Current economic conditions at the time of construction)
- Current economic factors (Current economic factors at the time of construction)
- Scope definition (Level of scope definition at the time of construction)
- Rework (Amount of rework that was done on the project)
- Scope change (Level of scope change that occurred on the project)
- Weather (General weather conditions at the time of construction)
- Access (Access to the site when the project was executed)
- Project size (Size of the project)
- Project conditions (General project conditions at the time of construction)
- Complexity (Complexity of the project in general)
- Repetition (Level of repetitive work that occurred)

The summary on page D23 lists the variables on all 45 projects. Each variable has three categories in which a project can fall. The decision of category allocation per variable and per project was made by the relevant project managers and site managers that worked on each of these projects. No scientific methodology was followed to allocate positions on this scale. Interviews with the various roll players revealed the situation as depicted on page D23.

3.2 Statistical analysis of raw data

Pages G3 to G32 contain the statistically altered ratios that were used to perform the RCE's on the target or sample projects (10 in total). The application of these ratios will be discussed later in this chapter. What is of importance here is to note that these ratios are not the same as the ones derived in Addendum D. The ratios calculated in Addendum D are the actual ratios based on historical data. The ratios on pages G3 to G32 are the statistically adjusted ratios which have been used to do RCE's for the ten sample projects (Addendum G). The process of deriving at the ratios set out on pages G3 to G32 need however to be discussed.

3.2.1 The research process

The role of statistics in research projects is set out in Figure 8.1. The steps in the process where statistics plays a role are marked with a dark out line. The process can be divided into five steps.

3.2.1.1 Planning

Steyn, Smit, Du Toit and Strasheim (1994: 3) pointed out that no research project of any significance can be conducted without proper planning. In the planning stage it is firstly important to formulate the purpose of the study as good as possible. To be able to reach this goal, it is important to extract certain information from a source. It is important however only to obtain the relevant information that is needed to fulfill the study's requirements.

3.2.1.2 Data collection

Physical data collection will not pose to be a problem if the planning has been done properly. The availability of data is dependant on the type of research conducted. More information on data collection is provided in Chapter 5 of this study.

3.2.1.3 Data normalisation and coding

Chapter 5 also contains information on data normalisation and how this can be done in the petrochemical construction industry.

3.2.1.4 Analysis

During this part of the investigation, statistical methodology are utilised to analise the gathered information. The first step in this process is called "descriptive statistics". Graziano and Raulin (1993: 90) describe three important groups of descriptive statistics; frequency counts and frequency distributions, graphical representations of data and summary statistics. Steyn, *et al* (1994: 5) expresses their view on descriptive statistics as follows:

> *"Descriptive statistics refer to the arrangement and summary of data by means of tabulating graphical presentation and the calculation of*

> *descriptive measures. By doing this, the inherent tendencies and properties of the gathered data can be shown."*

The second step in the investigation is referred to as "statistical intervention". Steyn, *et al* (1994: 5) refers to it as follows:

> *"Statistical intervention forms assumptions pertaining to the population from which the data has been drawn by utilising the descriptive measures that have been calculated."*

3.2.1.5 Conclusions

Once the statistical analysis has been conducted, important conclusions can be drawn in the form of a report. In this report it is important to answer as many of the questions that have been mentioned in the problem statement of the study. This step normally leads to further research.

3.2.2 What methodology to use?

Coetzee (personal interview: 01-09-2011) pointed out that the data pool of this study is too small (only 45 projects – refer to Addendum D) to apply significant statistical analysis. Although this number of projects (from a South African perspective) seems to be very few, it nevertheless represents the bulk of the petrochemical projects that were constructed in the past number of years. Bellamy (2011: 11) also stressed that for certain types of statistical analysis one require more data sources to establish meaningful results or to be of statistical significance.

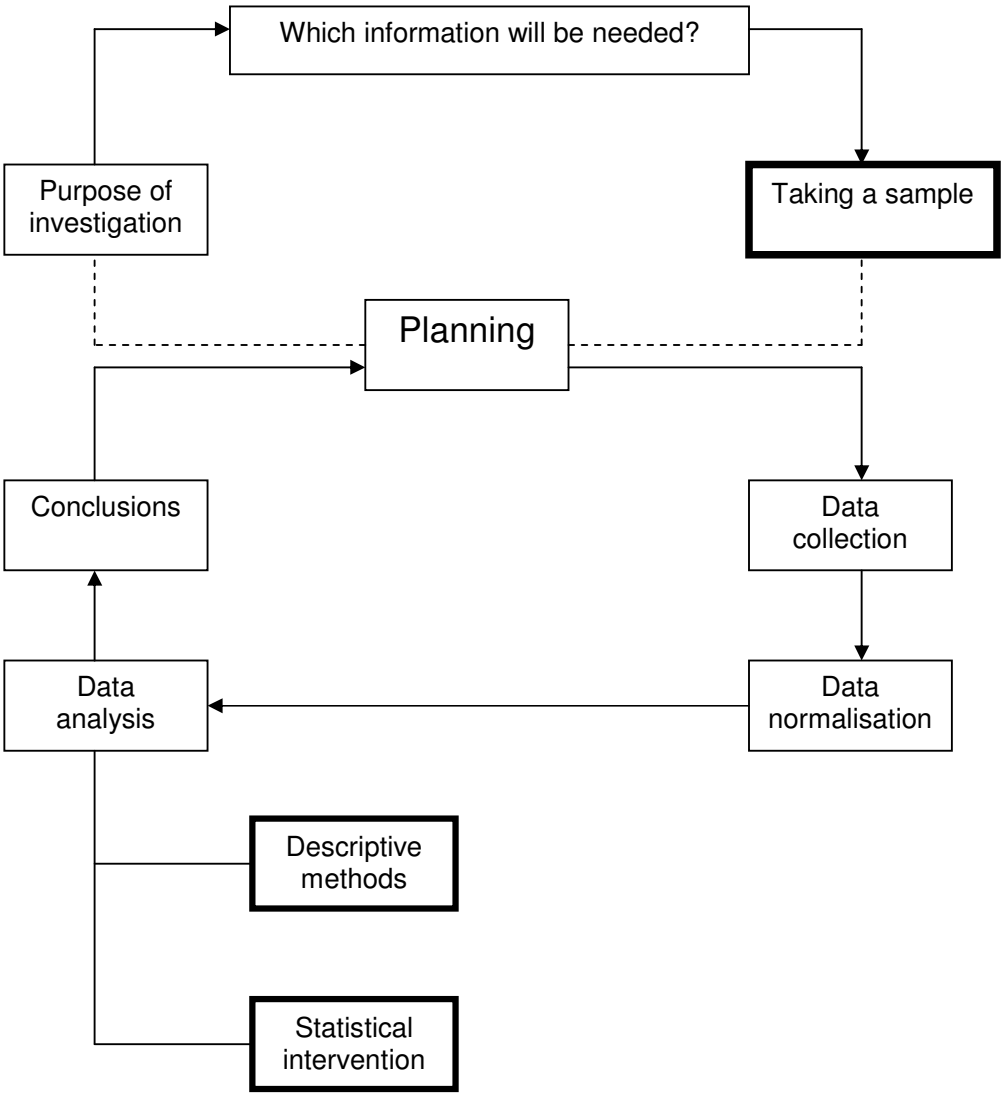


Figure 8.1: The role of statistics in research projects

Source: Steyn, *et al* (1994: 4)

Graziano and Raulin (1993: 97) pointed out that the measures of central tendency describe the typical or average score. They are called measures of central tendency because they provide an indication of the centre of the distribution where most of the scores tend to cluster. There are three measures of central tendency used to describe data; the mode, the mean and the median. The mode being the most frequently occurring score in the data field. The mode has the advantage of being simple to determine, but the disadvantage of being easily influenced by the change in one or two scores. Coetzee (personal interview: 01-09-2011) indicated that the use of the mode in this study is questionable seeing that the data field is too small.

To apply basic statistical analysis to the raw data it will be necessary to understand what the implication of certain formulas will be and how these formulas are being derived at.

3.2.2.1 Arithmetical mean

Graziano and Raulin (1993: 98) describe the mean as the “arithmetical average” of a particular set of scores. Steyn, *et al* (1994: 101) pointed out that this form of statistical indication is the most common form in use to indicate central tendency. The formula to determine the arithmetical mean is as follows:

$$\mu = \frac{\Sigma x}{N}$$

The addition of extra information into the data set will not have a significant influence on the value of μ. The smaller the data set, the greater the effect will be on μ, should there be any changes to the data set.

When the data set as set out in Addendum D is considered, the calculation for quantity ratio AB-Q1 (page G3) will be as follows:

$$\mu = \frac{\Sigma x}{N} \quad \textit{therefore} \quad \mu = \frac{98{,}21}{45} \quad \textit{therefore} \quad \mu = 2{,}18$$

The above calculation had been done to obtain all the “means” for the all the applicable ratios. The answers can be viewed on pages G3 to G32 Addendum G in the column headed “Project Ratio Mean”. The raw data can be obtained in the ratio summary of Addendum D.

3.2.2.2 Median

The median can be described as the fiftieth percentile of a data set. In other words, 50% of the values will be lower than the median and 50% will be higher. To determine the median, the values of a particular data set must be arranged from the lowest to the highest value. The value in the middle will then be the median. Steyn, *et al* (1994: 103) propose the following formula to calculate the median:

$$Median = \frac{n+1}{2} \text{ th value}$$

When considering the data in Addendum D, one can for instance (by applying the above formula) determine the median if all the data inputs are arranged from the lowest to the highest value. If the same ratio (AB-Q1 on page G3) is considered, the median will be 2,20. All the medians from the data of the 45 projects discussed in Addendum D, have been tabulated in Addendum G (page G3 to G32) under the heading "Project Ratio Median". All these medians had been calculated in the manner described above.

3.2.3 Applying the effects of the fourteen variables

The study of the theory pertaining to conceptual estimating (as described in Chapters 2 to 7 of this study) has revealed some factors that might influence the ratios calculated in Addendum D. These influences or variables have been summarised in Addendum D on page D23. There are fourteen in total.

Discussions have been held with several people that were involved in the 45 subject projects from which data had been drawn. Based on these discussions and a study of each project's detail, a position on the chart (page D23) had been allocated. These positions have not been calculated scientifically and were merely allocated based on what the project team and the project data revealed.

The summary of all the means and medians (pages G3 to G32) in Addendum G has been divided into fourteen major groups, based on the fourteen variables stated on page D23. Each group has been divided into three sub-groups ranging from "easy / little" to "normal" and finally to "complex / volatile, etc". Please refer to Addendum G to study the relevant column headings. Each sub-heading has again been divided into two separate columns named "mean" and "median".

To demonstrate how these values have been calculated, ratio AB-Q1 can be considered. Addendum D (page D23) reveals that the "material" variable can be spread as follows:

Material – Simple	-	9 Projects
Material – Normal	-	28 Projects
Material – Complex	-	8 Projects

Of the 45 subject projects there were 9 projects which material supply was considered to be “simple”; 28 projects had “normal” material supply constraints and 8 projects had rather “complex” material supply constraints. To determine the means and medians for the 9 projects which had few material supply constraints, the 9 projects had to be identified (page D23) and only their data had to be considered. The values of AB-Q1 in these 9 projects with “simple” material constraints were:

Project 3	-	AB-Q1 = 2,83
Project 9	-	AB-Q1 = 2,03
Project 17	-	AB-Q1 = 2,36
Project 23	-	AB-Q1 = 2,29
Project 24	-	AB-Q1 = 2,14
Project 29	-	AB-Q1 = 2,37
Project 30	-	AB-Q1 = 2,21
Project 31	-	AB-Q1 = 2,06
Project 40	-	AB-Q1 = 1,98

If the formulas described above are applied, the mean and median for this data set can be calculated. The mean for ratio AB-Q1 for the nine projects stated above is therefore 2,25 and the median is 2,21. These values have been entered into the ratio summary (page G3 to G32) of Addendum G under the “Material” heading, with a “Simple” constraint level. The rest of the ratios for variable changes have been calculated in a similar fashion.

3.3 Application of data on real life projects

To test the integrity of the data that is expressed in Addendum D and reworked and tabled in Addendum G, it will have to be applied to actual projects. The end results will then have to be compared to the actual costs (final account values) of these projects. The difference between these values will be an indication of just how applicable the data will be when employed in RCE. Again, the detail of the target projects can not be revealed due to secrecy agreements.

Ten typical petrochemical projects have been chosen and cost estimates for these projects had been done for these projects. The estimate method utilised was Ratio Conceptual Estimating (RCE). The variable characteristics of each project were tabulated and can be viewed in Addendum G on page G2. The quantities and rates applicable to these projects have then been calculated to form the basis of the estimate.

3.3.1 Discussion on the application of Addendum G

The detail of the ten target projects has all been listed in Addendum G from Project A to Project I. Once the ten chosen projects had been identified and their variable characteristics tabulated (refer to page G2), some basic quantities were taken off. These quantities were measured from conceptual design drawings and were then entered into a computer spread sheet as can be seen on page G-A1. The base rates utilised, were market related when considering the specific target project in question.

A breakdown of all the quantities for each of the ten projects had been prepared. The breakdown of Project A, for instance, can be found on pages G-A3 to G-A28. This breakdown is summarised on page G-A2. The same process was followed for all of the ten projects.

The spread sheet was developed in such a way that it is completely formula driven. The breakdown of the quantities, rates and totals on pages G-A3 to G-A28 have all either been calculated by means of formulas or were drawn from the information page which in the case of Project A, can be found on page G-A1. The shaded cells in the breakdown (pages G-A3 to G-A28) indicate quantities and rates that have been drawn from the information page (page G-A1 in the case of Project A). For instance, the “Site clearance” for Project A of 16,500 m² (shaded cell on the top of page G-A3) was directly taken from the information page (page G-A1). This quantity has in other words been measured off drawings and entered (by hand) into the information page.

The population of the information page is done by entering gathered information which then get utilised in the formulas throughout the spread sheet. The rates in the information page are the market related rates at that given point in time. The ten projects in question had been completed at different times; therefore different rates were used. The population of the break down for Project A (as shown on page G-A3 to G-A28) happen by means of formulas which utilise the information on the information

page as well as the statistically altered ratios (refer to the appropriate section in this chapter).

When the “Trimming of sides” for instance on Project A gets calculated; the ratio named AB-Q1 with a value of 2,18 had been used. In this case, both the “quantity ratio” and the “rate ratio” are the statistical “mean”. The relevant ratio to use can also be chosen on the information page of the estimate. In this case it is page G-A1. Depending on the choice made by the estimator (at the bottom of page G-A1), the computer will automatically apply the correct ratios (according to the table in Addendum G) to the measured quantities and rates also inserted on the information page, which will then (by means of formulas) populate the estimate break down (pages G-A3 to G-A28). All the un-shaded areas in each of the projects’ break downs represent a value which has been calculated by applying the appropriate ratio to another quantity or rate. How these ratios have been calculated can be viewed in Addendum D.

3.3.2 Outcome of application of statistically altered data

As previously mentioned, the variables for each of the ten target projects have been shown on page G2. These variables have been utilised to make adjustments to the data utilised in calculating each end cost. The cost summary of the sample projects is shown on page G1 of this study.

The summary on page G1 indicate the outcome of a RCE that was conducted on each of the ten sample projects utilising the “mean” and “median” ratios as well as the “mean” and “median” variable ratios.

Table 3.4 in Chapter 3 indicates the typical accuracy range for the different estimate classes. If this table is compared to the results on page G1, it will be found that most of the ten projects’ results fall well within the Class 3 and Class 4 accuracy range. The application of RCE based on the data set-out in Addendum D can therefore deliver cost estimates with the average accuracy as set out in the small table at the bottom of page G1. These results are in line with the requirements for a conceptual cost estimate as previously set out in this study. Refer to Chapter 3 for more information.

If the “average accuracy findings” (bottom of page G1) is studied, it will be noticed that the ratio with the best results (fluctuating the least) is the “variable median”. With an

average estimate value of 0,7% more than the final account value. This value is however only an average and to get a better understanding of the actual values obtained, one should study each project summary (page G1).

The difference in results between the “mean”, “median”, “variable – mean” and “variable – median” is so small (page G1), that it can hardly be considered as meaningful. The allocation of variable classification as set out on page G2 is also done in a non-scientific manner and is based on the experience of the team involved. By allocating the incorrect variable classification to the variable in question, will influence the end-result of the estimate. Seeing that the difference between the “mean” and the “variable – mean” as well as the “median” and the “variable – median” is so small, the implication of “variables” remains questionable and it seems that in this case, the application thereof is not necessary.

From the results stated on the summary page (page G1) it is clear that the “median” ratios provided better results than the “mean” ratios. The average difference between the final account values and the estimated values, when using the “median”, is 3,20%. This means that the application of RCE (using “median” ratios) resulted in a 3,20% higher estimated final cost, while the application of the “mean” ratios resulted in an average 5,46% lower cost. Although both sets of data provided good results, it seems that by making use of the “median” ratios will result in slightly higher end results, which for estimating, is beneficial.

4.0 SUMMARY

The practical application of Ratio Conceptual Estimating (RCE), if based on a properly developed database, can be successfully incorporated into the estimating process on a petrochemical project. This can either be done at tendering stage or it can be used as a management tool to forecast costs for additional scope. This is particularly of importance when conducting the financial forecast on the project.

In this study a subject project list of 45 projects have been used to create a database from which quantity ratios and rate ratios have been derived. Refer to Addendum D. Statistical analysis of these ratios provided a set of ratios (based on “means” and “medians”) which have been summarised and used to conduct actual estimates of ten projects. The results have been compared and found to be fairly accurate, which is well in line with the requirements of a conceptual cost estimate.

CHAPTER 9

CONCLUSIONS, LIMITATIONS AND FUTURE RECOMMENDATIONS

1.0 INTRODUCTION

The purpose of this chapter is to draw conclusions from the application of the data based on the theory basis provided in Chapters 2 to 7. Conclusions are drawn in accordance with the research objectives. Furthermore, limitations of this study are discussed and recommendations are made for the petrochemical construction industry. Finally, research opportunities that emanate from this research are presented.

2.0 CONCLUSIONS

Next, the conclusions of the empirical studies are drawn.

An abbreviated synopsis of the main points drawn from the study can be listed as follows:

- Cost control on construction projects is essential for the success of the project and monitoring of cost should be done throughout the life cycle of the construction project.
- Good cost estimating procedures will provide a solid base for the construction budget and a reasonable target by which the project can be controlled from a financial point of view.
- Scope definition is probably the most significant factor when any cost estimate is made.
- If conceptual cost estimates are conducted properly and if it is based on reliable databases, it can be a very useful tool in project cost control.
- Although conceptual estimates are considered to be a quick form of estimating, its success is largely based upon the quality of the database from which information is drawn. Setting-up a quality database takes a lot of time, but the dividends of this exercise will be realised in future estimates.
- Cost escalation and contingency analysis form an integral part of the estimating process and special emphasis should be put on these factors when the risk associated with the project is high.

- Financial forecasting is essential for the success of the project as it provides a monetary target that can be used to by management to measure the profit / loss forecast on the project and to report accordingly.

The primary objective of this study was to prove the effectiveness of Ratio Conceptual Cost Estimating (RCE) in the South African petrochemical construction industry.

Today, much more than ever before, financial success of any construction project, becomes more and more a result of scientific and precise evaluation of imposing factors and management thereof, than just informal decisions by management. Much creative thought should be put into the process of mitigating financial risks. It will be the contractor which excels in this, that will eventually be successful. Competition in the market is tough and work in the petrochemical construction industry is scarce.

To reach the goal mentioned in the previous paragraph, certain tools should be used to firstly allow management to get reliable answers and secondly to provide these answers at a reasonable level of accuracy. The time available to provide these answers is limited and to keep within the set program, the construction team on a given project should revert to methods which are economical when considering the time that they have at their disposal.

One such method that can be employed in financial forecasting is Ratio Conceptual Cost Estimating (RCE). RCE is a quick form of cost estimating and can be done fairly accurately. The purpose for which it is intended is to provide “check” estimates or basic estimates to adjust financial forecasting or to allow management to react to certain costs pertaining to scope adjustments on a project. RCE will however only be successful if it is based on a proper database which will take a considerable amount of time to establish, but once this is done, it will serve its purpose for a long time. Additions and adjustments to the databases can be made on an ongoing basis.

The petrochemical construction industry is no exception when it comes to dealing with cost forecasts. The results indicated in Chapter 8 of this study, showing the comparison between the ten target projects and the actual final account values of these projects, demonstrate that:

- firstly, the process of RCE can successfully be employed in the South African petrochemical industry, and

- secondly, the databases of 45 projects from which data has been drawn to derive at the ratios used in the RCE process, can be considered to be reliable.

Considering the above and especially taking into account the above bullet points, it is considered that researcher has reached the primary objective of the study and proved that RCE can successfully be utilised in the South African petrochemical construction industry.

The Secondary Objective of the study was to proof the value of Ratio Conceptual Cost Estimating (RCE) during the financial forecasting process.

Research mentioned in Chapter 7 of this study indicated the importance of financial forecasting. A study of the methodology of financial forecasting will reveal that the process of putting a future value to a particular scope of work, is nothing more than a range of small, medium and large cost estimates, combined into one exercise.

The time in which these estimates can be done is normally very limited as the financial forecast is done during the course of a project's life cycle. The scope is normally not well defined as the engineering of it is still in process. The limited level of scope definition together with the short duration in which these estimates can be done, makes the use of conceptual type estimates essential. RCE is one such method that can be used.

The nature of petrochemical plants is such that the lay-out and design criteria for most of these plants are similar. Taking this into consideration, it makes sense to make use of a system where ratios derived from previous projects, are used. RCE lends itself to this form of estimating and with a low level of available information; fairly accurate estimates can be compiled and included in the financial forecast.

Considering the fact that the Primary Objective of the study has been reached and that the contribution that RCE can have in the South African petrochemical construction industry, have been highlighted; conclusions can also be drawn regarding the use of RCE in financial forecasting. If RCE can be positively employed in conducting cost estimates for new petrochemical plants and the accuracy of these estimates is satisfactory (refer to Chapter 8), this form of cost estimating can also be used in the

costing of smaller portions of work. This has however not been proved in this study and remain open for discussion or for future research.

3.0 TESTING THE HYPOTHESES

This study researched, in particular, the use of Ratio Conceptual Cost Estimating (RCE) in the South African petrochemical construction industry. The Primary Hypothesis was mentioned in Chapter 1 as:

It is possible to apply Ratio Conceptual Cost Estimating (RCE) in the South African petrochemical construction industry.

From the interpretation and application of the theory of Chapters 2 to 7, Chapter 8 has been developed. In this chapter the process of RCE had been applied to ten typical petrochemical target projects. This process of RCE was based on a database derived from 45 historical projects (Addendum D). The results for the application of RCE in this instance are described in Chapter 8. When considering previous research, the international accepted level of accuracy for conceptual cost estimates is approximately 15% within the actual cost of the project.

The results obtained and described in Chapter 8 are well within this range of accuracy. Refer to Addendum G (page G1) for more information. Taking this into consideration, the primary hypothesis is supported.

The Secondary Hypothesis stated in Chapter 1, read:

The use of Ratio Conceptual Cost Estimating (RCE) in the construction of South African petrochemical projects will lead to improved cost forecasting.

The essence of cost forecasting lies in the timely prediction of future costs on a construction project. The purpose of cost forecasting in itself is to forewarn management of shifts in the projected cash flow to enable budget shifts or re-application of funds.

A cost estimate is nothing more than a prediction of what a particular exercise will cost at some point in time. A series of estimates of various sizes will be required throughout the lifespan of a construction project. The availability of engineering data and the

limited time available will necessitate a quick form of cost estimating. RCE does lend itself to these characteristics. Although the value of RCE in the South African petrochemical industry has been proved in this study, the specific application in smallish estimates (which normally forms part of the financial forecasting process) has not been tested. The secondary hypothesis is therefore not supported.

4.0 LIMITATIONS

Although the data pool seems to be quite comprehensive, it is actually not big enough to draw meaningful statistical analysis from. It will be many years before enough data sets exist for such analysis to be conducted. Competitive tendering procedures in the open market enhance this problem, seeing that many competitors do not want to surrender any information as they feel that this might compromise their position in the market place.

The size of the data pool of South African petrochemical projects poses to be the single most significant draw back of the use of RCE. This situation will improve over time as more projects are being constructed.

5.0 FUTURE RECOMMENDATIONS

Although the Primary Hypothesis has been supported, there are still areas where future research will add value. These areas can be summarised as follow:

- Although the use of RCE in South African petrochemical construction projects has proved to be successful when determining the cost of new plants, it has not been applied to small portions of scope additions / omissions. Future study may prove that similar databases (as stated in Addendum D) can be utilised to perform localised estimates.
- The current form of the database only caters for “installation” of items such as piping and mechanical equipment. Should the database be further developed, the “supply” of these items can also be included in the estimate.
- The development of locational factors which might be brought into the calculation might also be considered. The frequency of plants constructed in areas other than the traditional locations in South Africa, is however limited and the researcher will struggle to obtain a sufficient data pool.

BIBLIOGRAPHY

AACE (2010). Cost estimating classification system. [online]. Available from: http://www.aacei.org/technical/rp.shtml#17R-97. [Accessed 14 October 2010].

Abdul-Rahman, H. (1997). Some observations on the issues of quality cost in construction. International Journal of Quality and Reliability Management. Vol. 14. No. 5. p. 464-481.

Abdul-Rahman, H., Berawi, M. A., Berawi, A. R., Mohamed, O. & Yahya, I. A. (2006). Delay mitigation in the Malaysian construction industry. Journal of Construction & Engineering Management. Vol. 132. No. 1. p. 125-133. February.

Abdul-Rahman, H., Kwan, C. L. & Woods, P. C. (1999). Quality function deployment in construction design: Application in low cost housing design. International Journal of Quality and Reliability Management. Vol. 16. No. 6. p. 591-605.

Abdul-Rahman, H., Thompson, P. A. & Whyte, I. L. (1996). Capturing the cost of non-conformance on construction sites. International Journal of Quality and Reliability Management. Vol. 13. No. 1. p. 48-60.

Abi-Karam, T. (2004a). Construction trends and the cost engineer. In AACE International Transactions. Morgantown: AACE International.

Abi-Karam, T. (2004b). Design / suild Selection process: Art or science? In AACE International Transactions. Morgantown: AACE International.

Abourizk, S., Knowles, P. & Hermann, U. R. (2001). Estimating labor productivity for industrial construction activities. Journal of Construction & Engineering Management. Vol. 127. No. 6. p. 502 -511. December.

ACE. (1991). Estimating checklist for capital projects. E & FN Spon: New York.

Acharya, N. K., Lee, Y. D. & Im, H. M. (2006). Conflicting factors in construction projects: Korean perspective. Engineering, Construction and Architecture Management. Vol. 13. No. 6. p. 543-566.

Adams, R. B. (2004). Cost, quality and Sarbanes Oxley. In AACE International Transactions. Morgantown: AACE International.

Addison, J. T., Bellmann, L., Schank, T. & Teixeira, P. (2008). The demand for labor: An analysis using matched employer-employee data from the German LIAB. Will the high unskilled worker own-wage elasticity please stand up. Journal of Labor. Vol. 29. p. 114-137.

Adilov, N. & Smavati, H. (2009). Pump prices and oil prices: A tale of two directions. Atlantic Economic Journal. Vol. 37. p. 51-64.

Afrisam, (2008). Technical guide to the use of rapid strength cement. Brochure published by Afrisam SA (Pty). Ltd.

Agrawal, S. S. (2007). Advances in tank quality measurements can help cut operational costs. Hydrocarbon Processing. p. 67-70. June.

Ahcom, J., Uddin, S. & Shash, A. A. (2006). A pragmatic setup for cost estimation. In AACE International Transactions. Morgantown: AACE International.

Ahn, Y. & McLean, G. N. (2006). Regional human resource development: The case of Busan City. Vol. 9 (2). p. 261-270. June.

Aibino, A. A. & Odeyinke, H. A. (2006). Construction delays and their causative factors in Nigeria. Journal of Construction & Engineering Management. Vol. 132. No. 7. p. 667-677. July.

Akerlof, G. A. (2007). The missing motivation in macro-economics. The American economic Review. p. 5 – 36. March.

Alani, A. M. & Khosrowshahi, F. (2007). Development of an effective methodology for assessment, repair and maintenance of earthquake damaged buildings. Facilities. Vol. 25. No. 2. p. 32-47.

Al-Duaij, J., Awida, T. & Kollarayam, A. E. (2007). Performing value analysis on construction project variation orders. Cost Engineering. Vol. 49. No. 6. p. 23-27. June.

Alexopoulos, K., Mourtzis, D., Papakostas, N. & Chryssolouris, G. (2007). DESYMA: Assessing flexibility for the life cycle of manufacturing systems. International Journal of Production Research. Vol. 45. No. 7. p. 1683-1694. April.

Al-Gahtani, K. (2007). Risk assessment for scheduling acceleration. In AACE International Transactions. Morgantown: AACE International.

Algarni, A. M., Arditi, D. & Polat, G. (2007). Build-operate-transfer in infrastructure projects in the United States. Journal of Construction & Engineering Management. Vol. 133. No. 10. p. 728-735. October.

Alinaitwe, H. M., Mwakali, J. A. & Hansson, B. (2007). Factors affecting the productivity of building craftsmen-studies from Uganda. Journal of Civil Engineering and Management. Vol. 13. No. 3. p. 169-176. March.

Al-Jibouri, S. H. (2003). Monitoring systems and their effectiveness for project cost control in construction. International Journal of Project Management. Vol. 21. p. 143-154. September.

Alonso-Villar, O. (2005). The effects of transport costs revisited. Journal of Economic Geography. Vol. 5. p. 589-604. June.

Al-Reshaid, K., Kartam, N., Tewari, N. & Al-Bader, H. (2005). A project control process in pre-construction phases. Engineering, Construction and Architectural Management. Vol. 12. No. 4. p. 351-372.

Al-Sudairi, A. A. (2007). Evaluating the effect of construction process characteristics to the applicability of lean principles. Construction Innovation. Vol. 7. No. 1. p. 99-121.

Al-Tabtabai, H., Kartam, N., Flood, I. & Alex, A. P. (1997). Expert judgment in forecasting construction project completion. Engineering, Construction and Architectural Management. Vol. 4. No. 4. p. 271-293.

Alvi, M. I. (2008). Building a proactive supply chain. CT & L. p. 36. September.

Ampt, A., Westbrook, J., Creswick, N. & Mallock, N. (2007). A Comparison of self-reported and observational work sampling techniques for measuring time in nursing tasks. Journal of Health Services. Vol. 12(1). p. 18-24. January.

Anders, B. & Lars, S. (2007). A design structural matrix approach displaying structural and assembly requirements in construction: a timber case study. Journal of Engineering Design. Vol. 18(2). p. 113-124. April.

Anderson, A. I., Compton, D. & Mason, T. (2004). Managing in a dangerous world: The National Incident Management System. Engineering Management Journal. Vol. 16. No. 4. p. 3-9. December.

Anderson, D. L. (2008). Danish infrastructure projects new budgeting method: A rational process to managing political decisions. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th world congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Anjaneyulu, L. (2009). Performance Metrics Based on Forecast Variance: A case study. Cost Engineering. Vol. 51 (4). p. 9-18.

Anonymous. (nd). The Americas and the United States of America. Credit Control. p. 30-35.

Anonymous. (2002). Sasol starts work on SA-Mozambique pipeline. Mail & Guardian. 01 January 2002.

Anonymous. (2003a). Currency shifts bites into BHP Billiton. The Sydney Morning Herald. 24 February 2003.

Anonymous. (2003b). Currency fluctuations drags down BHP results. The Sydney Morning Herald. 24 February 2003.

Anonymous. (2006a). How rising wages are changing the game in China. Business Week. 27 March 2006.

Anonymous. (2006b). SA unveils R6bn bio-fuels plan. [online]. Available from: http://www.fin24.com/articles/default/display article.aspx?Artieleld=1518-25 2041657. [Accessed 04 June 2008].

Anonymous. (2006c). Cost of construction rework. [online]. Available from: http://www.contractorsblog.com/archives/2006/01/cost_of_rework_1.html. [Accessed 30 September 2008].

Anonymous. (2007a). Westinghouse takes on pebble bed operation. Professional Engineering. November.

Anonymous. (2007b). Is nuclear energy the environmentally friendly option for Ireland? Engineers Journal. Vol. 61. No. 9. p. 545-547. November.

Anonymous. (2007c). Pebble bed modular reactor. Advanced Materials and Processes. p. 141. November.

Anonymous. (2007d). A new day for energy in America. Nuclear Plan Journal. p. 13-14.September / October.

Anonymous. (2008a). Skills fears over UK reactor plans. Professional Engineering. p. 4. January.

Anonymous. (2008b). Technology, globalization altering construction. Cement Americas. p 4. January / February.

Anonymous. (2008c). Coega gets R1,5bn bio-fuels plant. [online]. Available from: http://www.southafrica.info/business/investing/rainbio -180308.htm. [Accessed 04 June 2008].

Anonymous. (2008d). Is the SA Bio-fuels debate properly framed? [online]. Available from: http://www.polity.org.za/article.php?a_id=129266. [Accessed 04 June 2008].

Anonymous. (2008e). Activity-Based Costing [online]. Available from: http://www.en_wikipedia.org/wiki/Activity-based costing. [Accessed 06 June 2008].

Anonymous. (2008f). Gekko systems' prototype underground pre-concentration plant. [online]. Available from: http://www.ferret.com.au/c/Gekko-Systems/Gekko-Systems-prototype-underground-plant. [Accessed 09 June 2008].

Anonymous. (2008g). Earned schedule: An extension to earned value management. [online]. Available from: http://www.earnedschdule.com [Accessed 09 June 2008].

Anonymous. (2008h). Volatility impels update to rules of thumb for cost estimations. Hydrocarbon Processing. p. 21. March.

Anonymous. (2008i). Time equals money: Maximize efforts in project change. [online]. Available from: http://www.interface-consulting.com/en/art/?64 [Accessed 02 October 2008].

Anonymous. (2008j). Risks of differing site conditions. [online]. Available from: http://www.interface-consulting.com/en/art/?8 [Accessed 02 October 2008].

Anonymous. (2008k).Change order management. [online]. Available from: http://www.interface-consulting.com/en/art/?22 [Accessed 02 October 2008].

Anonymous. (2008l). Work breakdown structure. [online]. Available from: http://en.wikipedia.org/wiki/Work_breakdown_structure?bcsi_scan_7D33CA42A816. [Accessed 03 October 2008].

Anonymous. (2008m). Work breakdown structure (WBS). [online]. Available from: http://hyperhot.com/pm_wbs.htm. [Accessed 03 October 2008].

Anonymous. (2008n). Work breakdown structure. [online]. Available from: http://www.chambers.com.au/Sample_p/wbs_cnsp.htm. [Accessed 03 October 2008].

Anonymous. (2008o). All change-economic conditions shake-up construction rankings. International Construction. p. 6. July-August.

Anonymous. (2008p). Contractor charged. International Construction. p. 6. July-August.

Anonymous. (2008q). Like a runaway train, steel's course is anybody's guess. American Metal Market. p. 10. November.

Anonymous. (2008r). Top merchanting chains profit tumbles. Builders Material Journal. p. 5. October.

Anonymous. (2008s). Delivering on our commitment to you. [online]. Available from: http://www.transnet.net/vissionmission.aspx. [Accessed 19 November 2008].

Anonymous. (2008t). Brick manufacturing at lowest level in 60 years. Builders Material Journal. p. 5. October.

Anonymous. (2008u). Tsvangirai vows to re-vamp Zim economy. [online]. Available from: http://www.mg.co.za/article/2008-03-27-tsvangirai-vows-to-revamp-Zim-economy. [Accessed 21 November 2008].

Anonymous. (2008v). Manual to go slow on forex rules. [online]. Available from: http://www.fin24.com/articles/default/display_article.aspx. [Accessed 03 December 2008].

Anonymous. (2010a). St' Paul's Cathedral History. [online]. Available from: http://www.stpauls.co.uk/Cathedral-History [Accessed 13 October 2010].

Anonymous. (2010b). France: SA is ready for nuclear power expansion. Mail & Guardian, 20 April 2010.

Anwer, M. S. & Sampath, R. K. (2001). Capital formation and economic growth. International Journal of Applied Economics and Econometrics. Vol. 9 (4). p. 411-423.

Aoieong, R. T., Tang, S. L. & Ahmed, S. M. (2002). A process approach in measuring quality costs of construction projects: Model Development. Construction Management and Economics. 20. p. 179-192. October.

Arain, F. M. & Pheng, L. S. (2005). The potential effect of variation orders on institutional building projects. Facilities. Vol. 23. No. 12. p. 496-510.

Arize, A., Malindretos, J. & Nam, K. (2005). Inflation and structural change in 50 developing countries. Atlantic Economic Journal. Vol. 33. p. 461-471.

Arnold, T. & North, D. S. (2008). Duration measures for corporate project valuation. The Engineering Economist. Vol. 53. p. 103-117.

Arrow, J. (2008). Knowledge-based proactive project risk management. In AACE International Transactions. Morgantown: AACE International.

Ashford, J. L. (1992). The management of quality in construction. E & F Spon. London.

Ashworth, A. (1992). Cost studies of buildings. Longman Group. Essex.

Ashworth, A. (1996). Estimating the life expectancies of building components in life-cycle costing calculations. Structural Survey. Vol. 14. No. 2. p. 4-8.

Ashworth, A. (2004). Cost studies of buildings. Pearson Prentice Hall. Essex.

Aslaksen, S. O. & Vigerust, G. (2007). Schedule and cost risk: An integrated part of risk management process in the Ormen Lange project. In AACE International Transactions. Morgantown: AACE International.

Assiskumar, S. (2008). Historical construction cost database and its application. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Association of Cost Engineers (1991). Estimating checklist for capital projects. Second Edition. E & FN Spon. New York.

Atkeson, A. & Kehoe, P. J. (2007). Modeling the transition to a new economy: Lessons from two technological revolutions. The American Economic Review. p. 64-68. March.

Atkin, B., Akintoye, A. & Skitmore, R. M. (1993). Time-cost planning of construction. The Royal Institute of Chartered Surveyors: London.

Austin, A. (2008). Rebuilding the American economy from the ground up. [online]. Available from: http://thedailyvoice.com/voice/2008/10/rebuilding-the-american-econom-001274.php [Accessed 21 November 2008].

Autiero, G. (2000). Market functioning and social rules. Economic Analysis. Vol. 3. No. 1. p. 49-64.

Azhar, S., Ahmed, S. M. & Caballero, A. A. (n.d.). Development of an integrated cost estimation and cost control system for construction projects. Florida: Florida State University.

Babusiaux, D. & Pierru, A. (2009). Investment project valuation: A new equity perspective. The Engineering Economist. Vol. 54. p. 101-108.

Baillie, H. M. (1967). Etiquette and the planning of state apartments in baroque palaces. Archeologia. Vol. 3. No. 3. p. 169-199.

Bain, J. (2008). Strong structures. Financial Mail. 12 September 2008.

Baliamoune-Lutz, M. (2008). Financial development and income in North Africa. International Advances in Economic Research. Vol. 14. p. 422-432.

Ball, J. F. & Petrowski, D. T. (2007). Projecting construction costs with tempered cost indices. In AACE International Transactions. Morgantown: AACE International.

Ballentine, G. L. & Gignac, A. (2008). Using the TCM framework for consistency and comparability of various types of environmental cost estimates. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Barbot, C. (2005). Airport pricing systems and airport deregulation effect on welfare. Journal of Air Transportation. Vol. 10. No. 2. p. 109-126.

Barlow, R. D. (2006). Builder beware: Why construction projects need materials management expertise. Healthcare Purchasing. p. 10-13. November.

Barmania, A. & McMullan, L. E. (2006). Estimating in 3D: The next dimension. In AACE International Transactions. Morgantown: AACE International.

Barnard, M. (2010). Staking kan sokker benadeel. Die Burger. 11 May 2010.

Barr, V. (1992). Alexandre Gustave Eiffel: A towering genius. Mechanical Engineering. February.

Barraza, G. A., Back, W. E. & Mata, F. (2004). Probabilistic forecasting of project performance using stochastic S-curves. Journal of Construction & Engineering Management. Vol. 130. No. 1. p. 25-32. February.

Barraza, G. & Bueno, R. A. (2007). Cost contingency management. Journal of Management in Engineering. p. 140-146. July.

Barthes, R. (1979). The Eifel Tower and other mythologies. New York : Hill and Wang

Baskaran, A., Ham, H. & Lei, W. (2006). New design procedure for wind uplift resistance of architectural metal roofing systems. Journal of Architectural Engineering. p. 168-177. December.

Bauer, N. (2010). South Africa needs policy change to fight unemployment. Business Day. 15 July 2010.

Bausbacher, E. & Hunt, R. (1993). Process plant lay-out and piping design. Prentice-Hall. New York.

Becker, F. S. (2006). Globalization, curricula reform and the consequences for engineers working in an international company. European Journal of Engineering Education. 31(3). p. 261-272. June.

Beech, J. (2006). Credit crisis and the impact on cash flow. Credit Control. p. 18-20.

Belcher, O. F. (2004). Charting a successful dispute resolution. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Bellamy, C. (2011). Principles of research design. Sage Publications: New York.

Bender, W. J. (2006). Daily observation reports prevent unwanted costs. In AACE International Transactions. Morgantown: AACE International.

Benjamin, C. (2008). Economic policy "to be compromise". [online]. Available from: http://www.businessday.co.za/articles/economy.aspx?ID=BD4A878898. [Accessed 21 November 2008].

Bent, J. A. (1982). Applied cost and schedule control. Marcel Dekker: New York.

Bentley, J. I. W. (1987). Construction tendering and estimating. E & F.N. Spon: New York.

Berends, T. C. (2006). Cooperative contracting on major engineering and construction projects. Vol. 51. p. 35-51.

Berends, T. C. & Dhillon, J. S. (2004). An analysis of contract cost phasing on engineering and construction projects. The Engineering Economist. Vol. 49. p. 327-337.

Berg, R. & Hinze, J. (2005). Theft and vandalism on construction sites. Journal of Construction & Engineering Management. Vol. 131. No. 7. p. 826-833. July.

Berger, R. (1986). Versailles: The Château of Louis XIV. University Park: The College Arts Association.

Bertisen, J. & Davis, G. A. (2008). Bias and error in mine project cost estimation. The Engineering Economist. Vol. 53. p. 118-139.

Bhokha, S. & Ogunlana, S. O. (1999). Application of artificial neural network to forecast construction duration of buildings at the pre-design stage. Engineering, Construction and Architectural Management. Vol. 6. No. 2. p. 133-144.

Bidarra, R. & Bronsvoort, W. F. (2000). Semantic feature modeling. Computer Aided Design. Vol. 32. p. 201-225.

Biffi, M. (2008). Linking the estimate, the schedule and the cost control through a standardized WBS. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Bilec, M., Ries, R. & Matthews, H. S. (2007). Sustainable development and green design - who is leading the green initiative? Journal of Professional Issues in Engineering Education and Practice. Vol. 133. No. 4. p. 265-269. October.

Billows, D. (2008a). Work breakdown structure: Is your WBS a solid foundation for success? [online]. Available from: http://www.4pm.com/articles/work_breakdown_structure.htm. [Accessed 03 October 2008].

Billows, D. (2008b). How many tasks in the WBS? [online]. Available from: http://www.4pm.com/articles/wbs.htm. [Accessed 03 October 2008].

Black, J. H. (1984). Cost engineering planning techniques for management. New York: Marcel Dekker.

Blandy, R. (2006). Australian labour market reform: What needs to be done? ABL. Vol. 32. No. 1. p. 1-17.

Blunt, A. (1980). Art and architecture in France 1500 to 1700. Harmondsworth, Middlesex, England: Penguin Books.

Blyth, K. & Kaka, A. (2006). A novel multiple linear regression model for forecasting S-curves. Engineering, Construction and Architectural Management. Vol. 13. No 1. p. 82-96.

Boero, G., Smith, J. & Wallis, K. F. (2008). Uncertainty and disagreement in economic prediction: The Bank of England survey of external forecasters. The Economic Journal. Vol. 118. p. 1107-1127.

Boeschoten, S. G. J. (2005). Reliability and accuracy of estimates. In AACE International Transactions. Morgantown: AACE International.

Bojanic, A. N. (2008). Inflation in post-conflict countries: The case of Sierra Leone. Atlantic Economic Journal. Vol. 36. p. 501-502.

Bonhomme-Delprato, D. (2008). Pricing cumulative impacts of differing site conditions and design changes in construction. Cost Engineering. Vol. 50(3). p. 12-16. March.

Borowicz, J. J. (2007). Wage rates, the untold story. Cost Engineering. Vol. 49(2). p. 19-27. February.

Borysowich, C. (2007). Measuring cost / schedule performance. [online]. Available from: http://www.blogs_ittoolbox.com/eai/implementation/archives/measuring-costschedule-perfo [Accessed 06 June 2008].

Bosch, D. (2004). Commissioning planning - a SASOL Technology approach. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Botti, F., Conte, A. Di Cagno, D. T. & D'Ippoliti, C. (2008). Risk attitude in real decision problems. The B.E. Journal of Economic Analysis & Policy. Vol. 8 (2). p. 1-30.

Bowen, P., Pearl, R., Cattell, K., Hunter, K. & Kelly, J. (2007). The role of value management in achieving best value in public service sector service delivery in South Africa: A research agenda. Acta Structilia. Vol. 14. No. 2. p. 58-75.

Bowyer, J. (1973). History of building. United Kingdom: Granada Publishing Limited.

Boyle, J. G. (2007). Productivity claims: Beyond "smoke and mirrors". In AACE International Transactions. Morgantown: AACE International.

Bradley, B. E. (2008). What is the US gulf coast baseline when measuring site productivity? In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Bradshaw, G. B. & Gruber, C. O. (2007). New nuclear power plants: Learning from history to understand costs and mitigate risks. In AACE International Transactions. Morgantown: AACE International.

Bredenhoeft, P. (2004). Cost trending throughout the design phase. In AACE International Transactions. Morgantown: AACE International.

Bredenhoeft, P. (2005). Controlling non-construction costs. In AACE International Transactions. Morgantown: AACE International.

Brent, A. C. & Labuschagne, C. (2007). An appraisal of social aspects in project and technology life cycle management in the process industry. International Journal of Management of Environmental Quality. Vol. 18. No. 4. p. 413-426.

Brigham, E. F., Gapenski, L. C. & Daves, P. R. (1999). Intermediate financial management. Dryden Press. Fort Worth.

Broad, W. J. (1990). How the $8 billion space station became a $120 billion showpiece. New York Times. 10 June.

Brock, H. R. & Palmer, C. E. (1986). Cost accounting: Principles and applications. McGraw-Hill: New York.

Brogden, H. E. & Taylor, E. (1950). The dollar criterion: Applying the cost accounting concept to criterion construction. Personnel Psychology. Vol. 3. p 133-154.

Brook, M. (2007). Estimating and tendering for construction work. Elsevier Butterworth Heinemann: New York.

Brooks, M. R. & Button, K. J. (1996). The determinants of shipping rates: A North Atlantic case study. Transport Logistics. Vol. 1. No. 1. p. 21-30.

Brooks, W. K. & Coleman, G. D. (2003). Evaluating key performance indicators used to drive contractor behavior at AEDC. Engineering Management Journal. Vol. 15. No. 4. p. 29-39. December.

Broome, J. (1999). The NEC engineering and construction contract: A user's guide. Thomas Telford: London.

Bruno, M., Di Tella, G., Dornbusch, R. & Fisher, S. (1988). Inflation stabilization. MIT Press. Cambridge.

Brunsman, A. R., Robson, K. F. & Gransberg, D. D. (2008). Parametric estimating for environmental remediation projects. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Buchner, T. W. (2007). Performance management theory: A look from the performer's perspective with implications for HRD. Human Resource Development International. Vol. 10 (1). p. 59-73. March.

Buell, M. (2008). Producing earned value from a geographic information system where scheduling tools were impractical. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Buettner, T. & Rincke, J. (2007). Labour market effects of economic integration: The impact of re-unification in German border regions. German Economics Review. Vol. 8 (1). p. 536-560.

Buffet, W. (2008). Buffet says “buy American”. [online]. Available from: http://www. Fin24.com/articles/default/display_article.aspx?ArticleId=2411602 [Accessed 21 November 2008].

Bureau for Economic Research (BER). (2008a). Building price indices. [online]. Available from: http://www.ber.ac.za/runtime/popcontentrun.aspx? Pageidref=1773. [Accessed 20 November 2008].

Bureau for Economic Research (BER). (2008b). Examples of the practical use of the BER building cost index. [online]. Available from: http://www.ber.ac.za/Knowledge/pkDownloadDocument.aspx%3Fdocid%3D4436. [Accessed 20 November 2008].

Burlton, R. T. (2001). Business process management. Sams Publishing. New York.

Burnside, C., Eichenbaum, M. & Rebelo, S. (1999). Prospective deficits and the Asian currency crisis. Paper presented at conference held at The World Bank. 03 August 1999.

Burroughs, S. E. & Juntima, G. (2004). Exploring techniques for contingency setting. In AACE International Transactions. Morgantown: AACE International.

Burrows, T. K., Pegg, I. & Martin, J. (2005). Predicting building construction duration. In AACE International Transactions. Morgantown: AACE International.

Butts, G. C. (2006). Accurate estimates in less than a minute. In AACE International Transactions. Morgantown: AACE International.

Butts, G. C. (2007a). Escalation: How much is enough? In AACE International Transactions. Morgantown: AACE International.

Butts, G. C. (2007b). Excel for cost engineers. In AACE International Transactions. Morgantown: AACE International.

Caddell, C. P., Crepinsek, S. R. & Klanae, G. P. (2004). Risk assessments: Value of the process. In AACE International Transactions. Morgantown: AACE International.

Camargo, M., Rabenasolo, B., Jolly-Desodt, A. & Castelain, J. (2003). Application of the parametric cost estimation in the textile supply chain. Journal of Textile and Apparel, Technology and Management. Vol. 3 (1), p. 1-12. September.

Campbell, C. M. (2008). An efficiency wage approach to reconciling the wage curve and the Phillips curve. Labour Economics. Vol. 15. p. 1388-1415.

Carbone, T. A. & Tippett, D. D. (2004). Project risk management using the project risk FMEA. Engineering Management Journal. Vol. 16. No. 4. p. 28-35. December.

Carlos, A. P. & Formoso, C. T. (2006). An evaluation of risk factors impacting construction cash flow forecast. Journal of Financial Management of Property and Construction. Vol. 11. No. 2. p. 75-90.

Carmeli, A. & Weisberg, J. (2006). Exploring turnover intentions among three professional groups of employees. Human Resource Development International. Vol. 9(2). p 191-206. June.

Carr, P. G. (2005). Investigation of bid price competition measured through pre-bid project estimates, actual bid prices and number of bidders. Journal of Construction & Engineering Management. Vol. 131. No. 11. p. 1165-1172. November.

Carrell, M. R., Kuzmits, F. E. & Elbert, N. F. (1989). Personnel human resource management. Merrill Publishing: Columbus.

Carson, C. W. (2007). A structural approach to least cost recovery scheduling. In AACE International Transactions. Morgantown: AACE International.

Cascio, W. F. (1982). Costing human resources: The financial impact of behavior in organizations. Kent Publishing. New York.

Cass, D. J. (2007). The earned value management maturity model. Cost Engineering. Vol. 49. No. 7. p. 18-19. July.

Castro-Lacouture, D. & Skibniewski, M. J. (2003). Applicability of e-Work Models for the automation of construction materials management systems. Production Planning and Control. Vol. 14 (8). p. 789-797. December.

Cesarone, J. (2007). Project management by the numbers: How earned value analysis can keep you on track. Industrial Engineer. p. 37-41. November.

Cha, H. S. & O'Connor, J. T. (2005). Optimizing implementation of value management processes for capital projects. Journal of Construction & Engineering Management. Vol. 131. No. 2. p. 239-251. February.

Chadee, D. D. & Crow, D. (1997). Impacts on currency fluctuations on Japanese foreign direct investment. Asia Pacific Journal of Marketing and Logistics. Vol. 9. No. 3. p. 42-52.

Chan, A. P. C. & Chan, A. P. L. (2004). Key performance indicators for measuring construction success. Benchmarking: An International Journal. Vol. 11. No. 2. p. 203-221.

Chan, A. P. C., Scott, D. & Chan, A. P. L. (2004). Factors affecting the success of a construction project. Journal of Engineering & Construction Management. Vol. 130. No. 1. p. 153-155. February

Chan, J. K. W., Tam, C. M. & Cheung, R. K. C. (2005). Construction firms at the crossroads in Hong Kong. Engineering, Construction and Architectural Management Journal. Vol. 12. No. 2. p. 111-124.

Chan, E. H. W. & Tse, R. Y. C. (2003). Cultural considerations in international construction contracts. Journal of Construction & Engineering Management. Vol. 129. No. 4. p. 375-381. August

Chang, C., Hanna, A. S., Lackney, J. A. & Sullivan, K. T. (2007). Quantifying the impact of schedule compression on labor productivity for mechanical and sheet metal contractors. Journal of Engineering & Construction Management. Vol. 133. No. 4. p. 287-296. April.

Chassiakos, A. P. & Sakellaropoulos, S. P. (2005). Time-cost optimization of construction projects with generalized activity constraints. Journal of Engineering & Construction Management. Vol. 131. No. 10. p. 1115-1124. October.

Chau, K. W. (1998). The implications of the difference in the growth rates of the prices building resources and outputs in Hong Kong. Engineering, Construction and Architectural Management. Vol. 5. No. 1. p. 38-50.

Checkley, K. (1994). Cash is king: A practical guide to strategic cash management. Pitman Publishing. London.

Chehayeb, C. & Al-Hussein, M. (2006). Using artificial neural networks for predicting the outcome of Canadian construction litigated claims. In AACE International Transactions. Morgantown: AACE International.

Chen, M. T. (2007). ABC of cash flow projections. In AACE International Transactions. Morgantown: AACE International.

Chen, M. T. (2008). The ABC's of earned value application. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Chen, K., Imrohoroglu, A. & Imrohoroglu, S. (2006). The Japanese saving rate. The American Economic Review. p. 1850-1858. December.

Chen, H., O'Brien, W. & Herbsman, Z. J. (2005). Assessing the accuracy for cash flow models: The significance of payment conditions. Journal of Construction & Engineering Management. Vol. 131. No. 6. p. 669-688. June.

Cheng, E. W. L. & Li, H. (2004). Development of a practical model of partnering for construction projects. Journal of Construction & Engineering Management. Vol. 130. No. 6. p. 790-798. December.

Cheng, E. W. L. & Li, H. (2006). Job performance evaluation for construction companies: An analytic network process approach. Journal of Construction & Engineering Management. Vol. 132. No. 8. p. 827-835. August.

Cheng, E. W. L., Li. H. & Fox, P. (2007). Job performance dimensions for improving final project outcomes. Journal of Construction & Engineering Management. Vol. 133. No. 8. p. 592-599. August.

Cheng, M. & Yang, S. (2001). GIS-based cost estimates integrating with material layout planning. Journal of Construction & Engineering Management. Vol. 127. No. 4. p. 291-299. August.

Chester, M. & Hendrickson, C. (2005). Cost impacts, scheduling impacts and the claims process during construction. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 102-107. January.

Cheung, F. K. T. & Skitmore, M. (2005). Refinement of storey enclosure forecasting method. In AACE International Transactions. Morgantown: AACE International.

Cheung, S., Suen, H. C. H. & Lam, T. (2002). Fundamental of alternative dispute resolution processes in construction. Journal of Construction & Engineering Management. Vol. 128. No. 5. p. 409-417. October.

Cheung, S. O., Wong, P. S. P., Fung, A. Y. S. & Coffey, W. V. (2008). Examining the use of bid information in predicting the contractor's performance. Journal of Financial Management of Property and Construction. Vol. 13. No. 2. p. 111-122.

Cheung, S. O., Yiu, T. W. Y. & Yeung, S. T. (2006). A study of styles and outcomes in construction dispute negotiation. Journal of Construction & Engineering Management. Vol. 132. No. 8. p. 805-814. August.

Chew, M. Y. L. & De Silva, N. (2004). Factorial method of performance assessment of building facades. Journal of Construction & Engineering Management. Vol. 130. No. 4. p. 525-533. August

Chow, G. C. & Shen, Y. (2006). Demand for education in China. International Economic Journal. Vol. 20 (2). p. 129-147.

Chua, D. K. H. & Godinot, M. (2006). Use of a WBS matrix to improve interface management in projects. Journal of Construction & Engineering Management. Vol. 132. No. 1. p. 67-79. January.

Chulkov, D. V. & Desai, M. S. (2005). Information technology project failures. International Management and Computer Security Journal. Vol. 13. No. 2. p. 135-143.

Chung, C. (2007). Technological progress, terms of trade, and monopolistic competition. International Economic Journal. Vol. 21. (1). p. 61-70.

Chung, B. & Skibniewski, M. J. (2007). Cost-benefit analysis of ERP modules in construction firms. In AACE International Transactions. Morgantown: AACE International.

Chuong, Y. T. (2007). Project estimate reviews for oil and gas projects. In AACE International Transactions. Morgantown: AACE International.

Ciccarelli, J. J. (2003). Cost control systems: Benefits provided to claims analysis. In AACE International Transactions. Morgantown: AACE International.

Ciccarelli, J. J. (2004). The real cost of mitigating delays. In AACE International Transactions. Morgantown: AACE International.

Ciccarelli, J. J. & Murch, M. (2008). Risk review of recovery schedules. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Cicmil, S. & Nicholson, A. (1998). The role of the marketing function in operations of a construction enterprise: Misconceptions and paradigms. Management Decision. Vol. 36. No. 2. p. 96-101.

Cilliers, W. W. & Nagel, P. J. A. (1994). Logistics trends in South Africa. International Journal of Physical Distribution and Logistics Management. Vol. 24. No. 7. p. 4-14. February

Claasen, L. (2008a). B&W instrumentation and electrical: Building on momentum. Financial Mail. 25 April 2008.

Claasen, L. (2008b). Filling the energy space. Financial Mail. 04 July 2008.

Clare, B. S. (2008). Reviewing change orders 101. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Clark, F. D & Lorenzoni, A. B. (1985). Applied cost engineering. Marcel Dekker: New York.

Clemens, C. (2008). Imperfect competition and growth with entrepreneurial risk. German Economic Review. Vol. 9 (2). p. 180-206.

Cocodia, E. O. (2008). Creating better cost estimates for floating offshore structures by assessing cost correlation and understanding risk. Proceedings of the Eighteenth International Offshore and Polar Engineering Conference, Vancouver – Canada. July 2008.

Coenen, G., Orphanides, A. & Wieland, V. (2004). Price stability and monetary policy effectiveness when nominal interest rates are bounded at zero. Advances in Micro-economics. Vol. 4 (1). p. 1-23.

Coetsee, L. D. (2002). Peak performance and productivity: A practical guide for a motivating climate. L. D. Coetsee: Johannesburg.

Coetzer, W. (2011). (Lecturer – University of the North West). Interview regarding use of statistical models when designing mathematical equations for the petrochemical industry. 1 September 2011, Vanderbijlpark.

Cohen, A. & Einav, L. (2007). Estimating risk preferences from deductible choice. The American Economic Review. p. 745-788.June.

Cohen, N. (1990). All about meteorological services: The diverse new industry of private weather forecasting. New York Times. 19 August.

Coleman, S. (2006). Scope of work and problem identification: the signs. [online]. Available from: http://www.accessmylibrary.com/coms2/summary_0286-17604308_ITM. [Accessed 30 September 2008].

Cottrell, D. S. (2006). Contractor process improvement for enhancing construction productivity. Journal of Construction & Engineering Management. Vol. 132. No. 2. p. 189 – 196. February.

Cox, R. F., Issa, R. R. A. & Koblegard, K. (2005). Management's perception of key behavioral indicators for construction. Journal of Construction & Engineering Management. Vol. 131. No. 3. p. 368-376. March.

Creamer, T. (2008). Misconceptions distorting SA's bio-fuels strategy. [online]. Available from: http://www.engineeringnews.co.za/article.php?a id=129131. [Accessed 04 June 2008].

Creamer, T. (2010). Rail's return, infrastructure push, worrying climate change facts. Engineering News. 16 July.

Creech, W. D. (2005). Sarbanes-Oxley and cost engineering. In AACE International Transactions. Morgantown: AACE International.

Creech, W. D. (2006). Financial administration of construction contracts by owners. In AACE International Transactions. Morgantown: AACE International.

Cullen, S. (2004). Essentials of cost management. In AACE International Transactions. Morgantown: AACE International.

Cummins, T. R. & Jenks, T. (1989). Using life-cycle concepts to estimate building costs. The Bottom Line: Managing Library Finances. Vol. 2. No. 2. p. 15-17.

Dagut, J. (2006). On migratory labour in South Africa. South African Journal of Economics. Vol. 62 (4). p. 260-265.

Davig, T. & Leeper, E. M. (2007). Generalizing the Taylor principle. The American Economic Review. p. 607-635. June.

Davis, W. L. & Figgins, B. (2009). Do economists believe American democracy is working? Journal of the American Institute for Economic Research. Vol. 6 (2). p. 195-202.

Department of Defense (DoD). (2005). Work breakdown structures for defense materiel items. MIL-HDBK-881A. [online]. Available from: http://www.acq.osd.mil/pm/currentpolicy/wbs/MIL_HDBK-881A/WebHelp3/MILHDBK881A.htm. [Accessed 04 May 2009].

Dennis, N. (2007). Competition and change in the long-haul market from Europe. Journal of Air Transportation. Vol. 12. No. 2. p. 4 – 26.

De Puyfontaine, R. (1972). Louis Michel Thibault 1750 – 1815: His official life at the Cape of Good Hope. Tafelberg Uitgewers Bpk. Cape Town.

Derfus, P. J., Maggitti, P. G., Grimm, C. M. & Smith, K. G. (2008). The red queen effect: Competitive actions and firm performance. Academy of Management Journal. Vol. 51(1). p 61-80.

Deschenes, O. & Greenstone, M. (2007). The economic impacts of climate change: Evidence from agriculture output and random fluctuations in weather. The American Economic Review. p. 354-385. March.

De Silva, N. & Vithana, S. B. K. H. (2008). Use of PC elements for waste minimization in the Sri Lankan construction industry. Structural Survey. Vol. 26. No. 3. p. 188-198.

De Villiers, G. du T. (1986). The impact of climate and weather on the activities of the building and construction industry in South Africa. Final report No 120 of the South African National Scientific Programs. Issued by the Foundation for Research Development of the Council for Scientific and Industrial Research. January.

Devine, T. J. (2006). The Russian approach to project management in the oil industry. In AACE International Transactions. Morgantown: AACE International.

Diano, Z. & Cao, S. (2004). Application of the enterprise cost norm in bills of quantity. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Dieterle, R. A. (2008). The Eichleay formula: Is standby the standard? In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

DiMonica, P. (2006). Hunt for business: Grow now or be eaten! Six proven management methods to grow your business. Cost Engineering. Vol. 48(11). p 10-11. November.

Dobler, D. W., Burt, D. N. & Lee, L. (1990). Purchasing and materials management. McGraw-Hill: New York.

Donoghue, M. & Wright, M. L. J. (2002). William T. Thornton on the economics of trade unions: An early contribution to efficient bargaining theory. International Journal of Applied Economics and Econometrics. Vol. 10 (2). p. 218-254.

Doyle, J. T., Molnar, J. M. & Brown, R. B. (2008). Lessons learned on reducing change orders. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Doyon, B. & Werick, B. (2008). Cost of the damage due to flooding of residential buildings. Performance Indicator Summary. [online]. Available from: http://www.losl.org/twg/pi/pi_residentialdamage.html. [Accessed 09 June 2008].

Dow, D. (2004). Does the discipline of project controls really add value? Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Downes, K. (1990). Sir Christopher Wren: the design of St. Paul's Cathedral: introduction and catalogue. Trefoil Publications. London.

Duff, M. J., Okun, L. B. & Veneziano, G. (March 2002) (PDF). Trialogue on the number of fundamental constants. Institute of Physics Publishing for SISSA/ISAS. pp. 17.

http://jhep.sissa.it/archive/papers/jhep032002023/jhep032002023.pdf. Retrieved 2008-02-02.

Dumond, E. J. (2000). Value management: An underlying framework. International Journal of Operations and Production Management. Vol. 20. No. 9. p. 1062-1077.

Dunlap, D. W. (1991). Commercial property: Construction costs: For some, a lucky time to be building. New York Times. 8 April.

Dunlop, P. & Smith, S. D. (2004). Planning, estimation and productivity in the lean concrete pour. Engineering, Construction and Architectural Management. Vol. 11. No. 1. p. 55-64.

Dysert, L. R. (2004). Estimating. In Amos, S. J. (ed.). Skills and Knowledge of Cost Engineering. Morgantown: AACE International, p. 9.1-9.35.

Dysert, L. R. (2006). Is “Estimating Accuracy” and Oxymoron? In AACE International Transactions. Morgantown: AACE International.

Dysert, L. R. (2008). An introduction to parametric estimating. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Dysert, L. R. & Pickett, T. W. (2005). So you think you’re an estimator? Cost Engineering, 47. p 30-35. September.

Easterly, W. (2007). Was development assistance a mistake? AEA Papers and Proceedings. p. 328-332. May.

Eder, G. J. (1979). What’s behind Inflation and how to beat it. Prentice-Hall. Englewood Cliffs.

Edwards, D. J., Holt, G. D. & Harris, F. C. (1998). Predictive maintenance techniques and their relevance to construction plant. Journal of Quality in Maintenance Engineering. Vol. 4. No. 1. p. 25-37.

Edwards, D. J., Holt, G. D. & Harris, F. C. (2000). A comparative analysis between the multilayer perception "neural network" and multiple regression analysis for predicting construction plant maintenance costs. Journal of Quality in Maintenance Engineering. Vol. 6. No. 1. p. 45-60.

Ekanayake, L. L. & Ofori, G. (2000). Construction material waste source evaluation. Paper presented as part of the Strategies for a sustainable Built Environment – Pretoria; 23 – 25 August.

El-Adaway, I. & Ezeldin, A. S. (2007). Dispute review boards: Expected application on Egyptian large-scale construction projects. Journal of Professional Issues in Engineering Education and Practice. Vol. 133. No. 4. p. 365-372. October.

Elazouni, A. M., Ali, A. E. & Abdel-Razek, R. H. (2005). Estimating the acceptability of new formwork systems using neural networks. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 33-41. January.

Eldenburg, L. G. & Wolcott, S. K. (2005). Cost management. John Wiley & Sons: New York.

Elizandro, D. W. & Matson, J. O. (2007). Taking a moment to teach engineering economy. The Engineering Economist. Vol. 52. p 97-116.

Ellsworth, R.K. (2007). Cost to capacity factor development for facility projects. Cost Engineering, 49. p 26-29. September.

Eloff, T. (2009). An introduction to the science and art of road building. Journal of Construction & Engineering Management. Vol. 158. No. 1. p. 12-18. January.

El Wardani, M., Messner, J. I. & Horman, M. J. (2006). Comparing procurement methods for design-build projects. Journal of Construction & Engineering Management. Vol. 132. No. 3. p. 230-238. March.

Enshassi, A., Aziz, A. R. A. & Karriri, A. E. (2008). Investigating overhead costs in construction projects in Palestine. Journal of Financial Management of Property and Construction. Vol. 13. No. 1. p. 35-47.

Enshassi, A., Mohamed, S. & Madi, I. (2005). Factors affecting accuracy of cost estimation of building contracts in the Gaza Strip. Journal of Financial Management of Property and Construction. Vol. 10. No. 2. p. 115-125.

Enshassi, A., Mohamed, S., Mayer, P. & Abed, K. (2007). Benchmarking masonry labor productivity. International Journal of Productivity and Performance Management. Vol. 56. No. 4. p. 358-368.

Enshassi, A., Mohamed, S., Mustafa, Z. A. & Mayer, P. E. (2007). Factors affecting labour productivity in building projects in the Gaza Strip. Journal of Civil Engineering and Management. Vol. 13. No. 4. p. 245-254.

Erasmus, M. (2004). Determination of replacement, insurance base and residual (including rehabilitation) values for capital assets. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Eschenbach, T. & Cohen, R. (2006). Which interest rate for evaluating projects? Engineering Management Journal. Vol. 18. No. 3. p. 11-19. September.

Esposto, A. (2008). Skill: An elusive and ambiguous concept in labour market studies. ABL. Vol. 34. No. 1. p. 100-124.

Establishing a cost control system (2008). [online]. Available from: http://www.builderspace.com/features/progress-estimates.html. [Accessed 01 February 2008].

Evensmo, J. & Karlsen, J. T. (2004). Reviewing the assumptions behind performance indexes. In AACE International Transactions. Morgantown: AACE International.

Evensmo, J. & Karlsen, J. T. (2005). Earned value: The hammer without nails? In AACE International Transactions. Morgantown: AACE International.

Evensmo, J. & Karlsen, J. T. (2006). Earned value based forecasts: Some pitfalls. In AACE International Transactions. Morgantown: AACE International.

Evrenosoglu, F. B. (2008). The use of relational databases in forensic delay analysis. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Ewing, B. T. & Thompson, M. A. (2007). Symmetric and asymmetric stationary tests of productivity. The Engineering Economist. Vol. 52. p 355-365.

Ezeldin, A. S. & Sharara, L. M. (2006). Neural networks for estimating the productivity of concreting activities. Journal of Construction & Engineering Management. Vol. 132. No. 6. p. 650-656. June.

Faig, M. & Jerez, B. (2006). Inflation, prices, and information in competitive search. Advances in Micro-economics. Vol. 6 (1). p. 1-34.

Fang, D., Fong, P. S. & Li, M. (2004). Risk assessment model for tendering for Chinese building projects. Journal of Construction & Engineering Management. Vol. 130. No. 6. p. 862-868. December.

Fang, D., Li, M., Fong, P. S. & Shen, L. (2004). Risks in Chinese construction market: Contractor's perspective. Journal of Construction & Engineering Management. Vol. 130. No. 6. p. 853-861. December.

Fang, W. H. & Rogerson, J. H. (1999). Value engineering for managing the design process. International Journal of Quality and Reliability Management. Vol. 16. No. 1. p. 42-55.

Farkas, J. & Uys, P. (2004a). Cost analysis of bolted and welded frame connections. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Farkas, J. & Uys, P. (2004b). Cost estimation for the optimum design of welded structures. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Farrow, T. (2004). Extensions of time analysis: Methodology and mythodology. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Farrow, T. (2007). Developments in the analysis of extensions of time. Journal of Professional Issues in Engineering Education and Practice. Vol. 133. No. 3. p. 218-228. July

Faurie, J. (2008). Soil stabilizer supports stadium construction. Martin Creamer's Engineering News. 07 November.

Fayek, A. R. & Oduba, A. (2005). Predicting industrial construction labor productivity using fuzzy expert systems. Journal for Construction & Engineering Management. Vol. 131. No. 8. p. 938-941. August.

Fayek, A. R., Revay, S. O., Rowan, D. & Mousseau, D. (2006). Assessing performance trends on industrial construction mega projects. Cost Engineering. Vol. 48(10). p. 16-21. October.

Fearon, G. (2009). Government funding policy towards communicable diseases. Atlantic Economic Journal. Vol. 37. p. 121-134.

Fehr, E. & Goette, L. (2007). Do workers work more if wages are high? Evidence from a Randomized Field Experiment. The American Economic Review. p. 298-317. March.

Fellows, R. & Liu, A. M. M. (2000). Human dimensions in modeling prices of building projects. Engineering, Construction and Architectural Management. Vol. 7. No. 4. p. 362-372.

Ferrao, P. (2004). Disputes resolved, cost compiled & apportionment and the value of the project is… Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Ferreira, L. R. & Rogerson, J. H. (1999). The quality management role of the owner in different types of construction contracts for process plants. Total Quality Management. Vol. 10. No. 3. p. 401-411.

Ferry, D. J. & Brandon, P. S. (1980). Cost planning of buildings. 4th ed. London: Granada Publishing Limited.

Finger, M. & Piers, M. (2005). Air transport regulation under transformation: The case study of Switzerland. Journal of Air Transportation. Vol. 10. No. 2. p. 20-31.

Finlay, K., Norman, G. R., Stolberg, H., Weaver, B. & Keane, D. R. (2006). In-training evaluation using hand-held computerized clinical work sampling strategies in radiology residency. JACR. 57(1). p 232 – 237. October.

Fisher, J. D. (2002). Real time valuation. Journal of Property Investment and Finance. Vol. 20. No. 3. p. 213-221.

Flanagan, R. & Jewell, C. (2005). Whole life appraisal for construction. Blackwell Publishing: Malden.

Flanagan, R., Kendell, A., Norman, G. & Robinson, G. D. (2001). Life cycle costing and risk management. Construction Management and Economics. Vol. 5. p 53-71.

Flanagan, R. & Norman, G. (1983). Life cycle costing for construction. The Royal Institute of Chartered Surveyors: London.

Fleishman, M. E. (2004a). Labour in skills and knowledge of cost engineering. Edited by Scott, J.A. Morgantown: AACE International.

Fleishman, M. E. (2004b). Improving cost control for skeptical managers. In AACE International Transactions. Morgantown: AACE International.

Flemming, Q. W. & Koppelman, J. M. (2009). The two most useful earned value metrics: The CPI and the TCPI. Cost Engineering. Vol. 51 (3). p. 22-25.

Fong, P. S., Shen, Q. & Cheng, E. W. L. (2001). A framework for benchmarking the value management process. Benchmarking: An International Journal. Vol. 8. No. 4. p. 306-316.

Ford, D. N. (2002). Achieving multiple project objectives through contingency management. Journal of Construction & Engineering Management. Vol. 128. No. 1. p. 30-39. February.

Formoso, C. T., Soibelman, L., De Cesare, C. & Isotto, E. L. (2002). Material waste in the building industry: Main causes and prevention. Journal of Construction & Engineering Management. Vol. 128. No. 4. p. 316-325. August.

Frankel, D. M. & Burdzy, K. (2005). Shocks and business cycles. Advances in Theoretical Economics. Vol. 5 (1). p. 1-86.

Frisch, H. (1977). The role of money in the inflation analysis. In: Inflation Theory and Anti-inflation Policy – edited by Erik Lundberg. The Macmillan Press. New York.

Galf, J. & Monacelli, T. (2008). Optimal monetary and fiscal policy in a currency union. Journal of International Economics. Vol. 76. p. 116-132.

Galloway, R. M. & Jozefowicz, J. J. (2008). The effects of immigration on regional unemployment rates in the Netherlands. International Advances in Economic Research. Vol. 14. p. 291-302.

Gardiner, P. D. & Stewart, K. (2000). Revisiting the golden triangle of cost, time and quality: The role of NPV in project control, success and failure. International Journal of Project Management. Vol. 18. p 251-256. February.

Garlick, A. (2007). Estimating Risk. Gower Publishing Company. Burlington.

Garratt, A., Koop, G. & Vahey, S. P. (2008). Forecasting substantial data revisions in the presence of model uncertainty. The Economic Journal. Vol. 118. p. 1128-1144.

Gerber, D. (2008). (Contracts Director- Thyssenkrupp Engineering). Personal communication regarding major influences on construction cost in tendering on new work. 19 November 2008, Johannesburg.

Geweke, J. (2007). Bayesian model comparison and validation. AEA Papers and Proceedings. p. 60-64. May.

Gibbons, J. (2009). Welcome to Nevada. Economic Development Journal. Spring. p. 3.

Gibson, G. E., Wang, Y., Cho, C. & Pappas, M. P. (2006). What is pre-project planning anyway? Journal of Management in Engineering. Vol. 22. No. 1. p. 35-42. January.

Gil-Alana, L. A. (2009). Government expenditures and revenues: Evidence of fractional co-integration in an asymmetric modeling. International Advances in Economic Research. Vol. 15. p. 143-155.

Gilbreath, B. & Montesino, M. U. (2006). Expanding the HRD role: Improving employee well-being and organizational performance. Human Resource Development International. Vol. 9 (4). p 563-571. December.

Goldman, O. B. (1920). Financial engineering. Wiley. New York.

Goodwill, D. (2008). Strategies and tactics for reshaping North America's supply chains. CT & L. p. 38. September.

Gordon, A. (2008). What is a work breakdown structure? [online]. Available from: http:///www.brightthub.com/office/project-management/articles/2645.aspx?bcsi. Accessed 03 October 2008].

Grandlich, C. (2004). Using activity-based costing in surgery. [online]. Available from: http:///www.findarticles.com/p/articles/mi_m0ESI/is_1_79/ai_112686290. Accessed 06 June 2008].

Gransberg, D. D. & Carlisle, J. B. (2008). Estimating preconstruction services fees for CM-at-risk projects. . In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Gransberg, D. D. & Diekmann, J. (2004). Quantifying pavement life cycle cost inflation uncertainty. In AACE International Transactions. Morgantown: AACE International.

Gransberg, D. D., Lopez del Puerto, C. & Humphrey, D. (2007). Relating cost growth from the initial estimate to design fee for transportation projects. Journal of Construction & Engineering Management. Vol. 133. No. 6. p. 404-408. June.

Grant, E. J., Jones, J. & Vlachos, P. P. (2007). Design and wind tunnel performance testing of a new omni-directional roof vent. Journal of Architectural Engineering. p 18-21. March.

Gravelle, J. G. & Smetters, K. A. (2006). Does the open economy assumption really mean that labour bears the burden of a capital income tax? Advances in Economic Analysis & Policy. Vol. 6 (1). p. 1-42.

Graves, P. E. & Sexton, R. L. (2006). Demand and supply curves: Rotations versus shifts. Atlantic Economic Journal. Vol. 34. p. 361-364.

Graziano, A. M. & Raulin, M. L. (1993). Research methods: A process of inquiry. Harper Collins College Publisher: London.

Groth, J. C. & Kinney, M. R. (1994). Cost management and value creation. Cost Management and Value Creation. Vol. 32. No. 4. p. 52-57.

Grubb, F. (2007). The net worth of the US federal government, 1784-1802. AEA Papers and Proceedings. p. 280 – 284. May.

Guggemos, A. A. & Horvath, A. (2006). Decision-support tool for assessing the environmental effects of constructing commercial buildings. Journal of Architectural Engineering. p 187-195. December.

Guizhi, M. (2004). The reform of China's construction cost management after admission to the WTO. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Gunham, S. & Arditi, D. (2005). Factors affecting international construction. Journal of Engineering & Construction Management. Vol. 131. No. 3. p. 273-282. March.

Gunham, S. & Arditi, D. (2007). Budgeting owner's construction contingency. Journal of Construction & Engineering Management. 133(7). p 492-497. July.

Gunner, J. & Skitmore, M. (1999). Pre-bid building price forecasting accuracy: Price intensity theory. Engineering, Construction and Architectural Management. Vol. 6. No. 3. p. 267-275.

Gupta, R. (2007). Financial liberalization and inflationary dynamics: An open economy analysis. International Economic Journal. Vol. 21 (3). p. 335-360.

Guthrie, R., Purse, K. & Lurie, P. (2006). Workers' compensation in Western Australia: A case study 1993 – 2004. ABL. Vol. 32 No 1. p 62-73.

Hagmann, C., Stoy, C. & Terashima, N. (2008). Steel construction costs for early project phases, Germany. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Hale, D. (2008). International comparisons of labour disputes in 2006. Economic & Labour Marker Review. Vol. 2. No. 4. p 32-39. April.

Hall, J. C. & Leeson, P. T. (2007). Good for the goose, bad for the gander: International labor standards and comparative development. Journal of Labor. Vol. 28. p. 658-676.

Hamaker, J. W. & Compomation, P. J. (2005). Improving space project cost estimating with engineering management variables. Engineering Management Journal. Vol. 17. No. 2. p. 28-33. June.

Hamilton, A. C. (2004). Cost management. In AACE International Transactions. Morgantown: AACE International.

Hamood Al-Harthy, M. (2007). Stochastic oil price models: Comparison and impact. The Engineering Economist. 52. p. 269-284.

Han, H. J. & Park, C. S. (2008). A study on estimating investment timing of real options. The Engineering Economist. Vol. 53. p. 197-229.

Han, S. H. & Diekmann, J. E. (2001). Approaches for making risk based go/no-go decision for international projects. Journal of Construction & Engineering Management. Vol. 127. No. 4. p. 300-308.

Hancock, T. (2010). Concerns about nuclear-powered South Africa. Engineering News. October.

Hanna, A. S., Camlic, R., Peterson, P. A. & Lee, M. (2004). Cumulative effect of project changes for electrical and mechanical construction. Journal of Construction & Engineering Management. Vol. 130. No. 6. p. 762-771. January.

Hanna, A. S., Camlic, R., Peterson, P. A. & Nordheim, E. V. (2002). Quantitative definition of projects impacted by change orders. Journal of Construction & Engineering Management. Vol. 128 . No. 1. p. 57-64. February.

Hanna, A. S. & Gunduz, M. (2004). Impact of change orders on small labor-intensive projects. Journal of Construction & Engineering Management. Vol. 130. No. 5. p. 726-733. October.

Hanna, A. S., Peterson, P. & Lee, M. (2002). Benchmarking productivity indicators for electrical / mechanical projects. Journal of Construction & Engineering Management. Vol. 128. No. 4. p. 331-337. August.

Hannon, J. J. (2005). Estimating problems in heavy construction organizations. In AACE International Transactions. Morgantown: AACE International.

Hannon, J. J. (2007). Estimators' functional role change with BIM. In AACE International Transactions. Morgantown: AACE International.

Hansen, L. P. (2007). Beliefs, doubts and learning: Valuing macro-economic Risk. AEA Papers and Proceedings. p. 1-30. May.

Hanvey, C. (2008a). Project change: Deal with it. [online]. Available from: http:///www.interface-consulting.com/en/art/?124. Accessed 02 October 2008].

Hanvey, C. (2008b). Design documents and design. [online]. Available from: http:///www.interface-consulting.com/en/art/?26. Accessed 02 October 2008].

Hao, J. L., Hills, M. J. & Huang, T. (2007). A simulation model using system dynamic for construction and demolition waste management in Hong Kong. Construction Innovation. Vol. 7. No. 1. p. 7-21.

Harbuck, R. H. (2007). Are accurate estimates achievable during the planning of transportation projects? In AACE International Transactions. Morgantown: AACE International.

Harris, J. W. (2004). Cost validation methodology: New Systems Implementation. In AACE International Transactions. Morgantown: AACE International.

Harris, J. W. & DiCiesare, L. B. (2007). Lost profit analysis – Lost Business Opportunities. In AACE International Transactions. Morgantown: AACE International.

Hassanein, A. (2006). Conceptual planning of highway construction projects. In AACE International Transactions. Morgantown: AACE International.

Hassanein, A. & Khalil, B. (2006). Developing general indicator cost indices for the Egyptian construction industry. Journal of Financial Management of Property and Construction. Vol. 11. No. 3. p. 181-194.

Hassanein, A. & Khalil, B. (2008). Building Egypt 1 – A general indicator cost index for the Egyptian construction industry. Cost Engineering. Vol. 50. No. 4. p. 18-26. April.

Hassanein, A. G. & El Nemr, W. (2007). Construction claims in Egypt: Contracts and similarities with published literature. In AACE International Transactions. Morgantown: AACE International.

Hastak, M., Gokhale, S., Goyami, K., Hong, T. & Safi, B. (2007). Project manager's decision aid for a radical project cycle reduction. Journal of Construction & Engineering Management. Vol. 133. No. 6. p. 437-445. June.

Hastak, M. & Shaked, A. (2000). ICRAM-1: Model for international construction risk assessment. Journal of Management and Engineering. Vol. 16. No. 1. p. 59-69.

Hazelton, S. (2008). European weakness: A weak residential construction sector will drag the European industry into a mild recession for the next two years. International Construction. p. 16-17. September.

Heathcote, K. (2004). Real time earned value. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Henock, L. (2008). The value relevance of the foreign translation adjustment. [online]. Available from: http:///www.accessmylibrary.com/coms2/summary_0286-19752890_ITM. Accessed 03 December 2008].

Henschel, B. A. & Hildreth, J. C. (2008). Resolution now: The key to contemporaneous dispute resolution starts with impact classification. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Herath, S. B. & Kumar, P. (2007). New research directions in engineering economics: Modeling dependencies with copulas. The Engineering Economist. Vol. 52. p. 305-331.

Hewitt, P. M. (2006). Heavy civil infrastructure WBS. In AACE International Transactions. Morgantown: AACE International.

Hewitt, P. M. (2007). Development of an international cost database. In AACE International Transactions. Morgantown: AACE International.

Hewitt, P. M. (2008). Estimating international hydro-electrical projects. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Hill, M. (2007). Energy regulator grants license to Transnet for R11bn fuel pipeline. Engineering News. 13 September.

Hill, T. W. (2006). Economics of engineering: A new fabric from some old threads. The Engineering Economist. 51. p 347-359.

Hollmann, J. K. (2007a). The Monte-Carlo challenge: A better approach. In AACE International Transactions. Morgantown: AACE International.

Hollmann, J. K. (2007b). What is cost engineering and how is cost and schedule management an “estimating” function? Cost Engineering, 49. p 8. November.

Hollmann, J. K. & Dysert, L. (2007). Escalation estimation: Working with economics consultants. In AACE International Transactions. Morgantown: AACE International.

Hollmann, J. K. & Dysert, L. R. (2008). Escalation estimating: Lessons learned in addressing market demand. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Horman, M. J. & Kenley, R. (2005). Quantifying levels of wasted time in construction with Meta-Analysis. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 52-61. January.

Horman, M. J. & Thomas, H. R. (2005). Role of inventory buffers in construction labour performance. Journal of Construction & Engineering Management. Vol. 131. No. 7. p. 834-843. July.

Hsieh, C. & Klenow, P. J. (2007). Relative prices and relative prosperity. The American Economic Review. p. 562-585. June.

Hua, G. B. (2008). The state of applications of quantitive analysis techniques to construction economics and management (1983 to 2006). Construction Management & Economics. Vol. 26. No. 5. p. 485-497.

Huber, K. J. (2004). The integration of the value methodology - VM/VE (value management / value engineering) into the capital project execution process. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Hudson, J. W. & Hudson, S. P. (2004). Value cost management. In AACE International Transactions. Morgantown: AACE International.

Hughes, W. P. (1991). Effective control of construction projects. Paper presented at the 7th Annual ARCOM conference. University of Bath.

Hughes, S. W., Tippett, D. D. & Thomas, W. K. (2004). Measuring project success in the construction industry. Engineering Management Journal. Vol. 16. No. 3. p. 31-37. September.

Humphreys, K. K. (1984). Project and cost engineers' handbook. Marcel Dekker: New York.

Humphreys, K. K. (1991). Jelen's cost and optimization engineering. McGraw-Hill: New York.

Humphreys, K. K. (2004). Conducting project risk analysis: How to do it and how not to do it. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Humphreys, K. K. (2007). Green building: Project planning and cost estimating. Cost Engineering. Vol. 49. No. 4. p. 10. April.

Huot, J. (2008). Impact costs litigation on Montreal's mega hospitals. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Hyari, K. & El-Rayes, K. (2006). Optimal planning and scheduling for repetitive construction projects. Journal of Management in Engineering. Vol. 22. No. 1. p. 11-19. January.

Ibrahim, A. D., Shash, A. A., Assaf, S. A. & Jannadi, O. A. (2007). A study of the relationship between size and unit construction of residential buildings. Cost Engineering. Vol. 49 (9). p. 18-23.

Ibbs, W. (2005). Impact on change's timing on labor productivity. Journal of Construction & Engineering Management. Vol. 131. No. 11. p. 1219-1223. November.

Ibbs, W. & Nguyen, L. D. (2008). Analysis of delay damages for site overhead. Cost Engineering. Vol. 50, No. 3. p. 30-33. March.

Ikpe, E. O., Potts, K., Proverbs, D. & Oloke, D. (2007). Application of cost-benefit analysis to construction health and safety management. In AACE International Transactions. Morgantown: AACE International.

Innes, J., Kouhy, R. & Vedd, R. (2001). Management accounting and strategic human resource management. Chartered Institute of Management Accountants. London.

International Society of Parametric Analysts and the Society of Estimating and Analysis (2007). Parametric Estimating Handbook, Fourth Edition. [online]. Available from: http:///www.ispa-cost.org. Accessed 11 February 2009.

Iyer, K. C. & Jha, K. N. (2006). Critical factors affecting schedule performance: Evidence from Indian construction projects. Journal of Construction & Engineering Management. Vol. 132. No. 8. p. 871-881. August.

Jackson, J. A. (2008). Modeling international escalation factors for upstream EP projects. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Jackson, M. O. & Rogers, B. W. (2007). Meeting strangers and friends of friends: How random are social networks? The American Economic Review. p. 890-915. June.

Jacobson, S. H. & McLay, L. A. (2006). The economic impacts of obesity on automobile fuel consumption. The Engineering Economist. 51. p 307-323.

Jambhekar, V. S. & Weeks, S. D. (2007). Estimate review and assurance: Owners challenges. In AACE International Transactions. Morgantown: AACE International.

Jambhekar, V. S. & Weeks, S. D. (2008). Change management during FEED: An owner's case study. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Jansen-Rommijn, A. M. (2008). How to perform a location factor survey. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Janssen, C. & Yang, Z. (1999). Estimating the market value of a proposed townhouse development. Journal of Property Investment and Finance. Vol. 17. No. 5. p. 501-516.

Jenkins, A., Babuk, T. & Mohitpour, M. (2005). Lowering pipeline costs through applied technology. In AACE International Transactions. Morgantown: AACE International.

Jeon, J. (2009). Success factors for a lessons-learned system in a construction organization. Cost Engineering. Vol. 51 (5). p. 13-20.

Jha, K. N. & Devaya, M. N. (2008). Modeling the risks faced by Indian construction companies assessing international projects. Construction Management & Economics. Vol. 26. No. 4. p. 337-348.

Jiao, J. & Tseng, M. M. (1999). A pragmatic approach to product costing based on standard time estimation. International Journal of Operations and Production Management. Vol. 19. No. 7. p. 738-755.

Johnson, L. E. & Cate, T. (2006). A history of post Keynesian economics since 1936: A review article. Atlantic Economic Journal. Vol. 34. p. 115-123.

Johnson, S. (2007). Who will keep the lights on? TCE. p 30-31. October.

Jones, C. I. (2001). Was an industrial revolution inevitable? Economic growth over the very long run. Advances in Macro-economics. Vol. 1 (2). p. 1-43.

Jordaan. G. (2004). Adding value to property by pricing a vision: An urban design perspective. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Jorgenson, D. W. & Vu, K. (2007). Information technology and the world growth resurgence. German Economic Review. Vol. 8 (2). p. 125-145.

Kadir, M. R. A., Lee, W. P., Jaafar, M. S., Sapuan, S. M. & Ali, A. A. A. (2006). Construction performance comparison between conventional and industrialised building systems in Malaysia. Structural Survey. Vol. 24. No. 5. p. 412-424.

Kaiser, M. J. (2006). Offshore decommissioning cost estimation in the Gulf of Mexico. Journal of Construction & Engineering Management. Vol. 132. No. 2. p. 249-258. March.

Kaiser, M. J., Pulsipher, A. G. & Byrd, R. C. (2005). Cost of abrasive cutting in decommissioning operations in the Gulf of Mexico. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 137-148. January.

Kaiser, M. J., Pulsipher, A. G. & Martin, J. (2005). Cost of site clearance and verification operations in the Gulf of Mexico. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 117-126. January.

Kaka, A. P. (1999). The development of a benchmark model that uses historical data for monitoring the progress of current construction projects. Engineering, Construction and Architectural Management. Vol. 6. No. 3. p. 256-266.

Kaka, A. P., Lewis, J. & Petros, H. (2003). The effects of variability of project planning on cost commitment curves: A case study. Engineering Construction and Architectural Management. Vol. 10. No. 1. p. 15-26.

Kallantzis, A., Soldatos, J. & Lambropoulos, S. (2007). Linear versus network scheduling: A critical path comparison. Journal of Construction & Engineering Management. Vol. 133. No. 7. p. 483-491. July.

Kapetanios, G. & Marcellino, M. (2009). A parametric estimation method for dynamic factor models of large dimensions. Journal of Time Series Analysis. Vol. 30 (2). p. 208-238.

Kapp, E. (2004). Controlling the influence of foreign exchange and escalation on capital projects in the South African context. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Karam, A. & Venter, N. (2007). Affordable housing on contaminated land in Johannesburg. Acta Structilia. Vol. 14. No. 2. p. 35-37.

Karanasos, M. & Schurer, S. (2008). Is the relationship between inflation and its uncertainty linear? German Economic Review. Vol. 9 (3). p. 265-286.

Karpetis, C. (2008). Money, income and inflation in equilibrium: The Case of Greece. International Advances in Economic Research. Vol. 14. p. 205-214.

Karshenas, S. (2007). A computerized approach to design cost analysis. In AACE International Transactions. Morgantown: AACE International.

Kashiwagi, D. & Savicky, J. (2003). The cost of "best value" construction. Journal of Facilities Management. Vol. 2. No. 3. p. 285-295.

Kasprowicz, T. (2004). Comprehensive analysis of construction projects implementation. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Kassab, M., Hipel, K. & Hegazy, T. (2006). Conflict resolution in construction disputes using the Graph Model. Journal of Construction & Engineering Management. Vol. 132. No. 10. p. 1043-1052. October

Kates, S. (2002). Economic management and the Keynesian revolution: The policy consequences of the disappearance of Say's law. The International Journal of Applied Economics and Econometrics. Vol. 10 (3). p. 463-479.

Katz, D. M. (2002). Activity-based costing (ABC). [online]. Available from: http:///www.cfo.com/article_cfm/3007694. Accessed 06 June 2008].

Kauffmann, P., Keating, P. E. C. & Considine, C. (2002). Using earned value methods to substantiate change-of-scope claims. Engineering Management Journal. Vol. 14, No. 1, p. 13-20. March.

Kawai, M. & Akiyama, S. (2000). Implications of the currency crisis for exchange rate arrangements in emerging East Asia. Seminar on Exchange Rate Issues in an Environment of Volatile Capital Flows. Kuala Lumpur: 30 May 2000.

Kelly, R. D. (2005). Eichleay and qualifying costs. In AACE International Transactions. Morgantown: AACE International.

Kenley, R. (2003). Financing construction. London: Spon Press.

Keogh, W., Dalrymple, J. F. & Atkins, M. H. (2003). Improving performance: Quality costs with a new name? Managerial Auditing Journal. Vol. 18. No. 4. p. 340-346.

Ker-Fox, G. (2004). The PBMR risk management system: A case study. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Kern, A. P. & Formoso, C. T. (2006). A model for integrating cost management and production planning and control in construction. Journal of Financial Management of Property and Construction. Vol. 11. No. 2. p. 75-90.

Khan, S. (2007). How to reduce risk in project schedules and portfolios. Cost Engineering. Vol. 49. No. 5. p. 14-15. May.

Kharbanda, O. P., Stallworthy, E. A. & Williams, L. F. (1987). Project cost control in Action. Gower Technical Press: Hampshire.

Khosrowshahi, F. (1997). The optimum project duration and cost curve for Hong Kong public housing projects. Engineering, Construction and Architectural Management. Vol. 4. No. 4. p. 249-269.

Kim, K. & De la Garza, J. M. (2003). Phantom float. Journal of Construction & Engineering Management. Vol. 129. No. 5. p. 507-517. October.

King, R. O. (2006). CABA promotes building life-cycle cost analysis: Organization to introduce assessment tool in 2007. [online]. Available from: http:///www.automatedbuildings.com/news/dec06/articles.caba/061122104004caba.htm. Accessed 16 April 2008].

Kini, D. U. (1999). Materials management: The key to successful project management. Journal of Management in Engineering. p 30-34. January / February.

Kinney, C. L. (2006). Planning the development of your estimate. In AACE International Transactions. Morgantown: AACE International.

Kinney, C. L. & Gauche, R. (2006). What's in ISBL, OSBL and the factors? In AACE International Transactions. Morgantown: AACE International.

Kinney, C. L. & Soubiran, N. (2004). Interactive roadmap to conceptual cost estimating. In AACE International Transactions. Morgantown: AACE International.

Kirkham, R. J. (2005). Re-engineering the whole life cycle costing process. Construction Management and Economics. Vol. 23. p 9-14. January.

Klopper, D. (2008). Radio broadcasting from radio station RSG (100 to 104FM) on program "Landboufokus". Discussion regarding current world economic status. 21 November at 5:45AM.

Ko, C. & Cheng, M. (2007). Dynamic prediction of project success using artificial intelligence. Journal of Construction & Engineering Management. Vol. 133. No. 4. p. 316-320. April.

Koehn, E. & Jagushte, S. A. (2005). Construction productivity in developing global regions. In AACE International Transactions. Morgantown: AACE International.

Kohl, B. & Wulke, R. J. (2004). Supplementing accounting systems for project cost management. In AACE International Transactions. Morgantown: AACE International.

Kojima, F. (2007). Matching and price competition: Comment. The American Economic Review. p. 1027-1031. June.

Koller, G. (2005). Risk assessment and decision making in business and industry. Chapman & Hall. New York.

Kopczuk, W. & Slemrod, J. (2005). Denial of death and economic behavior. Advances in Theoretical Economics. Vol. 5 (1). p. 1-24.

Koushki, P. A. & Kartam, N. (2004). Impact of construction materials on project time and cost in Kuwait. Engineering, Construction and Architectural Management. Vol. 11. No. p. 126-132.

Knight, K. & Robinson, A. (2002). Use of fuzzy logic for predicting design cost overruns in building projects. Journal of Construction & Engineering Management. Vol. 128. No. 6. p. 503-512. December.

Kraay, A. & Ventura, J. (2002). Product prices and the OECD cycle. Advances in Micro-economics. Vol. 2 (1). p. 1-16.

Kraus, W. E. (2007a). Tools for developing mutual understanding on classification of construction costs. In AACE International Transactions. Morgantown: AACE International.

Kraus, W. E. (2007b). Earn an incredible return on your investment. Cost Engineering. Vol. 49(10). p 3-4. October.

Kraus, W. E. (2008). Cost estimating and analysis. Cost Engineering. Vol. 50. No. 4. p. 3-4. April.

Kraus, W. E., Watt, S. & Larson, P. D. (2007). Challenges in estimating costs using building information modeling. In AACE International Transactions. Morgantown: AACE International.

Krebs, T. (2007). Job displacement risk and the cost of business cycles. The American Economic Review. p. 664-686. June.

Kubitscheck, V. (2000). Risk management: Finding the value within. Balance Sheet. Vol. 8. No. 5. p. 38-41.

Kuehn, U. (2007). Earned value management – Why am I being forced to do it? In AACE International Transactions. Morgantown: AACE International.

Kulatunga, U., Amaratunga, D., Haigh, R. & Rameezdeen, R. (2006). Attitudes and perceptions of construction workforce on construction waste in Sri Lanka. International Journal of Management of Environmental Quality. Vol. 17. No. 1. p. 57-72.

Kumar, S., Nottestad, D. A. & Macklin, J. F. (2007). A profit and loss analysis for make-to-order versus make-to-stock policy: A Supply Chain case study. The Engineering Economist. 52. p 141-156.

Kupakuwana, P. (2007). A critical analysis of asbestos removal project cost implications. Cost Engineering, 49. p 30-35. November.

Kuprenas, J. A. (2008). Influence of quality on construction costs. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Kuprenas, J. A. & Nasr, E. B. (2007). Cost performance comparison of two public sector project procurement techniques. Journal of Management in Engineering. Vol. 23. No. 3. p. 114-121. July.

Kwak, Y. H. & Watson, R. J. (2005). Conceptual estimating tool for technology-driven projects: exploring parametric estimating technique. Article available from: http://www.elsevier.com/locate/technovation; Technovation 25 (2005). p. 1430-1436.

Kydland, F. E. (2006). Quantitative aggregate economics. The American Economic Review. p. 1373-1383. December.

Labuske, K. & Streb, J. (2008). Technological creativity and cheap labour? Explaining the growing international competitiveness of German mechanical engineering before World War I. German Economic Review. Vol. 9 (1). p. 65-86.

Lapinski, A. R., Horman, M. J. & Riley, D. R. (2006). Lean processes for sustainable project delivery. Journal of Construction & Engineering Management. Vol. 132. No. 10. p. 1083-1091. October.

Lam, P. T. I., Chan, A. P. C., Wong, F. K. W. & Wong, F. W. H. (2007). Constructability rankings of construction systems based on the analytical hierarchy process. Journal of Architectural Engineering. 13(1). p 36-43. March.

Langston, L. S. (2008). Making waves. Mechanical Engineering. p 34-38. February.

Lapidow, B. L. (2007). Winter road construction. Engineer. p. 45-46. January – March.

Laubscher, J. (2008). The downturn in the economy. [online]. Available from: http://www.sanlam.co.za/eng/economicinsight/economiccommentary [Accessed 21 November 2008].

Lavedan, P. (1979). French architecture. London: Scolar Press.

Lavingia, N. J. (2004). Best practices in cost engineering. In AACE International Transactions. Morgantown: AACE International.

Leadre, O., Austeng, K., Haugen, T. I. & Klakegg, O. J. (2006). Procurement routes in public building and construction projects. Journal of Construction & Engineering Management. Vol. 132. No. 7. p. 689-696. July.

Lechthaler, W. & Snower, D. J. (2008). Minimum wages and training. Labour Economics. Vol. 15. p. 1223-1237.

Lee, T. (2008). In Harlem, worker falls three floors to his death. New York Times. 12 September 2008.

Lee, S. & Halpin, D. W. (2003). Predictive tool for estimating accident risk. Journal of Construction & Engineering Management. Vol. 129. No. 4. p. 431-436. August.

Lee, E., Lee, H. & Ibbs, C. W. (2007). Productivity aspects of urban freeway rehabilitation with accelerated construction. Journal of Construction & Engineering Management. Vol. 133. No. 10. p. 798-806. October.

Lee, S. B., Park, C. & Cho, B. (2007). Development of a highly efficient and resistant robust design. International Journal of Production Research. Vol. 45. No. 1. p 157-167. January.

Leedy, P. D. (1980). Practical research. New York. Macmillan Publishing Co., Inc.

Leedy, P. D. & Ormond, J. E. (2001). Practical research planning and design. 7th ed. Upper Saddle River. Merrill Prentice Hall.

Leishman, C. & Watkins, C. (2002). Estimating local repeat sales house price indices for British cities. Journal of Property Investment and Finance. Vol. 20. No. 1. p. 35-58.

Lenard, D. (2004). Cost management futures: A scenario for the cost management professional to creatively restructure and advance the body of knowledge in an ever changing world. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Leo, D. W. & Knotowicz, S. W. (2005). Project estimate reviews. In AACE International Transactions. Morgantown: AACE International.

Le Roux, F. & Cloete, C. (2007). The disclosure of costs and income on incomplete contracts in the financial statements of contractors. Acta Structilia. Vol. 14 (2). p 1-34. December.

Letsoalo, M. (2010). Cosatu plans more strikes. Mail & Guardian. 21 May 2010.

Lewis, R. M. & Spencer, G. R. (2007). Total cost management: A case study in missed opportunity. In AACE International Transactions. Morgantown: AACE International.

Li, H., Shen, Q. P. & Love, P. E. D. (2005). Cost modeling of office buildings in Hong Kong: An exploratory study. Facilities. Vol. 23. No. 10. p. 438-452.

Li, W. G. (2005). A case study: Schedule forecast verification with productivity assessment. In AACE International Transactions. Morgantown: AACE International.

Li, W. G., Hani, H. E. & McCammon, P. (2007). Use of direct payment procedure. In AACE International Transactions. Morgantown: AACE International.

Life cycle costing (2008a). [online]. Available from: http://www.ogc.gov.uk/implementing_plans_introduction_life_cycle_costing.asp. [Accessed 16 April 2008].

Life cycle costing (2008b). [online]. Available from: http://photovoltaics.sandia.gov/docs/LCcost.htm. [Accessed 16 April 2008].

Life cycle cost analysis (2008c). [online]. Available from: http://en.wikipedia.org/wiki/Life_cycle_cost _analysis. [Accessed 16 April 2008].

Lin, A. C., Huang, Y., Punches, G. & Chen, Y. (2007). Effect of a robotic prescription-filling system on pharmacy staff activities and prescription-filling time. Am J Health-Syst Pharm. 64. September.

Lin, G. & Shen, Q. (2007). Measuring the performance of value management studies in construction: Critical review. Journal of Management in Engineering. Vol. 23. No. 1. p. 2-9. January.

Ling, D., Roy, R. & Taratoukline, V. (2004). Cost engineering for track maintenance and renewal within the UK Railway Industry. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Ling, F. Y. Y., Chan, S. L., Chong, E. & Ee, L. P. (2004). Predicting performance of design-build and design-bid-build projects. Journal of Management in Engineering. Vol. 130. No. 1. p. 75-83. February

Lipke, W. (2005). Earned schedule leads to improved forecasting. Unpublished paper presented by Lipke, W. Oklahoma, USA.

Lipke, W. & Henderson, K. (2006). Earned schedule: An emerging enhancement to EVM. Practice for Earned Value Management. p 1-16. Project Management Institute-College: Sydney.

Littell, M. (2001). World history: Patterns of interactions. New York: Houghton Mifflin.

Liu, L. & Zhu, K. (2007). Improving cost estimates of construction Projects Using Phased Cost Factors. Journal of Construction & Engineering Management. p 91-95. January.

Liu, M. & Ling, Y. Y. (2005). Modeling a contractor's mark-up estimation. Journal of Construction & Engineering Management. Vol. 131. No. 4. p. 391-399. April.

Livengood, J. C. & Bryant, C. R. (2004). Calculating imaginary numbers: Time quantification in acceleration. In AACE International Transactions. Morgantown: AACE International.

Lo, W., Lin, C. L. & Yan, M. R. (2007). Contractor's opportunistic bidding behavior and equilibrium price level in the construction market. Journal of Construction & Engineering Management. Vol. 133. No. 6. p. 409-416. June.

Lodewijks, J. (2002). Recent developments in the history of economics. International Journal of Applied Economics and Econometrics. Vol. 10 (1). p. 115-125.

Lofton, W. D. (2006). Estimating at owner companies. In AACE International Transactions. Morgantown: AACE International.

Lofton, W. D. & Coppo, R. J. (2007). Practical risk analysis. In AACE International Transactions. Morgantown: AACE International.

Lofton, W. D. & Monteith, M. D. (2004). Collaborative estimating. In AACE International Transactions. Morgantown: AACE International.

Lomax, R. (2005). Inflation in practice: Models, forecasts, and hunches. Atlantic Economic Journal. Vol. 33. p. 251-265.

Loos, J. (2008). Residential building cost inflation is moderate, but very significant in the context of a very weak residential market. [online]. Available from: http://www.fnb.co.za/homeloans/usefulinformation/buildingcost.html [Accessed 20 November 2008].

Lorenz, D. & Lützkendorf, T. (2008). Sustainability in property development: Theory and practice. Journal of Property Investment and Finance. Vol. 26. No. 6. p. 482-521.

Louw, W. (2002). Project control tools. Paarl (South Africa). iMEC Publishing.

Love, P. E. D. (2002). Auditing the indirect consequences of rework in construction: A case based approach. Management Auditing Journal. Vol. 17. Issue 3. p 138-146.

Love, P. E. D. & Edwards, D. J. (2004). Determinants of rework in building construction projects. Engineering, Construction and Architectural Management. Vol. 11. No. 4. p. 259-274.

Love, P. E. D., Ghoneim, A. & Irani, Z. (2004). Information technology evaluation: Classifying indirect cost using the structured case method. Journal of Enterprise Information Management. Vol. 17. No. 4. p. 312-325.

Love, P. E. D. & Josephson, P. (2004). Role of error-recovery process in projects. Journal of Management in Engineering. Vol. 20. No. 2. p 70-79. April..

Love, P. E. D. & Li, H. (2000). Quantifying the causes and costs of rework in construction. Construction Management and Economics. Vol. 18. Issue 4. p 479-490. June.

Love, P. E. D., Mandal, P., Smith, J. & Li, H. (2000). Modeling the dynamics of design error induced rework in construction. Construction Management & Economics. Vol. 18. Issue 5. p 567-574. July.

Love, P. E. D. & Smith, J. (2003). Benchmarking, bench action and bench learning: Rework mitigation in projects. Journal of Management in Engineering. Vol. 19. No. 4. p 147-159. October.

Love, P. E. D., Smith, J. & Li, H. (1999). The propagation of rework benchmark metrics for construction. International Journal of Quality and Reliability Management. Vol. 16. No. 7. p. 638-658.

Love, P. E. D. & Sohall, A. S. (2003). Capturing rework costs in projects. Managerial Auditing Journal. Vol. 18. No. 4. p. 329-339.

Love, P. E. D., Tse, R. Y. C. & Edwards, D. J. (2005). Time-cost relationship in Australian building construction projects. Journal of Construction & Engineering Management. Vol. 131. No. 2. p. 187-194. February.

Lowe, D. J., Emsley, M. W. & Harding, A. (2006). Predicting construction cost using multiple regression techniques. Journal of Construction & Engineering Management. Vol. 132. No. 7. p. 750-758. July.

Lowe, D. J., Emsley, M. W. & Harding, A. (2007). Relationships between total construction cost and design related variables. Journal of Financial Management of Property and Construction. Vol. 12. No. 1. p. 11-24.

Lowe, D. J. & Skitmore, M. (2001). Human effects in construction contract price forecasting: Experience and experiential learning styles. Journal of Construction & Engineering Management. Vol. 127. No. 6. p. 485-493. December.

Lu, M. & Anson, M. (2004). Establish concrete placing rates using quality control records from Hong Kong building construction projects. Journal of Construction & Engineering Management. p. 216-224. March / April.

Lucas, D. A. (2007). Complex contracting: Effects on cost management. In AACE International Transactions. Morgantown: AACE International.

Lucena, J. C. (2006). Globalization and organizational change: Engineer's experiences and their implications for engineering education. European Journal of Engineering Education. 31(3). p 321-338. June.

Luiz, J. M. (2002). South African state capacity and post-apartheid economic reconstruction. International Journal of Social Economics. Vol. 29. No. 8. p. 594-614.

Lukas, J. A. (2006). Bad estimates just don't happen. In AACE International Transactions. Morgantown: AACE International.

Lukas, J. A. (2008). Earned value analysis: Why it does not work. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Lum, S. K. (2004). Property price indices in the Commonwealth. Journal of Property Investment and Finance. Vol. 22. No. 1. p. 25-54.

Lundberg, E. (1977). Inflation theory and anti-inflation policy. The Macmillan Press Ltd. New York.

Lünsche, S. (2004). Eskom : A R200bn power drive. Financial Mail. 10 December 2004.

Lünsche, S. (2007). Nuclear power: Getting clean. Financial Mail. 22 June 2007.

Lünsche, S. (2008). Electricity: Industry pitches in. Financial Mail. 21 March 2008.

Maddex, W. E. (2008). Range estimating: The implications? In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Mähring, M., Holmström, J., Keil, M. & Montealegre, R. (2004). Trojan actor-networks and swift translation. Information Technology and People Journal. Vol. 17. No. 2. p. 210-238.

Mandel, M. (2007). What spending slowdown? Business Week. April, 23.

Mapenzouswa, S. (2010). South Africa wages worry business. Mail & Guardian. 03 June 2010.

Maples, G., Greco, A., Heady, R. & Tanner, J. (2005). Teaching project management and cost engineering. In AACE International Transactions. Morgantown: AACE International.

Marsh, P. S. (2007). Lifetime multi-objective optimization of cost and spacing of corrosion rate sensors embedded in a deteriorating reinforced concrete bridge deck. Journal of Structural Engineering.133(6). p 777-787. June.

Martin, J. (2004a). Performance measurement in the UK Construction Industry. In AACE International Transactions. Morgantown: AACE International.

Martin, J. (2004b). Database for elemental post Planning. In AACE International Transactions. Morgantown: AACE International.

Marx, H. J. (2004). Traditional methods: How valuable is your estimate? Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Mashalingam, A. & Levitt. R. E. (2007). Institutional theory as a frame work for analysing conflicts on global projects. Journal of Construction & Engineering Management. Vol. 133. No. 7. p. 517-528. July.

Masmoudi, F., Bouaziz, Z. & Hachicha, W. (2005). Computer-aided cost estimation of weld operations. International Journal for Advanced Technology. Vol. 33. p. 298-307. December.

Mathews, W. R. & Atkins, W. M. (1957). A history of St Paul's cathedral. Rowan Press. London.

Mathis, M. (2008). Work breakdown structure: Purpose, process and pitfalls. [online]. Available from: http://www.projectsmart.co.uk/work-breakdown-structure-purpose-process-pitfalls.html [Accessed 03 October 2008].

Matsaganis, M. (2007). Union structures and pension outcomes in Greece. British Journal of Industrial Relations. Vol. 45. No. 3. p. 537-555. September.

Matthews, B., Sylvie, J. R., Lee, S., Thomas, S. R., Chapman, R. E. & Gibson, E. (2006). Addressing security in early stages of project life cycle. Journal of Management in Engineering. Vol. 22. No. 4. p. 196-202. October.

Mattheys, K. (2004). Development of an integrated business and career model for Cost engineering which would build an effective project management / cost engineering relationship based on the high performance work team concept. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Mayo, L. & Nuryeva, R. (2006). Increasing steel price effect on equipment price. In AACE International Transactions. Morgantown: AACE International.

Mazouk, M. & Moselhi, O. (2004). Fuzzy clustering model for estimating hauler's travel time. Journal of Management in Engineering. Vol. 130 . No. 6. p. 878-886. December

McAuley, T. (2008). Understanding green building cost and value. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

McCarthy, R. (2004). Understanding project costs and building costs. The Bottom Line: Managing Library Finances. Vol. 17. No. 1. p. 6-9.

McCuen, T. L. (2008). Scheduling, estimating and BIM: A profitable combination. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

McDuling, J., Horak, J. & Cloete, C. (2004). Quantifying the consequences of maintenance budget cuts. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

McDowell, G. N. (2008). A few good cost estimators. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

McKeenan, M. T. & Rosetti, K. (2007). The cost of change. Cost Engineering. Vol. 49(4). P. 8. April.

Mearig, T., Coffee, N. & Morgan, M. (1999). Life cycle cost analysis Handbook. [online]. Available from: http://www.eed.state.ak.us/facilities/publications/lccahandbook1999.pdf [Accessed 16 April 2008].

Melamed, D., Skokan, B., Zenkowich, M. & Kocher, D. (2007). The use of historical costs from the rocky flats environmental technology site for estimating uncertainty for the life-cycle cost of the US department of energy environmental management program. In AACE International Transactions. Morgantown: AACE International.

Menches, C. L. & Hanna, A. S. (2006). Quantitative measurement of successful performance from the project manager's prospective. Journal of Construction & Engineering Management. Vol. 132. No. 12. p. 1284-1293. December.

Meyer, E. (1997). Factors to consider when implementing a fully mechanized sugarcane harvesting system. Journal of South African Sugar Technology. Vol. 71 (2). p. 79-81.

Meyerhoefer, C. D. & Zuvekas, S. H. (2008). The shape of demand: What does it tell us about direct-to-consumer marketing of antidepressants? The B. E. Journal of Economic Analysis & Policy. Vol. 8 (2). p. 1-32.

Meza, F. & Quintin, E. (2007). Factor utilization and the real impact of financial crises. The B. E. Journal of Micro-economics. Vol. 7 (1). p. 1-39.

Milne, D. (2004). The introduction of the earned value principle to the South African gold mining industry. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Miltenburg, J. & Pong, H. C. (2007). Order quantities for style goods with two order opportunities and Bayesian updating of demand. Part I: No Capacity Constraints. International Journal of Production Research. Vol. 45. No. 7. p 1643-1663. April.

Minahan, T. (2007). Practical tips in an uncontrollable environment. Government Procurement. August.

Minutes of meeting (2002). Minutes of the 16th Leeu-Taaiboschspruit forum meeting held on 24 April 2002 Sasol Kliplapa. [online]. Available from: http://www. http://www.dwaf.gov.za/Forums/Leeu/LTFMinutes/16thLTF25-%252004-02.doc [Accessed 19 November 2008].

Mitchell, G. & Klastorin, T. (2007). An effective methodology for the stochastic project compression problem. IIE Transactions. 39. p 957-969. February.

Mitropoulos, P. & Howell, G. (2001). Model for understanding, preventing and resolving project disputes. Journal of Construction & Engineering Management. Vol. 127. No. 3. p. 223-231. June.

Mochtar, K. & Arditi, D. (2001). Pricing strategy in the US construction industry. Construction Management and Economics. Vol. 19. p 405-415. October.

Molenaar, K.R. (2005). Programmatic cost risk analysis for highway megaprojects. Journal of Construction & Engineering Management. p 343-353. March.

Molly, K. K. (2007). Six steps for successful change order management. Cost Engineering. Vol. 49. No. 4. p. 12-19. April.

Moola, N. (2008). Banking on China. Financial Mail. 15 August 2008.

Morris, P. & Matthiessen, L. F. (2005). Budgeting green: A comprehensive methodology. In AACE International Transactions. Morgantown: AACE International.

Morris, P. & Willson, W. F. (2006). Measuring and managing cost escalation. In AACE International Transactions. Morgantown: AACE International.

Morton, H. V. (1966). The waters of Rome. Joseph.

Moselhi, J. L. O. & Alkass, S. (2006). Forecasting project status by using fuzzy logic. Journal of Construction & Engineering Management. Vol. 132. No. 11. p. 1193-1202. November.

Moselhi, O., Assem, I. & El-Rayes, K. (2005). Change order impact on labor productivity. Journal of Construction & Engineering Management. Vol. 131. No. 3. p. 354-359. March.

Motloung, M. (2008). 2010 Broadcasting: Time to boot up. Financial Mail. 12 September 2008.

Motwani, J., Kumar, A., & Novakoski, M. (1995). Measuring construction productivity: A practical approach. Work Study. Vol. 44. No. 8. p. 18-20.

Mountney, S. L., Gao, J. X. & Wisealls, S. (2007). A knowledge system to support manufacturing knowledge during preliminary design. International Journal of Production Research. Vol. 45. No. 7. p 1521-1537. April.

Moussourakis, J. & Haksever, C. (2007). Models for accurate computation of earliest and latest start times and optimal compression of project networks. Journal of Construction & Engineering Management. Vol. 133. No. 8. p. 600-608. August.

Mulambya, E. (2007). The value added by linking the project risk register to quantitative schedule risk analysis. In AACE International Transactions. Morgantown: AACE International.

Munde, G. (2003). After-costs of library construction: A case study of Lied Library at the University of Nevada, Las Vegas. The Bottom Line: Managing Library Finances. Vol. 16. No. 4. p. 143-150.

Muscianesi, J. (2003). Conceptual estimates are crucial to successful development: Real Estate Development Helped by Services of Conceptual Estimator. Real Estate Weekly. p 2-5. February.

Musgrove, J. G. (2007). Conceptual estimate cost flow: An oxymoron? In AACE International Transactions. Morgantown: AACE International.

Musgrove, J. G. (2008). If you build it, they will come : Making historical project data useful. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Nachtmann, H. & Al-Rifai, M. H. (2004). An application of activity based costing in the air conditioner manufacturing industry. The Engineering Economist. Vol. 49. p 221 – 236.

Nalewaik, A. & Venters, V. (2008). Costs and benefits of building green. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008

Nassar, K. M., Gunnarsson, H. G. & Hegan, M. Y. (2005). Using Weibull Analysis for evaluation of cost and schedule performance. Journal of Construction & Engineering Management. Vol. 131. No. 12. p. 1257 – 1262. December

Nassar, K. M. & Hegab, M. Y. (2006). Developing a complexity measure for project schedules. Journal of Construction & Engineering Management. Vol. 132. No. 6. p. 554-561. June.

Nassar, K. M., Nassar, W. M. & Hegab, M. Y. (2005). Evaluating cost overruns of asphalt paving project using statistical process controls methods. Journal of Construction & Engineering Management. Vol. 131. No. 11. p. 1173-1178. November.

Navon, R. & Berkovich, O. (2005). Development and on-site evaluation of a automated materials management and control model. Journal of Construction & Engineering Management. Vol. 131 (12). p 1328-1336. December.

Navon, R. & Berkovich, O. (2006). An automated model for materials management and control. Construction Engineering and Management. Vol. 24. p 635-646. June.

Nelson, E. (2005). The great inflation of the seventies: What really happened. Advances in Micro-economics. Vol. 5 (1). p. 1-48.

Nepal, M. P., Park, M. & Son, B. (2006). Effects of schedule pressure on construction performance. Journal of Construction & Engineering Management. Vol. 132. No. 1. p. 182-188. February.

Newnan, D. G., Eschenbach, T. G. & Lavelle, J. P. (2004). Engineering economic analysis. Oxford University Press: New York.

Nima, M. A., Abdul-Kadir, M. R., Jaafar, M. S. & Alghulami, R. G. (2004). Constructability concepts in Kuala Selangor cable-stayed bridge in Malaysia. Journal of Construction & Engineering Management. Vol. 130. No. 4. p. 315-321. August.

Nishimura, M. (1995). Composite-factored engineering. AACE Transactions. Morgantown, West Virginia: AACE International.

Nitithamyong, P. & Skibniewski, M. J. (2006). Success / failure factors and performance measures of web-based construction project management systems: Professional's viewpoint. Journal of Construction & Engineering Management. Vol. 132. No. 1. p. 80-87. January.

Nogueira, P. & Paixão, E. (2007). Models for mortality associated with heat waves: Update of the Portuguese heat health warning system. International Journal of Climatology. Vol. 28. No. 4. p. 454-562. June.

Noor, I., Grumo, M., Kniskern, M. W. & Kopach, A. (2006). Bid Preparation Using Cost Templates and Range Estimating – An Equipment Manufacturer's Perspective. In AACE International Transactions. Morgantown: AACE International.

Noor, I. & Tichacek, R. L. (2004). Contingency misuse and other risk management pitfalls. In AACE International Transactions. Morgantown: AACE International.

Norfleet, D. A. (2007). The theory of indirect costs. In AACE International Transactions. Morgantown: AACE International.

Norrbin, S. C., Pipatchaipoom, O. & Bors, L. (2008). How robust is the natural resource curse? International Economic Journal. Vol. 22 (2). p. 187-200.

Nottestad, D. A. & Macklin, J. F. (2007). A profit and loss analysis for make-to-order versus make-to-stock policy: A supply chain case study. The Engineering Economist. 52. p 141-156.

Nutakor, G. (2007). Assessing final cost of construction at bid time. Cost Engineering. 49. p 10-16. November.

O'Brien, D. P. (2002). Paul Samuelson: The theorist as historian of economic thought. International Journal of Applied Economics and Econometrics. Vol. 10 (1). p. 1-29.

O'Connor, A. (2008). Two arrested after death at work site in Harlem. New York Times. 12 September 2008.

O'Connor, J. T. & Huh, Y. (2005). Crew production rates for contract time estimation: Bent footing, column and cap of highway bridges. Journal of Construction & Engineering Management. Vol. 131. No. 9. p. 1013-1020. September.

O'Connor, J. T. & Huh, Y. (2006). Crew production rates for contract time estimation: Beam erection, deck and rail of highway bridges. Journal of Construction & Engineering Management. Vol. 132. No. 4. p. 408-415. April.

O'Connor, J. T. & Yang, L. (2004). Project performance versus use of technologies at project and phase levels. Journal of Construction & Engineering Management. Vol. 130. No. 4. p. 322-329. June.

Odeyinka, H. A., Lowe, J. & Kaka, A. (2008). A decision support system specification for out-turn cost and cost escalation in the heavy engineering industry. Journal of Financial Management of Property and Construction. Vol. 13. No. 1. p. 5-17.

Oladapo, A., Aladegbaiye, O. & Aibinu, A. (2008). The development of location adjustment factors for construction price estimating in Nigeria. Acta Structilia. Vol. 15. Issue 1. p 118-132.

Olhager, J. & Selldin, E. (2007). Manufacturing planning and control approaches: Market alignment and performance. International Journal of Production Research. Vol. 45. No. 6. p 1469-1484. March.

Olivei, G. & Tenreyro, S. (2007). The timing of monetary policy shocks. The American Economic Review. p. 636-663. June.

O'Mahony, M., Robinson, C. & Vecchi, M. (2008). The impact of ICT on the demand for skilled labour: A cross-country comparison. Labour Economics. Vol. 15. p. 1435-1450.

Omitaomu, O. A. & Badiru, A. B. (2007). Fuzzy present value analysis model for evaluating information system projects. 52. p 157-178.

Oo, B. L., Drew, D. & Lo, H. (2007). Modeling contractor's mark-up behavior in different construction markets. Engineering, Construction and Architecture Management. Vol. 14. No. 5. p. 447-462.

Opfer, N. D. (2004). Engineering. In skills and knowledge of cost engineering. Edited by Scott, J.A. Morgantown: AACE International.

Osborne, E. (2006). Corruption and technological progress: A take-off theory of good governance. Atlantic Economic Journal. Vol. 34. p. 289-302.

Ostrowski, V. M. & Midgette, M. T. (2005). Concurrent delay analysis for litigation. In AACE International Transactions. Morgantown: AACE International.

Owen, J. K. (2007). Implementing earned value management in a R&D Environment. In AACE International Transactions. Morgantown: AACE International.

Oyegoke, A. S. (2004). Preconstruction design cost management techniques: A tool for value management in construction projects. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Oyegoke, A. S. (2006). Building competence to manage contractual claims in the international construction environment. Engineering, Construction and Architectural Management. Vol. 13. No. 1. p. 96-113.

Paek, J. H. (2000). Running a profitable construction company: Revisited break-even Analysis. Journal of Management and Engineering. 16 (3). p 40-46. May.

Page, J. S. (1996). Conceptual cost estimating manual. Gulf Professional Publishing: Houston.

Palmer, G. R. (2008). The measured mile: A better way of using an old tool. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Palmer, N & Hughes, M. (2008). Labour force survey, re-weighing and seasonal adjustment review 2008. Economic and Labour Marker Review. Vol. 2. No 5. p 3-4. May.

Palutikof, J. (2006). The impact of weather and climate on industrial production in Great Britain. International Journal of Climatology. Vol. 3. No. 1. p. 65-79. November.

Park, H., Thomas, S. R. & Tucker, R. L. (2005). Benchmarking of construction productivity. Journal of Construction & Engineering Management. Vol. 131. No. 7. p. 772-778. July.

Park, H. K., Han, S. H. & Russell, J. S. (2005). Cash flow forecasting model for general contractors using moving weights of cost categories. Journal of Management in Engineering. Vol. 21. No. 4. p. 164-172. October.

Park, K., Hwang, Y., Seo, S. & Seo, H. (2003). Quantitative assessment of environmental impacts on life-cycle of highways. Journal of Management in Engineering. Vol. 129. No. 1. p. 25-31. February.

Park, M. & Peña-Mora, F. (2004). Reliability buffering for construction projects. Journal of Management in Engineering. Vol. 130. No. 5. p. 626-637. October.

Parkin, M. & Swoboda, A. (1977). Inflation: A review on the issues. In – Inflation Theory and Anti-inflation Policy. Edited by Erik Lundberg. The Macmillan Press. New York.

Parry, C. (2008). The slow oil shock. Financial Mail. 29 August 2008.

Parsons, V. S. (2006). Project performance: How to assess the early stages. Engineering Management Journal. Vol. 18. No. 4. p. 11-15. December.

Patiro, R. (2007). Unlocking key performance Indicators: Order acquisition ratio. [online]. Available from: http://www.grokdotcom.com/2007/10/30order-acquisition-ratio/ [Accessed 09 June 2008].

Patterson, D. (2006). Managing project cost risk. In AACE International Transactions. Morgantown: AACE International.

Payne, B. (2007). How design documents create claims and what to do about It. In AACE International Transactions. Morgantown: AACE International.

Pena-Mora, F. & Park, M. (2001). Dynamic planning for fast-tracking building construction projects. Journal of Construction & Engineering Management. Vol. 127. No. 6. p. 445-456. December.

Peters, M. S., Timmerhaus, K. D. & West, R. E. (2003). Plant design and economics for chemical engineers. McGraw-Hill: New York.

Peters, T. F. (2004). Constructive acceleration: Waking the sleeping giant. In AACE International Transactions. Morgantown: AACE International.

Perrott, M. W. (2004). The cost estimator's dilemma. In AACE International Transactions. Morgantown: AACE International.

Perry, L. (2006). Labour market reforms and lockouts in New Zealand. ABL. Vol. 32 No. 4. p 401-420.

Phelps, E. S. (2007). Macro-economics for a modern economy. The American Economic Review. p. 543-561. June.

Pheng, L. S. (2007). Managing building projects in ancient China: A comparison with modern-day project management principles and practices. Journal of Management History. Vol. 13. No. 2. p. 192-210.

Phillips, J. (2005). Real world project management: Managing the project scope. [online]. Available from: http://www.ciscopress.com/articles/article.asp?p=363892&seqNum=3 [Accessed 30 September 2008].

Phua, F. T. T. & Rowlinson, S. (2004). How important is cooperation to construction project success? A grounded empirical quantification. Engineering, Construction and Architectural Management. Vol. 11. No. 1. p. 45-54.

Picard, J. E. & Hutcheson, J. (2008). Promoting power plant construction project productivity. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Pickavance, K. (2008). The use of forensic animations in resolving complex disruption claims: A case study. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Picken, D. H. & Mak, S. (2001). Risk analysis in cost planning and its effect on efficiency in capital cost budgeting. Logistics Information Management. Vol. 14. No. 6. p. 318-327.

Pickett, T. (2005). Preparing a basis of an estimate. In AACE International Transactions. Morgantown: AACE International.

Pickett, T. W. & Elliott, B. G. (2007). Transforming historical project data into useful information. In AACE International Transactions. Morgantown: AACE International.

Pienaar, L. (1990). 40 years of Sasol, 1950-1990. Johannesburg, Sasol.

Poh, P. S. H., Malcolm, R. & Horner, W. (1995). Cost-significant modeling: Its potential for use in South East Asia. Engineering, Construction and Architectural Management. Vol. 2. No. 2. p. 121-139.

Polaski, M. H. & Horman, M. J. (2005). Continuous value enhancement process. Journal of Construction & Engineering Management. Vol. 131. No. 12. p. 1274-1282. December.

Polat, G. & Arditi, D. (2005). The JIT materials management system in developing countries. Construction Management and Economics. 23. p 697-712. September.

Polla, D. (2007). Parametric factors as applied to pipeline cost estimating. Cost Engineering. 49. p 12-17. July.

Popescu, A. I. & Jerz, J. (2008). Total float management: Renovating a misused and abused approach. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Postavaru, N. (2004). Value beyond indicators. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Postula, F. D. (2004). Cost elements. In Skills and Knowledge of Cost Engineering. Edited by Scott, J.A. Morgantown: AACE International.

Prasad, R. (2007). Schedule and cost risk evaluation. In AACE International Transactions. Morgantown: AACE International.

Prasad, R. (2008). Cost contingency: Analysis and evaluation. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Pratt, M. J., Anderson, B. D. & Ranger, T. (2005). Towards the standardized exchange of parameterized feature-based CAD models. Computer-Aided Design. 37. p 1251-1265.

Prentice, J. (2004). Earned value in quantity surveying versus other environments. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Prince, F. A. (2002). Why NASA's management does not believe the cost estimate. Engineering Management Journal. Vol. 14, No. 1, p. 7-12. March.

Project Management Institute (PMI). (1996). A guide to the project management body of knowledge. Sylva, North Carolina: PMI Publishing.

Pulaski, M. H., Horman, M. J. & Riley, D. R. (2006). Constructability practices to manage sustainable building knowledge. Journal of Architectural Engineering. p 83-92. June.

Putzger, I. (2008a). Lufthansa takes over orphaned Frankfurt freighter route. CT & L. p. 6. September.

Putzger, I. (2008b).Grounded. CT & L. p. 16-18. September.

Quiggin, J. (2006). Stories about productivity. ABL. Vol. 32. No. 1. p. 18-26.

Rad, P. F. & Levin, G. (2004). Characterizing project performance with quantified indices. In AACE International Transactions. Morgantown: AACE International.

Rad, P. (2008). A formalized method for prioritizing prospective proposals. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Rajpatty, S. J. (2008). The role of the estimator in today's construction industry. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Ramabodu, M. S., Kotze, B. G. & Verster, J. J. P. (2007). Diversity and value in Africa's real estate. Journal of Property Investment and Finance. Vol. 25. No. 1. p. 7-22.

Rameezdeen, R. & Ramachandra, T. (2008). Construction linkages in a developing country: The case of Sri-Lanka. Construction Management & Economics. Vol. 26. No. 5. p. 499-506.

Ramey, V. A. & Vine, D. J. (2006). Declining volatility in the US automobile industry. The American Economic Review. p. 1876-1889. December.

Rankin, L. K., Slootman, T. & Jergeas, G. F. (2008). The industry's perspective on workforce planning for major projects. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Rashbaum, W. K. (2008a). Two crane workers charged with cutting guardrail before co-worker fell to his death. New York Times. 24 September 2008.

Rashbaum, W. K. (2008b). City issues controversial new rules regulating cranes at construction sites. New York Times. 19 September 2008.

Rashbaum, W. K. (2008c). OHSA issues violations in collapse of crane. New York Times. 16 September 2008.

Razzak, W. A. & Timmins, J. C. (2008). A macro-economic perspective on skill shortages and the skill premium in New Zealand. Australian Economic Papers. March. p. 74-91.

Reh, J. (2008). Key Performance Indicators (KPI). [online]. Available from: http://www.management about.com/cs/generalmanagement/a/keyperfindic.htm [Accessed 09 June 2008].

Reina, P. (2006). South Africa will be first to build pebble-bed reactor. Engineering News-Record. 256 (13). p 18.

Reinschmidt, K. & Trejo, D. (2006). Economic value of building faster. Journal of Construction & Engineering Management. Vol. 132. No. 7. p. 759-766. July.

Retief, J. & Ker-Fox, G. (2004). Application of reliability based limit state theory to contingency management. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Revkin, A. C. (2005). Pact signed for prototype coal plant. New York Times. 7 December 2005.

Ribeiro, R. (1996). Engineering contracts. Butterworth-Heinemann: Oxford.

Richards, B. L. (2005). Cautions of computerized estimating. In AACE International Transactions. Morgantown: AACE International.

Richards, B. L. (2006). Estimate reconciliation. In AACE International Transactions. Morgantown: AACE International.

Richards, B. L. (2008). Ten cents on estimating. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Ries, R., Bilec, M. M., Gokhan, N. M. & Needy, K. L. (2006). The economic benefits of green buildings: A comprehensive case study. The Engineering Economist. Vol. 51. p. 259-295.

Ripley, P. W. (2004). Contingency! Who owns and manages it? In AACE International Transactions. Morgantown: AACE International.

Robinson, J. (1996). Role of valuations in major development projects. Journal of Property Valuation and Management. Vol. 14. No. 3. p. 6-19.

Rodl, R. H., Prinzing, P. & Aichert, D. (1985). Cost estimating for chemical plants. AACE Transactions. Morgantown, West Virginia: AACE International.

Robson, A. J. & Kaplan, H. S. (2007). Why do we die? Economics, biology and aging. AEA Papers and Proceedings. p. 492-495. May.

Roncaglia, A. & Goodacre, H. (2008). The wealth of ideas: A history of economic thought. Economic Issues. Vol. 13 (1). p. 106-108.

Rossetti, K. & McKeeman, M. (2008). Cost-plus-fee government contracts not always a "slam dunk." Cost Engineering. Vol. 50. No. 7. p. 6-7. July.

Rossler, P. E. & High, M. S. (2007). Products liability law and its implications for engineering practice. Engineering Management Journal. Vol. 19. No. 2. p. 23-30. June.

Rothwell, G. (2005). Contingency in levelized capital cost estimation. In AACE International Transactions. Morgantown: AACE International.

Rowe, J. F. (2005). Construction cost contingency tracking system. In AACE International Transactions. Morgantown: AACE International.

Roztocki, N. & Needy, K. L. (1999). Integrating activity-based costing and economic value added in manufacturing. Engineering Management Journal. Vol. 11. No 2. p. 17-22. June.

Ruffo, M. & Hague, R. (2007). Cost estimation for rapid manufacturing: Simultaneous production of mixed components using laser sintering. Engineering Manufacturing. Vol. 221. p. 1585-1591. July.

Rusek, A. (2008). Inflation dynamics in new EU member states: The Czech case. International Advances in Economic Research. Vol. 14. p. 191-204.

Ruskin, A. M. (2004). Two issues concerning the use of earned value measurements. Engineering Management Journal. Vol. 16. No. 3. p. 26-30. September.

Sacks, R., Esquenazi, A. & Goldin, M. (2007). LEAPCON: Simulation of lean construction in high-rise apartment buildings. Journal of Construction & Engineering Management. Vol. 133. No. 7. p. 529-539. July.

Saito, Y. (2004a). 2003 Japanese chemical plant cost trends. In AACE International Transactions. Morgantown: AACE International.

Saito, Y. (2004b). 2002 Japanese chemical plant cost trend (as compared with USA and UK). Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Sakka, Z. I. & El-Sayegh, S. M. (2007). Float consumption impact on cost and schedule in the construction industry. Journal of Construction & Engineering Management. Vol. 133. No. 2. p. 124-130. February.

Samid, G. (2004). Cost engineering and homeland security. In AACE International Transactions. Morgantown: AACE International.

Sanchez, M. (2008). The link between interest rates and exchange rates: Do contractionary deprecations make a difference? International Economic Journal. Vol. 22 (1). p. 43-61.

Sandberg, F. H., Hetland, P. W. & Tolo, O. (2005). Is cost estimation only about hard facts? In AACE International Transactions. Morgantown: AACE International.

Sanders, M. (2007). Broken buildings, busted budgets: How to fix America's trillion-dollar construction industry. Cost Engineering. Vol. 49(9). p 16. September.

Sappe, R. (2007), A schedule success: Hartsfield-Jackson Atlanta airport's runway delivered 11 days early and $102 million under budget. Cost Engineering. Vol. 49. No. 4. p. 21-23. April.

Saville, A. (2010). Productivity is our best currency. Mail & Guardian. 10 September 2010.

Schary, P. B. (1998). Strategic dimensions of the supply chain. Transport Logistics. Vol. 1 No. 3. p. 155-166.

Schelling, T. C. (2006). An astonishing sixty years: The legacy of Hiroshima. The American Economic Review. p. 929-937. September.

Schoen, J. W. (2008). Economy in turmoil: How the global crises has unfolded. [online]. Available from: http://www.msnbc.msn.com/id/26797480 [Accessed 21 November 2008].

Schottlander, D. E. (2006). How accurate are your estimate? In AACE International Transactions. Morgantown: AACE International.

Schottlander, D. E. (2007). A study of design-build estimates at the 10 percent completion level. In AACE International Transactions. Morgantown: AACE International.

Scott, J. (2006). Housing tighter for New Yorkers of moderate pay. New York Times. 16 June.

Scott, P. A. (2005). Development of field and laboratory ergonomic investigations in South Africa. African Newsletter on Occupational Health and Safety. Vol. 15 (4). p. 4-7.

Scott, S. & Harris, R. A. (2004). United Kingdom construction claims: Views of professionals. Journal of Construction & Engineering Management. Vol. 130. No. 5. p. 726-733. October.

Selg, R. A. & Thomas, D. C. (2004). Department of energy / Savannah river site productivity measurement and continuous improvement. In AACE International Transactions. Morgantown: AACE International.

Serpell, A. F. (2005). Improving conceptual cost estimating performance. In AACE International Transactions. Morgantown: AACE International.

Setijono, D. & Dahlgaard, J. J. (2008). The value of quality improvements. International Journal of Quality and Reliability Management. Vol. 25. No. 3. p. 292-312.

Shafritz, J. M. (1992). Personnel management in government: Politics and Process. Dekker. New York.

Shah, J. J., Jeon, D. K., Urban, S. D., Bliznakov, P. & Rogers, M. (1996). Database infrastructure for supporting engineering design histories. Computer-Aided Design. 28(5). p 347-360.

Shaheen, A. A., Fayek, A. R. & AbouRizk, S. M. (2007). Fuzzy numbers in cost range estimating. Journal of Construction & Engineering Management. Vol. 133. No. 4. p. 325-334. April.

Shakantu, W., Tookey, J. E. & Bowen, P. A. (2003). The hidden cost of transportation of construction materials: An overview. Journal of Engineering, Design and Technology. Vol. 1. No. 1. p. 103-118.

Shapira, A. & Goldenberg, M. (2007). "Soft" considerations in equipment selection for building construction projects. Journal of Construction & Engineering Management. Vol. 133. No. 10. p. 749-760. October.

Shapira, A., Lucko, G. & Schexnayder, C. J. (2007). Cranes for building construction projects. Journal of Construction & Engineering Management. Vol. 133. No. 9. p. 690-700. September.

Sharma, A. & Lutchman, C. (2006). Scope definition for expanding operating projects. In AACE International Transactions. Morgantown: AACE International.

Shash, I. A. A., Assaf, S. A. & Jannadi, O. A. (2007). A study of the relationship between size and unit construction of residential buildings. Cost Engineering. Vol. 49(9). p 18-23. September.

Shekaran, K. (2008). Construction cost study of Abu Dhabi and Dubai bridges and road works. Cost Engineering. Vol. 50. No. 4. p 10-16. April.

Shen, L., Lu, W. & Yam, M. C. H. (2006). Contractor key competitiveness indicators: A China study. Journal of Construction & Engineering Management. Vol. 132. No. 4. p. 416-424. April.

Shen, Q. & Liu, G. (2003). Critical success factors for value management studies in construction. Journal of Construction & Engineering Management. Vol. 129. No. 5. p. 485-491. October.

Shengping, L. & Tiong, R. (2004). Cost-effective reinforced concrete structural systems. In AACE International Transactions. Morgantown: AACE International.

Shi, J. J., Cheung, S. O. & Arditi, D. (2001). Construction delay compotation method. Journal of Construction & Engineering Management. Vol. 127. No. 1. p. 60-65. February.

Shirley, G. C. & Banks, J. L. (2007). Best practices for an independent review process for high-dollar, high-risk cost estimates. In AACE International Transactions. Morgantown: AACE International.

Shohet, I. M. (2006). Key performance indicators for strategic healthcare facilities maintenance. Journal of Construction & Engineering Management. Vol. 132. No. 4. p. 345-352. April.

Simon, C. D. & Sohal. A. S. (1995). The changing strategic vision of South African manufacturing: The case of the chemical industry. Industrial Management and Data Systems. Vol. 95. No. 8. p. 14-20.

Singh, A. (2003). Accelerated work-schedule design considering efficiency losses for overtime and over-manning. Engineering, Construction and Architectural Management. Vol. 10. No. 5. p. 312-321.

Singh, A. (2007). Approximate estimating method for typical buildings. Cost Engineering. Vol. 49. No. 8. p. 28-31. August.

Singh, A., Shiramizu, S. & Gantam, K. (2007). Bid risk and contingency analysis. Cost Engineering. 49. p 20-27. December.

Singh, P., Oh, J. E., Labi, S. & Sinha. K. C. (2007). Cost-effectiveness of warranty pavement projects. Journal of Construction & Engineering Management. Vol. 133. No. 2. p. 217-224. March.

Singh, R. (2004). Pricing: In skills and knowledge of cost engineering. Edited by Scott, J.A. Morgantown: AACE International.

Skinner, S. (2008). Sky high solutions. International Construction. p. 25-33. September.

Skitmore, M. & Drew, D. (2003). The analysis of pre-tender building price forecasting performance: A case study. Engineering, Construction and Architectural Management. Vol. 10. No. 1. p. 36-42.

Skitmore, M. & Ng, S. T. (2002). Analytical and approximate variance of total project cost. Journal of Construction & Engineering Management. Vol. 128. No. 5. p. 456-460. October.

Skitmore, M., Runeson, G. & Chang, X. (2006). Construction price formation: Full-cost pricing or neoclassical microeconomic theory? Construction Management and Economics. Vol. 24. p 773-783. July.

Skitmore, R. M. (1986). Towards and expert building price forecasting system. Surveyors Publications: London.

Skitmore, R. M. (1991). Early stage construction price forecasting. The Royal Institute of Chartered Surveyors: London.

Skorupka, D. (2004). Neural networks in the risk management of a project. In AACE International Transactions. Morgantown: AACE International.

Slight-Gibney, N., Grenci, M. & Blackwell, L. S. (2004). Starting with an empty map: Benchmarking time and costs for serials operations. Serials Librarian. 46(3/4). p 287-293.

Smallwood, J. (2007). The practice of construction management. Acta Structilia. Vol. 14 (2). p 62-89. December.

Smets, F. & Wouters, R. (2007). Shocks and frictions in US Business Cycles: A Bayesian DSGE approach. The American Economic Review. p. 586-606. June.

Smith, J., O'Keeffe, N., Georgiou, J. & Love, P. E. D. (2004). Auditing construction costs during building design. Managerial Auditing Journal. Vol. 19. No. 2. p. 259-271.

Smith, N. (2008). Nuclear energy: The bidding race begins. Financial Mail. 08 February 2008.

Smith, W. P. (2010). (Senior Quantity Surveyor - Thyssenkrupp Engineering). Personal development regarding financial forecast and reporting on construction projects in the petro-chemical environment in South Africa. 02 February 2010, Johannesburg.

Smyrlis, L. (2008). Why we better get ready for another trucking capacity crunch; and upward pressure on rates. CT & L. p. 4. August.

Snedaker, S. (2006). Changes to your scope. [online]. Available from: http://www.projectsatwork.com/content/Articles/231628.cfm [Accessed 30 September 2008].

Society of Cost Estimating and Analysis (SCEA). (2005). Parametric estimating handbook, Fourth Edition. Vienna, VA. International Society of Parametric Analysts (ISPA).

Sommers, P. M. (2008). The war in Iraq and the 2006 U. S. elections. International Advances in Economic Research. Vol. 14. p. 353-354.

Son, J., Mattila, K. G. & Myers, D. S. (2005). Determination of haul distance and direction in mass excavation. Journal of Construction & Engineering Management. Vol. 131. No. 3. p. 302-309. March.

Song, L. & AbouRizk, S. M. (2005). Quantifying engineering project scope for productivity modeling. Journal of Construction & Engineering Management. Vol. 131. No. 3. p. 360-367. March.

Song, L. & AbouRizk, S. M. (2006). Modeling labor productivity in steel fabrication. In AACE International Transactions. Morgantown: AACE International.

Sonmez, R. (2004). Conceptual cost estimating of building projects with regression analysis and neural networks. Canadian Civil Engineer. Vol. 31. p 677-683.

Sonmez, R. (2005). Review of conceptual cost modeling techniques. In AACE International Transactions. Morgantown: AACE International.

Sonmez, R., Ergin, A. & Birgonul, M. T. (2007). Quantitative methodology for determination of cost contingency in international projects. Journal of Management in Engineering. Vol. 23. No. 1. p. 35-39. January.

Sorenson, G. E. & Lavelle, J. P. (2008). A comparison of fuzzy set and probabilistic paradigms for ranking vague economic investment information using a present worth criterion. The Engineering Economist. Vol. 53. p. 42-67.

Spencer, G. R. & Lewis, R. M. (2006). Schedule analysis indices. In AACE International Transactions. Morgantown: AACE International.

Squires, D., Reid, C. & Jeon, Y. (2008). Productivity growth in natural resource industries and the environment: An application to the Korean Tuna Purse-seine Fleet in the Pacific Ocean. International Economic Journal. Vol. 22 (1). p. 81-93.

Srour, I. M., Haas, C. T. & Borcherding, J. D. (2006). What does the construction industry value in its workers? Journal of Construction & Engineering Management. Vol. 132. No. 10. p. 1053-1058. October.

Staff Reporter, (2008). Despite Wall Street panic: McCain says fundamentals of economy is strong. [online]. Available from: http://thedailyvoice.com/voice/2008/09/despite-wall-street-panic-mcca-001143.php [Accessed 21 November 2008].

Stats SA, (2008a). Consumer price index. [online]. Available from: http://www.statssa.gov.za/keyindicators/cpi.asp [Accessed 20 November 2008].

Stats SA, (2008b). Production price index. [online]. Available from: http://www.statssa.gov.za/keyindicators/ppi.asp [Accessed 20 November 2008].

Stats SA, (2010). Productivity index. [online]. Available from: http://www.statssa.gov.za/publications/statsdownload.asp?PPN=D0406&SCH=4299 [Accessed 03 March 2010].

Steel and Engineering Industries Federation of South Africa (SEIFSA) (2009). Economic and Commercial. [online]. Available from: http://www.seifsa.co.za/default.php?id=104&menu=2&menuid=7 [Accessed 06 August 2009].

Steenkamp, L. (2010). Krisis kom met petrol oor staking. Die Burger. 19 May 2010.

Stein, R. E. (2008). Development and implementation of collaborative and integrated cost management tools in a global energy company. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Stenzel, C. & Stenzel, J. (2003). Essentials of cost management. New Jersey: John Wiley and Sons.

Sterner, E. (2000). Life-cycle costing and its use in the Swedish building sector. Building Research & Information. Vol. 28 (5/6). p 387-393.

Stewart, W. E. & Mastenbrook, S. M. (1983). Parametric estimation of ventilation perfusion ratio distributions. Journal of Applied Physiology. Vol. 55 (1). p. 37-55.

Steyn, A. G. W., Smit, C. F., Du Toit, S. H. C. & Strasheim, C. (1994). Moderne statistiek vir die praktyk. NBD; Goodwood, South Africa.

Stiglitz, J. E. (2009). The current economic crisis and lessons for economic theory. Eastern Economic Journal. Vol. 35. p. 281-296.

Stock, J. R. & Lambert, D. M. (2001). Strategic logistics management. New York. McGraw-Hill Irwin Publishing.

Stoy, C., Dreier, F. & Schakher, H. (2007). Construction duration of residential building projects in Germany. Engineering, Construction and Architecture Management. Vol. 14. No. 1. p. 52-64.

Stratton, G., Redman, F. Q. & Kehret, M. (2004). Architecting and Raytheon production cost model. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Stratton, R. W. (2007). Applying earned schedule analysis to EVM data for estimating completion date. In AACE International Transactions. Morgantown: AACE International.

Strugnell, K. (2008). All change in the European lending market. Credit Control. p. 48-53. January.

Struts, C. S. & Griffis, F. H. (2005a). Addressing pricing: Value bidding for engineers and consultants. Journal of Construction & Engineering Management. Vol. 131 (6). p 621-630. June.

Struts, C. S. & Griffis, F. H. (2005b). Pricing engineering services. Journal of Construction & Engineering Management. Vol. 21 (2). p 56-62. April.

Styan, J. (2010). SA's railways collapsing. [online]. Available from: http://www.fin24.com/Economy?SAs-railways-collapsing-20100429 [Accessed 14 October 2010].

Sullivan, C. J. (2008). An ounce of prevention: Creative scope change orders may avoid costly litigation. [online]. Available from: http://www.interface-consulting.com/en/art/?21 [Accessed 02 October 2008].

Swanson, G. J. (2005). America the broke: How spending of the White House and Congress are bankrupting our country and destroying our children's future. Engineering Management Journal. Vol. 17. No. 4. p. 64. December.

Swart, B. J. (2004). The value of efficient contract documents and conditions effecting mediation. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Tague, T. & Morrison, F. (2007). "Einstein's Percent Complete. Cost Engineering. Vol. 49(9). p 12-15. September.

Tam, C. (2007). The evolution of estimating models in the building industry. University of the Free State: Bloemfontein.

Tan, Y., Lester, L. & Richardson, S. (2008). Labour force projections: A case study of the Greater Metropolitan Area of New South Wales. ABL. Vol. 34. No. 1. p. 79-99.

Tang, C. M., Leung, A. Y. T. & Lam, K. C. (2006). Entropy application to improve construction finance decisions. Journal of Construction & Engineering Management. Vol. 132. No. 10. p. 1099-1113. October.

Tang, X., Wang, M. & Wang, S. (2007). A systematic methodology for quality control in the product development process. International Journal of Production Research. Vol. 45. No. 7. p 1561-1576. April.

Tas, E. & Yaman, H. (2005). A building cost estimation model based on cost significant work packages. Engineering, Construction and Architectural Management. Vol. 12. No. 3. p. 251-263.

Tebin, H. I. (2009). Pricing tenders for construction. Cost Engineering. Vol. 51 (1). p. 7-14.

Templeton, M. (2006). Cost and resource management using primavera. In AACE International Transactions. Morgantown: AACE International.

Termini, M. J. (2003). Strategic project management: Tools and techniques for planning, decision making and implementation. Engineering Management Journal. Vol. 15. No. 3. p. 47. September.

Thomas, H. R. & Ellis, R. D. (2007). Contractor pre-bid planning principles. Journal of Construction & Engineering Management. Vol. 133. No. 8. p. 542-552. August.

Thomas, H. R., Horman, M. J., Minchin, R. E. & Chen, D. (2003). Improving labor flow reliability for better productivity as lean construction principle. Journal of Construction & Engineering Management. Vol. 129. No. 3. p. 251-261. June.

Thomas, H. R., Riley, D. R. & Messner, J. I. (2005). Fundamental principles of site material management. Journal of Construction & Engineering Management. p 808-815. July.

Thomas, H. R. & Sakarcan, A. S. (1994). Forecasting labour productivity using factor model. Journal of Engineering Management. Vol. 120. No. 1. p. 228-239. March / April.

Thomas, M. (2006). The gold standard: Work measurement remains infinitely valuable in the manufacturing landscape. Industrial Engineer.

Thomas, S. (2004). Nuclear reactor: Too early for bed. Financial Mail. 26 March 2004.

Tichacek, R. L. (2005). Effective cost management: Back to Basics. In AACE International Transactions. Morgantown: AACE International.

Thurlow, P. (2009). Seminar on new engineering contract 3 (NEC 3), 30 September to 01 October, Midrand – Johannesburg.

Tirasirichai, C. & Enke, D. (2007). Case study: Applying a regional CGE model for estimation of indirect economic losses due to damaged highway bridges. The Engineering Economist. 52. p 367-401.

Toakley, A. R. & Marosszeky, M. (2003). Towards total project quality: A review of research needs. Engineering, Construction and Architectural Management. Vol. 10. No. 3. p. 219-228.

Tompkins, B.G. (1985). Project cost control for managers. Houston: Gulf Publishing.

Touran, A. (2003). Probabilistic model for cost contingency. Journal of Construction & Engineering Management. Vol. 129. No. 3. p. 280-284. June.

Touran, A. & Lopez, R. (2006). Modeling cost escalation in large infrastructure projects. Journal of Construction & Engineering Management. Vol. 132. No. 8. p. 853-860. August.

Townssend, K. & Charles, M. B. (2008). Jarhead and deskilling in the military: Potential implications for the Australian labour market. ABL. Vol. 34. No. 1. p. 64-78.

Treloar, G. J., Love, P. E. D. & Crawford, R. H. (2004). Hybrid life-cycle inventory for road construction and use. Journal of Construction & Engineering Management. Vol. 130. No. 1. p. 43-49. February.

Trigunarsyah, B. (2004). Constructability practices among construction contractors in Indonesia. Journal of Construction & Engineering Management. Vol. 130. No. 5. p. 656-669. October.

Trost, S. M. & Oberlender, G. D. (2003). Predicting accuracy of early cost estimates using factor analysis and multivariate regression. Journal of Construction & Engineering Management. Vol. 129. No. 2. p. 198-204. April.

Tsai, P. & Tsay, C. (2008). Outward foreign direct investment and inward international labour migration: Substitutes or complements? International Economic Journal. Vol. 22 (1). p. 127-139.

Tuffs, A. (2008). Research sparks public concern about risk from nuclear power. British Medical Journal. 336(7634). p 13.

Uher, T. E. (1996). Cost estimating practices in Australian construction. Engineering, Construction and Architectural Management. Vol. 3. No. 1. p. 83-95.

Unal, R., Keeting, C. B., Chytka, T. M. & Conway, B. A. (2005). Calibrating of expert judgements applied to uncertainty assessment. Engineering Management Journal. Vol. 17. No. 2. p. 34-43. June.

Uppal, K. B. (2006). So, is this the estimate? In AACE International Transactions. Morgantown: AACE International.

Uppal, K. B. (2007). Factored estimating for process industries. In AACE International Transactions. Morgantown: AACE International.

Valle-Riestra, J. F. (1983). Project evaluation in the chemical process industries. McGraw-Hill Book Company. New York.

Van der Dussen, L. J. (2004). Value beyond cost: Dynamic cost systems to deliver the real value. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Van der Horst, R. (nd). Bridging finance in Scotland. Credit Control. P. 40-42.

Van der Merwe, C. (2008). Airport upgrades feel building escalation pinch. Engineering News. 4th July.

Van der Werf, A. (2004). Experiences with front-end integrated estimating tools. In AACE International Transactions. Morgantown: AACE International.

Van Niekerk, N. (2008). (Contracts Director - Thyssenkrupp Engineering). Personal communication on the current economic situation pertaining to tendering on engineering contracts in the petro-chemical environment in South Africa. 23 April 2008, Johannesburg.

Van Robbroeck, T. P. C. (1982). The Drakensberg project: Water and power for South Africa. The Civil Engineer in South Africa. p. 343-352. August.

Van Wyk, C. (2010). R75 miljard nodig vir SA paaie. Die Burger. 25 May.

Vargas, R. V. (2004). Earned value probabilistic forecasting using Monte Carlo simulation. In AACE International Transactions. Morgantown: AACE International.

Varila, M. & Sievanen, M. (2005). Profitability estimation of pioneering R&D Project. In AACE International Transactions. Morgantown: AACE International.

Venter, I. (2008). Weak rand will push Gautrain cost upwards. [online]. Available from: http://www.engineeringnews.co.za/article/weak-rand-will-push-gautrain-cost-upwards. [Accessed 03 December 2008].

Venters, V. G. (2004). Cost of quality. In AACE International Transactions. Morgantown: AACE International.

Verschoor, J. (2005). The benefits of Monte-Carlo schedule analysis. In AACE International Transactions. Morgantown: AACE International.

Verster, J. J. P. (2004). Cost management aimed at value: In search of a comprehensive model. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Verveniotis, P. (2008). Mega project control: Effective program, project and WBS granularity decisions. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Vianna, J. F. & Teles, E. F. (2008). Methodology for calculating a pipeline repair cost. . In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Vilela, P. R. & Longo, O. C. (2008). Methodology for field appropriation of detailed estimates. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Viljoen, W. J. (2008). EVM for world class project controls. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Villar, A. (2003). The generalized linear production model: Solvability, non-substitution and productivity measurement. Advances in Theoretical Economics. Vol. 3 (1). p. 1-23.

Vits, J., Gelders, L. & Pintelon, L. (2007). Manufacturing process changes: Myopic and long-term planning. International Journal of Production Research. Vol. 45. No. 1. p 1-27. January.

Vis, P. H. (2005). Parametric cost estimating for Greenfield breweries. Faculty of Civil Engineering and Geosciences. Delft University of Technology.

Voronin, V. E. & Prokhorov, Y. A. (1993). Role of land-based prototype plants in propulsion nuclear power plants engineering. [online]. Available from: http://www.energystorm.us/Role_Of_Land_based_Prototype_Plants_In_Propulsion_Nuclear_Power_Plants_Engineering [Accessed 09 June 2008].

Voss, G. B., Sirdeshmukh, D. A. & Voss, Z. G. (2008). The effects of slack resources and environmental threat on product exploration and exploitation. Academy of Management Journal. Vol. 51 (1). p 147-164.

Vrijland, M. S. A. (2005). Correlation of variables in Monte Carlo simulation. In AACE International Transactions. Morgantown: AACE International.

Waara, F. & Bröchner, J. (2006). Price and non-price criteria for contractor selection. Journal of Construction & Engineering Management. Vol. 132. No. 8. p. 797-804. August.

Wainwright, W. H. & Wood, A. A. B. (1991). Practical builder's estimating, Fourth Edition. Leckhampton: Stanley Thornes Publishing.

Wallwork, J. W. (2007). Determining the cost to complete. In AACE International Transactions. Morgantown: AACE International.

Walsh, K. D., Sawhney, A. & Bashford, H. H. (2007). Production equations for unsteady-state construction processes. Journal of Construction & Engineering Management. Vol. 133. No. 3. p. 254-261. March.

Walsh, K. D., Sawhney, A. Brown, A. (2005). International comparisons of cost for the construction sector: Purchasing power parity. Journal of Construction & Engineering Management. Vol. 131. No. 2. p. 160-167. February.

Walsh, K. D., Sawhney, A. & Vachris, M. A. (2006). Improving inter-spatial comparison of construction costs. Engineering, Construction and Architecture Management. Vol. 13. No. 2. p. 123-135.

Warszawski, A. (2003). Analysis of costs and benefits of tall buildings. Journal of Construction & Engineering Management. Vol. 129. No. 4. p. 421-430. August.

Webb, A. (2003a). The project manager's guide to handling risk. Burlington: Gower Publishing.

Webb, A. (2003b). The project manager's guide to using earned value. Burlington: Gower Publishing.

Weber, A. & Thomas, R. (2005). Key performance indicators: Measuring and managing the maintenance function. Paper presented by the Ivara Corporation. Ontario, Canada.

Weiman, D. F. & James, J. A. (2007). The political economy of the US monetary union: The civil war era as a watershed. AEA Papers and Proceedings. p. 271-275. May.

Welfe, W. (2008). A knowledge-based economy: New directions of macro-modeling. International Advances of Economic Research. Vol. 14. p. 167-180.

Wellington, A. M. (1887). The economic theory of the location of railways. Wiley, New York.

Westell, J. (2008). Gateway strategy tackling congestion woes. CT & L. p. 9. August.

Whalen, T. M., Gopal, S. & Abraham, D. M. (2004). Cost-benefit model for the construction of Toronto shelters. Journal of Construction & Engineering Management. Vol. 130. No. 6. p. 772-779. December.

Whiteside, J. D. (2004). Developing estimating models. In AACE International Transactions. Morgantown: AACE International.

Whiteside, J. D. (2005). A methodology for estimating engineering details. In AACE International Transactions. Morgantown: AACE International.

Whiteside, J. D. (2006). Construction productivity. In AACE International Transactions. Morgantown: AACE International.

Whiteside, J. D. (2007). Contingency modifier tool. In AACE International Transactions. Morgantown: AACE International.

Whiteside, J. D. (2008). A practical application of Monte Carlo simulation in forecasting. In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Wicks, F. (2007). 50 Years of nuclear power. Mechanical Engineering. p. 36-39. November.

Williams, J. (1996). Estimating for building and civil engineering works. Butterworth Heinemann: Oxford.

Williams, T. P. (2005). Bidding ratios to predict highway project costs. Engineering, Construction and Architectural Management Journal. Vol. 12. No. 1. p. 35-51.

Williams, T. P. (2007). Application of tree-maps to the analysis of competitively bid project cost overruns. Construction innovation: Information, Process and Management. Vol. 7. No. 4. p. 340-356.

Wills, T. H. & Wills, W. D. (1996). A quality performance management system for industrial construction engineering projects. International Journal of Quality and Reliability Management. Vol. 13. No. 9. p. 38-48.

Wilmeth, R. G. & Usrey, M. W. (2000). Reliability-centered maintenance: A case study. Engineering Management Journal. Vol. 12, No. 4, p. 25-31. December.

Wilmot, C. G. & Cheng, P. E. (2003). Estimating future highway construction costs. Journal of Construction & Engineering Management. Vol. 129. No. 3. p. 272-279. June.

Wilmot, C. G. & Mei, B. (2005). Neural network modeling of highway construction costs. Journal of Construction & Engineering Management. Vol. 131. No. 7. p. 765-771. July.

Winter, R. & Calvey, T. T. (2008). Who should own the float? In: AACE International Transactions. Morgantown: AACE International. Paper presented at: The 6th World Congress of ICEC. Canada, Toronto. 29 June to 02 July 2008.

Wong, J., Chiang, Y. H. & Ng, T. (2008). Construction and economic development: The case of Hong Kong. Construction Management & Economics. Vol. 26. No. 8. p. 815-826.

Wong, J. T. Y. & Hui, E. C. M. (2006). Construction project risks: Further considerations for constructors' pricing in Hong Kong. Construction Management and Economics. Vol. 24. p 425-438. April.

Wong, L. T. (2002). A cost model for plumbing and drainage systems. Facilities. Vol. 20. No. 12. p. 386-393.

Wong, P. S. P., Cheung, S. O. & Hardcastle, C. (2007). Embodying learning effect in performance prediction. Journal of Construction & Engineering Management. Vol. 133. No. 6. p. 474-482. June.

Wood, B. (2005). Towards innovative building maintenance. Structural Survey. Vol. 23. No. 4. p. 291-297.

Würth, M. P. M. (2006). Productivity in the South African Manufacturing Industry. South African Journal of Economics. Vol. 63 (2). p. 96-107.

Xiao, H. & Proverbs, D. (2003). Factors influencing contractor performance: An international investigation. Engineering, Construction and Architectural Management Journal. Vol. 10. No. 5. p. 322-332.

Xu, T. & Tiong, R. L. K. (2001). Risk assessment on contractors' pricing strategies. Construction Management and Economics. Vol. 19. p 77-84.

Yahya, K. & Boussabaine, A. H. (2006). Eco-costing of construction waste. International Journal of Management of Environmental Quality. Vol. 17. No. 1. p. 6-19.

Yang, J. (2007). How the critical chain scheduling method is working for construction. Cost Engineering. Vol. 49. No. 4. p. 25-32. April.

Yates, J. K. (2007). Globalization of engineering and construction legal issues. Journal of Professional Issues in Engineering Education and Practice. p. 169 -170. July.

Yan Xiaoyan, L. (2004). Quota: An important factor in the reform of construction cost estimates in China. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Ye, M., Zyren, J., Blumberg, C. J. & Shore, J. (2009). A short-run crude oil price forecast model with Ratchet effect. Atlantic Economic Journal. Vol. 37. p. 37-50.

Yepez, A. (2008). A cost function for the natural gas transmission industry. The Engineering Economist. Vol. 53. p. 68-83.

Yisa, S. B., Ndekugi, I. & Ambrose, B. (1996). A review of changes in the UK construction industry. European Journal of Marketing. Vol. 30. No. 3. p. 47-64. June.

Yiu, C. Y., Ho, H. K., Lo, S. M. & Hu, B. Q. (2005). Performance evaluation for cost estimators by reliability interval method. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 108-116. January.

Yiu, C. Y. & Tam, C. S. (2006). Rational under-pricing in bidding strategy: A real options model. Construction Management and Economics. Vol. 24. p 475-484. May.

Yonezawa, T. (2005). Practical EVMS for an EPS project. In AACE International Transactions. Morgantown: AACE International.

Yongqiang, C., Fei, P. & Libo, S. (2004). Analysis of cost issues for project management contracts: A new management mode for engineering projects. Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Younossi, O., Areana, M. V., Moore, R. M., Lorell, M., Mason, J. & Graser, J. C. (2002). Military jet engine acquisition: Technology basics and cost-estimating methodology. RAND (Project Air Force): Pittsburgh.

Yu, M. K. W. & Ive, G. (2006). A survey of building price indices compiling methods in Britain. Proceedings of the RICS (COBRA) conference. University College London. 7 – 8 September. p. 784-800.

Zaborowski, J. (2009). Opportunities in a recession. Economic Development Journal. Vol. 8 (1). p. 42-48.

Zack, J. G. (2006). TCM: The key to successfully managing projects. Cost Engineering. Vol. 48(11). p. 3-5. November.

Zack, J. G. (2007). Cost estimating: A dying art? Cost Engineering. Vol. 49(1). p 3-4. January.

Zastrozny, E. P. (1974). Practical cost estimating for the South African chemical Process Industry. The South African Coal, Oil and Gas Corporation Limited: Sasolburg.

Zayed, T. M. (2005). Productivity and cost assessment for continuous flight auger piles. Journal of Construction & Engineering Management. Vol. 131. No. 6. p. 677-688. June.

Zayed, T. M. & Halpin, D. W. (2005). Productivity and cost regression models for pile construction. Journal of Construction & Engineering Management. Vol. 131. No. 7. p. 779-789. July.

Zhang, D. (2005). A different perspective on using multiple internal rates of return: The IRR parity technique. The Engineering Economist. Vol. 50. p. 327-335.

Zhang, X. (2005). Critical success factors for public-private partnerships in infrastructure development. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 3-14. January.

Zhang, Y., Novick, D., Hadavi, A. & Krizek, R. J. (2008). Whole life cycle cost for Chicago type Bascule bridges. Cost Engineering. Vol. 50. No 4. p 28-32. April.

Zhao, J. G. (2006). Significance of WBS in contingency modeling. In AACE International Transactions. Morgantown: AACE International.

Zheng, D. X. M., Ng, T. & Kumaraswamy, M. M. (2005). Applying pareto ranking and niche formation to genetic algorithm-based multi-objective time-cost optimization. Journal of Construction & Engineering Management. Vol. 131. No. 1. p. 81-91. January.

Zhou, S. & Li, D. (2004). A new mechanism for construction management systems in wind-power development. . Paper presented at: The 4th World Congress of ICEC. South Africa, Cape Town.

Ziguras, S. (2006). Labour market transitions and risk of exclusion. ABL. Vol. 32. No. 3. p. 203-226.

Zou, P. X. W. & Wong, A. (2008). Breaking into China's design and construction market. Journal of Technology Management in China. Vol. 3. No. 3. p. 279-291.

Zou, Y. & Lee, S. (2006). Impacts of project change management on project cost and schedule performances. In AACE International Transactions. Morgantown: AACE International.

Zuckerman, S. (2007). Comparing cost in construction arbitration & litigation. Dispute Resolution Journal. p 42-48. May / July.

Zwemmer, D. & Van Ten Hof, J. (1979). The construction of Saldanha Bay harbour. Die Siviele Ingenieur in Suid-Afrika. p. 238-240. October.

THE USE OF RATIO CONCEPTUAL COST ESTIMATION FOR PETROCHEMICAL CONSTRUCTION PROJECTS IN SOUTH AFRICA

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(Volume 2 of 3)

ADDENDUM A

ESTIMATING CHECKLIST FOR CAPITAL PROJECTS

1.00		LAND AND SITE DEVELOPMENT
1.01		**Land acquisition**
1.01.01		Purchase
1.01.02		Freehold
1.01.03		Leasehold
1.01.04		Rental
1.01.05		Development grants or tax concessions obtainable
1.02		**Rates, taxes, stamp duty, levies, tariffs**
1.03		**Lump sum contributions to local authorities**
1.04		**Compensation for damage**
1.05		**Fees (e.g. Legal)**
1.06		**Access to site including wayleaves and easements**
1.06.01		Roads
1.06.02		Footpaths
1.06.03		Rail tracks
1.06.04		Conveyors
1.06.05		Canals and waterways
1.06.06		Landing strips and helicopter pads
1.06.07		Tunnels and bridges
1.07		**Services to and from site including wayleaves and easements**
1.07.01		Electricity
1.07.02		Gas
1.07.03		Water
1.07.04		Telephone and communications
1.07.05		Sewer
1.07.06		Pipelines (Refer to section 13.00)
1.08		**Surveys and investigations**
1.08.01		Ecological and environmental surveys
1.08.02		Geological, geotechnical, hydrographic and seismic surveys
1.08.03		Trial holes, boreholes, samples, analyses and tests
1.08.04		Site instrumental tests

1.09		**Demolition, site clearance and diversions**
1.09.01		Demolition and site clearance (see also section 02.00)
1.09.02		Diversion of roads, pipelines and services
1.09.03		Diversion of canals and waterways
1.09.04		Relocation of plant/buildings/townships etc.
1.09.05		Protection of adjoining properties
1.09.06		Removal of underground obstructions
1.10		**Ground stabilization**
1.10.01		Ground protection, compaction and/or grouting
1.10.02		Ground stabilization
1.10.03		Sink holes, subsidence and fault lines
1.10.04		Diaphragm walls
1.10.05		Suppression of vegetation
1.10.06		Preliminary drainage, dewatering or sand drains
1.11		**Fencing**
1.11.01		Permanent and temporary fencing (see also section 02.00)
1.11.02		Gates (see also section 02.00)
1.11.03		Hoardings
1.12		**Signs and illuminated boards**
1.13		**Site screening**
1.13.01		Screening embankments (see also section 02.00)
1.13.02		Tree/bush planting (see also section 02,00)
1.14		**Pre-production mine development**
1.14.01		Shafts/bores/raises/adits
1.14.02		Drives/gates/headings
1.14.03		Rooms/stopes

2		CIVIL ENGINEERING
2.01		**Excavation**
2.01.01		Site clearance, demolition
2.01.02		Excavation of topsoil including lifting turf
2.01.03		Reduce level excavation or cut and fill
2.01.04		Excavation of soft spots and filling
2.01.05		Rock removal including ripping, drilling and blasting
2.01.06		Excavation for foundations and basements
2.01.07		Excavation for existing services
2.01.08		Excavation of pits, basins, channels and ducts
2.01.09		Excavation for transport facilities and paving
2.01.10		Excavation for exposed pipe or cable tracks
2.01.11		Excavation for pipes
2.01.12		Excavation for cables
2.01.13		Diaphragm walls (see also section 01.00)
2.01.14		Dewatering (see also section 01.00)
2.01.15		Forming earth bunds and embankments
2.01.16		Sand padding (if not included elsewhere)
2.01.17		Disposal of surplus including offsite tips
2.01.18		Double handling of surplus
2.02		**Filling and shoring**
2.02.01		Selected, non-selected or imported filling
2.02.02		Bulk fill: embankments, terraces, earth bunds
2.02.03		Under structures, paving and slabs
2.02.04		Make up levels and soft spots
2.02.05		Borrow pits and quarries
2.02.06		Blinding
2.02.07		Compaction
2.02.08		Sand padding to pipes and cables
2.02.09		Temporary shoring or support work
	a)	timber
	b)	steel
	c)	scaffolding

2.03		**Geotechniques**
2.03.01		Piling
	a)	bored, cast or driven
	b)	precast concrete, prestressed and precast planks
	c)	timber
	d)	steel-isolated and interlocking sheet
	e)	cofferdams and caissons
	f)	pre-boring and disposal of surplus
	g)	enlarged bases
	h)	jetting
	i)	obstructions
	j)	permanent casings
	k)	concrete or backfill to empty bore
	l)	trim heads
	m)	excavations, concrete, reinforcement and formwork
	n)	tests: Kentledge, non-destructive, sacrificial provisions; penetration, compression, lateral, uplift; inclinometers
	o)	delays: rigs standing
2.03.02		Diaphragm walls
	a)	excavations, disposal, backfill, concrete, reinforcement
	b)	trim level of wall
	c)	joints
	d)	guide walls: excavation, disposal, backfill, concrete, reinforcement and formwork
	e)	tests
	f)	delays: rigs standing
2.03.03		Underpinning
	a)	excavation, disposal, support work, breaking out existing, backfilling concrete, formwork, reinforcement, brickwork, tanking
2.03.04		Ground and rock anchors
	a)	drill grout holes, drive injection pipes, grouting
2.03.05		gun-applied concrete
	a)	slabs, walls, beams, columns, sprayed concrete, mesh reinforced concrete and expanded metal
2.03.06		Reinforced earth
	a)	strips, planks, grids, anchors, fabrics, GRP, weldmesh, expanded metal

2.04		**Concrete supply, yard facilities, formwork and sundries**
2.04.01		Concrete supply: site mix, premix, pumped, additives: waterproof, sulphate resisting
2.04.02		Site set up: batching plant, hard standings, aggregate bins, cement silo, debagging machines, water supply, storage tanks
2.04.03		Transport: mixer trucks, dump trucks, dumpers, conveyors, monorail, pumps, chutes
2.04.04		Vibrators, vibrators, pokers, screed boards
2.04.05		Cranage
	a)	tower, fixed, rail mounted, climbing
	b)	mobile, wheel based, tracked
	c)	fork-lift trucks
2.04.06		Formwork / shuttering
	a)	timber faced, steel panels
	b)	face finish: sawn, fair, other
	c)	decking: coffered, troughed, voids, woodwool, metal profiled
	d)	vertical: beams, columns, walls
2.04.07		Reinforcement
	a)	mild steel, high yield steel, stainless steel
	b)	fabric: laps and joints
	c)	prestressed: pre-tentioned / post-tentioned
2.04.08		Precast concrete
	a)	beams, columns, slabs, portal farmes
	b)	segmental units: subways, culverts, ducts
	c)	copings, sills, cappings, lintels
	d)	kerbs, paving channels, edgings
	e)	reinforced: pre-strssed: pre-tentioned, post-tentioned
2.04.09		Sundries
	a)	expansion and construction joints
	b)	waterstops
	c)	holding-down bolts
	d)	waterproof tanking
	e)	surface treatments and finishes
	f)	chemical or acid-resistant tiling
	g)	cutting, chasing, rebating
	h)	geotextile fabrics and sheeting

	i)	grouting
2.05		**Foundations**
2.05.01		Foundations for structures
2.05.02		Retaining and basement walls
2.05.03		Foundations, paving and bunds to and around tanks
2.05.04		Precast products, including beams and sleepers
2.05.05		Foundations for plant, machinery, equipment and pipe work
2.05.06		Foundations for electrical and instrumentation installations
2.05.07		Foundations for import / export loading facilities
2.06		**Pits, basins and channels**
2.06.01		Firewater
2.06.02		Sewage treatment
2.06.03		Oil water separators
2.06.04		Slurry ponds
2.06.05		Weighbridge pits
2.06.06		Cooling water including intake / outfall structures, culverts, strainer, siphon recovery and make-up pump chambers
2.06.07		Rail unloader pits
2.07		**Ducts, etc.**
2.07.01		Cooling water culverts (if not in Section 2.1)
2.07.02		Cable ducts
2.07.03		Pipe ducts
2.07.04		Pipe culverts (under roads, etc)
2.07.05		Precast concrete cable tiles and marker posts
2.08		**Steel encasement**
2.08.01		Steel encasement
2.08.02		Fireproofing
2.09		**Transport facilities and paving**
2.09.01		Roads, turning circles and ramps
2.09.02		Paths
2.09.03		Car parks, paved areas and hard standings
2.09.04		Curbs
2.09.05		Paving under plant
2.09.06		Rail track, platforms and ancillaries (see Section 14.00)
2.09.07		Road / rail canal unloading facilities (see Section 14.00)
2.09.08		Bridges and tunnels

2.09.09		Airfield landing strips and helipads
2.09.10		Traffic signs and markings
2.10		**Marine work**
2.10.01		Cooling water intakes / outfalls, structures and culverts (if in Section 2.06.07)
2.10.02		Tidal work
2.10.03		Dredging
2.10.04		Hardfilling
2.10.05		Jetties and moorings
2.10.06		Wharves
2.10.07		Reservoirs
2.10.08		Dams
2.10.09		Breakwaters
2.10.10		Foreshore protection
2.10.11		Pontoons
2.11		**Structures**
2.11.01		Towers and silos
2.11.02		Windshields, stacks and flues
2.11.03		Tanks and pits
2.11.04		Bunds and firewalls
2.11.05		Storage for raw material or product
2.11.06		Loading/unloading structures including lifts, gantries, booms and special structures (see also section 14.00)
2.12		**Cooling towers**
2.12.01		Foundations
2.12.02		Shell
2.12.03		Collection surround
2.12.04		Internal discharge structures
2.12.05		Packing
2.12.06		Foundations for forced-draught fans
2.13		**Mining**
2.13.01		Shafts, bores and raises
2.13.02		Tunnels, rooms and stopes
2.13.03		Service tunnels
2.13.04		Storage caverns
2.13.05		Adits

2.13.06		Drives, gates and headings
2.14		**Drainage**
2.14.01		Stream or channel diversions
2.14.02		Land drainage and open ditches, lined or unlined
2.14.03		Surface water drainage
2.14.04		Sewer drainage
2.14.05		Oily water drainage
2.14.06		Other drainage
2.14.07		Crossings including river, road, rail, fence open cut or thrust
2.14.08		Pipe including fittings and coatings
2.14.09		Paddings, beds and surrounds
2.14.10		Concrete stools, thrust blocks and supports
2.14.11		Manholes, inspection chambers and gullies
2.14.12		Pits, basins and channels (see also section 2.06)
2.14.13		Septic tanks, soakaways and cesspits
2.14.14		Filter beds
2.14.15		Sedimentation chambers
2.14.16		Pumping stations
2.14.17		Valves
2.14.18		Outfalls
2.15		**Water supply**
2.15.01		Dams
2.15.02		Reservoirs
2.15.03		Stream or channel diversions
2.15.04		Leats
2.15.05		Pipework
2.15.06		Manholes and inspection chambers
2.15.07		Compensation water channels
2.15.08		Settling tanks
2.15.09		Sand filters
2.15.10		Chlorination and chemical treatment
2.15.11		Pumping stations
2.15.12		Valves
2.15.13		Intakes
2.16		**Pipework and cabling** (see also sections 6,7 and 8)
2.16.01		Water

2.16.02		Firemains and hydrants
2.16.03		Process or any other pipework below ground (see also section 6)
2.16.04		Valves and pits
2.16.05		Pipe coating
2.16.06		Pipe surrounds
2.16.07		Cable trenches, ducts, padding, tiles and markers
2.17		**Brickwork, blockwork and masonry**
2.17.01		Walls and structures
2.17.02		Stacks and flue linings
2.17.03		Ancillaries, including damp courses, ties, joint reinforcement, bonding, etc.
2.18		**Landscaping**
2.18.01		Soft landscaping
	a)	cultivating, weeding, herbicides, fertilizing, mulching
	b)	turfing, grass seeding
	c)	plants, shrubs, trees
	d)	hedges
	e)	protection
2.18.02		Hard landscaping
	a)	pavings: bricks, blocks, flags, setts, cobbles, gravel, hoggin, concrete including kerbs, edges, channels
	b)	surfaces: sports, e.g. coloured tarmacadam, sheeted, tufted, including markings and lines
.	c)	walls: retaining walls, blast walls, fences, rock-filled gabions, sight and acoustic screening
	d)	fencing and hedging: fences, hedges, security fences, gates and hoardings
	e)	site/street furniture: signs, bollards, barriers, lifting barriers, seats, benches, tables, litterbins, gritbins, dustbins and planters
	f)	equipment: sports, playground, cycle stands, clothes drying
	g)	artwork: sculptures, carvings ornamental works, flag-poles, poster hoardings, displays
2.19		**Roads**
2.19.01		Sub-base
	a)	Granular, soil cement, lean mix, hard core
2.19.02	a)	macadam: wet mix, dry bound

	b)	bitumen: open texture, dense
	c)	tarmacadam: open texture, dense
	d)	tar surface
2.19.03		Surface
	a)	cold asphalt wearing course
	b)	rolled asphalt
	c)	slurry, sealing, surface dressing bitumen spray

3		BUILDINGS INCLUDING BUILDING SERVICES
3.01		**Substructure**
3.01.01		Site investigation
3.01.02		Site clearance/demolition
3.01.03		Removal of vegetable soil
3.01.04		Reduce level excavation
3.01.05		Basement excavation
3.01.06		Soft sports and fillings
3.01.07		Sheet piling
3.01.08		Piling
3.01.09		Dewatering
3.01.10		Filling and imported filling to make up levels
3.01.11		Column bases, pile caps and ground beams
3.01.12		Strip foundations
3.01.13		Basements
3.01.14		Underpinning
3.01.15		Retaining structures
3.01.16		Rafts
3.01.17		Substructure walls
3.01.18		Floor trenches and covers
3.01.19		Underfloor drainage
3.01.20		Ground floor slab
3.02		**Superstructure**
3.02.01		Frame and encasing
3.02.02		Upper floors
3.02.03		Roofs
3.02.04		Staircases and ramps
3.02.05		Lift shafts
3.02.06		External walls
3.02.07		Windows
3.02.08		External doors
3.02.09		Flues and chimney shafts
3.02.10		Fire escapes

3.02.11		Loading bays
3.02.12		Blast or impact-resisting requirements
3.03		**Finishings**
3.03.01		Internal walls and finishes
3.03.02		Floor finishes
3.03.03		Ceiling finishes
3.03.04		Staircase finishes
3.03.05		Internal doors and screens
3.03.06		Internal decoration
3.03.07		External decoration
3.03.08		Special acoustic requirements
3.03.09		Fireproofing and insulation
3.04		**Fittings**
3.04.01		Fittings, cupboards, benches and counters
3.04.02		Furniture general
3.04.03		Special furniture (e.g. canteen/classroom)
3.04.04		Carpets and curtaining
3.04.05		Recreational equipment
3.04.06		Shutters, screens and blinds
3.05		**Services** (see also sections 6,7 and 8)
3.05.01		Sanitary fittings
3.05.02		Waste, soil and overflow pipes
3.05.03		Rainwater installation
3.05.04		Hot, cold and drinking water services
3.05.05		Heating installation
3.05.06		Gas installation
3.05.07		Electrical installation
3.05.08		Any engineering installation particular to the type of building
3.05.09		Telephone and telecommunications installations
3.05.10		Computer installation
3.05.11		Refuse disposal3.06
3.05.12		Ventilation/air conditioning installation
3.05.13		Lifts and escalators
3.05.14		Overhead cranes and rails
3.05.15		Window cleaning gear
3.05.16		Special equipment (e.g. kitchen, laboratory and laundry)

3.05.17		Security and monitoring systems
3.05.18		Fire protection (e.g. alarms, sprinklers, dry risers, hose reels and extinguishers)
3.05.19		Builder's work in connection with services
3.06		**External works**
3.06.01		Alterations to public highways
3.06.02		Roads
3.06.03		Parking areas/building
3.06.04		Paths and paved areas
3.06.05		Walling and fencing
3.06.06		Drainage
3.06.07		Lighting
3.06.08		Connection of utilities
3.06.09		Builder's work in connection with services
3.06.10		Landscaping and planting

4		STRUCTURES (Also refer to Section 2 Civil Engineering and Section 3 Buildings
4.01		**Supporting structures**
4.01.01		Structures for plant and equipment including mezzanine floors, decking
4.01.02		and any enclosing sheeting
4.01.03		Structures in support, around and access to top of plant and equipment
4.01.04		Pre-assembles units
4.01.05		Plant and equipment supports
4.01.06		Pipe racks
4.01.07		General pipe supports
4.01.08		Minor access platforms
4.01.09		Lift structures
4.01.10		Fire-fighting towers
4.01.11		Cable races
4.01.12		Unloading / loading structures
4.02		**Steelwork**
4.02.01		Supply, fabrication and erection
4.02.02		Rolled sections
4.02.03		Plates and flats
4.02.04		Hollow sections
4.02.05		Built-up box sections
4.02.06		Grillages, columns, beams and plates
4.02.07		Deck-framing and portal frames
4.02.08		Trusses, trestles, towers, bracings, purlins
4.02.09		Decking, cladding, panelling
4.02.10		Walkways, platforms
4.02.11		Bridges, gantries, balconies, ramps
4.02.12		Stairways, landings, ladders, handrails, gates, cages
4.02.13		Floor plates, gratings
4.02.14		Duct covers, frames
4.02.15		On-site welding
4.02.16		Tests
4.02.17		Surface treatments including blast cleaning, flame cleaning, galvanizing, painting
4.02.18		Ancillary items including anchor bolts, holding down-bolt assemblies,

		packing, grouting
4.03		**Timberwork**
4.03.01		Shoring
4.03.02		Columns, beams, trusses, portal frames
4.03.03		Trestles, towers, bracings, purlins
4.03.04		Decking, cladding, panelling, linings, sheeting, casings
4.03.05		Walkways, platforms, gantries, bridges
4.03.06		Stairways, landings, ladders
4.03.07		Handrails, balustrading
4.04		**Pre-cast concrete work (see Section 02.04.08 Precast Concrete)**
04.05		**Scaffolding**
4.05.01		Material: steel, galvanized, alloy, other
4.05.02		Method: supply, hire , erect, maintain, adapt, dismantle, remove
4.05.03		Location: internal, external, load bearing, below datum, in vessels
4.05.04		Type: putlog, independent, birdcage
4.05.05		Decking: boards, protection fans, safety measures
4.05.06		Ancillaries: barriers, hand and safety rails, ladders, chutes, enclosing sheeting

5		PLANT INCLUDING MACHINERY AND EQUIPMENT
5.01		**Manufacturing facilities**
5.01.01		Manufacturing plant and equipment because of the wide variation in types of product and facilities it is not possible to include a checklist, and the estimator must ascertain the requirements.
5.02		**Process plant**
5.02.01		Vessels
	a)	Reactors
	b)	Columns
	c)	Pressure vessels
	d)	Fermenters
	e)	Non-pressure vessels
	f)	Jacketed vessels
5.02.02		Vessel ancillary equipment
	a)	Agitators and supports
	b)	Internal trays
	c)	External and internal coils
	d)	Packing (Raschig rings, etc)
	e)	Distributors
5.02.03		Heat transfer including integral supports
	a)	Fixed heat exchangers
	b)	Floating heat exchangers
	c)	Finned tube air coolers
	d)	Cooling towers
5.02.04		Process displacement equipment (refer to Section 06:00 for non-process equipment)
	a)	Pumps, rotary
	b)	Pumps, reciprocating
	c)	Pumps, portable drum
	d)	Pumps, vacuum
	e)	Pumps, peristaltic
	f)	Process gas compressors
	g)	Fans
	h)	Blowers
	i)	Exhausters

	j)	Ejectors and injectors
5.02.05		Compressor ancillary equipment
	a)	Inlet filter
	b)	Inlet silencer
	c)	Discharge silencer
	d)	Pre-cooler
	e)	Inter-cooler
	f)	After cooler
	g)	Lubricating oil tank, pump and local pipe work
	h)	Lubricating oil cooler
	i)	Lubricating oil filter
5.02.06		Prime movers
	a)	Electric motors; standard, flame proof and drip proof
	b)	Gas expanders
	c)	Turbines: steam or gas
	d)	Internal combustion engines
	e)	Hydraulic turbines
	f)	Wind turbines
5.02.07		Filtration and separation
	a)	Air filters
	b)	Gas filters
	c)	Bag filters
	d)	Liquid filters
	e)	Strainers
	f)	Dust filters and precipitators
	g)	Separators
	h)	Centrifuges
	i)	Cyclones
	k)	Sieving and separating equipment
5.02.08		Heaters
	a)	Boilers
	b)	Furnaces
	c)	Ovens
	d)	Kilns
	e)	Non-fired heaters: induction RF/microwave, infra-red, etc
	f)	Stacks, flues and flares

5.02.09		Mixing equipment
	a)	Agitators
	b)	Mixing and kneading machines
	c)	Blending equipment
5.02.10		Disintegration equipment
	a)	Crushers
	b)	Grinders
	c)	Mills
5.02.11		Miscellaneous equipment
	a)	Drying equipment
	b)	Chillers and scrapers
	c)	Crystallizers
	d)	Winterization
5.03		**Electrical generation, transmission and distribution**
5.03.01		Boiler
	a)	Drum and internals
	b)	Furnace walls
	c)	Roof and enclosure
	d)	Primary super heater
	e)	Platen super heater
	f)	Final super heater
	g)	Re-heater
	h)	Attemperator
	i)	Economizer
	k)	Large-bore down comers and circulation pipe work
	l)	Boiler circulation pumps including motors
	m)	Blow down, drain and vent pipe work
	n)	Safety vessels and silencers
	o)	Drum and unit slings
	p)	Casings
5.03.02		Fuel firing
	a)	Mills
	b)	Feeders
	c)	Pulverized fuel / oil / gas burners
	d)	Pressurized air fans
	e)	Pulverized fuel piping

	f)	Stokers and chaingrates
	g)	Oil-firing lighting-up equipment including oil heaters
	h)	Burner management
	i)	Gas compressors
5.03.03		Air heaters
5.03.04		Soot blowers
5.03.05		Precipitators including rectifiers, transformers and local cabling
5.03.06		Draught plant
	a)	Forced draught fans and motors
	b)	Induced draught fans and motors
	c)	Flues
	d)	Ducts
	e)	Dampers
	f)	Local control and instrumentation
	g)	Insulation
	h)	Flue gas desulphurization
5.03.07		Main turbo alternator and associated items
	a)	Turbines: high pressure, intermediate pressure, low pressure
	b)	Valves: high pressure valves and governor gear, interceptor valves
	c)	Re-heaters
	d)	Generator including excitation system, earthing and protection
	e)	Lubrication oil system and pipe work
	f)	Generator stator cooling system
	g)	Hydrogen cooling system including storage, valves and pipe work
	h)	Carbon dioxide system including storage, valves and pipe work
	i)	Nitrogen system including storage, valves and pipe work
	j)	Condenser / dump condenser including CW valves and tubing
	k)	Feed heating system, condensate including feed regulator valves
	l)	Feed pumps including main feed pump, starting and standby feed pumps and emergency feed pumps
	m)	Local control and instrumentation (if not in Section 08:00)
5.03.08		Power station hydro turbines, pump turbines, alternators and motors
	a)	Hydro turbine including isolating and control / governing valves with
	b)	jacking and lubricating oil systems
	c)	Pump turbines including isolating and control / governing valves with
	d)	jacking and lubricating oil systems and declutching gear

	e)	Alternators including excitation systems system and ancillaries
	f)	Alternators / motors including excitation system and ancillaries
5.04		Process pipe work
5.04.01		Process pipe work (Section 06:00)

6		MECHANICAL SERVICES
6.01		**Process pipe work**
6.01.01		Carbon steel pipe work
6.01.02		Stainless steel pipe work
6.01.03		Other pipe work
6.01.04		Un-designed small-bore pipe work
6.01.05		Pipe fittings
6.01.06		Valves: motorized valves, control valves and relief valves
6.01.07		In-line equipment
6.01.08		Internal lining
6.01.09		Insulation (Also see Section 10:00)
6.01.10		External coating (Also see Section 11:00)
6.01.11		Non-destructive testing
6.01.12		Testing and cleaning
6.01.13		Trace heating (Also see Section 7:00)
6.02		**Cooling water**
6.02.01		Water source and supply including pumps and motors, and screens including backwash
6.02.02		Pre-treatment storage tanks or ponds
6.02.03		Treatment
	a)	Screens and filters
	b)	Flocculators
	c)	Settling tanks
	d)	Desalinization
	e)	Demineralization
	f)	Anti-biological, bactericidal and fungicidal
	g)	Antiscaling
	h)	De-aerators
	i)	Reverse osmosis plants
	j)	Storage, handling and dosing of treatment chemicals
6.02.04		Post-treatment storage tanks or ponds
6.02.05		Distribution
	a)	Circulating and purge pumps and motors including gearboxes
	b)	Headers, pipe work and manifolds (flow and return)
	c)	Trunk mains (flow and return)

	d)	Undersigned small-bore pipe work
	e)	Isolating valves including actuators
	f)	Internal lining
	g)	Insulation and external coating (see Section 10:00 and 11:00)
	h)	Non-destructive testing
	i)	Testing and cleaning
6.02.06		Treatment for recycling and return
	a)	Cooling towers
	b)	Spray ponds
	c)	Filters
	d)	Chlorination plant
6.03		Steam and condensate
6.03.01		Boiler plant (see Section 06:13 for boiler plant, 06:15 for fuel storage, and 06:14 for stacks and flues)
6.03.02		Steam accumulator
6.03.03		Distribution pipe work
	a)	Pipe work trunk mains
	b)	Trace heating pipe work and un-designed small-bore pipe work
	c)	Isolating, reducing and relief valves
	d)	Traps, strainers, separators and manifolds
	e)	Expansion devices
	f)	Internal lining
	g)	Insulation and external coating (see Section 10:00 and 11:00)
	h)	Non-destructive testing
	i)	Testing and cleaning
6.03.04		Condensate
	a)	Collecting and flash tanks
	b)	Pumps and motors
	c)	Pipe work
	d)	Un-designed small-bore pipe work
	e)	Headers and manifolds
	f)	Isolating valves
	g)	Condensate polishing
	h)	Insulation and external coating (see Section 10:00 and 11:00)
	i)	Non-destructive testing
	j)	Testing and cleaning
	k)	For feed heating see Section 05.03.08 on hydro turbines)

6.03.05		High pressure work: high pressure steam feeds such as that between boiler and turbine in power generation
6.04		**Process water (for relevant items see sections 06.02.01 for water source, and 06.02.02 – 06.02.04 for treatment and storage)**
6.04.01		Boiler plant (see Section 6.11 for boiler plant, 6.13 for fuel storage, and 6.12 for stacks and flues)
6.04.02		Distribution pipe work
	a)	Pumps and motors
	b)	Pipe work mains and distribution spurs
	c)	Un-designed small bore pipe work
	d)	Valves, motorized valves, control and relief valves
	e)	In-line equipment
	f)	Internal lining
	g)	Insulation and external coating (also see section 10:00 and 11:00)
	h)	Non-destructive testing
	i)	Testing and cleaning
6.05		**Potable water (Refer to section 06.02 for list of items as applicable)**
6.06		**Fire mains, spray and dosing (Ensure that below ground fire main pipe work is included in section 02.00 Civil Engineering together with storage ponds and / or intakes; for above ground pipe work see section 06.02 for list of items if applicable)**
6.06.01		Pressure storage tanks
6.06.02		Compressors including motors
6.06.03		Pumps and motors
6.06.04		Diesel pumps
6.06.05		Foam systems
6.06.06		Dry risers
6.06.07		Sprinklers and monitors
6.06.08		Detectors
6.06.09		Carbon dioxide systems
6.06.10		Halon systems
6.07		**Drainage (Ensure that below ground surface water, oily water and foul sewer drainage are included in section 02.00, civil engineering, together with separators, settlement tanks, sewerage treatment facilities and outfalls; for above-ground pipe work see section 06.02 for list of items as applicable)**

6.08		**Process effluents (solid, liquid or gaseous)**
6.08.01		Collection and storage
	a)	Solids collection system
	b)	Effluent drainage systems, sumps, ponds, interceptors and tanks
	c)	Fume intake ducts and fans
	d)	Special handling of contaminated / toxic waste
	e)	Ash handling
6.08.02		Treatment
	a)	Neutralizers
	b)	Bacteriological beds
	c)	Activated sludge beds
	d)	Oxidation / reduction
	e)	Heavy metals removal
	f)	Chemical treatment
	g)	Deodorizers
	h)	Absorbers
	i)	Chemical storage and handling including air supply for aerators
6.08.03		Separation
	a)	Flocculators
	b)	Settling tanks and beds
	c)	Drainage beds
	d)	Concentrators
	e)	Cyclones and hydro-cyclones
	f)	Filters
	g)	Grit arrestors
	h)	Electrostatic precipitators
6.08.04		Waste storage and handling
6.08.05		Disposal
	a)	Incinerators
	b)	Chimney and stacks
	c)	Dumping costs
	d)	Contaminated / toxic waste
	e)	Outfalls: sewer connections and tidal outfall control
	f)	Packaging / selling
6.08.06		Distribution
	a)	Pumps and motors
	b)	Interconnecting pipe work

	c)	Un-designed small-bore pipe work
	d)	Internal lining
	e)	Insulation and external coating (also see section 10:00 and 11:00)
	f)	Non-destructive testing
	g)	Testing and cleaning
6.09		**Gas and inert gas (Excluding air)**
6.09.01		Source
6.09.02		Unloading and storage
	a)	Handling: HP containers
	b)	Receivers
6.09.03		Generators
	a)	HP Containers
	b)	Generators
	c)	Evaporators
6.09.04		Treatment
	a)	Filters
	b)	Driers
	c)	Heaters
	d)	Refrigerators
6.09.05		After treatment and storage
	a)	HP, LP
6.09.06		Distribution
	a)	Compressors including motors, coolers and ancillaries
	b)	Headers and manifolds
	c)	Pipe work and isolating valves
	d)	Un-designed small-bore pipe work
	e)	Reducing sets
	f)	Insulation and external coating (also see section 10:00 and 11:00)
	g)	Non-destructive testing
	h)	Testing and cleaning
6.10		**Air (including compressed air)**
6.10.1		Air intake
6.10.2		Pre-treatment
	a)	Filters
	b)	Washers
	c)	Silencers
6.10.3		Compressor plant

	a)	Compressors including motors, coolers and ancillaries
6.10.4		After treatment
	a)	Filters including sterilizing filters
	b)	Scrubbers including sterilizing scrubbers
	c)	Electrostatic precipitators
	d)	Humidifiers and de-humidifiers
	e)	Heaters / coolers
6.10.5		Storage
	a)	Air receivers
	b)	Stand-by cylinders
6.10.6		Distribution
	a)	Headers and manifolds
	b)	Pipe work and isolating valves
	c)	Un-designed small-bore pipe work
	d)	Traps, separators, etc.
	e)	Reducing valves
	f)	Special outlets (, e.g. for breathing hoods, air-driven tools, etc.)
	g)	Insulation and external coating (also see section 10:00 and 11:00)
	h)	Non-destructive testing
	i)	Testing and cleaning
6.11		**Refrigeration services**
6.11.01		Storage
	a)	Refrigerant including gas cylinder handling
	b)	Cooling-medium raw materials
6.11.02		Cooling medium make-up and storage
	a)	Make-up tanks
	b)	Solid handling
	c)	Reservoir tanks
6.11.03		Refrigeration plant
	a)	Compressors: mechanical or jets
	b)	Absorbers
	c)	Freezing mixture tanks
	d)	Coolers / condensers
	e)	Receivers
	f)	Evaporators and coils
	g)	Auxiliaries including eliminators (moisture and oil)
	h)	Control gear

6.11.04		Refrigerant distribution
	a)	Pumps and motors
	b)	HP headers and manifolds
	c)	LP headers and manifolds
	d)	LP trunk mains and isolating valves
	e)	Un-designed small-bore pipe work
6.11.05		Cooling medium distribution
	a)	Pumps and motors
	b)	Headers and manifolds
	c)	Trunk mains and isolating valves
	d)	Un-designed small-bore pipe work
	e)	Insulation and external coating (also see section 10:00 and 11:00)
	f)	Non-destructive testing
	g)	Testing and cleaning
6.12		**Heating, ventilation and air conditioning**
6.12.01		Main plant
	a)	Air fans including motors
	b)	Pumps including motors
	c)	Refrigeration units
	d)	Heating units
	e)	Heat exchangers including calorifiers
	f)	Biological controls
	g)	Humidifiers
	h)	Filters
	i)	Cooling towers
	j)	Local pipe work
	k)	Drains
	l)	Storage tanks
	m)	Local duct work, silencers, intakes, exhausts
	n)	Dampers including actuators
	o)	Local controls (also see section 8.00)
	p)	Local cabling (also see section 07.00)
	q)	Insulation and external coating (also see section 10.00 and 11.00)
	r)	Control panels (also see section 8.00)
6.12.02		Duct work
	a)	Flow duct system
	b)	Return duct system

	c)	Registers
	d)	Spray / steam injectors
	e)	Dampers including actuators
	f)	Insulation and external coating (also see section 10.00 and 11.00)
6.12.03		Hot water systems
	a)	Flow and return pipe work
	b)	Manifolds
	c)	Radiators including fan assisted
	d)	Local circulating pumps including motors
	e)	Valves
	f)	Insulation and external coating (also see section 10.00 and 11.00)
	g)	Testing and cleaning
6.12.04		Direct acting and local system
	a)	Local air-conditioning units
	b)	Electric heaters
	c)	Gas / liquefied petroleum gas (LPG) / oil heaters
6.12.05		Sensors and controls (also see section 8.00)
	a)	Temperature sensors
	b)	Local area controls
	c)	Humidity sensors
	d)	Radiation sensors
6.12.06		Control system (also see section 8.00)
	a)	Remote control panels
	b)	System alarms
6.12.07		Cabling (also see section 7.00)
	a)	Power cables
	b)	Main plant cables
	c)	Damper / valve actuators cabling
	d)	Control cables
	e)	Sensor control cables
	f)	Actuator / vale control cables
	g)	Remote stations to main panel
6.12.08		Pipe work
	a)	Hot water trunk mains and distribution
	b)	Gas / LPG / oil
	c)	Refrigerant
	d)	System set-up, testing and commissioning

6.13		**Boiler plant**
6.13.01		Boilers including waste heat and electrode boilers
6.13.02		Burners
6.13.03		Stokers
6.13.04		FD and ID fans and motors
6.13.05		Super heaters
6.13.06		De-super heaters
6.13.07		Economizers
6.13.08		Air heaters and motors
6.13.09		Acid and chemical cleaning
6.13.10		Soot blowers
6.13.11		Shot cleaners
6.13.12		Grit arrestors
6.13.13		Precipitators, bag filters, etc.
6.13.14		Ash handling
6.13.15		Control gear
6.13.16		Blow down
6.13.17		Duct work and dampers including actuators
6.14		**Chimney stacks, flues and flares**
6.14.01		Lining, flues and windshields
6.14.02		Cladding
6.14.03		Anti-corrosion treatment
6.14.04		Lighting conductors
6.14.05		Warning lights
6.14.06		Flare igniters and knock-out drums
6.15		**Fuel storage and preparation**
6.15.01		Storage areas, bunkers, tanks and gas holders
6.15.02		Heating and pumping plant
6.15.03		Pulverizing plant if not with boiler
6.15.04		Solid fuel handling and weighing
6.16		**Special maintenance facilities:**
		For any item within section 06.00 as required
6.16.01		Winterization (see also section 10.00)
6.16.02		Cranes, hoists, runway beams, etc.
6.17		**Import/export loading facilities:**
		Allow for any items here only if not incorporated within section 14.00
6.17.01		Weighing devices, weighbridges, load cells, etc.

6.17.02		Cranes
6.17.03		Fork-lift trucks and specialist vehicles/attachments
6.17.04		Special rail truck handling facilities
6.17.05		Unloading and loading arms including screw unloaders
6.17.06		Barge tipplers
6.17.07		Conveyors, chutes and silos including magnetic separators, gauging, etc.
6.17.08		Vacuum or hydraulic transportation plants
6.17.09		Vacuum cleaning systems
6.17.10		Can, drum, bottling, packet filling, emptying and handling devices
6.17.11		Boom stackers, bucket wheel store/reclaim machines
6.17.12		Batching plants
6.18		**Storage**
6.18.01		Storage tanks, vessels or spheres (also see section 12.05)
6.18.02		Skimming equipment to settling tanks

7.00		ELECTRICAL SERVICES
7.01		**Extra high voltage (EHV) system (Incoming supplies above 11kV)**
7.01.01		EHV switchgear and isolators including foundations and compounds (if not separate), protective gear, metering, local controls, dedicated compressors, earthing devices, key cabinets (including contents), interlocking and exchange boxes
7.01.02		EHV cable (if not general cabling) including terminations and structure, sealing ends, watersheds, co-ordinating gaps through joints, oil/gas associated systems and connections, droppers, flexible connections and jumpers
7.01.03		EHV overhead lines including towers/poles and their foundations, cross arms, guys, insulators, surge diverters, line fuses, auto-reclosers, conductors, spacers and dampers, earth wires, droppers, flexible connections and jumpers
7.01.04		EHV transformers (EHV/HV) including foundations and compounds (if not separate), bushings and watersheds, tap changers, coolers, fans, motors, control gear, interconnecting pipework, local cubicles, oil fill, together with relay panels, protective gear and associated current transformers
7.01.05		Instrument transformers (where not supplied elsewhere) (a) voltage including, if appropriate, line couplers, line traps, support structures, local cubicles and local wiring (b) current including support structures, local cubicles and local wiring
7.01.06		Supply authority capital contribution
7.01.07		Supply authority maintenance charges
7.01.087		Charges for training and authorization for switching
.02		**High voltage (HV) system (exceeding 440 V up to 11kV)**
7.02.01		HV switchgear including foundations/support and compounds (if not separate), protective gear, metering, local controls, earthing devices, key cabinets (including contents), interlocking and exchange boxes
7.02.02		HV cables (if not general cabling) including terminations, sealing ends, watersheds, co-ordinating gaps, through joints, lugs, glands, sealing and earth links
7.02.03		HV overhead lines including towers/poles and their foundations, cross

		arms, guys, insulators, surge diverters, line fuses, auto-reclosers, conductors, dampers, earth wires, droppers, flexible connections and jumpers
7.02.04		HV transformers (HV/HV)(HV/MV) including foundations and compounds (if not separate), bushings and watersheds, tap-changers, coolers, fans, motors, control gear, interconnecting pipework, local cubicles, oil fill, together with relay panels, protective gear and associated current transformers (NB: HV/MV integral transformers are included with MV switchboards – see section 07.03.01)
7.02.05		Earthing transformers
7.02.06		Earthing resistors including fill, heaters and thermostats
07.03		**Medium voltage (MV) system (440 V and below)**
7.03.01		MV switchboard, control gear, motor starters including foundations/support and compounds (if not separate), integral transformers, busbars, outgoing circuit breakers, contactors, motor control gear, mcbs,isolators, protective gear, metering, local switchboard-mounted selector switches, control buttons, auxiliary relays, gland plates, earthing bars and links and key cabinets (including contents)
7.03.02		MV fuseboards, distribution boards and feeder pillars including case, fuseways with fuses and gland plates
7.03.03		MV outgoing circuits (a) switchboard, contractor, motor control or fuseway as appropriate (b) power cable (c) control cables (600/1000 V grade) to local control station and/or emergency stop (d) control cables (100 V grade) to local junction box (excluding junction box) to sensors, transducers, (excluding devices, detectors, etc.) (see also section 8.00 Instrumentation and controls) (e) earthing of individual circuit items if appropriate
7.04		**DC System**
7.04.01		Storage batteries including supports, acid fill, inter-cell connections, and accessories (a) 240 V (b) 110 V

		(c) 50 V (d) Other
7.04.02		Chargers including foundations/support (if not separate)
7.04.03		DC switchgear including foundations/support and compounds (if not separate) protective gear, metering, local controls, earthing devices, key cabinets (including contents) interlocking and exchange boxes and local cables
7.04.04		DC fuseboards including case, fuseways with fuses and gland plates
7.04.05		Rectifiers including foundations/support/mountings, interconnections, terminals, cooling, fuse/protection and metering
7.04.06		Inverters and uninterruptible power supplies including foundation/support/mountings, protective gear, metering, control gear, earthing devices, key cabinets (including contents) and interlocking
7.04.07		DC cables
7.04.08		Outgoing DC circuits (a) circuit breaker, contactor, fuseway or motor control device as appropriate (b) power cable (c) control cables (600/1000 V grade) to local control station and/or emergency stop (d) control cables (100 V grade) to local junction box (excluding junction box) to sensors, transducers, (excluding devices, detectors, etc.) (see also section 10.00 Instrumentation and controls) (e) earthing of individual circuit items if appropriate, emergency lighting and DC power and plant items
7.05		**Transformers:** *Transformers not included elsewhere and/or of a specialised nature including foundations and compounds (if not separate), bushings and watersheds, tap changers, coolers, fans, motors, control gear, interconnecting pipework, local cubicles, oil fill, together with relay panels, protective gear and associated current transformers*
7.05.01		Generator transformers
7.05.02		Generator unit transformers
7.05.03		Generation earth transformers including, in addition to general note above, kick fuses, grid resistors, connections to generator terminals including insulators

7.05.04		Station/auxiliary transformers
7.05.05		Instrument transformers where separately supplied for metering and/or protection including mountings
		(a) voltage transformers
		(b) current transformers
		(c) auxiliary current transformers
7.05.06		Portable transformers
7.05.07		Transformer oil-conditioning equipment
7.06		**Lighting, heating and small power**
7.06.01		Lighting equipment including fittings, light panels, luminaries, switches, starters, lamps and cabling (if not separate)
		(a) plant
		(b) buildings
		(c) street and area lighting including towers/poles, standards, columns
		(d) flood lighting including towers/poles
		(e) high bay lighting
		(f) emergency lighting
		(g) exit lighting
		(h) traffic lights and road signs
		(i) navigation lights
		(j) airfield lighting including control equipment, regulators, isolating transformers, plugs and sockets
		(k) any other listed item
7.06.02		Switchboards, fuseboards and control panels
7.06.03		Power sockets
7.06.04		Welding sockets
7.06.05		Heaters, boilers including thermostats, control switches, relays and contractors
		(a) heaters
		(b) water heaters
		(c) electrode boilers
7.06.06		Trace heating (if not part of plant controls) including heating tapes, thermostats, local connecting boxes, cabling, insulation, and finishing (if not separate)
7.06.07		Clocks including master if appropriate, slaves, outlet boxes and dedicated cabling

7.06.08		Fans including control devices
7.06.09		Security systems including power units, detectors, sensors, closed circuit TV cameras, control and display units, dedicated floodlights, bells, sirens and dedicated cabling
7.06.10		Card access system including readers, control units/computers, door/gate/turnstile control gear (including door/gate/turnstile if not included elsewhere), dedicated cabling and card issuing devices
7.06.11		Staff recording system including clocks, card readers, storage racks, control units/computers and display/output devices
7.06.12		Building monitoring system including energy, lighting, fire alarm and security systems in one package, and dedicated cabling
7.06.13		Any other listed item
7.07		**Emergency generation**
		(For main generating equipment see section 05.03)
7.07.01		Prime mover (diesel, petrol, gas, gas-turbine, hydro) including foundations, controls, local pipework
7.07.02		Alternator including excitation system, barring gear if appropriate
7.07.03		Fuel storage system
7.07.04		Lubrication system
7.07.05		Cooling systems (a) prime mover (b) oil coolers (c) storage (d) treatment
7.07.06		Neutral and earthing system
7.07.07		Synchronising, protection, automatic control
7.08		**Miscellaneous equipment**
7.08.01		Power factor correction capacitors
7.08.02		Load shedding equipment
7.09		**Cabling**
		(where not already included as part of other works)
7.09.01		Generator main connections complete, including own ventilation/cooling system, local controls and cubicles and type testing if appropriate
7.09.02		Power cables (a) EHV (b) HV: 11kV, 6.6kV and 3.3kV (c) MV 415/240 including the systems of section 09.03 and 09.06

		as appropriate
		(d) DC system including the system of section 09.04 as appropriate
7.09.03		Control and communication system cables
		(a) 600/1000 V grade (110 V system)
		(b) 100 V grade (light current systems)
		(c) screened cable
		(d) radio
		(e) special cables, thermocouple tails, etc.
		(f) other cables
7.09.04		MICC cable including olives, pots, sealing compound, beads/sleeves, saddles
7.09.05		Supports
		(a) racks
		(b) trays
		(c) conduit
		(d) trunking
		(e) transits for fireproofing
		(f) support steelwork fro above, and control stations
7.09.06		Ancillary items including gland plates, internal terminals, links jumpering, ferrules, sleeves
		(a) junction boxes
		(b) marshalling kiosks
7.09.07		Earthing system
		(a) earth mat/plates
		(b) earth rods, including driving
		(c) earth tape
		(d) trenches and cable connections
		(e) connections of plant structure to earthing system and test clamps
		(f) earthing of pylons, towers, poles, posts and fences
		(g) radio frequency earthing and system
7.09.08		Fireproofing of cable
7.09.09		Cathodic protection including anodes, pits, power supply, cabling and fittings
7.09.10		Lightning protection including conductors, tape/cable, cleats, earth electrodes and links
7.09.11		Pylons, towers, poles, posts including foundations, catenaries and all

		fittings
7.10		**Testing and commissioning** *Site testing, pre-commissioning and commissioning components and systems as required where not allowed for elsewhere*
7.11		**Civil aspects** *If civil works do not cover, account is to be taken of precast trenches, excavation, sand, cable tiles, route markers, backfill, covers, conduits, preformed ducts, sealing, weather protection and general builders work*

8.00		INSTRUMENTATION AND CONTROLS INCLUDING COMMUNICATIONS
8.01		**Computer based systems**
8.01.01		Computers including consoles/cabinets/housings, supports/mounts, power supplies, integral ventilating/cooling, dedicated inter-unit cabling, highway connections if appropriate, input/output devices, displays, data storage media, operating systems (a) main computer (b) back-up computer (c) distributed computers (d) programmable logic controllers (e) data loggers and acquisitions (f) simulators
8.01.02		Peripherals (item not included within a computer system as in section 8.02.01) (a) desk/keyboard/display unit/software loading (b) keyboards (c) VDU (d) Printers (e) Plotters (f) Recorders (g) Back-up devices/tape streamer
8.01.03		Ancillaries (a) dedicated cabling
8.01.04		Support services (where not included in other sections of the estimate) (a) heating and ventilating/cooling system (b) power supplies
8.02		**Electronic/relay based systems**
8.02.01		Equipment cubicles including cubicle, supports/mounts, cable gland plates, termination, instrument pipework, relays, interfaces, amplifiers, logic units, transmitters, receivers, all internal wiring and piping, self contained power supplies, fuses, indicating lights, self-contained ventilation cooling systems, anti-condensate heaters a) Sequence control b) Interlock c) Valve selection

		d) Alarm / annuciator e) Modulating controls
8.03		**Pneumatic Systems** (including cabinets / housings, supports / mountings, integral air compressors, local piping)
8.03.01		Actuation system a) Electrical / pneumatic converters b) Actuators
8.03.02		Self-contained systems: in addition to generic inclusion, detectors, transducers, setting devices, actuator / drive and controlling devices (valves, etc.)
8.04		**Hydraulic Systems**
8.04.01		Actuation systems including cabinets/housings, supports/mounts, integral pumps, reservoirs, tanks, piping and any converters.
8.05		**Process input devices, transducers, transmitters**
8.05.01		Transducers (and integral transmitters) including housings/mountings/supports, weatherproofing, environmental protection, internal/local wiring, internal power packs, if appropriate (a) electrical (b) pressure (c) temperature (d) level (e) flow (f) ionizing radiation, X-ray and nuclear (g) position, speed, acceleration and seismic (incl anemometer) (h) mass (i) humididty (j) chemical composition (k) optical (l) other listed items
8.05.02		Transmitters (if separate)
8.05.03		Local control stations (a) push button stations and selectors (b) emergency stops (c) multi-functions local controllers (d) supports steelwork for above

8.06		**Output devices, VDU's, indicating instruments**
8.06.01		Visual display units (when not part of complete system)
8.06.02		Mimic diagrams
8.06.03		Indicating instruments
8.06.04		Electrical integrating instruments
8.06.05		Mechanical integrating instruments
8.06.06		Recorders
8.06.07		Alarm fascias, annunciators
8.07		**Control desks and panels** *(where not included as part of a comprehensive control scheme, but including as appropriate: mounting/supports, environmental protection, weatherproofing, all internal wiring and piping, ventilation, heating, drains, terminals/connections/sockets for external cabling, pipe connectors for external piping)*
8.07.01		Desks (a) process control (b) electrical system (c) cooling water control (d) ancillary plant list
8.07.02		Control panels
8.07.03		Instrument panels
8.08		**Electronic/electrical ancillaries** *(including housing, mountings/supports, internal power packs, internal wiring, environmental protection, weatherproofing, ventilation, cooling, heating, drains and terminals/connections/sockets for external cabling)*
8.08.01		Signal conditioning equipment
8.08.02		Three term controllers
8.08.03		Additional items, e.g. special additional limit switches
8.09		**Power Packs**
8.09.01		Electrical power supply units: separate power supply units for providing AC and/or DC supplies to equipment without integral power units (a) instrument supplies (b) computer supplies (c) auxiliary supplies (d) other listed items
8.09.02		Instrument and control air compressor including base plates, housings, support/mountings, environmental protection, weatherproofing, all self-

		contained piping and wiring, drains, driers, receivers, integral instruments, terminal blocks and pipe connectors for external connections
8.09.03		Hydraulic power packs including base plates, housings, support/mountings, environmental protection, weather proofing, storage tanks, all self-contained piping and wiring, drains, integral instruments, terminal blocks and pipe connections for external connections
8.10		Fire protection *(including sensors, central and zone monitors, dedicated cabling, integral power supplies, but excluding water/foam/gas pipe work and nozzles, and excluding direct-acting sprinkler system detector)*
8.10.01		Sensors
8.10.02		Zone monitors and relays
8.10.03		Central monitor
8.11		**Remote viewing and closed circuit TV**
8.11.01		Cameras including all mountings, housings, supports, environmental protection and weatherproofing, and all facilities for swivelling, tilting and zooming
8.11.02		Monitors
8.11.03		Dedicated cabling
8.11.04		Ancillary equipment
8.11.05		Control equipment
8.11.06		Video recorders
8.11.07		Lighting gear and supplies
8.12		**Electrical actuators for valves, dampers and controllers**
8.12.01		Valve actuators (a) isolating/regulating actuators (b) modulating actuators
8.12.02		Damper actuators
8.12.03		Slave actuators for controllers
8.13		**Instrument valves, blowdown racks, impulse piping** *(including isolating and test valves and air release facilities)*
8.13.01		Instrument valves
8.13.02		Instrument blowdown racks including drain facilities to appropriate terminal point
8.13.03		Instrument impulse piping
8.13.04		Manifolds

8.14		**Communication systems**
8.14.01		PABX/PBX system including exchange equipment, main distribution frame, sockets, operators consoles, test equipment and dedicated cabling
8.14.02		Telephone instruments including acoustic enclosures if appropriate
8.14.03		Public address systems including cabinets, audio modules, amplifiers, microphones, control unit, speakers and dedicated cabling
8.14.04		Staff location/paging systems including transmitter, aerial encoders, transceivers, battery charging rack and dedicated cabling
8.14.05		Direct wire system including exchange equipment, instruments and dedicated cabling
8.14.06		Telex including machines, dedicated cabling, exchange equipment
8.14.07		Facsimile including machines, dedicated wiring and anciliaries
8.14.08		Modems and computer interfaces including equipment, dedicated wiring, power supplies and controlling software
8.14.09		Alarm/bell system including bell pushes, bells, sirens, repeaters, auto-callers, dedicated wiring and power supplies
8.14.10		Radio system including transmitter, receiver, field and/or portable receivers/transceivers, aerials, connecting radio cables, control station, battery charging racks
8.14.11		Intercom system including master station equipment, out stations and dedicated wiring
8.15		**Data communications**
8.15.01		Modems
8.15.02		Multiplexers
8.15.03		Data links
8.15.04		Dedicated cabling
8.15.05		Dedicated power supplies
8.15.06		Other interfaces
8.15.07		Control devices
8.15.08		Control software
8.15.09		External charges
8.16		**Portable instruments** *(including all cases, accessories, leads, probes, connectors, tapping devices, hoses, drains, vessels, etc.)*
8.16.01		Electrical/electronic instruments (a) volt/ammeters (b) wattmeters

		(c) electrostatic instruments
		(d) oscilloscopes
		(e) oscillator/signal generators
		(f) frequency meters
		(g) pyrometer/thermocouple
		(h) other listed items
8.16.02		Pneumatic/hydraulic instruments
		(a) pressure gauges
		(b) level gauges
		(c) flow meters
		(d) other listed items
8.17		**Applications software**
8.17.01		Software
8.17.02		Computer operator manuals
8.18		**Manuals**
8.18.01		Operating manuals
8.18.02		Maintenance manuals
8.18.03		Spare manuals
8.18.04		Testing and commissioning manuals
8.19		**Cabling** *(where not already included as part of other works)*
8.19.01		Power cables
		(a) MV 415/240 V including systems of section 7.03 and 7.06 as appropriate
		(b) DC system including system of section 07.04 as appropriate
8.19.02		Control and communication system cables
		(a) 600/1000 V grade (110 V system)
		(b) 100 V grade (light current systems)
		(c) Screened cables
		(d) Radios
		(e) Special cables
		(f) Other cables
8.19.03		MICC cables including olives, pots, sealing compound, beads/sleeves, saddles
8.19.04		Supports for pipework where appropriate as well as cables
		(a) racks
		(b) trays
		(c) conduits

		(d) support steelwork for above, and control stations
8.19.05		Ancillary items including internal terminals, links, jumpering, ferrules, sleeves
		(a) junction boxes
		(b) marshalling kiosks
		(c) transits for fireproofing
8.19.06		Earthing system
		(a) earth mat/plates
		(b) earth rods including driving
		(c) earth tape
		(d) connections of plant structure to earthing system
		(e) earthing of pylons, towers, poles, posts and fences
		(f) Radio frequency earthing and system
		(g) Trenches and cable connections
8.19.07		Fireproofing of cable
8.19.08		Pylons, towers, poles, posts including foundations, all fittings
8.20		**Instrument piping, tubing, multicore tubing and associated valves, manifolds and fittings** *(including supports, racks, trays, necessary terminal unions, joints, intermediate unions, cleats, clips, insulation, weatherproofing, trace heating, cooling and mechanical protection)*
8.20.01		Instrument air pipework
8.20.02		Process connections and assemblies, including fittings
8.20.03		Impulse pipework
8.20.04		Tubing and multi-core tubing
8.20.05		Manifolds
8.20.06		Instrument isolating valves
8.20.07		Drain, charging and other valves
8.21		**Testing and commissioning**: *site testing, pre-commissioning components and systems as required where not allowed elsewhere*
8.21.01		Component/system site testing
8.21.02		Calibration
8.21.03		Pre-commissioning
8.21.04		Commissioning
8.22		**Control valves** (*if not included with pipework)*
8.23		**Civil aspects** *(if civil works do not cover, account is to be taken of precast trenches, excavation, sand, tiles, markers, backfill, covers, conduits, ducts, sealing, weather protection and general builders work)*

9.00		REMOTE FABRICATION/PRE-ASSEMBLY FACILITIES
9.01		**Land and site development**
9.01.01		Cost of separate yard and facilities
9.01.02		Any further development required to yard and load-out facilities or access thereto
9.02		**Civil engineering**
9.02.01		Concrete bases
9.02.02		Steel supports
9.03		**Structures**
9.03.01		Additional steelwork required to modularize
9.03.02		Bracing and additional steelwork required for fabrication
9.03.03		Bolt-up sections
9.04		**Plant**
9.04.01		Additional packing plates under plant
9.05		**Mechanical Services**
9.05.01		Testing pipe in shorter sections
9.05.02		Sealing ends of pipes
9.05.03		Fabrication of spool pieces for site hook up
9.05.04		Extra welds in hook up
9.06		**Electrical services**
9.06.01		Extra testing
9.06.02		Additional junction boxes
9.06.03		Rolling up cables including additional waste in length
9.06.04		Additional jointing
9.07		**Instrumentation and controls**
9.07.01		Extra testing
9.07.02		Additional marshalling boxes
9.07.03		Rolling up cables including additional waste in length
9.07.04		Additional jointing
9.07.05		Protection of sensitive instruments (or remove and refit)
9.08		**Insulation**
9.08.01		Protection of exposed ends if insulation
9.08.02		Separate insulation over hook up welds and spool pieces
9.09		**Protective coatings**
9.09.01		Separate protective coating over hook up welds

9.10		**Engineering design**
9.10.01		Additional design costs for prefabrications or modules
9.11		**Project management and/or project charges** *(additional costs of having staff and facilities at both the worksite and fabrication yard)*
9.11.01		**Supervision and management**
9.11.02		Inspection
9.11.03		Offices and welfare facilities
9.11.04		Telephone, telex, telefax and copying machine costs
9.12		**General factors**
9.12.01		Effects of any difference in labour cost levels at fabrication yard
9.12.02		Savings constructing in permanent yard and/or in covered facilities
9.13		**Transport**
9.13.01		Any double handling of materials and transport to fabrication yard
9.13.02		Cranage and load out costs
9.13.03		Temporary load out and sea or road fastening steel
9.13.04		Sea and/or road transport
9.13.05		Heavy lift cranage and facilities at site
9.13.06		Survey, preparation of access/roads/jetties for movement of modules

10.00		INSULATION
10.00		**Type of insulation**
10.01.1		Fibre type
10.01.2		Moulded and formed insulation
10.01.3		Glass fibre
10.01.4		Mineral wool/cork
10.01.5		Polystyrene
10.01.6		Felt
10.01.7		Other specified insulation
10.02		**Heat conservation, frost and personnel protection**
10.02.01		Boiler equipment, flues and ducts
10.02.02		Heat recovery plant
10.02.03		Other plant, equipment and machinery
10.02.04		Columns
10.02.05		Vessels
10.02.06		Drums
10.02.07		Tanks
10.02.08		Pumps
10.02.09		Pipes
10.02.10		Ducts
10.02.11		Buildings
10.02.12		Voids
10.03		**Cold conservation and condensation protection**
10.03.01		Refrigeration plant
10.03.02		Cold rooms
10.03.03		Other plant, equipment and machinery
10.03.04		Pipes
10.04		**Cladding or surface finish**
10.04.01		Metal cladding to any of the foregoing
10.04.02		Fibreglass finish to walking surfaces
10.04.03		Other surface finish

11.00		PROTECTIVE COATINGS
11.01		General factors affecting cost
11.01.01		Special scaffolding
11.01.02		Surface preparation
11.01.03		Materials, application and finish
11.01.04		Type of paint including oil, epoxy, cement based, chemical resistant, fire retardant, etc.
11.01.05		Touching up prepainted items after erection
11.02		**Fire protection** *(make allowance for paint finish, cast concrete, sprayed finish, cladding or such other finish as may be required)*
11.02.01		Surface preparation and any priming and painting below finish
11.02.02		Finish to buildings: walls
11.02.03		Finish to buildings: soffits
11.02.04		Finish to buildings: structural frame
11.02.05		Finish to steel structures and supports
11.02.06		Finish to plant, equipment machinery and vessels
11.03		**Below-ground protection** *(make allowance for paint finish, tape wrapping, encasing or other protection as may be required)*
11.03.01		Underground pipework and/or joints
11.03.02		Steel structural items or piling
11.03.03		Jetties or other structures below water level
11.03.04		Waterproofing
11.04		**General painting**
11.04.01		Buildings
11.04.02		Tanks, columns, vessels and similar
11.04.03		Plant, equipment, pumps and motors
11.04.04		Steel structures including enclosing housings, platforms, pipe racks, pipe supports, stairs, ladders hand rails
11.04.05		Pipework and supports
11.04.06		Electrical and instrumentation equipment
11.04.07		Heating and ventilation ducting and equipment
11.04.08		External facilities including fencing and gates
11.04.09		Finish below insulated pipes and surfaces
11.04.10		Motifs, colour codings, bands, lettering and panels

12.00		OFFSITE FACILITIES
12.01		**Land and site development**
12.01.01		Road, rail or water access to the site
12.01.02		Services to and from the site
12.01.03		Refer to section 1.00 for other items
12.02		**Civil engineering** *(see section 2.00 for a checklist of items)*
12.02.01		Oversite excavation and filling
12.02.02		Piling
12.02.03		Foundations
12.02.04		Pits, basins and channels
12.02.05		Concrete ducts
12.02.06		Road and paving
12.02.07		Reinforcement and sundries
12.02.08		Drainage
12.02.09		Landscaping
12.03		**Buildings for shelters**
12.03.01		Boiler houses
12.03.02		Compressor houses
12.03.03		Plant buildings
12.03.04		Workshops
12.03.05		Metering buildings
12.03.06		Analyser buildings
12.03.07		Chemical stores
12.03.08		Pump houses
12.03.09		Fire station
12.03.10		Medical centre/ambulance station
12.03.11		Substations/switch houses
12.03.12		Control rooms
12.03.13		Canteen
12.03.14		Rest rooms, changing rooms and welfare buildings
12.03.15		Administration buildings
12.03.16		Pit-head buildings
12.03.17		Other buildings
12.04		**Structures**

12.05		**Plant**
12.05.01		Storage tanks and vessels
12.06		**Mechanical services**
12.06.01		Pipework
		(a) extending services, utilities and feedstock to plant
		(b) product and byproduct from plant
		(c) firewater lines
12.07		**Electrical services**
12.07.01		Extending supplies to plant
12.07.02		Supplies to all offsite plant and equipment
12.07.03		Supplies to all offsite buildings and where required to structures
12.07.04		Road and area lighting
12.07.05		Earthing
12.07.06		Lightning protection
12.07.07		Transformer compounds
12.08		**Instrumentation and controls**
12.08.01		Control panels
12.08.02		Control from panels to plant
12.08.03		Instruments to offiste plant and equipment and cabling back to panels
12.09		**Remote fabrication facilities**
12.10		**Insulation** *(heat conservation, frost and personnel protection, cold conservation and condensation protection to the following)*
12.10.01		Pipework
12.10.02		Plant, vessels and equipment
12.11		**Protective coatings** *(fire protection, below-ground protection and painting to the following)*
12.11.01		Buildings
12.11.02		Tanks, columns, vessels, plant and equipment
12.11.03		Steel structures
12.11.04		Pipework and supports

13.00		IMPORT/EXPORT PIPELINES
13.01		**General factors affecting cost**
13.01.01		Fluid transported and working pressure
13.01.02		Environmental problems
13.01.03		Terrain: waterlogged peat
13.01.04		Terrain: mountain
13.01.05		Terrain: woodland
13.01.06		Terrain: built-up areas
13.02		**Material cost**
13.02.01		Pipe
13.02.02		Thick wall pipe
13.02.03		Sleeves
13.02.04		Fittings including bends and all fittings required for block valve pigging and terminal facilities
13.02.05		Weight coating or anchors
13.02.06		Outfall nozzles
13.03		**Easement cost**
13.03.01		Type of farmland and easement payment
13.03.02		Annual easement payment
13.03.03		Loss of crop
13.03.04		Access, pipe storage and fabrication areas
13.04		**Right-of-way**
13.04.01		Clearance of right-of-way
13.04.02		Temporary fencing
13.04.03		Topsoil stripping
13.04.04		Temporary roads in bad ground
13.05		**Stringing**
13.05.01		Preparation of pipe dumps
13.05.02		Offloading in pipe dumps
13.05.03		Loading and stringing including skids
13.05.04		Cold bending
13.05.05		Provision of rollers, winches, buoyancy for offshore lines
13.06		**Trenching**
13.06.01		General trenching and backfilling
13.06.02		Trenching in bad ground or running sand
13.06.03		Dewatering

13.06.04		Trenching in rock
13.06.05		Trenching in built up areas
13.06.06		Underwater dredging, trenching, backfilling or protection
13.06.07		Sand padding
13.06.08		Imported trench backfill
13.07		**Pipelaying**
13.07.01		Welding or jointing
13.07.02		Non-destructive testing
13.07.03		Wrapping
13.07.04		Holiday detection
13.07.05		Lower and lay
13.07.06		Cathodic protection including anodes
13.07.07		Weigh coating or anchors
13.07.08		Laying of offshore live including all marine facilities, anchors and winches
13.07.09		Tie-in between offshore and onshore sections
13.08		**Crossing including additional reinstatement costs**
13.08.01		Thrust, bored or directional drilled crossings
13.08.02		Open cut: roads
13.08.03		Open cut: tracks
13.08.04		Open cut: railways
13.08.05		Open cut: water crossings
13.08.06		Open cut: ditches
13.08.07		Open cut: major services
13.08.08		Crossing other services, cattle crossings or other locations necessitating tie-ins
13.08.09		Provision for future motorways, road or river diversions, future ditch deepening or future land drainage systems
13.09		**Testing and commissioning**
13.09.01		Swabbing pig runs
13.09.02		Gauging pig runs
13.09.03		Sectional air testing
13.09.04		Provision and disposal of water
13.09.05		Water testing
13.09.06		Swabbing pig runs
13.09.07		Tie-in of test points
13.09.08		Drying

13.09.09		Guaging and/or intelligent pig runs
13.09.10		Testing material
13.10		**Reinstatement**
13.10.01		Removal of temporary roads, skids, surplus soil and general site
13.10.02		clearance
13.10.03		Ripping or loosening sub-soil
13.10.04		Making good land drainage
13.10.05		Topsoil replacement
13.10.06		Rotovating
13.10.07		Stone picking
13.10.08		Re-seeding
13.10.09		Repairs to cross fences, walls and hedges
13.10.10		Removal (or leaving in) temporary fencing
13.10.11		Permanent road reinstatement
13.10.12		Track reinstatement
13.10.13		Marker posts
13.11		**Installations**
13.11.01		Intermediate block valve installations
13.11.02		Intermediate pigging installations
13.11.03		Terminal facilities including valves and pigging facilities
13.11.04		Metering and meter proving facilities
13.11.05		Heaters
13.11.06		Compressor stations
13.11.07		Storage facilities, intermediate and at terminals
13.12		**Installation compounds**
13.12.01		Purchase/rental of land
13.12.02		Access roads
13.12.03		Compound fencing and gates
13.12.04		Compound hard surfacing
13.12.05		Civil engineering work generally
13.12.06		Mechanical work
13.12.07		Electrical and instrumentation work
13.12.08		Tree planting in screening
13.13		**Telemetering and control systems**
13.14		**Intake and outfall structures and pump houses**
13.14.01		Intake structure
13.14.02		Outfall structure

13.14.03		Pump house

14.00		**OPERATIONAL AND GENERAL SERVICES**
14.01		**Office machinery and paper handling**
14.01.01		Collection/reception
		(a) sorting
		(b) Distribution
		(c) Franking
		(d) Machines for franking, weighing, slitting and sealing
14.01.02		Telex machines, exchange lines and consumables
14.01.03		Facsimile machines, exchange lines and consumables
14.01.04		Copiers
		(a) A4 and A3 size
		(b) Sorters
		(c) Drawing reproduction machines
		(d) Consumables
14.01.05		General office machinery
		(a) typewriters
		(b) word processors
		(c) drawing boards and drafting machines
		(d) consumables
14.01.06		Computers
		(a) main frames
		(b) pc computers
		(c) computer-aided design ancillaries such as printers, plotters, monitors and back-up
		(d) consumables
14.02		**Communications**
14.02.01		Telephones
		(a) exchange and operators equipment
		(b) internal lines and dedicated cabling
		(c) external lines
		(d) instruments
		(e) answering machines
		(f) monitors and loggers
14.02.02		Radio
		(a) fixed transmitters/receivers
		(b) portable transmitters/receivers

		(c) car and personal radio telephones
		(d) staff location and bleeper systems
14.02.03		Public address
		(a) amplifier
		(b) input stations
		(c) output stations
		(d) dedicated cabling
14.02.04		Video
		(a) closed circuit tv systems
		(b) recorders
14.03		**Transport**
14.03.01		Barges, tugs, etc.
14.03.02		Shunting locomotives and rolling stock
14.03.03		Tankers, lorries
14.03.04		Cars, vans
14.03.05		Personnel transport
14.03.06		Motor cycles, cycles
14.03.07		Lift and hoist trucks
14.03.08		Mobile trucks and platforms
14.03.09		Aircraft and helicopters
14.03.10		Associated special maintenance facilities
14.04		**Maintenance facilities**
14.04.01		Site maintenance including landscape and gardening
14.04.02		Building maintenance
14.04.03		Machinery and equipment maintenance
14.04.04		Instrument maintenance
14.04.05		Electrical maintenance including lifts
14.04.06		Vehicle and aircraft maintenance
14.04.07		Cleaning facilities including vacuum cleaning and windows
14.04.08		Offloading, handling and lifting facilities
14.04.09		Cranes and portable hoists
14.04.10		Scaffolds, ladders, trestles, etc.
14.04.11		Portable equipment (e.g. concrete mixers, pumps, air-compressors, welding sets, small hand tools, etc.)
14.04.12		Associated special safety gear (e.g. goggles, welding aprons, spark proof tools, low voltage tools)
14.04.13		Spares

14.05		**Lighting**
14.05.01		Emergency lighting
14.05.02		Portable lighting
14.05.03		Warning lights
14.05.04		Traffic lights
14.05.05		Generators
14.06		**Safety and welfare**
14.06.01		Drinking water points
14.06.02		Showers and baths
14.06.03		Emergency showers and baths
14.06.04		Eyewash and first aid kits
14.06.05		Ambulances
14.06.06		Protective clothing
14.06.07		Portable equipment (resuscitators, stretchers, etc.)
14.06.08		Breathing sets, lifebelts (e.g. for tank entry)
14.06.09		Smoking areas
14.06.10		First-aid stations and equipment
14.07		**Fire services**
14.07.01		Firemains and hydrants
14.07.02		Fire applications (engines, tenders, pumps, hoses)
14.07.03		Foam and CO2 systems
14.07.04		Fire alarm systems
14.07.05		Personnel clothing and equipment
14.07.06		Safety gear (breathing equipment, ropes, etc.)
14.08		**Security**
14.08.01		Security fencing
14.08.02		Time clocks
14.08.03		Watchmen
14.08.04		Intruder alarms
14.08.05		Home office, customs and excise and similar provisions
14.08.06		Security patrols
14.09		**Weighbridge and similar provisions**
14.09.01		Weighbridge and similar provisions

15.00		TEMPORARY AND/OR COMMON SITE FACILITIES
15.01		**Utilities including distribution and outlets and, where appropriate, charges**
15.01.01		Electricity
15.01.02		Water
15.01.03		Sewage and drainage
15.01.04		Compressed air and gases
15.01.05		Telephone/telex/telefax
15.01.06		Maintenance
15.02		**Office accommodation**
15.02.01		Offices and toilets
15.02.02		Car parking
15.02.03		Cleaning and maintenance
15.02.04		Jobsite signboard
15.03		**Safety and welfare buildings**
15.03.01		Rest and changing rooms
15.03.02		Toilets and washrooms
15.03.03		Lockers and drying rooms
15.03.04		Canteen (including vending machines about site)
15.03.05		Medical suite/first aid post
15.03.06		Ambulance
15.03.07		Medical attendant
15.03.08		Smoking areas
15.03.09		Cleaning maintenance
15.04		**Stores and workshops**
15.04.01		Compound including preparation and fencing
15.04.02		Stores building
15.04.03		Stores cranage and equipment
15.04.04		Stores labour
15.04.05		Workshops
15.04.06		Cleaning and maintenance
15.05		Contractors' areas
15.05.01		Preparation
15.05.02		Fencing
15.05.03		Access to areas
15.06		**Parking and personnel transport**

15.06.01		Parking areas for workforce and staff and parking control
15.06.02		Personnel transport offsite
15.06.03		Personnel transport onsite
15.06.04		Maintenance
15.07		Site security
15.07.01		Identification pass system
15.07.02		Operation of time clocking
15.07.03		Site guards including guardhouse
15.07.04		Security floodlighting
15.07.05		Microwave and infrared systems
15.08		**Hardstandings**
15.08.01		Hardstanding to working areas and access ways
15.09		**Scaffolding**
15.09.01		Scaffolding and platforms
15.09.02		Lifts and hoists
15.10		**General site transport, cranage and plant**
15.10.01		General site transport
15.10.02		General excavators/loaders
15.10.03		Cranage including tower cranes
15.10.04		Cement storage and mixing facilities and batch plants
15.10.05		Refuelling facilities
15.10.06		Floodlighting
15.11		**Contractors providing common services to site**
15.11.01		Scaffolding
15.11.02		Cleaning
15.11.03		Catering
15.11.04		Painting
15.11.05		Office management and services
15.11.06		Cranes
15.12		**Rates**
15.12.01		Local taxation on buildings

16.00		INFRASTRUCTURE
16.01		**Facilities during construction**
16.01.01		Housing encampments
16.01.02		Medical facilities
16.01.03		Welfare and recreational facilities
16.01.04		Schooling
16.01.05		Roads and site layout
16.01.06		Harbour facilities
16.01.07		Airstrips and helipads
16.01.08		Fencing
16.01.09		Sewage systems
16.01.10		Utilities
16.01.11		Staffing of facilities
16.02		Facilities left after construction
16.02.01		Refurbishment and handover of any of the above
16.02.02		Other contributions to local or national community

17.00		**MODIFICATIONS AND ALTERATIONS TO EXISTING PLANTS**
17.01		**Demolition or removal**
17.01.01		Gas free/decommission before commencement
17.01.02		Asbestos removal
17.01.03		Plant and equipment
17.01.04		Pipework
17.01.05		Electrical, instrumentation and telecommunications cabling and apparatus
17.01.06		Structures
17.01.07		Buildings
17.01.08		Underground foundations, services and paving layouts
17.02		**New work**
17.03		**Alterations, refurbishment and updating**
17.03.01		Gas free/decommission before commencement
17.03.02		Remedial work after asbestos removal
17.03.03		Plant and equipment
17.03.04		Pipework
17.03.05		Electrical, instrumentation and telecommunications cabling and apparatus
17.03.06		Structures
17.03.07		Buildings
17.03.08		Temporary facilities to keep plant operational
17.03.09		Hoardings, barriers, dust protection, etc.
17.04		**Maintenance**
17.04.01		Maintenance painting
17.04.02		Other general maintenance work

18.00		**ENGINEERING DESIGN AND PROCUREMENT**
18.01		**Proposal engineering**
18.01.01		Proposal co-ordination
		(a) pre-bid client negotiation
		(b) prepare basic data
		(c) department liaison
		(d) co-ordinate presentation to client
		(e) post-tender negotiations
18.01.02		Estimating
		(a) engineering manhour estimate
		(b) equipment and material estimate
		(c) construction estimate
		(d) commissioning estimate
		(e) project and construction estimates
18.01.03		Planning
		(a) programme for proposal
		(b) overall project programme
		(c) manhour histograms
		(d) "S" curves for cashflow
18.01.04		Contract and legal matters
		(a) tender documents
		(b) advise on financial and cashflow requirements
		(c) preliminary contract documents
		(d) obtain ECGD and other insurance quotations
		(e) post-tender negotiations
18.01.05		Technology input
		(a) data for estimating
		(b) engineering manhour estimates
		(c) staffing programmes
		(d) material take-offs if required
		(e) input to tender documentation
18.01.06		Secretarial and clerical work
		(a) general assistance and word processing
		(b) collating and producing tender documents
18.02		**Project management**
18.02.01		Project managers

18.02.02		Project engineering
18.02.03		Project controls and accounting
18.02.04		Procurement and expediting
18.02.05		Contracts
18.02.06		Consultants and specialists
18.02.07		Secreterial and clerical work
18.02.08		Documentation
18.03		**Process engineering**
18.03.01		Basic process design
		(a) heat and material balances
		(b) process studies
		(c) utility systems
		(d) process data sheets
18.03.02		Flowsheets
		(a) process flow diagrams
		(b) engineering flow diagrams
		(c) utility flow diagrams
18.03.03		Schedules and lists
		(a) equipment lists
		(b) line lists
		(c) controls and instrument schedules
18.03.04		Safety considerations
		(a) safety guidelines
		(b) safety review
		(c) safety reports
18.03.05		Commissioning
		(a) manuals and dossiers
		(b) pre-commissioning
		(c) commissioning
18.03.06		General activities
18.04		**Civil and structural engineering**
18.04.01		Architectural design
		(a) outline schemes
		(b) development drawings
		(c) construction drawings
		(d) approval drawings
		(e) details

		(f) schedules
		(g) layouts
18.04.02		Surveys
		(a) topographical surveys
		(b) soil surveys
		(c) general surveys
		(d) pipeline surveys
18.04.03		Site development
		(a) earthworks
		(b) roads, paths and parking
		(c) railways
		(d) temporary works
		(e) general site works
		(f) fencing
18.04.04		Underground services
		(a) layouts
		(b) details
		(c) schedules
		(d) pipe anchors
18.04.05		Foundations and civils
		(a) piling layouts
		(b) foundations
		(c) bund and retaining walls
		(d) tank foundations
		(e) pipe tracks and anchors
		(f) paving
		(g) pits and basins
		(h) isolated pipe supports
		(i) bending schedules
		(j) holding-down bolt schedules
		(k) building foundations
18.04.06		Structural concrete
		(a) structures
		(b) slabs
		(c) blast walls
		(d) bridges
		(e) blast resistant buildings

		(f) bending schedules
		(g) details
18.04.07		Steelwork
		(a) structures
		(b) building frames
		(c) pre-assembled units
		(d) pre-assembled racks
		(e) pipe racks
		(f) platforms and ladders
		(g) pipe supports
		(h) schedules
18.04.08		Documentation
		(a) bills of quantity
		(b) specifications
		(c) contract documents
18.04.09		General activities
18.05		**Vessel and heat transfer engineering**
18.05.01		Basic design: storage tanks
		(a) fixed roof tanks
		(b) floating roof tanks
		(c) double skinned tanks
		(d) spherical tanks
		(e) silos, bunkers and hoppers
18.05.02		Detailed design: storage tanks
		(a) spiral stair and caged ladder
		(b) handrailing
		(c) roof walkway and interconnecting walkways
		(d) agitator fittings
		(e) coils internal and limpet
		(f) connections
		(g) support structure
		(h) double-skin cryogenic tanks
18.05.03		Basic design: pressure vessels and agitators
		(a) pressure vessels
		(b) separators
		(c) fermentors

18.05.04		Detailed design: pressure vessels and agitators
		(a) pressure vessel scantling calculations
		(b) supports
		(c) coils and jackets
		(d) agitators and supports
		(e) platform and clips
		(f) wind check and seismic loading
		(g) local loads
		(h) body flanges
		(i) internals
18.05.05		Basic and detailed design: columns and stacks
		(a) basic design calculations
		(b) body flanges
		(c) local loading
		(d) platforms, ladders and pipe clips
		(e) trays
		(f) packing
		(g) wind check and seismic loading
		(h) guy ropes
18.05.06		Basic and detailed design: heat transfer
		(a) shell and tube exchangers
		(b) tank heaters
		(c) air coolers
		(d) cooling towers
		(e) waste heat recovery units
18.05.07		Fired heaters
		(a) boilers and incinerators
		(b) furnaces, ovens and kilns
		(c) flare systems
18.05.08		Disintegration equipment
		(a) crushers
		(b) grinders
		(c) mills
18.05.09		General activities
18.06		**Machinery and mechanical engineering**
18.06.01		Rotating machinery design
		(a) gas turbines

		(b) compressors: centrifugal
		(c) compressors: reciprocating
		(d) pumps: centrifugal
		(e) pumps: reciprocating
18.06.02		Mechanical handling design
		(a) conveyors
		(b) cranes and lifting equipment
		(c) unit loading systems
		(d) weighing equipment
		(e) stacking systems
		(f) storage systems
18.06.03		Mechanical packages design
		(a) water treatment
		(b) effluent treatment
		(c) packaged units
		(d) inert gas generators
		(e) steam-raising equipment
		(f) fuel systems
		(g) filtration units
18.06.04		Services
		(a) HVAC detail specification
		(b) Heating services
		(c) Air conditioning services
		(d) plumbing
18.06.05		General activities
18.07		**Electrical engineering**
18.07.01		Specifications
		(a) general electrical
		(b) general motors
		(c) mechanical package electrical
		(d) equipment electrical
		(e) installation
18.07.02		Requisition and data sheets
		(a) main equipment requisitions
		(b) bulk material requisitions
		(c) material requisitions
		(d) basic material and material lists

		(e) calculation sheets
18.07.03		Diagrams
		(a) main single-line diagrams
		(b) loading diagram
		(c) logic sequence diagram
		(d) control schematics
		(e) lighting and small power schematics
		(f) relay grading diagram
		(g) wiring diagrams
18.07.04		Layouts
		(a) power/substation
		(b) communication
		(c) cables
		(d) cable tray
		(e) earthing
		(f) lighting and small power
		(g) fire alarm
		(h) trace heating
18.07.05		Schedules and schematics
		(a) motor schedules
		(b) terminal schedules
		(c) cable schedules
		(d) motor relay schedules
		(e) cable hook up diagrams
		(f) communication diagrams
		(g) fire alarm diagrams
18.07.06		Detail drawings
		(a) earthing details
		(b) cable installation details
		(c) cathodic protection details
		(d) trace heating isometrics
		(e) hazardous area drawing
		(f) civil requirement drawings
18.07.07		Manuals
		(a) manuals and dossiers
		(b) power study report

18.07.08		Safety
		(a) safety guidelines
		(b) safety review
		(c) final safety review
18.07.09		General activities
18.08		**Instrument engineering**
18.08.01		Conceptual design
		(a) philosophy diagrams
		(b) logic diagrams
18.08.02		Layouts
		(a) routes
		(b) instruments
		(c) control room
18.08.03		Hook-ups
		(a) selection of hook ups
		(b) process allocation
		(c) transmission allocation
		(d) produce specials
		(e) mounting and tracing
18.08.04		Indexes and schedules
		(a) instrument index
		(b) relief and safety device index
		(c) input and output schedule
		(d) equipment certification schedule
		(e) cable list
		(f) junction box schedule
18.08.05		Schematic diagrams
		(a) loop diagrams
		(b) schematics
		(c) terminal indexes
		(d) field wiring block diagrams
		(e) power distribution diagrams and schedules
		(f) earthing diagrams
		(g) instrument utilities
18.08.06		Panel design
		(a) panel layouts
		(b) panel equipment lists

		(c) rack layouts
		(d) rack equipment lists
		(e) annunciator layouts
		(f) label lists
18.08.07		Instrument specifications
		(a) FM instruments (in-line)
		(b) FM instruments (field)
		(c) Panel mounted instruments
		(d) Reliability and calculations
18.08.08		System specifications
		(a) system specifications
		(b) central control systems
		(c) programme logic control
		(d) panel and rack specifications
		(e) packaged equipment specifications
18.08.09		Material take-off
		(a) material specifications
		(b) material take-off
18.08.10		Process instrument specifications
		(a) control valves
		(b) relief valves
		(c) control instruments
		(d) indicating and alarm settings
18.08.11		Engineering line diagrams
		(a) preliminary
		(b) intermediate
		(c) final
18.08.12		Communicating equipment design
18.08.13		Packaged equipment interfaces
18.08.14		General activities
18.09		**Piping engineering**
18.09.01		Material engineering
		(a) piping and valve specifications
		(b) general piping specifications
		(c) special piping design items
		(d) flowsheet and line list review

18.09.02		Schedules
		(a) line
		(b) design
		(c) steam trap
		(d) hose coupling
18.09.03		Piping models: notional
		(a) design model
		(b) build base board
		(c) model preliminary equipment
		(d) model structure
		(e) model cable and HVAC ducts
		(f) design and model pipework
18.09.04		Piping models: detail
		(a) build base board
		(b) model equipment
		(c) model structures
		(d) model cable and HVAC ducts
		(e) model piping
		(f) final ELD/ULD model check
18.09.05		Piping studies
		(a) draft piping studies
		(b) piping site survey
18.09.06		Layouts: prepared manually
		(a) plot plans
		(b) equipment layouts
		(c) escape route layouts
		(d) HVAC layouts
		(e) Fire protection layouts
18.09.07		Layouts: computer designed
		(a) build preliminary equipment
		(b) build preliminary structure
		(c) input preliminary cable and HVAC trays
		(d) check plant model input
		(e) equipment layouts
		(f) escape layouts
		(g) HVAC layouts
		(h) fire protection layouts

		(i) HVAC layouts
18.09.08		General arrangement drawings: prepared manually
		(a) general arrangement drawings
18.09.09		General arrangement drawings: computer designed
		(a) build approved equipment
		(b) build approved structure
		(c) input catalogues/specifications/instruments
		(d) input approved cable/HVAC trays
		(e) check plant model input
		(f) input pipes
		(g) interference connection checks
		(h) drawing production
		(i) input pipe supports
		(j) module administration
18.09.10		Isometrics: prepared manually
		(a) prepare and complete isometrics
		(b) add welded attachments
18.09.11		Isometrics: computer designed
		(a) details validation
		(b) check isometric output
18.09.12		Piping stress engineering
		(a) stress piping
		(b) stress pipe supports
		(c) produce pipe stress sketches
18.09.13		Material take off: prepared manually
		(a) preliminary
		(b) intermediate
		(c) final
18.09.14		Material take off: by computer
		(a) specification input
		(b) materials control input
		(c) isometric production
18.09.15		Flow and line diagrams
		(a) process flowsheets
		(b) engineering line diagrams
		(c) utility line diagrams
		(d) HVAC flowsheets

		(e) fire protection flowsheets
18.09.16		Weight control
18.09.17		Insulation
18.09.18		General activities
18.10		**Safety engineering**
18.10.01		General safety
		(a) procedures
		(b) bid evaluation
		(c) project control procedures
		(d) safety supervision
18.10.02		Safety criteria
		(a) design safety criteria
		(b) design safety philosophy
18.10.03		Design safety
		(a) fire and gas location drawings
		(b) hazardous area drawing
		(c) layout/passive protection/firewall location
		(d) escape route drawing
		(e) safety and fire equipment drawing
		(f) safety philosophy
		(g) HVAC damper operation
		(h) Safety signs drawings
		(i) Authority approval
18.10.04		Firewater distribution
		(a) ring main calculations
		(b) water demand calculations
		(c) firewater requirement report
		(d) firewater engineering line diagram
		(e) area protection drawings
18.10.05		Safety and fire fighting equipment
		(a) deluge/sprinkler systems design
		(b) deluge/sprinkler systems calculations
18.10.06		General activities
18.11		**Quality assurance**
18.11.01		Design phase
		(a) project quality manual
		(b) project quality plans

		(c) project procedures
		(d) design quality audits
		(e) design reviews
		(f) design document review
18.11.02		Procurement phase
		(a) review requisitions
		(b) review bid evaluations
		(c) vendor quality audits
		(d) review vendor quality assurance documents
		(e) quality assurance/quality control clarification meetings
18.12		**Quality control**
18.12.01		Vendor quality control
		(a) QA/inspection: major purchases
		(b) QA/inspection: minor purchases
		(c) Inspection co-ordination
		(d) Review and approve vendor QA documents
18.13		**General activities**
18.13.01		Procurement/expediting
18.13.02		Safety reviews
18.13.03		Approve client's drawings
18.13.04		Vendor print: control and approval
18.13.05		Site liaison
18.13.06		Local authority liaison
18.13.07		Inter-departmental meetings
18.13.08		Site meetings and visits
18.13.09		Requisitions
18.13.10		Bid analysis sheets
18.13.11		As-built drawing preparation
18.13.12		Construction support
18.13.13		Weight reports
18.13.14		Final documents
18.13.15		Project close-out reports
18.13.16		Supervision
18.14		**General project costs**
18.14.01		Project office costs and expenses
		(a) overheads: head office
		(b) overheads: project office

		(c) computer time and equipment
		(d) publicity models
		(e) office space for clients personnel
		(f) overheads: photographic work and other publicity
		(g) special tests and development
18.14.02		Records and communications
		(a) preliminary documentation
		(b) collation and storage of final documentation (inclusive of test and inspection records, operating and maintenance instructions and schedules)
		(c) special printing, duplicating and collating
		(d) photocopying
		(e) reproduction of drawings
		(f) microfilming and equipment
		(g) communications: telex, fax, couriers, etc.
		(h) special photography
18.14.03		Staff costs
		(a) travel expenses
		(b) subsidence
		(c) expenses for dependants, e.g. travel, accommodation
		(d) special payment bonuses
		(e) cost of client visits
		(f) personnel training
		(g) site entertainment (special visitors)
18.14.04		Fees and charges
		(a) consultants
		(b) legal consultants
		(c) translation costs
		(d) royalties and licensing fees
		(e) licenses and permits
		(f) insurance claims assessors
		(g) research and development
		(h) agents' commissions
		(i) inspection and testing authority fees, e.g. Lloyd's
		(j) insurance premiums
		(k) insurance of materials in storage
		(l) meteorological reports

18.14.05		Finance
		(a) escalation
		(b) professional insurance bonds
		(c) performance guarantees
		(d) finance costs and bank charges
		(e) forward buying of foreign currency
		(f) export credit guarantee premiums
18.14.06		Other requirements and services
		(a) pre-commissioning spares
		(b) commissioning spares
		(c) operational spares
		(d) overseas inspection services
		(e) vendor specialists and commissioning engineers
		(f) outside buying agencies
18.14.07		Consignment costs
		(a) packaging and protection
		(b) delivery to packaging and forwarding agents
		(c) storage prior to shipment
		(d) dock dues and agents fees
		(e) freight charges
		(f) import, export duties
		(g) bond area storage costs
		(h) freight insurance
		(i) storage at port of destination
		(j) freight from port to site

19.00		PROJECT CONSTRUCTION MANAGEMENT AND PROJECT CHARGES
19.01		**Head office project management: Construction phase**
19.01.01		Engineering departmental liaison
19.01.02		Site liaison
19.01.03		Vendor liaison
19.01.04		Construction procurement
19.01.05		Freight and delivery direction
19.01.06		Expediting
19.01.07		Continuing head office management services
19.02		**Finalization of design**
19.02.01		Tails engineering (all technologies)
19.02.02		Design work required to develop contract
19.03		**Procurement**
19.03.01		Complete design phase
19.03.02		Requisition and procurement-site material requirements
19.03.03		Complete expediting
19.04		**Subcontracts**
19.04.01		Complete preparation and negotiation of subcontracts
19.04.02		Administer contract and subcontracts
19.04.03		Agreement of variations, extra works, claims, progress
19.04.04		Payment and final account settlements with subcontractors, suppliers and client
19.05		**Site management and supervision**
19.05.01		Construction manager
19.05.02		Construction engineers
19.05.03		Resident site manager
19.05.04		Cost engineers/quantity surveyors
19.05.05		Planning engineers
19.05.06		Material controllers
19.05.07		Quality assurance and quality control engineers
19.05.08		Specialist engineers and consultants
19.05.09		Industrial relations officer
19.05.10		Safety officer
19.05.11		Welding engineer
19.05.12		Buyers
19.05.13		Site accountants

19.05.14		Subcontract administrators
19.06		**Site support and services**
19.06.01		Secretarial services
19.06.02		Clerks
19.06.03		Cars/drivers
19.06.04		Fees of other consultants or agents
19.06.05		Licences and permits
19.06.06		Inspection and testing
19.06.07		Models and publicity
19.07		**Staff costs**
19.07.01		Travel and subsistence expenses
19.07.02		Expenses for dependants (e.g. travel, accommodation and schooling)
19.07.03		Training of personnel
19.08		**Site facilities**
19.08.01		Utilities, office accommodation, safety and welfare, buildings, stores, workshops, contractors' areas, parking and personnel transport, site security, hardstandings, scaffolding, general site transport, cranage, plant and local authority rates
19.09		**Records**
19.09.01		Final documentation (test and inspection records, operating and instruction manuals)
19.09.02		As-built drawings
19.10		**Overheads**
19.10.01		Head office overheads
19.10.02		Financing
19.10.03		Escalation
19.10.04		Insurances
19.10.05		Bonds and guarantees
19.10.06		Profit

20.00		OVERSEAS PROJECTS
20.01		**Design fabrication and construction**
20.01.01		Compliance with local standards, specifications, practices and quality assurance
20.02		**Consignment costs**
20.02.01		Export packaging
20.02.02		Weather protection
20.02.03		Freight to and from ports
20.02.04		Loading and offloading (land and sea freight)
20.02.05		Shipment
20.02.06		Demurrage
20.02.07		Customs delays and other delays at ports
20.02.08		Storage
20.02.09		Double handling and re-handling
20.02.10		Insurances, loss damage, etc.
20.02.11		Premiums for war zones
20.03		**Fees**
20.03.01		UK agents
20.03.02		Customs agents
20.03.03		Other agents and suppliers agents
20.03.04		Translations
20.03.05		Legal
20.04		**Commissions**
20.04.01		Bank charges including letters of credit
20.04.02		Export credit guarantee
20.04.03		Buying
20.04.04		Consulate charges
20.04.05		Gratuities
20.04.06		Local agent
20.05		**Taxes and dues**
20.05.01		Import duties and port dues
20.05.02		Transmission taxes
20.05.03		Other local taxes
20.06		**Local territory costs**
20.06.01		Legislation: use of local labour and materials
20.06.02		Quality, cost and availability of local labour, plant and materials

20.06.03		Compliance with local regulations
20.06.04		Local trade practices, demarcation, etc.
20.06.05		Availability and suitability of local roads, utilities and housing
20.07		**Expatriate staff and labour**
20.07.01		Overseas allowances
20.07.02		Accommodation
20.07.03		Air fares and travel expenses
20.07.04		Leave
20.07.05		Local income tax
20.07.06		Work permits, visas and licenses
20.07.07		Site welfare facilities
20.07.08		Schooling
20.07.09		Medical expenses
20.07.10		Local transport
20.08		**Additional costs**
20.08.01		Higher level of initial spares
20.08.02		Higher level of construction, commissioning and operational spares
20.08.03		Extra cost of emergency freight
20.09		**Other risks**
20.09.01		Major economic dislocation
20.09.02		Payment: currency and place of payment
20.09.03		Risks not covered by any export credit guarantee
20.09.04		Settlement of disputes

21.00		COMMISSIONING, INITIAL OPERATION AND TRAINING
21.01		**Commissioning**
21.01.01		Ascertaining extent of work (i.e. assistance only to client)
21.01.02		Specialist engineers and operators
21.01.03		Commissioning equipment
21.01.04		Vendor's commissioning engineers and operators
21.01.05		Power supplies and consumables
21.01.06		Remedial work including special studies, investigations and redesigning as required
21.02		**Initial operation**
21.02.01		Start up costs
21.02.02		Operators and labour
21.02.03		Power supplies, consumables and raw materials
21.02.04		Working alongside and training clients operators
21.03		**Training**
21.03.01		Training clients staff: classroom
21.03.02		Training clients staff: during operation
21.03.03		Translations of manuals to local language
21.04		**Final clean up and making good**

22.00		PROVISIONAL SUMS, CONTINGENCIES AND ESCALATION
22.01		**Provisional and prime cost (PC) sums to be included on direction of client**
22.02		**Provisional and prime cost (PC) sums included by estimator**
22.03		**Contingency sums to be included on direction of client**
22.04		**Contingency allowance included by estimator which may include any of the following items**
22.04.01		Inclement weather
22.04.02		Industrial relations problems
22.04.03		Delays by others
22.04.04		Historical growth factor which may include design development and construction changes, unforeseen items, additional work, variations and claims
22.04.05		Quality of information and data and estimate accuracy
22.04.06		Risk
22.05		**Escalation and inflation in the following**
22.05.01		Engineering and design
22.05.02		Construction and labour
22.05.03		Construction plant
22.05.04		Construction materials
22.05.05		Site overheads and management
22.05.06		Fixed price element
22.05.07		Differences between actual increase and any reimbursement by any index
22.05.08		Market forces

Source: ACE (1991)

ADDENDUM B

Estimate summary worksheet

Estimate title: _____ Budget item # _____
Scope: _____ Estimate date: _____
Location: _____ Building: _____ Project year _____
Type / Process: _____ Size / Capacity: _____
Capacity Units: _____

Account CE	Account PA	Account definition	Labour	Material	Total	% of Total Capital
1		**Project administration**				
	0	Misc office costs	$	$		
	1	Project management	$	$		
	2	Project controls / estimating	$	$		
	3	Engineering management	$	$		
	4	Construction management	$	$		
	5	Procurement and contracts	$	$		
	6	Fabrication management	$	$		
	7	Administration support	$	$		
	8	Commissioning management	$	$		
					$	%
2		**Engineering / Design**				
	0	Misc Engineering services	$	$		
	1	Civil	$	$		
	2	Structural	$	$		
	3	Archtectural	$	$		
	4	Piping	$	$		
	5	Mechanical	$	$		
	6	Process - machine	$	$		
	7	Process - chemical	$	$		
	8	Electrical / Instrumentation	$	$		
	9	Environmental / other	$	$		
					$	%
3		**Pre-purchase material**				
	0	Indirect costs	$	$		
	1	Site preparation / civil	$	$		
	2	Concrete	$	$		
	3	Structural steel	$	$		
	4	Buildings	$	$		
	5	Equipment	$	$		
	6	Piping	$	$		
	7	Process air	$	$		
	8	Electrical / Instrumentation	$	$		
	9	Coatings	$	$		
					$	%
4		**Shop fabrication**				
	0	Indirect costs	$	$		
	1	Site preparation / civil	$	$		
	2	Concrete	$	$		
	3	Structural steel	$	$		
	4	Buildings	$	$		
	5	Equipment	$	$		
	6	Piping	$	$		
	7	Process air	$	$		
	8	Electrical / Instrumentation	$	$		
	9	Coatings	$	$		
					$	%
5		**Construction (Installation)**				
	0	Indirect costs	$	$		
	1	Demo / relocation (capital)	$	$		
	2	Site preparation / civil	$	$		
	3	Concrete	$	$		
	4	Structural steel	$	$		
	5	Buildings	$	$		
	6	Equipment	$	$		
	7	Piping	$	$		
	8	Process air	$	$		
	9	Electrical / Instrumentation	$	$		
	10	Coatings	$	$		
					$	%
		SUB-TOTAL CAPITAL COSTS			$	

6	**Contingency**			
1	Contingency	0,0%	of Capital sub-total	
2	Escalation	0,0%	of Capital sub-total	
	Mid-project year	2004		
	Annual inflation rate	3.00%		

Addendum C - Typical example of a piping work unit sheet

	Nominal Diameter 9mm / Inch)	550 = 22"											
	Outside Diameter (mm)	559.0											
	Wall Thickness (mm)	5.0	5.5	6.4	7.1	8.0	8.8	9.5	11.0	12.7	14.2	15.9	17.5
POS	SCHEDULE		10S	10				20 STD		30 XS		40	
1.1	Piping in Field	1.591	1.714	1.933	2.101	2.313	2.499	2.660	3.001	3.378	3.706	4.070	4.408
1.2	Piping on Pipe Rack	1.352	1.457	1.643	1.786	1.966	2.124	2.261	2.551	2.872	3.150	3.460	3.747
1.3	Piping Dismantling	0.477	0.514	0.580	0.630	0.694	0.750	0.798	0.900	1.014	1.112	1.221	1.322
2.2	Fitting (2 Connections)	4.683											
2.3	Fitting (3 Connections)	6.088											
3.1	Circumference Weld	6.166	6.346	6.693	6.98	7.383	7.760	8.107	8.899	9.874	10.798	11.913	13.024
3.2	Fillet Weld	3.700	3.807	4.016	4.190	4.430	4.656	4.864	5.340	5.925	6.479	7.148	7.815
3.3	Mitre Weld	8.016	8.249	8.709	9.079	9.598	10.088	10.539	11.569	12.837	14.038	15.487	16.931
3.4	Branch Connection	9.866	10.153	10.709	11.175	11.813	12.417	12.971	14.239	15.799	17.277	19.061	20.839
3.5	Weldolet, Nipplolet	14.325	15.206	16.879	18.257	20.120	21.859	23.442	27.015	31.343			
3.6	Reinforcement Pad	10.976	11.295	11.914	2.432	13.142	13.813	14.430	15.841	17.577	19.221	21.205	23.183
3.7	Welding Gaskets	10.509											
3.8	Backing Ring (for aluminum only)	1.150											
3.9	Cutting for modifications	0.925	0.952	1.004	1.048	1.107	1.164	1.216	1.335	1.481	1.620	1.787	1.954
3.10	Material multiplicator for Pos 3.1 to 3.8 in acc to explanation of the factor list, Drawing No 4-104189, III Appendix 1.												
4.1	Assembly of Flanges 100-300 lbs	4.582											
4.2	Assembly of Flanges 400-900 lbs	5.727											
4.3	Assembly of Flanges 1500-2500 lbs	6.415											
4.4	Spectacle Blind	0.916											
4.5	Pipe Bending												
4.6	Preparation of Thread Ends												
4.7	Thread Connection												
4.8	Dismantling: 0.7 x Factoren of Pos 4.1 to 4.4 and 4.7												
5.1	Valve Installation	9.350											
5.2	Valve with Driver installation	13.090											
5.3	Wafer type valve W. Driver Installation	7.480											
5.4	Wafer type valve installation	3.740											
5.5	Spindle Extension BL=1/2/3 Met.	3.552											
5.7	Dismantling: 0.7 x Factoren of Pos 5.1 to 5.4												
6.1	Pressure Test: Hydro / Pneumatic	0.410											
6.3	Service Test	0.287											
7.1	Nozzle reinforcing brackets												
7.2	Supports	AU mass factor = KG * 0.032 + 0.3											
7.3	Hanger and Spring Supports	ACC AMP 7.2											
7.4	Excess material on welding roots	0.916											
7.5	Drilling hole for instrument connection												

ADDENDUM D

Quantity ratios

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AB-Q1	1.35	1.98	2.83	2.83	2.46	2.18	2.18	2.03	2.03	1.90	2.27	2.27	2.12	1.98	2.36	2.36	2.36	2.20	2.20	2.05	2.45	2.45	2.29	2.14
AB-Q2	1.08	1.11	1.28	1.28	1.12	1.23	1.23	1.14	1.07	1.00	1.11	1.11	1.11	1.11	1.24	1.24	1.24	1.16	1.08	1.01	1.12	1.12	1.12	1.12
AB-Q3	1.00	1.11	1.48	1.69	1.48	1.45	1.55	1.55	1.55	1.45	1.73	1.86	1.73	1.62	1.93	2.07	2.22	2.22	2.22	2.07	2.47	2.65	2.47	2.31
AB-Q4	1.18	1.18	1.71	1.71	1.49	1.58	1.58	1.58	1.58	1.47	1.76	1.76	1.76	1.64	1.96	1.96	1.96	1.96	1.96	1.83	2.19	2.19	2.19	2.04
AC-Q1	1.00	1.38	1.47	1.58	1.04	1.20	1.28	1.19	1.28	1.37	1.46	1.57	1.57	1.68	1.81	1.69	1.57	1.69	1.81	1.93	2.07	1.47	1.58	1.47
AC-Q2	13.73	20.53	19.86	20.82	12.94	15.71	16.60	15.58	16.80	16.39	17.73	18.21	18.07	19.94	20.00	20.91	19.08	20.54	20.44	19.40	20.86	19.57	21.91	19.46
AC-Q3	1.00	0.94	1.00	1.00	1.23	1.17	1.15	0.67	0.65	0.72	1.07	1.17	1.17	1.07	1.00	0.58	0.60	0.57	0.59	1.50	1.40	1.00	0.92	0.68
AC-Q4	0.14	0.10	0.10	0.10	0.12	0.13	0.12	0.24	0.22	0.24	0.11	0.11	0.11	0.10	0.10	0.15	0.15	0.14	0.14	0.15	0.15	0.10	0.09	0.19
AC-Q5	0.04	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.04	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.05
AC-Q6	0.37	0.56	0.56	0.56	0.46	0.42	0.42	0.45	0.48	0.52	0.50	0.54	0.54	0.54	0.58	0.64	0.64	0.69	0.74	0.56	0.59	0.56	0.56	0.55
AC-Q7	1.79	1.61	1.62	1.61	1.24	1.62	1.62	1.46	1.76	1.59	1.57	1.88	1.89	1.88	1.88	2.67	2.49	2.50	2.66	2.75	1.84	1.61	1.61	1.65
AC-Q8	1.00	1.76	1.76	2.03	1.66	1.53	1.64	1.97	1.39	1.49	1.49	1.44	1.55	1.65	1.66	1.65	1.66	1.47	1.56	1.56	1.57	1.76	2.01	2.06
AC-Q9	0.30	0.42	0.45	0.45	0.35	0.39	0.39	0.38	0.27	0.27	0.27	0.37	0.40	0.43	0.43	0.43	0.40	0.31	0.31	0.31	0.31	0.45	0.45	0.46
AC-Q10	0.20	0.16	0.18	0.15	0.20	0.17	0.15	0.17	0.14	0.15	0.15	0.13	0.23	0.22	0.22	0.19	0.20	0.22	0.23	0.26	0.26	0.15	0.14	0.15
AC-Q11	10.30	15.38	15.37	15.23	11.88	13.68	14.64	13.68	14.66	14.65	14.62	22.06	10.75	10.72	10.75	10.02	9.34	14.34	15.34	15.34	15.36	15.22	15.21	15.23
AC-Q12	1.16	1.30	1.30	1.16	1.15	1.16	1.16	1.16	1.16	1.16	1.16	1.62	1.90	2.03	2.18	2.18	2.17	1.13	1.68	1.32	1.72	1.16	1.16	1.16
AC-Q13	0.11	0.15	0.15	0.18	0.12	0.13	0.14	0.13	0.14	0.15	0.16	0.16	0.16	0.17	0.17	0.16	0.16	0.11	0.16	0.17	0.15	0.16	0.18	0.16
AC-Q14	0.08	0.06	0.06	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.06	0.08	0.08	0.07	0.07	0.05	0.08	0.08	0.08	0.07	0.08
AC-Q15	68.67	77.00	92.67	76.33	51.75	73.33	62.25	93.50	126.00	147.50	66.50	127.50	126.50	159.50	65.00	115.00	114.50	133.50	109.00	72.75	97.33	68.50	80.33	126.50
AC-Q16	206.00	308.00	278.00	229.00	207.00	220.00	249.00	187.00	252.00	295.00	266.00	255.00	253.00	319.00	260.00	230.00	229.00	267.00	327.00	291.00	292.00	274.00	241.00	253.00
AC-Q17	1.00	1.00	1.00	1.49	1.22	1.13	1.13	1.19	1.28	1.00	1.34	1.44	1.55	1.32	1.52	0.91	0.85	0.85	0.87	0.89	1.07	1.49	1.49	1.47
AD-Q1	0.15	0.19	0.18	0.18	0.19	0.18	0.11	0.10	0.10	0.10	0.14	0.14	0.14	0.14	0.13	0.13	0.15	0.15	0.15	0.15	0.24	0.22	0.24	0.13
AD-Q2	0.11	0.18	0.12	0.20	0.18	0.12	0.16	0.10	0.09	0.07	0.08	0.08	0.29	0.27	0.27	0.08	0.08	0.08	0.22	0.23	0.15	0.16	0.14	0.20
AD-Q3	0.53	0.33	0.42	0.47	0.33	0.42	1.36	0.72	0.86	0.72	0.49	0.49	0.51	0.51	0.55	0.46	0.56	0.52	0.56	0.56	0.38	0.59	0.36	1.03
AD-Q4	0.27	0.35	0.47	0.16	0.35	0.47	0.46	0.38	0.42	0.25	0.20	0.20	0.18	0.20	0.18	0.15	0.17	0.16	0.18	0.19	0.47	0.21	0.44	0.40
AD-Q5	0.50	0.66	0.66	0.26	0.66	0.66	0.44	0.44	0.55	0.34	0.30	0.28	0.21	0.36	0.30	0.30	0.26	0.22	0.23	0.34	0.77	0.32	0.71	0.48
AD-Q6	2.00	2.10	1.68	1.61	2.10	1.67	1.14	1.14	1.26	1.25	1.73	1.61	1.31	1.31	1.23	1.23	1.72	1.50	1.51	1.35	2.07	1.73	1.92	1.41
AD-Q7	2.00	1.34	1.68	1.57	1.34	1.68	3.88	3.88	4.78	4.44	1.50	1.35	1.55	1.94	1.94	2.08	1.40	1.50	1.37	2.17	1.28	1.31	1.54	3.15
AD-Q8	4.06	4.15	3.88	3.25	4.16	3.89	3.86	3.86	4.28	4.24	3.55	3.55	2.77	4.18	3.89	3.91	3.43	2.99	2.94	3.90	4.51	3.86	4.20	3.89
AD-Q9	4.11	4.17	4.17	4.79	4.18	4.17	5.42	5.42	7.50	7.95	4.03	3.62	4.04	3.62	3.62	3.89	4.34	4.65	4.34	4.65	4.00	4.00	4.46	6.79
AD-Q10	1.00	1.08	1.16	0.71	1.08	1.16	0.62	0.62	0.72	0.71	0.88	0.88	0.84	0.78	0.72	0.74	0.67	0.67	0.68	0.63	1.06	0.64	1.14	0.53
AD-Q11	1.03	0.91	1.08	0.79	0.91	1.08	0.95	0.95	1.37	1.52	1.17	1.09	0.64	0.64	0.64	0.99	0.99	0.99	0.67	0.63	1.17	1.09	1.17	0.90
AD-Q12	1.03	0.69	0.89	0.65	0.70	0.89	0.66	0.66	1.48	2.25	1.27	1.18	0.69	0.69	0.74	1.15	1.00	1.00	0.68	0.64	0.72	0.72	0.73	0.64
AD-Q13	0.93	0.93	0.93	0.93	0.92	0.93	0.90	0.90	1.08	1.59	0.93	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.91
AD-Q14	0.14	0.09	0.14	0.08	0.09	0.14	0.07	0.07	0.22	0.31	0.19	0.19	0.06	0.06	0.06	0.21	0.20	0.21	0.08	0.07	0.11	0.10	0.11	0.06
AD-Q15	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AD-Q16	1.98	0.99	1.20	1.99	0.99	1.20	0.87	0.87	1.61	4.17	1.44	2.10	1.13	1.78	1.91	1.94	1.60	1.49	0.93	1.27	0.97	1.99	1.04	0.89
AE-Q1	6.73	5.40	5.85	5.09	4.72	5.76	5.49	4.41	4.39	4.13	4.14	5.80	5.88	5.82	5.78	5.86	5.37	4.74	4.41	4.44	4.44	5.75	5.06	5.06
AE-Q2	0.15	0.13	0.13	0.11	0.10	0.13	0.13	0.10	0.15	0.14	0.14	0.22	0.10	0.09	0.09	0.09	0.08	0.14	0.14	0.14	0.14	0.13	0.11	0.11
AE-Q3	6.64	8.27	8.98	10.06	7.72	8.62	8.80	8.47	5.98	6.03	6.05	5.89	5.46	5.39	5.00	5.06	4.66	6.96	4.67	5.97	4.60	9.95	10.00	10.19
AE-Q4	0.70	0.91	0.91	0.89	1.11	0.89	0.89	1.14	0.76	0.76	0.71	0.69	0.76	0.76	0.76	0.81	0.82	1.07	0.75	0.73	0.79	0.83	0.89	0.97
AE-Q5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.01
AE-Q6	483.73	607.16	607.27	497.99	393.69	392.57	421.31	717.49	716.44	668.77	435.21	728.02	780.36	617.13	550.31	848.46	765.42	765.59	233.43	474.87	642.25	498.43	498.09	728.33
AE-Q7	3.34	3.50	3.26	6.53	7.02	4.94	5.30	3.41	2.42	2.42	4.97	2.62	2.63	2.62	5.67	3.12	2.92	2.40	3.50	5.08	3.66	5.71	6.53	3.65
AE-Q8	1.93	2.34	2.34	2.57	2.58	2.39	2.57	3.02	2.00	2.14	1.83	2.02	2.02	2.01	1.69	2.10	2.25	1.99	1.93	1.63	2.80	2.40	2.56	2.81
AF-Q1	13.10	21.11	19.72	21.09	11.30	10.55	9.84	9.85	12.94	12.92	12.94	12.95	11.94	12.08	12.06	12.14	12.10	12.12	15.86	15.99	17.10	15.88	9.81	9.17
AF-Q2	1.54	1.08	1.08	1.09	0.88	0.94	2.15	2.13	1.49	1.49	1.02	0.95	1.21	1.35	1.61	1.88	1.77	1.04	1.33	0.97	1.04	1.33	0.98	1.83
AF-Q3	0.56	0.54	0.58	0.50	0.56	0.56	0.58	0.58	0.39	0.37	0.72	0.72	0.97	0.33	0.33	0.52	0.48	0.97	0.50	0.64	0.60	0.50	0.51	0.57
AF-Q4	0.43	0.52	0.49	0.52	0.66	0.66	0.55	0.61	0.45	0.45	0.45	0.45	0.33	0.38	0.38	0.39	0.42	0.39	0.53	0.41	0.41	0.53	0.76	0.57
AF-Q5	0.04	0.02	0.05	0.03	0.04	0.04	0.03	0.06	0.06	0.06	0.06	0.05	0.04	0.05	0.06	0.04	0.05	0.05	0.02	0.06	0.03	0.02	0.04	0.03
AF-Q6	0.72	0.44	0.75	0.45	1.29	1.38	1.05	1.10	0.71	0.71	0.69	1.09	0.87	1.06	1.14	0.62	0.62	0.67	0.51	0.68	0.44	0.51	1.71	1.21
AF-Q7	0.08	0.05	0.10	0.05	0.06	0.05	0.06	0.09	0.13	0.14	0.12	0.12	0.12	0.13	0.15	0.11	0.11	0.13	0.05	0.14	0.06	0.04	0.05	0.06
AF-Q8	0.02	0.02	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02
AF-Q9	0.63	0.40	0.41	0.48	0.99	1.06	1.14	1.22	0.44	0.47	0.43	0.68	0.70	0.78	0.70	0.47	0.42	0.49	0.53	0.49	0.42	0.53	1.22	1.40
AF-Q10	1.84	1.47	1.57	1.58	1.26	1.18	1.41	1.38	1.76	1.88	1.75	1.88	1.98	2.24	2.24	1.70	1.58	1.73	1.47	1.99	1.86	1.48	1.03	1.38
AF-Q11	13.31	19.11	10.65	20.00	12.83	14.09	13.67	8.57	7.95	7.78	8.74	9.25	9.80	10.94	8.81	14.14	9.27	8.26	20.90	8.16	16.89	19.38	11.55	15.60
AF-Q12	4.67	4.67	8.00	6.00	4.33	7.00	4.67	5.50	7.00	7.50	6.00	5.00	5.50	4.33	4.00	5.50	8.50	6.00	5.00	10.00	5.67	6.00	7.50	6.67
AF-Q13	0.11	0.07	0.07	0.08	0.08	0.27	0.25	0.25	0.07	0.20	0.22	0.23	0.07	0.20	0.23	0.25	0.08	0.07	0.13	0.08	0.09	0.09	0.10	0.07
AF-Q14	9.21	6.22	6.36	7.54	9.96	19.49	19.52	20.90	6.36	11.73	11.70	18.52	7.99	16.62	19.07	12.77	9.37	6.38	9.61	9.41	7.59	9.49	13.28	15.01
AF-Q15	0.45	0.52	0.52	0.47	0.62	0.66	0.59	0.61	0.52	0.43	0.47	0.47	0.52	0.38	0.38	0.47	0.51	0.57	0.39	0.44	0.27	0.56	0.47	0.35
AF-Q16	0.32	0.25	0.61	0.32	0.40	0.39	0.48	0.50	0.54	0.56	0.50	0.47	0.48	0.44	0.53	0.52	0.47	0.54	0.23	0.50	0.29	0.29	0.48	0.30
AF-Q17	0.08	0.07	0.06	0.07	0.06	0.05	0.06	0.07	0.07	0.08	0.05	0.09	0.08	0.09	0.08	0.08	0.13	0.12	0.12	0.08	0.06	0.04	0.06	0.07
AG-Q1	1.67	0.79	1.69	3.39	2.61	1.76	1.75	1.47	2.10	2.49	2.49	1.13	1.10	1.10	1.03	1.53	1.11	1.73	1.61	1.39	1.50	1.39	1.77	2.74
AG-Q2	0.39	0.29	0.29	0.56	0.37	0.24	0.24	0.33	0.86	0.36	0.33	0.33	0.38	0.45	0.37	0.59	0.25	0.44	0.24	0.27	0.27	0.27	0.24	0.80

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AG-Q3	3.86	2.66	1.63	3.51	2.53	5.83	5.32	2.52	6.42	2.41	2.42	3.69	3.93	3.87	3.90	5.80	4.15	3.35	4.95	3.72	3.97	3.49	5.85	6.03
AG-Q4	0.99	1.81	0.79	0.65	0.64	0.69	0.63	0.74	1.76	0.52	0.44	0.90	0.88	1.33	1.02	1.09	1.29	0.71	0.59	0.72	0.82	1.42	0.73	0.93
AG-Q5	2.10	5.04	1.47	1.57	1.38	1.65	1.44	1.57	2.77	1.47	1.37	3.31	3.52	3.52	4.07	4.64	2.20	1.59	2.20	1.52	2.32	1.42	1.26	1.17
AG-Q6	0.47	0.24	0.44	0.46	0.48	0.62	0.64	0.63	0.29	0.46	0.33	0.28	0.28	0.30	0.28	0.27	0.49	0.46	0.45	0.76	0.33	0.52	0.82	0.81
AG-Q7	0.99	1.81	0.79	0.65	0.64	0.69	0.63	0.74	1.76	0.52	0.44	0.90	0.88	1.33	1.02	1.09	1.29	0.71	0.59	0.72	0.82	1.42	0.73	0.93
AG-Q8	0.43	0.73	0.32	0.26	0.26	0.44	0.43	0.39	0.58	0.22	0.22	0.46	0.98	0.60	0.81	0.75	0.59	0.60	0.58	0.70	0.47	0.47	0.44	0.25
AG-Q9	0.51	0.32	0.56	0.51	0.53	0.89	0.99	0.69	0.60	0.52	0.52	0.47	0.46	0.39	0.45	0.40	0.61	0.71	0.49	0.86	0.34	0.82	0.60	1.18
AG-Q10	10.65	6.87	8.54	11.63	10.85	11.67	11.08	8.06	16.12	4.88	6.84	7.53	14.70	10.32	9.67	6.84	6.58	7.30	6.20	6.97	10.47	8.01	11.36	10.15
AG-Q11	0.10	0.12	0.16	0.13	0.12	0.08	0.07	0.08	0.11	0.07	0.11	0.06	0.16	0.14	0.09	0.09	0.10	0.09	0.14	0.14	0.07	0.10	0.08	0.06
AG-Q12	0.08	0.08	0.10	0.09	0.08	0.08	0.08	0.08	0.11	0.03	0.07	0.09	0.11	0.10	0.07	0.04	0.05	0.08	0.07	0.08	0.07	0.05	0.06	0.07
AG-Q13	32.92	16.92	22.63	21.79	22.77	43.52	45.41	42.11	25.09	46.11	25.51	29.47	29.47	21.04	17.25	34.62	67.65	47.00	24.18	38.06	25.26	51.72	51.22	56.50
AH-Q1	5.57	3.41	3.41	3.20	6.94	5.65	7.84	8.73	4.69	7.90	5.66	10.69	4.38	6.13	6.97	4.19	5.13	4.00	4.56	4.20	8.47	3.80	5.73	11.53
AH-Q2	4.16	3.95	4.25	2.70	3.85	4.19	5.85	5.43	3.57	2.81	3.14	9.35	3.22	4.03	3.83	3.98	3.97	3.84	4.68	4.83	8.00	2.71	2.73	5.76
AH-Q3	1.47	1.58	1.43	1.34	0.89	1.99	1.40	1.30	0.89	1.57	1.32	2.45	1.53	2.30	1.09	1.61	1.13	0.92	1.11	1.48	2.14	0.75	0.94	1.29
AH-Q4	0.74	1.17	0.92	1.25	0.55	0.66	0.71	0.63	0.88	0.36	0.48	0.65	0.90	0.99	0.74	0.70	0.48	1.52	0.67	0.65	0.50	0.74	0.63	0.39
AH-Q5	2.55	5.00	5.73	5.92	1.89	4.00	1.56	2.20	1.70	1.91	1.72	2.21	4.07	2.33	1.44	3.69	2.40	4.29	3.33	3.45	2.55	1.92	1.78	1.06
AH-Q6	0.53	0.89	0.90	0.90	0.42	0.71	0.74	0.34	0.53	0.28	0.39	0.35	0.72	0.83	0.56	0.51	0.68	0.78	0.47	0.54	0.35	0.63	0.35	0.57
AH-Q7	3.73	6.33	7.17	7.89	2.77	3.53	3.85	3.30	2.83	2.63	3.57	3.23	3.59	4.81	3.25	4.92	4.00	5.62	5.71	3.00	3.92	3.85	4.10	2.62
AH-Q8	18.67	31.67	28.67	35.50	9.00	30.00	12.50	11.00	17.00	14.00	16.67	10.50	20.33	19.25	13.00	19.67	24.00	18.25	26.67	34.50	12.75	12.50	20.50	11.33
AH-Q9	2.64	2.52	1.98	2.67	2.33	2.65	2.57	2.94	4.14	1.78	1.79	2.29	2.44	2.90	3.23	1.80	1.79	5.69	2.40	1.66	1.76	3.72	3.14	1.83
AH-Q10	0.26	0.16	0.26	0.17	0.17	0.25	0.17	0.21	0.34	0.25	0.27	0.23	0.15	0.18	0.27	0.26	0.20	0.39	0.34	0.25	0.25	0.33	0.33	0.25
AH-Q11	0.38	0.82	0.48	0.69	0.29	0.53	0.39	0.29	0.27	0.36	0.51	0.22	0.69	0.71	0.24	0.33	0.48	0.53	0.40	0.53	0.39	0.30	0.34	0.28
AH-Q12	0.34	0.33	0.35	0.28	0.36	0.59	0.45	0.33	0.45	0.35	0.36	0.22	0.46	0.37	0.34	0.50	0.35	0.25	0.19	0.52	0.21	0.20	0.20	0.31
AH-Q13	0.11	0.11	0.13	0.14	0.18	0.09	0.17	0.11	0.08	0.08	0.09	0.17	0.10	0.10	0.10	0.14	0.10	0.15	0.09	0.08	0.15	0.17	0.09	0.08
AH-Q14	0.12	0.10	0.07	0.09	0.09	0.07	0.14	0.09	0.18	0.12	0.18	0.11	0.10	0.17	0.19	0.10	0.10	0.09	0.11	0.11	0.07	0.10	0.17	0.15
AH-Q15	4.20	2.89	4.17	3.04	3.04	3.36	3.09	5.71	4.57	5.85	5.61	3.24	2.74	3.58	3.18	6.11	2.73	3.72	4.23	3.43	9.06	5.00	5.90	2.73
AH-Q16	2.02	2.18	1.37	1.36	1.44	1.31	1.31	2.55	1.50	2.92	4.03	3.75	2.07	1.79	0.97	1.84	1.65	2.07	3.67	3.97	3.02	1.78	2.81	1.22
AH-Q17	0.22	0.22	0.22	0.16	0.14	0.17	0.17	0.15	0.35	0.15	0.17	0.17	0.17	0.22	0.16	0.17	0.25	0.23	0.15	0.23	0.18	0.43	0.44	0.22
AH-Q18	22.33	21.77	21.72	17.51	13.24	26.40	18.20	17.61	43.56	15.33	17.06	14.71	23.18	16.11	22.77	23.27	25.35	30.99	19.52	21.57	13.72	43.32	40.48	12.82
AH-Q19	0.15	0.19	0.21	0.14	0.18	0.14	0.11	0.18	0.11	0.16	0.14	0.20	0.15	0.13	0.11	0.22	0.12	0.10	0.28	0.14	0.34	0.12	0.23	0.14
AH-Q20	0.20	0.20	0.21	0.18	0.12	0.23	0.15	0.17	0.19	0.15	0.21	0.13	0.21	0.23	0.15	0.18	0.14	0.44	0.26	0.19	0.19	0.22	0.19	0.19
AH-Q21	0.10	0.07	0.07	0.09	0.09	0.13	0.09	0.08	0.13	0.10	0.07	0.06	0.07	0.08	0.10	0.10	0.12	0.15	0.12	0.06	0.09	0.14	0.12	0.11
AH-Q22	201.00	192.45	202.20	150.50	138.74	248.45	176.47	235.38	266.67	263.29	284.85	201.35	190.80	201.79	142.50	138.53	241.89	317.44	244.44	179.59	200.00	278.02	261.54	193.98
AH-Q23	0.30	0.27	0.28	0.30	0.28	0.22	0.22	0.40	0.32	0.32	0.26	0.53	0.40	0.15	0.15	0.42	0.26	0.36	0.38	0.35	0.28	0.15	0.27	0.15
AH-Q24	0.46	0.28	0.34	0.30	0.27	0.28	0.20	0.47	0.34	0.63	0.60	0.61	0.44	0.55	0.52	0.61	0.35	0.44	0.46	0.37	0.73	0.35	0.66	0.23
AI-Q1	3.97	2.66	2.48	2.91	2.58	3.17	3.31	3.79	2.95	4.35	4.67	3.24	5.26	2.35	3.81	4.34	8.08	3.94	7.59	6.64	6.60	3.00	1.86	2.52
AI-Q2	0.38	0.49	0.28	0.24	0.25	0.27	0.29	0.45	0.45	0.78	0.83	0.24	0.38	0.25	0.73	0.78	0.51	0.55	0.48	0.65	0.61	0.28	0.28	0.27
AI-Q3	2.23	2.20	1.96	2.26	2.23	2.21	2.21	2.46	2.46	3.48	3.75	1.64	2.08	2.22	3.25	3.48	2.65	2.83	2.65	2.56	2.39	1.25	1.15	2.23
AI-Q4	0.30	0.47	0.39	0.41	0.46	0.27	0.24	0.43	0.40	0.45	0.36	0.16	0.13	0.50	0.48	0.45	0.13	0.43	0.13	0.40	0.40	0.29	0.47	0.50
AI-Q5	4.25	3.85	4.70	5.08	8.00	5.31	5.36	5.73	10.90	6.31	5.67	3.77	3.23	9.75	9.78	6.08	2.77	6.62	3.00	4.40	4.43	4.36	6.75	8.45
AI-Q6	0.30	0.43	0.31	0.35	0.45	0.34	0.35	0.40	0.48	0.43	0.43	0.25	0.23	0.38	0.35	0.32	0.13	0.27	0.16	0.35	0.35	0.36	0.59	0.35
AI-Q7	0.38	0.42	0.37	0.36	0.44	0.40	0.41	0.48	0.64	0.52	0.52	0.21	0.18	0.62	0.60	0.53	0.27	0.56	0.27	0.38	0.38	0.37	0.55	0.62
AI-Q8	0.10	0.16	0.14	0.11	0.08	0.08	0.07	0.10	0.08	0.04	0.07	0.07	0.12	0.13	0.05	0.07	0.09	0.09	0.09	0.10	0.10	0.09	0.10	0.07	0.07
AI-Q9	9.33	4.82	6.78	7.95	9.58	11.70	9.60	4.61	10.27	8.89	8.96	8.89	8.96	9.32	6.67	11.46	5.32	8.18	6.18	8.74	11.44	9.11	14.35	9.41
AI-Q10	0.02	0.03	0.03	0.02	0.03	0.02	0.01	0.03	0.02	0.04	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.03
AI-Q11	68.00	84.55	90.38	86.84	103.53	81.18	83.33	63.00	80.15	94.39	94.44	56.98	52.50	144.44	112.82	76.04	43.37	76.79	50.50	73.33	54.39	64.21	98.78	104.49
AJ-Q1	3.92	2.92	4.74	3.13	2.95	4.46	4.49	4.49	2.36	8.01	7.62	5.04	4.99	2.86	3.32	3.60	5.96	3.92	3.79	5.95	5.38	3.49	3.83	5.88
AJ-Q2	0.44	0.51	0.36	0.44	0.32	0.45	0.66	0.66	0.34	1.06	0.59	0.59	0.60	0.47	0.39	0.28	0.92	0.45	0.34	0.92	0.61	0.72	0.70	0.57
AJ-Q3	2.50	1.97	2.39	3.19	1.98	3.12	3.44	3.44	2.41	3.90	3.48	2.26	2.19	1.99	1.51	3.75	3.92	1.67	2.25	3.91	2.97	3.86	2.68	2.57
AJ-Q4	0.30	0.45	0.22	0.44	0.38	0.40	0.39	0.39	0.45	0.15	0.13	0.23	0.40	0.43	0.30	0.35	0.32	0.36	0.21	0.32	0.19	0.47	0.48	0.35
AJ-Q5	2.10	2.05	1.40	4.74	2.72	2.67	2.84	2.84	3.46	1.57	1.07	2.26	1.93	2.57	2.15	3.55	1.87	2.36	2.23	1.87	2.67	5.04	3.30	1.97
AJ-Q6	3.38	4.82	2.92	3.41	4.45	4.36	4.70	4.70	7.94	2.57	2.52	2.26	3.35	4.52	2.84	2.29	2.96	2.11	2.29	2.90	2.22	8.00	7.27	2.52
AJ-Q7	0.53	0.70	0.60	0.62	1.03	0.75	0.89	0.41	0.63	0.60	0.55	0.38	0.40	0.96	0.64	0.51	0.42	0.47	0.33	0.42	0.37	0.37	0.84	0.49
AJ-Q8	0.44	0.69	0.27	0.75	0.56	0.40	0.40	0.71	0.63	0.34	0.33	0.43	0.43	0.63	0.45	0.55	0.42	0.42	0.42	0.46	0.41	0.76	0.68	0.45
AJ-Q9	0.11	0.08	0.08	0.14	0.11	0.08	0.07	0.07	0.06	0.11	0.11	0.20	0.14	0.08	0.13	0.19	0.11	0.16	0.10	0.08	0.18	0.08	0.08	0.10
AJ-Q10	13.00	12.48	13.99	9.70	14.35	11.65	19.30	8.93	12.69	10.24	8.68	12.33	12.57	14.44	9.69	18.06	10.91	7.68	17.50	22.57	13.43	7.43	12.27	10.19
AJ-Q11	0.02	0.02	0.01	0.03	0.02	0.02	0.03	0.02	0.03	0.02	0.02	0.02	0.01	0.03	0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.05	0.05	0.02
AJ-Q12	0.05	0.07	0.04	0.07	0.06	0.06	0.06	0.06	0.07	0.04	0.03	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.04	0.04	0.03	0.08	0.08	0.03
AJ-Q13	67.69	98.54	60.87	67.70	68.06	67.61	67.50	105.56	82.32	32.58	29.00	69.37	71.30	58.48	39.23	46.43	45.51	69.03	43.05	96.55	94.12	75.98	80.74	62.93
AK-Q1	2.03	1.90	2.03	3.26	3.27	1.25	1.31	2.32	1.97	2.46	2.63	2.71	2.03	2.23	1.34	3.00	2.29	1.67	2.10	1.42	2.03	1.79	2.00	2.83
AK-Q2	0.53	0.52	0.52	0.88	0.88	0.32	0.32	0.88	0.58	0.52	0.37	0.50	0.85	0.35	0.41	0.85	0.49	0.50	0.32	0.32	0.33	0.33	0.88	0.95
AK-Q3	2.15	1.41	1.31	2.20	2.20	1.28	1.37	2.82	1.76	2.19	2.18	2.88	2.44	2.98	2.00	3.43	1.58	1.40	2.22	1.98	2.13	2.98	3.13	3.12
AK-Q4	0.58	0.49	0.37	0.36	0.39	0.90	0.86	0.69	0.63	0.32	0.30	0.39	0.88	0.55	0.76	0.63	0.57	0.72	0.77	0.86	0.67	0.63	0.88	0.49
AK-Q5	28.00	24.90	28.00	17.78	18.80	45.83	42.43	35.33	33.00	21.33	20.25	17.45	56.60	18.25	30.56	19.10	19.00	31.88	19.08	30.10	20.30	32.86	28.56	25.00
AK-Q6	4.67	3.46	4.45	4.71	4.59	7.24	6.75	4.61	3.79	4.57	4.26	6.40	6.74	4.47	6.71	3.18	3.00	5.10	4.49	6.69	4.72	3.65	9.88	3.39
AK-Q7	0.58	0.62	0.56	0.43	0.38	0.59	0.56	0.51	0.69	0.43	0.43	0.41	0.78	0.42	0.52	0.66	0.42	0.86	0.56	0.97	0.35	0.65	0.82	0.66
AK-Q8	0.49	0.39	0.46	0.32	0.32	0.70	0.72	0.46	0.36	0.43	0.40	0.34	0.75	0.49	0.51	0.64	0.33	0.42	0.29	0.71	0.65	0.37	0.55	0.41

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	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AK-Q9	0.31	0.46	0.19	0.23	0.23	0.22	0.20	0.32	0.29	0.20	0.19	0.17	0.25	0.28	0.31	0.52	0.55	0.44	0.43	0.24	0.33	0.42	0.20	0.31
AK-Q10	0.24	0.22	0.30	0.33	0.34	0.23	0.25	0.26	0.23	0.26	0.27	0.38	0.17	0.30	0.30	0.30	0.35	0.28	0.32	0.22	0.22	0.20	0.30	0.19
AK-Q11	9.03	7.10	13.28	7.38	8.06	8.02	9.10	7.47	7.65	5.77	8.97	8.42	11.50	10.59	6.10	5.05	6.50	9.79	11.73	13.65	12.39	8.28	10.55	13.43
AK-Q12	0.04	0.04	0.07	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.04	0.04	0.04	0.03	0.03	0.04	0.06	0.06	0.06	0.06	0.05	0.04	0.05
AK-Q13	112.00	66.76	165.07	80.97	81.91	96.76	163.14	106.61	138.26	104.03	108.44	72.64	77.22	86.57	168.63	74.18	90.79	146.37	145.21	164.71	154.17	89.15	86.22	165.89
AL-Q1	2.66	1.75	2.32	4.25	2.74	3.02	1.66	2.25	4.15	2.62	1.69	1.15	4.30	2.77	2.82	2.02	5.89	2.66	2.06	3.54	1.83	4.91	2.40	3.08
AL-Q2	0.25	0.22	0.35	0.56	0.25	0.25	0.24	0.22	0.42	0.32	0.19	0.16	0.40	0.40	0.37	0.16	0.56	0.33	0.19	0.35	0.15	0.40	0.23	0.17
AL-Q3	1.95	1.26	1.85	3.27	1.28	1.50	1.22	1.72	2.01	2.31	1.10	1.22	2.02	3.11	2.98	2.09	3.26	1.73	1.47	1.85	2.63	2.33	1.80	1.91
AL-Q4	0.60	0.80	0.96	0.47	0.43	0.36	0.94	0.54	0.49	0.78	0.94	0.92	0.61	0.83	0.85	0.54	0.27	0.81	0.46	0.80	0.88	0.33	1.04	0.37
AL-Q5	1.08	1.29	2.40	1.09	1.05	0.96	1.81	1.00	0.69	1.52	1.82	1.82	0.80	1.57	0.90	1.06	0.82	1.46	0.73	1.08	1.60	0.87	1.97	0.89
AL-Q6	2.50	1.81	1.22	1.93	1.61	2.50	1.53	2.58	3.84	1.77	1.77	1.59	2.26	2.30	4.00	3.40	1.71	1.89	3.50	2.38	3.30	2.02	2.05	2.00
AL-Q7	2.70	2.34	2.93	2.09	1.69	2.39	2.77	2.58	2.66	2.69	3.22	2.90	1.80	3.62	3.59	3.60	1.41	2.76	2.56	2.58	5.27	1.76	4.02	1.78
AL-Q8	0.45	0.60	0.71	0.34	0.29	0.27	0.53	0.32	0.45	0.44	0.46	0.46	0.43	0.44	0.62	0.68	0.32	0.41	0.31	0.31	0.49	0.32	0.67	0.33
AL-Q9	0.45	0.45	0.47	0.38	0.36	0.34	0.47	0.33	0.31	0.49	0.58	0.52	0.33	0.44	0.61	0.60	0.20	0.45	0.44	0.47	0.65	0.25	0.89	0.45
AL-Q10	0.15	0.11	0.07	0.10	0.14	0.16	0.13	0.18	0.23	0.14	0.14	0.14	0.20	0.10	0.17	0.19	0.14	0.10	0.34	0.16	0.10	0.10	0.12	0.16
AL-Q11	0.32	0.32	0.30	0.29	0.42	0.21	0.36	0.24	0.29	0.34	0.31	0.44	0.30	0.37	0.35	0.28	0.30	0.53	0.36	0.40	0.22	0.39	0.29	0.32
AL-Q12	0.64	0.97	0.95	0.60	0.70	0.46	0.65	0.78	0.68	0.80	0.80	0.80	1.00	0.85	0.94	0.38	0.89	0.81	0.65	0.72	0.41	0.72	0.55	0.77
AL-Q13	10.38	6.70	4.68	8.00	11.40	11.50	9.42	9.25	11.29	8.50	8.21	5.50	9.19	10.62	18.40	9.71	10.10	11.90	16.69	11.91	11.09	10.42	4.78	10.73
AL-Q14	8.82	11.23	12.23	8.68	8.87	6.08	5.59	8.92	13.20	6.59	9.17	13.51	4.88	10.92	7.01	11.60	6.88	8.63	6.25	6.39	6.92	7.20	18.90	6.67
AL-Q15	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.02	0.04	0.03	0.02	0.03	0.02	0.04	0.03	0.03	0.03	0.02	0.04	0.04	0.03	0.03	0.04	0.02
AL-Q16	1.37	0.98	0.98	1.43	1.49	1.37	1.26	1.75	3.03	1.40	0.93	1.10	1.57	1.54	1.37	1.60	2.13	1.33	1.65	1.66	1.19	1.23	1.83	1.47
AL-Q17	478.57	450.00	479.69	459.26	478.69	430.77	478.69	460.78	689.39	343.14	518.03	459.09	413.79	864.71	559.26	366.67	339.51	351.81	398.08	379.38	331.52	344.68	440.23	347.73
AM-Q1	3.72	3.58	3.40	4.22	4.84	6.83	4.73	3.66	2.36	5.06	3.71	3.98	3.77	4.14	2.44	2.78	2.94	2.90	3.63	5.07	5.12	3.50	2.46	7.42
AM-Q2	0.61	0.41	0.41	0.70	0.91	0.86	0.58	0.77	0.46	0.82	0.55	0.62	0.41	0.56	0.56	0.58	0.46	0.48	0.46	0.62	0.39	0.56	0.59	0.96
AM-Q3	1.15	1.19	1.21	1.32	1.22	1.14	1.09	1.36	0.65	1.17	1.15	1.15	1.32	0.94	1.23	0.68	0.87	1.66	1.04	1.12	1.05	0.70	1.14	1.80
AM-Q4	0.60	0.66	0.66	0.41	0.58	0.31	0.27	0.78	0.94	0.70	0.41	0.38	0.58	0.52	0.96	0.80	0.70	0.89	0.60	0.27	0.25	0.80	0.91	0.29
AM-Q5	2.56	1.62	1.62	1.60	2.35	1.93	1.92	3.58	4.29	1.80	3.40	3.37	1.69	1.93	4.11	2.55	1.47	2.91	1.48	1.92	1.79	2.69	4.63	1.93
AM-Q6	0.65	1.46	1.56	1.44	0.51	0.46	0.38	0.46	0.46	0.91	0.49	0.49	0.63	0.78	0.75	0.83	1.13	0.83	1.55	0.73	0.78	0.62	0.56	0.69
AM-Q7	1.60	2.14	2.40	1.57	1.83	1.15	1.66	2.16	2.41	1.06	1.20	1.09	1.56	1.91	2.55	2.23	1.04	2.14	1.53	1.15	1.07	1.13	1.64	1.24
AM-Q8	2.13	5.37	3.83	2.26	1.65	2.38	2.08	1.49	1.30	2.98	1.56	1.55	2.92	2.71	2.11	2.95	4.71	1.71	2.12	2.14	2.14	2.24	1.79	2.28
AM-Q9	0.94	1.52	1.15	1.57	1.63	0.97	0.72	0.73	0.71	1.38	0.72	0.68	0.80	0.81	0.90	1.26	1.55	1.25	1.91	0.61	0.96	0.87	0.52	0.74
AM-Q10	0.58	0.71	0.58	0.61	0.33	0.64	0.58	0.60	0.37	0.75	0.57	0.38	0.41	0.55	0.80	0.86	0.41	1.13	0.41	0.80	0.79	0.94	0.47	0.84
AM-Q11	0.42	0.37	0.27	0.26	0.68	0.25	0.19	0.54	0.65	0.61	0.29	0.30	0.31	0.57	0.67	0.55	0.46	0.60	0.41	0.31	0.20	0.41	0.55	0.22
AM-Q12	0.15	0.17	0.34	0.33	0.19	0.15	0.14	0.09	0.09	0.16	0.08	0.08	0.22	0.21	0.09	0.12	0.25	0.13	0.20	0.14	0.15	0.09	0.13	0.14
AM-Q13	0.30	0.27	0.21	0.23	0.46	0.39	0.53	0.43	0.54	0.21	0.23	0.29	0.35	0.24	0.31	0.42	0.29	0.42	0.20	0.27	0.25	0.31	0.22	0.29
AM-Q14	0.90	0.66	0.42	0.49	1.10	0.80	1.07	1.30	1.22	0.90	0.92	0.58	0.94	0.65	0.79	0.94	0.79	0.94	0.56	0.50	0.46	0.58	0.78	0.85
AM-Q15	0.30	0.17	0.23	0.31	0.27	0.23	0.16	0.31	0.18	0.45	0.53	0.58	0.35	0.26	0.22	0.22	0.46	0.36	0.20	0.37	0.43	0.32	0.30	0.22
AM-Q16	23.40	40.80	36.80	27.60	24.80	25.00	21.20	19.75	33.00	34.00	13.50	10.43	47.67	22.43	23.75	29.50	32.00	20.00	30.57	21.80	21.80	25.25	18.75	16.33
AM-Q17	0.13	0.05	0.11	0.17	0.23	0.12	0.09	0.16	0.19	0.09	0.13	0.12	0.13	0.18	0.13	0.08	0.09	0.21	0.20	0.09	0.10	0.10	0.08	0.14
AM-Q18	8.32	11.10	9.63	10.57	8.07	8.92	9.64	5.49	7.93	10.63	5.28	4.71	3.81	7.87	12.23	12.23	11.52	12.54	7.18	7.31	7.35	14.69	4.50	12.41
AM-Q19	0.20	0.17	0.20	0.21	0.19	0.14	0.20	0.22	0.15	0.24	0.20	0.12	0.13	0.20	0.20	0.20	0.21	0.24	0.12	0.32	0.28	0.31	0.21	0.23
AM-Q20	0.39	0.73	0.29	0.27	0.33	0.27	0.29	0.29	0.22	0.53	0.39	0.21	0.16	0.28	0.68	0.73	0.23	0.63	0.26	0.58	0.54	0.57	0.31	0.59
AM-Q21	2.58	2.68	2.24	2.27	1.52	3.53	1.50	4.04	3.96	2.08	2.47	1.91	5.81	2.58	2.49	2.50	2.62	2.38	2.81	3.79	2.48	1.97	2.64	1.66
AM-Q22	965.00	922.07	735.83	752.53	636.59	997.56	965.56	860.00	915.63	1,182.46	1,230.43	900.00	660.92	598.08	1,657.35	1,644.62	956.96	1237.74	833.06	1271.43	1190.82	873.68	727.06	1555.84
AN-Q1	1.50	0.75	0.00	1.22	2.22	1.62	1.17	0.00	1.50	0.65	0.00	1.02	1.86	0.80	0.00	1.69	1.57	1.72	1.50	1.06	0.00	1.93	0.86	0.00
AN-Q2	9.38	6.45	0.00	11.18	10.34	9.80	7.47	0.00	6.34	6.13	0.00	9.86	9.17	7.07	0.00	12.26	12.88	10.53	10.90	7.51	0.00	22.41	6.74	0.00
AN-Q3	4.89	3.11	0.00	6.09	6.89	5.92	7.04	0.00	4.77	3.06	0.00	5.07	4.72	3.87	0.00	4.49	5.87	3.71	4.91	4.67	0.00	8.17	4.46	0.00
AN-Q4	1.20	1.77	0.00	1.76	1.08	1.16	1.79	0.00	0.86	1.83	0.00	1.77	0.62	1.71	0.00	1.30	1.30	0.76	0.81	1.51	0.00	1.50	1.78	0.00
AN-Q5																								
AN-Q6	30.00	32.64	0.00	71.07	28.75	22.33	57.53	0.00	20.41	50.68	0.00	43.81	22.65	47.53	0.00	23.96	20.27	30.06	30.97	50.52	0.00	35.50	34.54	0.00
AN-Q7	1.58	2.08	0.00	1.03	0.98	3.27	1.19	0.00	2.29	0.97	0.00	1.93	2.17	1.38	0.00	2.79	1.84	1.42	1.55	0.92	0.00	1.46	2.72	0.00
AN-Q8	11.54	11.06	0.00	17.77	12.10	12.66	16.72	0.00	7.19	12.36	0.00	17.39	9.06	10.76	0.00	13.38	15.10	7.59	8.28	20.38	0.00	17.46	19.41	0.00
AN-Q9	12.00	13.83	0.00	7.50	13.25	18.00	8.60	0.00	26.67	11.80	0.00	8.67	8.67	11.00	0.00	11.17	19.75	12.75	6.89	9.60	0.00	15.00	17.00	0.00
AN-Q10	0.98	0.97	0.00	1.64	0.73	0.61	0.99	0.00	0.86	1.56	0.00	1.50	0.78	0.87	0.00	1.10	0.75	0.54	0.88	1.35	0.00	1.13	1.08	0.00
AN-Q11	9.38	12.96	0.00	20.90	6.46	15.03	14.99	0.00	9.33	14.80	0.00	9.90	5.64	13.98	0.00	9.79	7.93	8.96	6.02	15.75	0.00	7.29	22.37	0.00
AN-Q12	0.15	0.29	0.00	0.11	0.18	0.21	0.12	0.00	0.14	0.10	0.00	0.14	0.16	0.09	0.00	0.13	0.24	0.15	0.16	0.13	0.00	0.11	0.22	0.00
AN-Q13	0.20	0.19	0.00	0.15	0.33	0.13	0.13	0.00	0.28	0.29	0.00	0.16	0.10	0.14	0.00	0.17	0.26	0.21	0.13	0.22	0.00	0.27	0.16	0.00
AN-Q14	0.59	0.45	0.00	0.62	0.76	0.44	0.84	0.00	0.63	0.80	0.00	0.31	0.34	0.62	0.00	0.33	0.86	0.51	0.48	0.88	0.00	0.71	0.38	0.00
AN-Q15	0.15	0.18	0.00	0.11	0.13	0.11	0.17	0.00	0.10	0.09	0.00	0.30	0.21	0.10	0.00	0.30	0.15	0.13	0.26	0.13	0.00	0.14	0.14	0.00
AN-Q16	450.00	541.80	0.00	710.67	508.00	536.00	824.67	0.00	408.25	996.67	0.00	759.33	235.60	522.80	0.00	535.00	320.20	383.25	274.29	606.25	0.00	426.00	587.25	0.00
AN-Q17	0.12	0.11	0.00	0.12	0.11	0.12	0.13	0.00	0.20	0.18	0.00	0.09	0.13	0.16	0.00	0.08	0.11	0.15	0.19	0.09	0.00	0.08	0.11	0.00
AN-Q18	4.77	4.11	0.00	8.13	3.02	3.02	5.15	0.00	3.45	5.36	0.00	3.48	6.73	3.90	0.00	8.48	4.88	4.12	5.28	3.73	0.00	4.77	7.19	0.00
AN-Q19	0.17	0.14	0.00	0.19	0.14	0.07	0.13	0.00	0.17	0.22	0.00	0.12	0.16	0.11	0.00	0.22	0.16	0.11	0.16	0.31	0.00	0.16	0.22	0.00
AN-Q20	0.24	0.27	0.00	0.40	0.24	0.12	0.17	0.00	0.23	0.30	0.00	0.18	0.31	0.25	0.00	0.34	0.21	0.37	0.16	0.32	0.00	0.26	0.33	0.00
AN-Q21	18.72	19.05	0.00	20.84	17.52	12.81	18.38	0.00	20.29	20.51	0.00	13.57	28.84	12.02	0.00	17.03	16.51	21.15	24.02	22.08	0.00	18.78	18.75	0.00
AN-Q22	900.00	776.22	0.00	1,421.33	861.02	869.19	955.21	0.00	593.82	1,071.68	0.00	900.40	709.64	1,766.22	0.00	1,070.00	653.47	751.47	880.73	936.29	0.00	700.66	2155.05	0.00
AO-Q1	1.48	1.95	2.04	1.29	2.06	1.11	0.97	1.59	2.06	1.85	1.24	0.77	1.07	1.49	1.64	1.24	1.73	1.53	1.54	0.70	1.06	1.22	1.08	1.30

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AO-Q2	0.39	0.37	0.26	0.31	0.51	0.45	0.51	0.24	0.38	0.47	0.33	0.29	0.58	0.37	0.57	0.36	0.28	0.29	0.80	0.29	0.43	0.40	0.26	0.33
AO-Q3	2.01	1.75	1.98	2.68	2.81	2.02	2.00	2.20	1.32	1.92	1.21	1.13	1.96	1.38	3.96	2.56	3.48	1.82	3.15	1.45	2.33	1.46	1.38	1.21
AO-Q4	4.71	1.98	2.14	6.23	2.98	4.74	7.44	4.87	3.60	4.30	4.75	6.65	4.90	5.45	6.39	6.27	4.61	3.13	7.39	7.06	7.55	6.61	6.67	6.29
AO-Q5	6.11	4.24	4.54	8.10	7.00	7.83	13.22	5.33	4.50	4.53	6.33	8.96	8.68	6.26	8.14	7.41	5.86	4.03	6.82	11.65	13.00	8.54	9.00	4.26
AO-Q6	2.25	1.81	1.60	1.67	2.00	2.56	1.64	2.33	1.60	2.92	1.50	1.44	1.47	1.50	1.47	2.44	1.57	3.18	3.00	1.67	1.64	1.85	2.00	3.10
AO-Q7	33.00	20.50	21.80	40.50	35.00	45.00	47.60	22.40	21.60	28.67	38.00	68.67	47.75	21.13	44.75	32.60	32.25	28.20	44.33	46.60	58.50	29.29	45.00	33.00
AO-Q8	27.00	29.00	24.00	20.00	20.00	23.00	18.00	21.00	24.00	38.00	24.00	23.00	22.00	27.00	22.00	22.00	22.00	35.00	19.50	20.00	18.00	24.00	20.00	31.00
AO-Q9	4.71	2.12	4.74	8.53	4.52	6.43	7.21	3.50	2.16	3.82	4.90	6.87	6.82	4.57	9.42	6.52	3.23	4.15	6.82	7.52	5.09	6.41	6.43	4.71
AO-Q10	1.46	1.56	1.03	2.03	1.47	1.94	2.33	1.40	1.02	1.54	1.32	2.00	1.46	1.10	1.88	1.37	1.45	1.18	1.94	1.60	1.71	1.29	1.29	1.01
AO-Q11	0.15	0.15	0.11	0.11	0.08	0.09	0.07	0.11	0.12	0.13	0.15	0.16	0.10	0.11	0.11	0.11	0.21	0.25	0.12	0.12	0.11	0.16	0.15	0.21
AO-Q12	0.21	0.25	0.28	0.27	0.24	0.26	0.29	0.24	0.25	0.14	0.23	0.23	0.23	0.20	0.23	0.22	0.30	0.22	0.13	0.22	0.19	0.21	0.22	0.22
AO-Q13	0.63	0.80	0.83	0.86	0.63	0.56	0.69	0.69	0.68	0.65	0.94	1.00	0.94	1.00	1.00	0.47	0.70	0.50	0.87	0.52	0.55	0.43	0.56	0.67
AO-Q14	0.20	0.13	0.13	0.17	0.17	0.20	0.17	0.20	0.14	0.13	0.14	0.25	0.25	0.20	0.25	0.33	0.25	0.20	0.40	0.20	0.25	0.33	0.25	0.25
AO-Q15	2.84	2.41	2.73	5.23	2.86	3.75	4.58	3.73	2.84	2.87	3.62	6.06	4.06	2.77	2.56	3.70	1.87	2.76	5.02	4.48	3.49	3.73	3.21	1.86
AO-Q16	0.29	0.35	0.31	0.33	0.29	0.20	0.33	0.42	0.33	0.33	0.25	0.20	0.19	0.31	0.29	0.42	0.29	0.23	0.33	0.29	0.24	0.41	0.19	0.29
AO-Q17	7.50	5.86	9.69	8.59	11.07	11.04	4.44	6.05	4.80	6.82	6.06	4.80	3.56	7.16	5.39	3.96	7.43	4.71	7.42	5.79	6.96	7.16	6.87	5.34
AO-Q18	0.02	0.02	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.01	0.01
AO-Q19	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01
AO-Q20	3.75	3.64	6.45	5.30	5.50	5.40	2.91	3.00	3.00	3.42	2.33	3.30	3.86	2.33	3.70	1.60	3.50	3.45	5.38	2.73	2.11	5.25	3.56	2.70
AO-Q21	41.25	28.15	27.46	54.92	49.30	64.29	70.83	40.00	30.59	44.44	39.38	45.78	54.73	41.32	38.83	76.89	41.21	27.22	44.71	45.07	89.66	56.63	38.96	29.66
AP-Q1	1.74	1.88	2.08	2.43	2.10	1.96	2.53	1.24	1.53	1.85	1.36	1.33	1.19	1.13	1.10	1.32	1.40	1.69	2.72	1.70	1.18	1.68	1.39	2.66
AP-Q2	2.31	2.28	3.03	3.08	3.24	3.02	3.24	1.86	1.99	3.53	1.65	1.65	1.48	1.56	1.92	2.05	2.33	2.39	3.88	1.74	1.51	2.11	2.13	4.47
AP-Q3	1.27	1.32	1.64	1.77	1.76	1.16	1.77	0.69	0.76	1.33	1.23	1.14	1.14	1.26	0.96	1.04	1.15	1.29	1.36	1.14	0.79	0.90	1.03	1.84
AP-Q4	3.54	2.07	2.32	2.21	3.82	3.82	2.87	4.09	4.70	5.26	3.18	2.83	3.17	5.34	5.23	4.68	3.83	2.92	2.91	3.53	3.80	3.82	3.70	4.10
AP-Q5	0.46	0.61	0.51	0.53	0.37	0.37	0.35	0.33	0.32	0.68	0.56	0.56	0.62	0.89	0.72	0.55	0.31	0.40	0.29	0.26	0.62	0.37	0.31	0.43
AP-Q6	2.66	2.65	2.01	2.67	3.56	3.82	2.39	4.58	2.43	3.42	2.53	2.42	3.37	2.60	5.35	4.74	4.58	2.39	3.04	3.66	2.69	3.82	4.33	2.77
AP-Q7	0.56	0.38	0.46	0.42	0.64	0.64	0.54	0.63	0.53	0.59	0.52	0.45	1.03	0.98	0.50	0.69	0.63	0.46	0.59	0.53	0.59	0.64	0.59	0.40
AP-Q8	0.23	0.22	0.25	0.23	0.20	0.18	0.22	0.17	0.14	0.22	0.20	0.30	0.32	0.35	0.21	0.24	0.25	0.15	0.21	0.13	0.14	0.18	0.26	0.23
AP-Q9	4.46	2.89	3.24	3.41	3.66	3.93	2.51	6.59	5.94	6.96	5.57	4.04	4.66	5.20	8.95	5.44	3.29	6.34	2.79	5.25	4.72	6.72	3.51	4.42
AP-Q10	13.38	12.87	17.17	8.01	16.06	15.20	17.87	14.68	13.48	19.87	16.41	23.36	18.20	18.72	20.08	22.71	23.34	14.43	16.17	13.61	13.65	15.09	14.87	19.65
AP-Q11	2.26	1.35	2.48	3.03	2.36	2.36	2.13	2.50	1.55	3.27	1.89	2.77	2.09	3.52	3.95	2.88	2.60	2.03	2.21	1.60	2.26	2.55	1.68	2.19
AP-Q12	803.00	1,064.00	661.48	847.14	925.88	565.69	449.68	817.72	778.89	800.00	581.65	885.26	1,066.67	1,229.41	1,667.80	708.26	711.43	603.28	616.55	798.91	484.87	868.69	834.15	601.80
AP-Q13	0.46	0.42	0.34	0.31	0.54	0.54	0.53	0.53	0.46	0.51	0.57	0.36	0.74	0.45	0.72	0.59	0.55	0.47	0.45	0.36	0.45	0.46	0.46	0.33
AP-Q14	4.36	5.17	3.97	4.16	5.46	5.61	4.43	3.80	4.40	3.10	3.39	3.32	3.12	2.92	4.96	5.46	3.75	4.81	4.22	4.73	4.50	5.48	6.38	4.35
AP-Q15	2.00	2.32	2.00	2.27	2.17	3.87	1.40	1.94	1.94	1.89	1.98	1.28	1.50	1.57	4.78	4.44	2.05	2.30	1.24	1.85	1.99	2.98	3.14	2.02
AP-Q16	2.00	1.57	1.31	1.95	2.84	2.91	1.96	1.41	1.31	2.10	1.55	1.52	2.02	1.99	3.34	3.34	2.09	1.73	2.57	1.42	1.84	3.07	2.51	1.52
AP-Q17	1.00	0.85	1.27	0.69	0.95	0.98	0.77	0.97	0.97	1.00	0.94	0.93	0.76	1.02	1.31	1.15	0.69	1.03	0.97	0.80	0.62	1.01	1.50	0.57
AP-Q18	437.50	515.50	400.50	410.67	858.80	869.20	385.63	408.83	385.50	273.21	345.67	253.73	414.14	407.33	696.86	702.50	560.40	353.80	451.88	434.63	276.50	428.09	623.86	415.14
AP-Q19	1.00	0.75	0.95	0.65	1.38	1.52	0.85	0.66	0.62	1.10	0.85	1.06	0.92	0.75	1.92	1.46	1.07	1.16	0.97	0.95	1.39	1.58	1.11	0.64
AP-Q20	1.00	1.06	0.91	0.91	1.45	1.60	0.65	1.29	1.29	1.11	0.77	0.98	0.58	1.02	1.77	1.35	0.70	0.76	0.64	0.64	1.05	1.11	1.87	1.08
AP-Q21	8.63	7.13	7.99	7.88	9.77	6.95	6.20	9.57	8.26	12.99	6.72	9.75	16.75	9.51	13.99	11.45	10.85	8.85	7.62	8.81	10.13	7.04	6.36	6.61
AQ-Q1	2.27	3.51	2.02	2.56	1.73	1.91	3.03	3.04	2.60	3.50	3.00	2.16	2.30	2.13	2.40	1.62	1.97	2.84	3.32	1.53	3.56	1.02	1.74	2.22
AQ-Q2	8.90	8.47	12.30	7.66	7.77	11.92	7.72	4.98	5.87	5.96	10.25	5.94	5.85	6.08	5.14	7.85	7.04	8.49	5.62	13.60	9.50	14.90	7.85	8.11
AQ-Q3	0.11	0.11	0.24	0.10	0.14	0.10	0.08	0.08	0.09	0.07	0.08	0.08	0.14	0.12	0.15	0.24	0.12	0.10	0.08	0.17	0.08	0.11	0.15	0.12
AQ-Q4	0.41	0.31	0.59	0.54	0.55	0.36	0.21	0.29	0.36	0.18	0.46	0.40	0.40	0.44	0.41	0.61	0.31	0.50	0.19	0.44	0.31	0.92	0.41	0.25
AQ-Q5	5.56	5.46	7.87	3.93	3.48	5.81	8.64	6.08	5.14	7.82	7.18	3.69	7.44	5.18	6.06	4.67	5.73	5.45	8.54	4.01	4.63	7.99	8.17	8.44
AQ-Q6	0.83	0.56	1.34	0.90	1.01	0.88	1.34	0.57	1.12	0.83	0.83	0.37	0.69	0.69	0.78	0.56	0.63	0.77	0.97	0.62	0.80	0.75	0.92	1.11
AQ-Q7	16.67	23.21	26.50	14.42	15.21	15.87	26.51	25.37	30.53	22.52	23.11	8.61	30.52	19.37	16.28	11.71	17.57	14.26	18.91	8.10	12.02	23.90	18.30	15.27
AQ-Q8	1.48	1.55	1.65	1.53	1.42	1.02	1.65	1.70	2.07	1.34	1.77	1.06	2.06	1.32	1.09	1.05	1.06	0.86	1.45	0.70	1.27	2.47	2.08	1.90
AQ-Q9	400.00	436.50	380.33	334.00	648.00	325.50	374.33	304.00	325.67	555.50	481.00	258.00	442.50	333.00	318.00	217.00	329.50	230.67	474.00	266.50	685.00	519.50	915.00	426.00
AQ-Q10	20.00	13.86	30.03	20.24	19.06	18.60	29.55	22.52	17.76	35.84	30.06	8.90	26.82	23.79	14.79	15.50	13.18	22.32	15.29	13.33	18.51	28.08	30.50	21.30
AQ-Q11	0.83	0.65	1.17	0.96	0.82	0.49	1.17	0.70	1.18	1.11	1.10	0.37	1.11	0.67	0.97	0.60	1.21	0.81	0.88	0.35	0.52	1.15	1.23	1.11
AR-Q1	3.24	2.98	4.80	1.93	2.18	2.81	2.05	2.23	4.09	2.14	5.15	4.79	1.83	4.10	3.13	2.33	2.46	3.59	2.39	2.92	2.96	2.76	2.42	4.56
AR-Q2	9.17	6.20	10.00	17.50	23.50	8.83	16.53	12.18	8.56	17.40	9.20	9.42	18.75	9.45	13.11	10.91	8.91	8.73	12.07	15.42	14.79	6.48	6.92	6.68
AR-Q3	0.11	0.07	0.08	0.19	0.18	0.10	0.18	0.15	0.07	0.16	0.10	0.11	0.19	0.10	0.12	0.12	0.09	0.07	0.14	0.21	0.13	0.11	0.11	0.11
AR-Q4	0.41	0.63	0.39	0.51	0.66	0.31	0.60	0.36	0.62	0.63	0.27	0.30	0.49	0.45	0.30	0.47	0.40	0.43	0.36	0.60	0.89	0.40	0.29	0.32
AR-Q5	5.56	5.80	8.31	8.11	2.84	11.17	3.34	8.44	3.99	4.41	6.40	2.88	4.03	6.44	7.41	3.96	3.68	9.42	8.09	3.53	8.11	8.43	5.43	5.94
AR-Q6	1.00	1.22	0.68	1.14	1.22	1.52	1.16	1.75	0.68	0.69	1.06	0.83	0.72	0.87	1.27	0.97	0.91	1.64	1.93	0.90	1.54	1.00	0.64	1.10
AR-Q7	13.89	14.59	13.87	18.82	11.10	17.66	12.99	21.01	7.31	9.81	9.25	10.91	8.41	21.22	13.57	8.67	12.10	19.68	20.21	16.48	26.79	20.25	15.76	15.94
AR-Q8	2.57	1.78	2.53	2.37	1.96	2.10	2.07	1.91	3.73	2.60	4.36	1.81	3.22	2.16	3.63	4.20	2.82	2.60	1.75	2.16	1.89	1.75	2.19	2.87
AR-Q9	0.72	0.72	0.47	0.51	0.75	0.82	0.72	0.73	0.89	0.74	1.29	0.86	0.67	0.72	0.66	0.74	0.84	0.52	0.69	0.43	0.41	0.77	0.46	0.70
AR-Q10	0.72	0.75	0.92	0.58	0.73	0.73	0.75	0.55	0.83	0.66	1.26	0.55	0.81	0.53	0.64	0.71	0.82	0.85	0.68	0.85	0.41	0.72	0.44	0.49
AR-Q11	0.87	0.93	0.83	1.20	0.72	1.28	0.53	0.78	0.65	0.54	0.80	0.62	0.63	1.26	1.23	0.87	0.53	1.02	1.80	0.91	1.28	0.81	0.89	0.96
AR-Q12	4.50	3.39	4.27	5.75	3.79	5.02	5.75	9.02	2.53	2.61	5.00	3.95	3.27	6.55	4.70	2.89	5.68	7.23	6.10	3.22	4.98	7.09	3.96	3.36
AR-Q13	1.06	0.63	1.22	0.68	0.73	1.12	1.07	1.13	1.35	0.59	1.53	0.75	0.74	1.02	1.42	1.75	1.15	1.04	0.77	0.85	0.82	0.69	0.93	0.96
AS-Q1	4.19	6.07	4.12	3.00	4.23	6.58	4.14	3.84	2.80	2.02	4.22	0.00	4.08	0.00	4.55	4.53	5.54	3.08	3.71	0.00	2.98	3.00	6.07	2.44
AS-Q2	0.48	0.39	0.40	0.50	0.86	0.59	0.50	0.74	0.54	0.65	0.40	0.00	0.34	0.00	0.48	0.59	0.43	0.63	0.47	0.00	0.69	0.61	0.64	0.76

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AS-Q3	8.00	5.06	11.50	10.57	8.80	5.18	5.00	12.24	6.73	11.67	7.88	0.00	6.28	0.00	10.80	5.50	4.96	11.30	8.17	0.00	10.27	12.79	8.45	19.11
AS-Q4	0.48	0.55	0.50	0.45	0.68	0.49	0.52	0.47	0.40	0.68	0.43	0.00	0.45	0.00	0.42	0.51	0.66	0.60	0.49	0.00	0.75	0.48	0.50	0.80
AS-Q5	0.34	0.36	0.24	0.45	0.45	0.34	0.33	0.56	0.36	0.36	0.22	0.00	0.26	0.00	0.57	0.36	0.35	0.39	0.32	0.00	0.46	0.75	0.24	0.45
AS-Q6	0.48	0.45	0.50	0.61	0.71	0.36	0.46	0.48	0.48	0.38	0.46	0.00	0.44	0.00	0.41	0.51	0.34	0.68	0.43	0.00	0.49	0.80	0.54	0.82
AS-Q7	2.57	3.26	2.76	2.24	3.60	2.48	2.10	3.17	2.74	3.62	2.25	0.00	3.16	0.00	3.39	1.96	2.43	2.75	2.14	0.00	3.52	2.42	2.03	4.29
AS-Q8	0.09	0.06	0.06	0.19	0.12	0.08	0.09	0.14	0.08	0.13	0.10	0.00	0.09	0.00	0.09	0.09	0.09	0.12	0.05	0.00	0.12	0.21	0.10	0.09
AS-Q9	72.00	100.00	75.00	97.37	90.00	58.76	65.66	70.37	74.00	96.33	68.48	0.00	47.51	0.00	92.86	84.62	44.44	137.50	102.74	0.00	96.70	114.29	51.75	113.19
AS-Q10	0.25	0.39	0.30	0.23	0.37	0.25	0.15	0.47	0.39	0.14	0.19	0.00	0.29	0.00	0.15	0.33	0.35	0.27	0.33	0.00	0.50	0.35	0.25	0.24
AS-Q11	3.00	3.50	2.50	4.00	6.50	5.50	4.00	4.50	3.25	2.33	2.00	0.00	4.00	0.00	3.50	3.00	3.50	3.00	3.25	0.00	3.67	4.00	3.50	2.33
AS-Q12	3.00	2.18	3.01	3.10	2.71	2.98	3.91	3.21	4.15	2.93	5.50	0.00	4.08	0.00	2.70	3.49	2.15	2.98	2.70	0.00	3.24	1.32	2.26	2.31
AS-Q13	0.11	0.11	0.12	0.14	0.15	0.07	0.12	0.17	0.13	0.13	0.10	0.00	0.08	0.00	0.10	0.11	0.11	0.21	0.16	0.00	0.13	0.18	0.16	0.19
AS-Q14	4.50	7.04	3.51	5.52	5.20	8.59	3.19	4.59	5.12	3.48	2.97	0.00	4.60	0.00	4.35	5.96	3.41	5.03	5.91	0.00	6.29	5.71	4.70	2.85
AS-Q15	150.00	153.47	244.71	126.04	213.11	154.32	200.00	170.97	144.21	125.56	222.02	0.00	220.83	0.00	217.95	144.94	137.21	107.69	163.38	0.00	125.86	62.76	112.96	172.29
AT-Q1	11.67	16.93	11.95	6.78	10.57	16.58	0.00	7.67	10.47	0.00	6.00	14.31	12.67	0.00	17.50	18.09	0.00	12.31	12.71	0.00	11.29	7.19	0.00	18.13
AT-Q2	0.94	1.25	1.33	1.50	0.82	0.92	0.00	0.88	0.79	0.00	1.20	1.23	1.20	0.00	0.60	0.58	0.00	0.81	0.68	0.00	0.67	1.50	0.00	0.62
AT-Q3	7.50	5.17	10.93	12.86	7.14	10.91	0.00	7.11	8.24	0.00	6.77	6.11	4.98	0.00	5.77	4.85	0.00	7.43	5.14	0.00	9.15	15.44	0.00	4.65
AT-Q4	0.10	0.09	0.12	0.10	0.07	0.09	0.00	0.15	0.10	0.00	0.09	0.15	0.09	0.00	0.07	0.07	0.00	0.06	0.06	0.00	0.10	0.15	0.00	0.05
AT-Q5	0.47	0.45	0.40	0.51	0.39	0.34	0.00	0.50	0.39	0.00	0.60	0.55	0.28	0.00	0.33	0.34	0.00	0.45	0.34	0.00	0.35	0.75	0.00	0.22
AT-Q6	0.54	0.34	1.11	0.64	0.56	0.38	0.00	0.65	0.35	0.00	0.46	0.64	0.71	0.00	0.52	0.52	0.00	0.33	0.65	0.00	0.78	0.58	0.00	0.35
AT-Q7	30.00	36.59	42.55	50.00	29.17	29.27	0.00	28.85	44.12	0.00	36.73	34.04	30.00	0.00	30.00	39.29	0.00	40.63	32.08	0.00	32.56	47.73	0.00	13.11
AT-Q8	30.00	18.52	33.33	45.00	19.72	20.00	0.00	51.72	32.61	0.00	33.96	31.37	20.69	0.00	31.58	22.45	0.00	27.66	32.69	0.00	22.22	32.31	0.00	26.67
AT-Q9	150.00	187.50	222.22	200.00	116.67	200.00	0.00	214.29	107.14	0.00	138.46	123.08	150.00	0.00	100.00	157.14	0.00	108.33	121.43	0.00	140.00	175.00	0.00	61.54
AT-Q10	45.71	39.73	75.38	48.00	58.06	30.34	0.00	51.47	48.33	0.00	43.28	43.33	43.75	0.00	41.67	44.23	0.00	27.27	44.87	0.00	63.49	56.92	0.00	50.00
AT-Q11	26.67	24.37	26.63	21.24	31.30	26.73	0.00	42.17	26.85	0.00	39.19	26.00	23.73	0.00	23.15	22.55	0.00	28.04	24.14	0.00	22.99	31.09	0.00	17.86
AT-Q12	0.67	0.40	1.02	0.63	1.03	0.41	0.00	0.69	0.63	0.00	0.64	0.43	0.74	0.00	0.64	0.58	0.00	0.45	0.41	0.00	1.29	0.73	0.00	0.52
AT-Q13	1.78	1.00	4.08	2.40	2.40	1.29	0.00	2.92	2.07	0.00	1.32	1.08	1.47	0.00	1.79	1.10	0.00	2.00	2.50	0.00	2.50	2.31	0.00	1.88
AU-Q1	1.04	0.65	0.94	1.04	0.68	0.91	0.55	0.68	0.00	1.15	1.23	1.09	0.00	0.95	1.02	0.00	0.82	0.00	1.34	1.04	1.04	0.00	1.19	1.80
AU-Q2	1.34	2.09	1.78	0.92	1.97	1.15	1.68	2.14	0.00	1.45	1.45	0.74	0.00	1.52	0.92	0.00	1.95	0.00	1.05	0.98	0.91	0.00	1.09	0.52
AU-Q3	6.98	10.66	3.90	4.36	16.67	6.02	8.33	15.48	0.00	9.60	4.71	5.77	0.00	7.81	4.73	0.00	9.78	0.00	6.46	7.39	6.90	0.00	5.27	4.56
AU-Q4	0.27	0.32	0.35	0.37	0.41	0.16	0.29	0.41	0.00	0.32	0.18	0.15	0.00	0.20	0.20	0.00	0.25	0.00	0.20	0.17	0.16	0.00	0.24	0.17
AU-Q5	1.99	3.04	1.86	2.08	2.40	1.72	1.75	2.81	0.00	2.16	2.21	1.59	0.00	1.64	1.92	0.00	2.74	0.00	1.68	2.48	2.67	0.00	1.23	1.41
AU-Q6	0.15	0.24	0.11	0.11	0.24	0.14	0.23	0.25	0.00	0.15	0.12	0.10	0.00	0.17	0.14	0.00	0.15	0.00	0.16	0.17	0.15	0.00	0.20	0.11
AU-Q7	0.45	0.61	0.39	0.45	0.69	0.40	0.39	0.50	0.00	0.30	0.54	0.38	0.00	0.49	0.37	0.00	0.63	0.00	0.36	0.34	0.34	0.00	0.43	0.22
AU-Q8	7.44	8.50	7.95	6.86	10.60	4.61	11.70	8.83	0.00	12.94	8.51	4.23	0.00	8.00	7.63	0.00	7.06	0.00	7.08	7.74	7.24	0.00	7.61	3.05
AU-Q9	111.67	173.80	110.11	94.27	181.67	57.32	143.49	175.00	0.00	125.84	117.11	91.86	0.00	81.21	85.58	0.00	156.17	0.00	117.19	116.07	76.96	0.00	71.51	73.28
AU-Q10	37.22	41.85	36.75	41.17	45.60	29.38	35.09	41.22	0.00	41.40	24.93	19.75	0.00	41.78	33.38	0.00	33.36	0.00	28.85	40.63	38.00	0.00	27.89	24.00
AU-Q11	10.00	12.59	5.22	8.21	10.91	13.78	8.08	10.53	0.00	4.17	14.75	13.73	0.00	13.61	8.86	0.00	14.71	0.00	10.82	5.46	5.11	0.00	11.00	6.03
AV-Q1	0.70	0.66	0.47	0.74	0.88	1.01	0.00	0.96	0.55	0.00	0.70	1.07	1.10	0.00	0.68	0.95	0.00	0.70	0.73	0.00	0.65	0.56	0.00	0.55
AV-Q2	0.94	1.35	0.70	0.75	1.08	1.03	0.00	1.23	1.03	0.00	1.58	1.00	1.44	0.00	0.67	1.20	0.00	1.01	0.60	0.00	0.97	1.03	0.00	0.78
AV-Q3	0.94	1.06	0.95	1.01	0.70	0.70	0.00	0.84	0.68	0.00	0.97	0.96	0.98	0.00	0.94	1.11	0.00	1.09	0.63	0.00	0.67	0.90	0.00	0.55
AV-Q4	40.11	57.76	41.54	28.13	50.35	42.83	0.00	86.20	28.22	0.00	42.94	33.20	45.37	0.00	27.13	31.96	0.00	61.41	40.48	0.00	39.97	28.96	0.00	29.97
AV-Q5	18.75	20.00	17.25	28.00	12.00	15.00	0.00	11.67	34.67	0.00	25.75	16.80	20.75	0.00	30.00	23.75	0.00	13.60	13.17	0.00	17.00	22.25	0.00	33.00
AV-Q6	3.26	2.22	1.97	2.90	2.07	2.86	0.00	1.67	3.85	0.00	3.32	4.42	4.37	0.00	3.00	6.33	0.00	3.40	3.16	0.00	4.86	4.45	0.00	2.36
AV-Q7	0.10	0.15	0.21	0.23	0.10	0.11	0.00	0.11	0.10	0.00	0.12	0.06	0.13	0.00	0.21	0.08	0.00	0.07	0.10	0.00	0.06	0.06	0.00	0.14
AV-Q8	0.92	1.44	1.52	1.53	1.38	1.11	0.00	0.78	1.23	0.00	1.19	1.00	0.70	0.00	1.43	0.83	0.00	0.51	0.61	0.00	0.47	0.59	0.00	1.33
AV-Q9	5.75	6.62	10.64	11.46	7.80	6.80	0.00	8.17	5.79	0.00	6.72	5.83	5.60	0.00	8.15	3.37	0.00	5.63	3.87	0.00	2.77	5.80	0.00	5.50
AW-Q1	10.00	8.42	13.35	13.18	5.76	0.00	7.13	8.06	4.18	5.84	0.00	6.86	0.00	6.33	9.98	0.00	6.59	10.30	7.81	0.00	10.73	10.79	6.72	9.99
AW-Q2	1.20	0.96	1.41	0.86	1.46	0.00	1.53	1.37	2.01	2.17	0.00	1.14	0.00	1.43	1.04	0.00	1.78	1.30	1.88	0.00	0.72	0.70	1.68	0.69
AW-Q3	6.35	7.76	4.47	4.75	7.55	0.00	14.12	4.31	12.97	11.41	0.00	4.47	0.00	5.31	4.30	0.00	10.05	6.58	9.70	0.00	4.53	6.59	10.69	8.84
AW-Q4	1.20	0.94	1.18	0.61	2.00	0.00	2.00	1.59	2.11	2.05	0.00	1.18	0.00	1.37	1.12	0.00	2.51	1.41	1.26	0.00	1.08	1.23	1.30	1.17
AW-Q5	0.23	0.27	0.15	0.11	0.28	0.00	0.32	0.24	0.28	0.39	0.00	0.15	0.00	0.27	0.20	0.00	0.36	0.18	0.36	0.00	0.14	0.18	0.29	0.18
AW-Q6	0.03	0.03	0.03	0.03	0.03	0.00	0.04	0.03	0.06	0.04	0.00	0.03	0.00	0.04	0.03	0.00	0.04	0.03	0.04	0.00	0.03	0.03	0.05	0.03
AW-Q7	15.00	20.44	15.87	20.13	14.57	0.00	24.07	20.29	16.96	10.91	0.00	12.42	0.00	23.53	22.83	0.00	20.72	23.11	11.44	0.00	14.34	13.35	9.49	20.21
BA-Q1	9.67	21.33	8.39	13.36	6.19	6.45	9.22	9.18	11.79	8.26	7.20	6.58	10.65	12.00	10.91	7.43	13.14	12.36	14.42	9.01	8.45	9.12	6.67	6.34
BA-Q2	1.45	2.18	1.28	1.94	2.25	1.60	1.00	0.95	1.35	0.91	0.73	1.47	1.94	2.25	2.18	0.88	1.29	1.21	1.41	1.07	0.83	1.04	1.57	1.64
BA-Q3	1.81	2.53	1.05	2.82	1.93	1.85	1.73	1.73	1.94	2.73	1.27	1.56	1.94	2.05	2.64	2.44	2.58	2.43	1.35	2.23	1.71	1.86	1.69	1.77
BA-Q4	1.81	2.82	1.15	1.72	1.50	2.67	1.86	1.73	1.55	1.67	1.27	1.04	1.57	2.05	2.18	2.00	1.63	1.55	1.29	1.93	1.60	1.86	1.69	1.64
BA-Q5	7.25	6.86	5.75	10.33	9.00	8.00	4.33	3.80	7.75	6.00	3.17	12.50	16.50	11.25	12.33	4.40	6.20	6.80	7.75	5.80	6.00	4.33	4.40	5.75
BB-Q1	27.17	31.46	47.79	18.37	20.36	51.83	26.92	19.09	21.30	19.93	28.48	16.42	35.96	18.67	29.50	26.03	17.84	32.41	16.63	53.37	16.96	23.48	21.91	17.72
BB-Q2	12.52	9.81	22.17	13.37	5.99	16.91	12.80	12.73	12.81	12.89	8.49	11.59	21.97	12.08	17.83	8.19	17.04	16.48	8.88	22.68	12.55	10.90	6.59	6.11
BB-Q3	12.00	12.95	20.53	16.92	8.11	17.10	8.03	8.02	12.58	8.03	12.05	12.40	17.02	7.81	11.52	18.67	12.33	9.83	11.80	19.09	12.31	7.91	13.17	8.07
BB-Q4	12.52	12.76	18.63	13.37	11.17	22.47	12.20	14.75	13.71	12.78	12.38	8.76	11.97	11.97	20.91	12.80	13.48	22.72	11.37	20.46	8.42	9.85	10.36	7.27
BB-Q5	90.00	99.82	138.56	67.69	70.46	121.00	58.77	92.55	114.25	118.00	69.74	69.56	133.54	54.35	130.31	94.92	89.15	120.07	54.52	143.19	108.75	53.48	76.83	38.43
BC-Q1	73.11	55.03	63.17	56.51	97.32	97.76	44.81	81.36	102.38	101.89	82.24	55.12	49.12	56.98	53.17	49.44	117.92	162.32	63.17	87.24	64.24	45.28	57.27	51.47
BC-Q2	28.44	22.46	17.76	21.02	39.73	25.70	18.14	32.22	38.15	25.01	40.92	16.77	30.81	26.43	32.67	26.44	42.17	47.47	16.65	31.40	25.63	25.43	35.68	27.13
BC-Q3	3.88	2.95	2.73	4.20	5.66	3.81	3.72	2.97	3.55	8.14	5.16	5.09	2.95	3.34	4.40	3.33	3.70	4.45	3.35	3.41	3.35	2.19	3.04	4.30
BC-Q4	32.29	18.27	19.28	31.73	46.60	41.42	21.81	26.91	34.09	32.30	28.99	33.80	33.47	21.30	27.04	34.19	51.71	52.42	28.77	47.84	19.04	43.59	56.10	33.43

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
BC-Q5	215.28	164.18	309.72	222.08	305.25	187.80	172.48	233.76	228.48	338.28	223.79	158.43	168.65	159.67	160.69	172.43	210.38	263.36	190.27	185.56	302.91	202.31	279.46	214.92
BC-Q6	227.94	130.63	226.14	273.72	228.94	311.81	189.73	165.58	335.35	329.14	457.11	234.82	162.41	216.53	164.51	216.33	231.41	330.18	141.29	353.27	208.25	169.44	203.93	167.16
BD-Q1	24.55	18.48	22.73	22.16	34.97	21.20	54.48	16.51	19.25	17.65	16.61	16.12	21.11	24.60	21.21	18.40	19.54	54.72	16.10	22.74	34.35	25.97	24.23	25.75
BD-Q2	45.00	23.82	49.36	37.70	47.00	29.15	77.90	47.88	45.91	44.92	32.40	58.13	26.93	42.46	42.10	45.11	62.75	73.27	29.42	32.35	60.08	28.33	26.19	29.50
BD-Q3	60.00	40.50	49.36	47.13	42.73	54.14	55.64	47.88	63.13	38.50	60.75	58.13	53.86	34.50	52.63	40.60	71.71	67.17	62.11	78.57	55.46	63.75	52.38	59.00
BD-Q4	45.00	33.75	45.25	23.56	47.00	37.90	97.38	47.88	28.06	38.50	28.59	42.27	25.13	61.33	30.07	33.83	41.83	57.57	32.88	50.00	65.55	63.75	46.56	52.44
BD-Q5	19.29	8.62	30.17	26.93	18.80	16.48	31.16	13.21	18.04	22.46	19.44	17.22	16.39	19.03	18.30	20.30	15.69	31.00	13.00	15.28	22.53	21.25	13.52	20.52
BE-Q1	14.67	11.03	10.91	9.65	23.75	17.87	12.74	11.06	9.95	16.20	18.15	16.43	20.56	19.17	23.48	20.44	14.08	12.88	14.33	20.58	8.40	9.22	12.45	32.45
BE-Q2	0.96	0.87	0.49	0.49	1.14	0.88	0.60	0.50	0.95	1.29	1.45	1.48	1.34	1.22	1.46	1.31	1.04	0.63	0.63	1.04	1.00	1.33	0.60	1.69
BE-Q3	1.83	1.80	1.30	0.85	1.84	2.00	2.67	1.29	1.60	1.91	2.03	2.57	3.92	2.50	2.70	1.70	2.50	0.94	1.96	2.38	1.55	1.74	1.07	2.03
BE-Q4	1.05	1.02	0.68	0.54	2.04	0.89	0.73	0.79	1.08	1.47	1.02	1.18	1.34	0.90	1.64	2.00	1.35	1.21	0.78	1.27	0.67	0.93	0.88	1.85
BE-Q5	5.50	4.09	2.50	3.67	8.14	6.00	5.00	4.40	8.00	5.73	10.17	8.43	4.64	10.00	6.00	5.11	4.55	4.86	5.88	5.18	4.25	5.71	4.83	10.17
BF-Q1	11.43	18.42	13.11	15.84	17.06	16.86	7.08	8.03	17.08	11.04	6.90	7.14	11.87	17.98	7.85	17.85	7.72	9.45	22.10	8.01	12.40	22.09	8.01	11.30
BF-Q2	21.33	22.00	24.77	20.18	40.40	38.40	27.90	21.40	20.93	40.92	29.70	30.56	21.77	29.06	19.15	16.87	14.25	11.75	47.36	20.71	30.00	31.50	20.25	12.71
BF-Q3	7.11	7.78	5.28	6.13	9.40	10.67	6.80	5.94	5.33	10.02	7.24	7.43	4.96	7.62	5.08	5.38	7.92	5.73	10.63	5.27	6.77	10.26	4.76	9.54
BF-Q4	21.33	31.63	23.00	21.44	33.67	22.59	21.46	12.59	15.42	21.35	12.38	13.10	23.58	31.00	15.56	23.00	15.83	13.06	24.81	19.33	30.00	24.50	27.00	20.54
BF-Q5	17.78	18.07	12.38	31.18	18.36	34.91	12.13	26.75	18.31	23.38	24.75	25.00	18.87	25.83	17.79	19.46	21.92	14.69	24.81	16.11	19.09	25.94	16.20	12.14
C-Q1	0.34	0.57	0.60	0.31	0.23	0.21	0.31	0.26	0.21	0.24	0.20	0.21	0.54	0.46	0.42	0.39	0.24	0.25	0.25	0.33	0.37	0.47	0.50	0.44
C-Q2	2.63	4.39	2.97	1.64	3.43	3.64	2.26	1.39	1.86	2.40	2.42	2.62	3.05	2.30	2.44	2.27	1.44	1.36	2.70	2.74	2.49	5.68	4.03	2.32
C-Q3	0.19	0.20	0.17	0.12	0.13	0.11	0.16	0.11	0.12	0.16	0.11	0.10	0.22	0.15	0.21	0.21	0.21	0.23	0.09	0.18	0.11	0.13	0.13	0.13
C-Q4	0.55	0.43	0.33	0.54	0.56	0.77	0.69	0.63	0.61	0.97	0.79	0.55	0.43	0.65	0.54	0.58	1.12	1.14	0.56	0.70	0.38	0.39	0.39	0.42
C-Q5	0.33	0.35	0.20	0.41	0.36	0.33	0.35	0.39	0.54	0.50	0.44	0.44	0.25	0.25	0.26	0.39	0.48	0.46	0.43	0.35	0.36	0.20	0.18	0.17
C-Q6	0.36	0.14	0.47	0.30	0.32	0.35	0.35	0.35	0.36	0.21	0.28	0.27	0.43	0.46	0.52	0.47	0.23	0.35	0.30	0.34	0.25	0.42	0.45	0.55
C-Q7	0.19	0.20	0.12	0.14	0.25	0.26	0.27	0.19	0.10	0.18	0.26	0.25	0.15	0.13	0.15	0.10	0.15	0.20	0.23	0.21	0.22	0.38	0.30	0.17
DA-Q1	54.29	36.71	54.09	44.45	50.65	51.89	62.35	60.09	83.16	45.22	91.01	90.96	53.00	54.08	36.66	56.40	58.31	33.41	56.43	57.49	86.06	75.84	75.53	76.80
DB-Q1	161.29	160.74	173.23	182.62	244.62	177.85	185.12	126.60	258.13	189.81	181.54	160.66	201.74	159.15	114.07	163.94	112.45	101.54	168.81	142.14	189.58	164.98	168.89	199.74
DC-Q1	260.59	259.62	187.71	213.52	474.36	486.58	302.85	212.32	440.27	482.97	438.65	415.52	272.51	245.12	196.29	217.38	191.85	218.32	355.83	292.69	303.34	313.54	261.47	269.18
DD-Q1	46.70	41.02	45.59	53.43	71.14	75.05	39.14	73.74	74.78	44.63	81.63	63.04	27.63	33.05	42.95	28.69	32.44	29.55	41.99	46.49	86.71	48.89	69.33	46.41
DE-Q1	103.50	106.66	103.46	77.54	139.16	118.81	118.84	122.89	114.02	91.43	168.10	113.98	103.48	101.00	88.02	76.62	134.83	147.43	152.89	74.44	99.00	107.36	69.42	65.73
E-Q1	233.16	233.16	190.46	216.77	338.86	374.73	236.32	263.42	392.47	213.91	541.46	244.72	215.19	151.19	204.71	158.40	160.81	233.79	243.93	160.05	296.30	244.86	196.33	209.87
E-Q2	207.01	179.44	179.44	204.24	274.76	288.39	197.71	213.59	302.75	240.16	301.65	288.38	170.06	177.84	173.59	177.84	184.97	172.60	251.26	188.26	240.25	189.05	179.85	183.83
F-Q1	16.80	16.30	16.40	18.18	25.73	16.06	19.54	13.71	19.17	16.80	18.48	27.01	15.54	16.80	15.83	14.33	14.55	15.74	16.80	17.35	21.35	16.28	11.58	17.17
F-Q2	49.41	37.57	32.61	53.38	51.17	105.37	42.43	40.30	81.36	66.70	87.66	53.71	30.91	37.25	31.28	33.57	58.82	36.29	69.18	30.84	60.03	30.23	36.98	37.81
F-Q3	0.23	0.24	0.17	0.30	0.17	0.16	0.41	0.13	0.37	0.18	0.21	0.21	0.19	0.29	0.20	0.14	0.17	0.24	0.27	0.23	0.18	0.09	0.15	0.29
F-Q4	0.67	0.67	0.68	0.59	0.50	0.67	0.98	0.70	0.89	0.65	0.62	0.70	0.44	0.84	0.65	0.77	0.60	0.44	0.74	0.66	0.80	0.70	0.72	0.79
G-Q1	24.57	25.98	21.48	38.32	25.26	16.61	23.85	18.41	21.47	24.66	16.61	16.61	18.52	54.76	43.00	19.22	16.61	16.13	16.57	18.41	17.28	34.40	25.76	15.71
G-Q2	276.76	280.88	491.78	402.88	404.89	403.19	371.50	198.11	217.40	455.85	267.86	220.33	208.77	674.81	594.88	276.94	210.08	245.22	324.74	241.83	179.48	388.29	287.08	297.11
G-Q3	8.53	6.85	6.29	6.18	5.69	6.08	7.94	7.75	8.00	5.67	6.72	10.07	9.93	5.63	6.08	10.50	11.25	9.92	5.28	7.29	14.08	7.67	8.73	8.25
G-Q4	5.69	5.42	4.84	6.93	6.89	8.64	8.73	4.33	2.79	10.13	5.74	5.02	4.74	8.68	8.19	6.29	5.12	4.35	8.56	3.21	5.27	4.72	4.46	5.54
G-Q5	0.73	0.77	1.04	0.63	0.59	0.48	0.55	0.55	1.88	0.70	0.50	0.58	0.58	0.50	0.57	0.90	0.84	0.88	0.55	0.73	0.57	0.85	0.63	0.49
G-Q6	1.39	1.33	1.06	1.10	0.91	1.07	1.92	0.95	1.14	2.16	1.39	1.65	1.67	3.47	2.16	1.43	1.09	0.96	1.65	1.00	1.20	1.85	1.34	1.47
G-Q7	24.75	16.90	63.31	33.42	39.92	33.43	22.91	22.91	23.73	15.62	15.45	21.38	19.97	16.15	16.26	29.54	29.53	36.10	31.49	22.90	23.39	22.92	17.93	17.41
G-Q8	0.56	1.33	0.36	0.57	0.53	0.38	0.44	0.44	0.38	1.33	1.24	0.42	0.37	0.43	0.54	0.52	0.52	0.38	0.42	0.38	0.40	0.38	0.77	0.76
G-Q9	3.79	3.79	4.70	5.56	6.01	5.41	2.97	2.98	2.32	3.82	3.53	2.91	2.73	5.44	5.10	4.21	4.19	3.35	3.39	5.91	2.73	6.38	3.92	6.01
G-Q10	9.97	9.97	8.13	6.25	5.80	6.35	14.76	7.32	8.34	12.79	7.12	7.77	7.34	12.75	11.21	15.13	12.33	6.24	11.32	4.26	9.42	18.51	9.87	11.80
G-Q11	4.03	6.55	3.28	5.30	5.30	5.51	3.50	3.14	3.31	6.31	6.49	3.66	3.93	3.78	5.69	4.31	4.32	5.57	2.05	4.58	2.93	4.56	5.57	5.67

Rate ratios

AB-R1	3.33	4.91	5.70	6.53	4.72	4.04	4.07	4.53	4.86	4.53	4.23	4.72	4.72	5.84	4.72	4.71	4.72	4.90	5.26	3.74	3.78	4.05	3.78	3.78
AB-R2	0.97	0.75	0.87	0.87	0.92	1.01	0.74	0.89	0.95	0.95	0.83	0.92	0.92	0.96	0.86	0.86	0.86	0.90	0.96	1.46	0.94	1.01	1.21	1.01
AB-R3	7.66	10.45	13.01	14.97	13.33	8.35	10.69	11.91	12.77	11.92	11.93	13.33	14.27	14.83	15.22	16.29	17.50	17.01	18.24	10.45	14.66	15.73	12.18	11.35
AB-R4	5.70	8.72	10.85	10.86	8.51	5.67	7.34	8.18	8.18	7.62	7.64	8.51	8.49	9.54	8.50	8.52	8.52	8.85	8.86	8.02	9.83	9.83	9.83	9.81
AC-R1	137.84	192.31	192.31	199.96	192.39	192.39	192.39	192.39	150.20	192.39	214.45	192.21	192.22	179.40	199.98	199.98	223.68	141.81	211.47	197.08	216.02	167.43	199.96	167.43
AC-R2	24.32	23.46	25.13	21.88	24.25	25.98	24.25	25.98	21.88	27.83	27.83	23.28	24.95	24.95	24.95	24.95	22.51	17.69	26.38	24.59	25.90	21.88	21.88	21.88
AC-R3	0.19	0.21	0.22	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.16	0.17	0.16	0.16	0.15	0.16	0.10	0.14	0.12	0.14	0.19	0.19	0.19
AC-R4	0.23	0.22	0.23	0.22	0.24	0.24	0.35	0.38	0.32	0.28	0.24	0.24	0.25	0.25	0.24	0.33	0.35	0.25	0.20	0.17	0.16	0.20	0.22	0.37
AC-R5	0.80	0.89	0.95	0.95	1.09	1.17	0.60	0.60	0.60	1.55	1.55	1.77	1.90	2.04	1.90	0.50	0.50	0.50	0.60	0.53	0.61	0.95	0.95	0.52
AC-R6	0.22	0.24	0.26	0.24	0.21	0.23	0.22	0.22	0.22	0.25	0.24	0.21	0.23	0.23	0.21	0.15	0.15	0.10	0.21	0.19	0.21	0.23	0.24	0.22
AC-R7	0.35	0.50	0.53	0.50	0.57	0.62	0.56	0.52	0.42	0.52	0.58	0.54	0.54	0.51	0.47	0.33	0.36	0.25	0.34	0.32	0.51	0.47	0.50	0.51
AC-R8	0.27	0.24	0.24	0.21	0.23	0.21	0.20	0.28	0.24	0.32	0.32	0.23	0.25	0.23	0.23	0.22	0.23	0.17	0.29	0.27	0.27	0.21	0.21	0.17
AC-R9	0.30	0.31	0.31	0.29	0.29	0.31	0.29	0.45	0.36	0.52	0.52	0.28	0.30	0.30	0.30	0.28	0.30	0.33	0.50	0.46	0.48	0.27	0.29	0.28
AC-R10	0.41	0.39	0.53	0.59	0.57	0.57	0.57	0.57	0.44	0.57	0.63	0.43	0.39	0.43	0.43	0.43	0.43	0.23	0.30	0.27	0.29	0.49	0.59	0.49
AC-R11	1.00	0.68	0.68	0.70	0.68	0.68	0.68	0.68	0.87	0.63	0.68	1.94	1.94	2.23	2.39	2.56	2.39	0.88	1.00	0.78	0.69	0.75	0.70	0.75
AC-R12	5.68	8.37	8.96	7.26	8.37	8.96	8.37	8.96	5.90	10.29	9.60	4.56	4.88	4.25	3.97	3.70	3.97	4.33	5.68	6.77	7.95	6.77	7.26	6.77
AC-R13	1.00	1.01	1.01	1.08	1.01	1.01	1.01	1.01	1.10	1.09	1.09	1.16	1.16	1.16	0.97	0.91	0.97	0.69	1.34	1.08	1.48	1.08	1.08	1.08

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AC-R14	83.78	140.40	150.43	78.82	87.34	87.34	127.88	137.01	117.28	103.47	87.14	143.94	143.94	134.34	115.74	115.74	124.01	87.94	82.85	73.56	97.34	73.56	78.82	134.17
AC-R15	27.03	20.31	20.31	33.72	38.88	41.66	21.33	21.33	17.04	49.35	49.35	18.14	19.43	18.14	23.74	22.16	22.16	14.67	26.09	31.48	39.43	31.48	33.72	16.91
AC-R16	48.65	48.79	52.28	50.88	50.88	50.88	51.01	51.01	40.76	45.74	45.74	50.02	50.02	50.02	49.47	46.17	49.47	35.08	51.50	47.49	42.13	47.49	50.88	46.63
AC-R17	0.24	0.31	0.33	0.27	0.24	0.26	0.24	0.24	0.24	0.28	0.27	0.26	0.26	0.24	0.34	0.34	0.36	0.25	0.36	0.34	0.24	0.26	0.27	0.24
AD-R1	1.00	1.61	1.61	1.51	1.61	0.86	0.81	0.75	0.75	0.99	0.99	0.99	0.99	0.91	0.92	0.92	0.93	0.93	0.93	1.21	0.24	1.31	1.21	0.75
AD-R2	6.04	9.74	10.40	4.74	9.76	8.79	9.41	8.08	5.52	3.86	3.60	3.95	4.25	4.24	3.80	3.42	4.45	4.45	3.95	10.49	0.47	7.76	10.50	10.10
AD-R3	6.04	8.64	9.22	3.85	8.66	5.75	5.75	5.93	3.97	3.11	2.71	2.72	4.15	4.44	4.75	4.27	3.59	3.35	2.53	8.01	0.77	8.04	8.02	5.35
AD-R4	0.61	0.58	0.63	0.53	0.58	0.43	0.40	0.40	0.40	0.52	0.46	0.46	0.41	0.44	0.41	0.41	0.53	0.49	0.40	0.51	2.07	0.64	0.51	0.35
AD-R5	0.34	0.26	0.22	0.22	0.26	0.53	0.57	0.61	0.65	0.24	0.25	0.23	0.37	0.37	0.42	0.38	0.25	0.23	0.26	0.28	1.28	0.23	0.28	0.65
AD-R6	0.20	0.21	0.23	0.19	0.21	0.20	0.20	0.20	0.20	0.17	0.15	0.15	0.20	0.20	0.21	0.21	0.18	0.18	0.14	0.20	4.51	0.21	0.20	0.19
AD-R7	1.46	2.34	2.35	1.39	2.34	0.81	0.76	1.00	0.95	1.47	1.47	1.52	0.96	1.21	0.98	0.92	1.69	1.69	1.55	2.04	3.32	2.39	2.04	0.61
AD-R8	0.10	0.11	0.10	0.10	0.11	0.17	0.12	0.16	0.13	0.11	0.11	0.11	0.11	0.10	0.13	0.11	0.10	0.09	0.10	0.10	4.00	0.10	0.10	0.13
AD-R9	4.84	5.50	5.14	3.11	5.50	2.56	3.56	3.70	4.59	3.24	3.25	3.28	3.07	4.66	3.12	3.13	4.28	4.28	4.06	5.60	1.06	5.22	5.59	2.99
AD-R10	0.79	0.78	0.70	0.70	0.78	1.53	1.53	0.72	0.72	0.59	0.59	0.86	0.93	1.02	0.70	0.53	0.57	0.51	1.04	0.69	0.72	0.84	0.69	1.47
AD-R11	0.09	0.10	0.10	0.09	0.10	0.08	0.05	0.12	0.14	0.08	0.08	0.06	0.05	0.06	0.07	0.08	0.10	0.09	0.05	0.09	1.17	0.08	0.09	0.08
AD-R12	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.05	0.05	0.04	0.04	0.02	0.02	0.03	0.03	0.04	0.05	0.04	0.03	0.03	0.72	0.03	0.03	0.02
AD-R13	4.28	4.28	4.28	4.28	4.28	4.20	1.93	5.57	7.77	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	0.93	4.28	4.28	4.16
AD-R14	1.39	1.08	1.01	0.94	1.08	0.57	0.83	2.75	2.11	1.91	2.05	0.72	0.67	0.62	2.05	2.43	1.84	1.84	0.54	1.33	0.11	0.88	1.33	0.70
AD-R15	1.64	1.38	1.38	1.29	1.38	0.96	0.93	1.80	3.30	1.64	1.64	1.13	1.05	0.98	1.25	1.48	1.82	1.82	0.98	1.73	0.01	1.05	1.73	1.09
AD-R16	1.79	2.25	2.10	1.27	2.25	1.76	1.84	4.10	3.61	1.70	1.82	1.17	1.10	1.28	1.70	1.88	2.15	2.15	1.12	2.41	0.03	1.86	2.41	1.70
AD-R17	0.04	0.02	0.02	0.04	0.02	0.02	0.02	0.04	0.08	0.03	0.03	0.03	0.03	0.04	0.05	0.04	0.03	0.03	0.02	0.02	0.97	0.02	0.02	0.02
AE-R1	1.00	0.86	0.86	0.81	0.86	0.75	0.75	0.68	0.72	0.68	0.68	0.92	0.92	0.86	0.86	0.86	0.86	0.57	0.63	0.63	0.62	0.86	0.81	0.65
AE-R2	221.48	200.62	187.23	193.14	187.24	162.99	160.43	212.60	216.02	227.35	227.76	121.37	121.19	113.06	113.34	105.74	113.18	210.85	233.96	233.89	230.90	193.37	193.57	150.98
AE-R3	0.11	0.16	0.17	0.15	0.17	0.17	0.17	0.12	0.10	0.12	0.11	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.07	0.09	0.10	0.15	0.15	0.14
AE-R4	0.13	0.14	0.14	0.16	0.15	0.16	0.18	0.12	0.15	0.11	0.11	0.15	0.14	0.15	0.15	0.16	0.15	0.20	0.12	0.13	0.13	0.16	0.16	0.21
AE-R5	60.00	36.26	33.84	68.91	58.29	58.29	39.81	37.16	47.00	52.72	62.59	40.48	40.47	43.37	42.22	39.40	39.40	39.40	81.03	73.82	76.36	73.82	68.90	40.47
AE-R6	0.04	0.04	0.04	0.07	0.07	0.09	0.05	0.03	0.03	0.07	0.07	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.06	0.06	0.07	0.04
AE-R7	0.06	0.07	0.08	0.08	0.08	0.08	0.09	0.07	0.06	0.05	0.05	0.08	0.07	0.08	0.08	0.08	0.08	0.07	0.06	0.06	0.05	0.08	0.08	0.10
AF-R1	0.65	0.41	0.44	0.56	0.41	0.77	0.83	0.97	0.80	0.74	0.44	0.44	0.47	0.72	0.63	0.63	0.43	0.40	0.46	0.46	0.46	0.37	0.40	0.90
AF-R2	1.40	1.60	1.50	1.26	1.27	1.44	1.44	1.37	1.30	1.21	2.42	2.26	2.42	1.10	0.99	0.92	1.80	1.80	1.35	1.45	1.26	1.40	1.40	1.47
AF-R3	24.26	23.01	23.01	29.58	42.55	31.51	35.12	32.16	21.92	23.49	21.53	21.53	21.53	19.71	25.06	25.05	25.13	25.12	29.14	27.20	29.14	37.07	37.07	30.88
AF-R4	19.41	17.06	12.02	15.21	49.68	26.21	31.31	26.21	17.97	17.97	18.61	18.61	20.08	16.77	20.54	19.17	20.36	20.36	14.03	21.60	13.10	37.55	40.23	25.37
AF-R5	24.26	38.73	17.93	17.01	25.47	22.77	22.77	35.05	29.74	31.87	32.89	29.18	32.53	34.86	39.19	41.98	38.39	35.77	16.87	34.74	18.08	25.47	23.77	23.07
AF-R6	1.00	0.87	1.04	0.76	0.53	0.79	0.71	0.75	0.81	0.75	0.64	0.96	0.90	1.05	0.81	0.75	0.69	0.98	0.89	0.81	0.89	0.65	0.61	0.73
AF-R7	0.04	0.03	0.06	0.06	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.06	0.03	0.06	0.04	0.04	0.04
AF-R8	157.14	114.25	106.72	144.43	328.32	278.86	333.07	290.53	126.26	113.21	123.90	103.68	103.87	95.08	117.69	117.72	118.02	118.03	117.17	109.40	130.60	265.70	284.66	254.10
AF-R9	0.13	0.14	0.13	0.10	0.07	0.10	0.09	0.09	0.12	0.11	0.12	0.12	0.12	0.14	0.12	0.13	0.12	0.13	0.10	0.11	0.11	0.09	0.08	0.10
AF-R10	0.14	0.09	0.18	0.18	0.13	0.14	0.16	0.08	0.08	0.09	0.08	0.10	0.09	0.09	0.08	0.12	0.09	0.10	0.24	0.10	0.19	0.13	0.14	0.14
AF-R11	0.15	0.20	0.15	0.15	0.16	0.14	0.17	0.14	0.17	0.21	0.25	0.18	0.16	0.15	0.17	0.20	0.27	0.18	0.25	0.19	0.23	0.22	0.18	0.23
AF-R12	1.00	0.75	0.72	0.68	1.93	2.07	2.22	0.68	0.57	2.56	2.39	2.39	1.57	1.68	1.81	1.93	1.02	0.75	0.65	0.91	0.92	0.99	0.91	0.75
AF-R13	34.38	29.69	31.84	43.13	57.64	45.74	54.63	55.80	43.77	35.88	35.96	33.55	33.93	31.07	35.11	32.77	34.08	32.15	36.37	23.84	36.13	33.55	33.56	30.79
AF-R14	6.20	11.47	5.67	5.32	8.69	8.29	6.25	8.98	8.77	8.77	11.41	9.45	11.29	11.29	12.09	12.09	10.67	8.37	3.85	8.80	5.06	7.88	9.24	6.37
AF-R15	2.81	2.12	1.78	2.52	3.70	2.68	3.20	3.00	2.47	2.21	2.74	3.03	2.74	2.34	2.64	2.64	3.49	2.60	2.09	3.13	3.22	2.74	3.19	2.46
AF-R16	0.12	0.15	0.18	0.17	0.16	0.17	0.11	0.11	0.10	0.11	0.13	0.11	0.13	0.13	0.13	0.13	0.06	0.08	0.11	0.07	0.12	0.18	0.16	0.12
AG-R1	0.05	0.03	0.04	0.07	0.05	0.05	0.04	0.05	0.06	0.08	0.03	0.04	0.04	0.04	0.03	0.05	0.04	0.06	0.04	0.05	0.05	0.04	0.05	0.09
AG-R2	0.59	0.85	0.91	0.56	0.87	0.90	0.69	0.35	0.60	0.65	0.64	0.57	0.47	0.47	0.63	0.45	0.70	0.88	0.68	0.94	0.87	0.68	0.90	0.25
AG-R3	1.28	2.64	2.90	1.96	1.74	1.01	2.12	0.88	2.09	1.79	1.58	1.46	1.28	1.19	1.47	1.04	1.24	0.74	1.42	1.12	1.20	1.42	1.01	0.54
AG-R4	0.05	0.04	0.07	0.07	0.07	0.06	0.07	0.03	0.10	0.10	0.04	0.04	0.06	0.05	0.05	0.05	0.07	0.04	0.06	0.09	0.04	0.03	0.05	0.09
AG-R5	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AG-R6	0.13	0.11	0.16	0.17	0.13	0.13	0.14	0.10	0.26	0.24	0.12	0.12	0.07	0.09	0.08	0.09	0.07	0.12	0.08	0.09	0.14	0.10	0.13	0.10
AG-R7	0.13	0.13	0.13	0.13	0.07	0.10	0.06	0.13	0.12	0.13	0.15	0.14	0.13	0.14	0.17	0.18	0.12	0.11	0.08	0.12	0.11	0.11	0.12	0.09
AG-R8	6.36	6.77	11.60	13.00	6.23	6.21	6.58	7.05	11.32	11.56	5.35	6.78	4.66	6.86	4.37	7.18	8.54	10.38	7.74	6.57	10.57	3.64	4.38	10.11
AG-R9	0.03	0.02	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.04	0.02	0.02	0.03	0.04
AG-R10	0.03	0.03	0.04	0.05	0.03	0.03	0.03	0.02	0.07	0.05	0.02	0.04	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.04	0.03
AG-R11	5.98	7.16	12.40	13.90	5.84	5.72	5.76	3.69	6.26	11.58	3.75	5.08	7.68	6.43	5.49	3.17	6.53	5.76	5.01	9.30	6.46	4.77	5.98	9.20
AH-R1	0.05	0.03	0.03	0.03	0.04	0.08	0.08	0.05	0.06	0.07	0.07	0.03	0.05	0.04	0.03	0.05	0.05	0.03	0.03	0.04	0.04	0.05	0.04	0.04
AH-R2	1.69	1.59	1.67	1.19	1.62	2.73	2.28	2.73	1.27	1.19	2.85	1.16	1.84	1.27	1.77	1.77	1.30	1.56	1.74	1.35	1.27	1.14	1.46	1.56
AH-R3	0.78	0.81	0.80	0.80	1.05	0.89	0.80	0.89	0.70	0.70	1.14	0.75	1.11	0.79	0.80	0.53	0.67	0.49	0.53	0.75	0.40	0.57	0.51	0.84
AH-R4	19.41	20.22	30.61	30.91	19.74	19.70	17.30	19.41	11.93	9.97	18.92	29.20	29.24	30.20	39.36	22.49	12.12	24.23	22.57	16.74	17.06	19.82	20.05	19.35
AH-R5	157.14	229.21	174.50	171.75	173.56	120.14	98.55	264.75	123.53	96.46	103.62	160.09	155.55	210.43	239.05	159.13	98.48	250.72	217.88	173.15	159.77	160.10	184.43	228.62
AH-R6	1.00	1.68	1.80	1.93	1.47	0.66	0.86	1.68	0.81	0.65	0.66	1.47	1.75	0.78	1.61	0.99	0.93	2.23	1.61	0.80	0.68	0.68	0.75	1.09
AH-R7	1.00	1.46	1.46	1.46	0.92	1.27	0.60	1.46	0.54	0.50	0.64	0.92	1.51	1.74	1.13	0.76	0.62	1.67	1.13	1.34	1.00	1.18	0.59	1.42
AH-R8	1.00	1.66	1.78	1.78	2.04	0.96	0.84	1.09	0.87	0.68	1.03	2.04	1.13	1.39	1.54	1.06	0.72	1.94	1.05	0.78	0.62	1.02	1.31	0.96
AH-R9	1.00	1.43	1.53	1.53	1.54	0.95	0.57	1.47	0.86	0.59	0.99	1.40	1.02	0.87	1.03	0.91	1.00	1.68	1.77	1.40	1.38	0.77	1.05	1.35
AH-R10	7.78	7.68	11.57	11.92	11.23	7.10	6.24	11.33	7.44	6.35	7.56	8.60	14.89	7.31	8.88	5.94	10.88	11.50	10.20	8.11	6.84	7.74	8.05	6.73
AH-R11	7.78	6.83	4.28	6.65	5.45	9.89	11.53	10.69	7.36	7.51	7.78	5.50	9.90	7.38	7.53	6.69	11.28	3.99	7.04	11.61	7.41	4.53	3.41	10.36
AH-R12	7.02	4.47	8.68	10.43	6.93	7.20	10.04	4.69	5.03	5.23	5.12	4.88	9.85	7.19	6.85	7.87	8.54	5.23	5.78	5.91	5.05	11.12	6.94	4.48

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AH-R13	7.50	8.97	5.90	5.74	5.07	7.51	5.50	4.25	7.77	8.19	10.56	7.00	5.89	11.94	6.54	5.24	8.52	3.20	7.09	7.53	7.24	11.57	9.83	5.97
AH-R14	8.05	8.39	7.84	6.33	8.46	6.10	10.53	5.67	12.30	10.71	18.22	9.84	8.07	6.17	10.78	6.98	9.18	8.10	6.75	5.21	10.20	4.98	13.32	5.39
AH-R15	22.00	15.75	19.85	16.53	26.41	17.32	29.90	24.35	33.30	40.68	22.74	32.09	14.91	11.41	19.35	30.15	37.00	14.16	40.93	18.60	20.98	19.05	22.00	23.78
AH-R16	1.00	0.96	1.00	1.01	1.49	0.85	0.67	0.77	0.65	0.69	1.00	0.81	1.06	1.31	0.75	0.90	0.99	0.64	0.60	1.51	0.79	1.87	0.75	0.86
AH-R17	60.00	80.70	76.71	45.23	39.17	96.76	127.22	57.35	46.38	54.97	39.40	46.86	57.37	55.79	63.13	43.33	42.13	66.35	133.21	44.93	78.41	45.16	40.83	108.31
AH-R18	218.75	237.26	258.87	122.86	136.87	226.08	238.79	191.56	161.63	323.16	277.79	170.90	207.27	218.75	265.81	230.47	127.48	236.13	365.54	221.26	193.32	164.39	219.35	318.43
AH-R19	190.91	139.10	244.08	189.22	125.54	311.66	291.22	269.61	197.51	198.48	182.48	232.13	122.36	129.12	200.42	185.05	178.14	282.30	219.12	145.57	237.66	137.17	254.82	222.38
AH-R20	0.17	0.26	0.18	0.16	0.15	0.17	0.11	0.24	0.14	0.16	0.15	0.25	0.25	0.23	0.26	0.10	0.16	0.25	0.24	0.20	0.14	0.14	0.16	0.23
AH-R21	22.92	23.94	24.14	25.88	38.59	13.80	32.09	22.42	23.39	30.61	40.45	44.48	29.01	11.28	32.17	30.03	24.73	23.97	30.77	13.65	15.76	13.28	28.77	20.21
AH-R22	15.71	11.00	11.78	12.62	16.89	8.53	14.88	10.40	24.15	22.19	23.96	24.59	14.97	14.96	22.24	21.26	28.46	11.29	13.17	10.16	14.96	13.58	25.79	10.85
AI-R1	0.05	0.04	0.04	0.05	0.07	0.03	0.05	0.05	0.03	0.06	0.04	0.04	0.06	0.03	0.05	0.08	0.05	0.10	0.08	0.07	0.04	0.04	0.02	0.03
AI-R2	1.69	2.45	1.33	1.26	1.58	1.07	2.33	2.49	1.19	4.04	1.27	1.27	1.73	1.27	4.33	1.76	3.07	2.67	1.76	2.39	1.46	1.36	1.10	1.27
AI-R3	0.78	0.79	0.73	0.74	0.67	0.83	1.14	1.14	0.86	1.30	0.62	0.62	0.82	0.70	1.30	0.74	1.30	1.22	0.74	0.70	0.51	0.42	0.39	0.70
AI-R4	19.41	24.22	21.96	16.90	7.58	20.00	19.66	27.79	29.66	25.23	12.34	11.52	10.76	24.37	28.42	8.74	28.71	9.37	8.74	29.74	18.95	20.30	28.57	24.38
AI-R5	1.00	0.92	1.28	0.75	0.65	1.61	1.51	1.51	1.68	1.40	0.86	0.86	0.81	1.81	2.39	0.75	1.94	0.75	0.75	1.13	0.91	0.91	1.45	1.68
AI-R6	157.14	142.10	200.87	155.84	103.37	256.30	234.60	234.60	199.99	180.96	125.04	114.37	114.31	153.61	189.24	83.02	192.17	83.08	83.10	196.30	201.81	216.00	316.43	171.39
AI-R7	7.78	7.64	7.66	4.93	3.35	12.54	11.47	11.47	12.17	11.01	7.11	3.82	3.82	12.28	12.67	5.59	12.08	5.99	5.59	8.37	7.48	7.48	11.80	11.46
AI-R8	7.78	10.88	8.42	10.98	8.61	5.75	5.06	5.06	4.90	5.91	6.21	11.32	11.32	6.26	5.13	6.58	6.61	8.06	7.53	7.68	7.60	5.39	7.81	6.80
AI-R9	190.91	301.47	185.33	185.37	198.55	176.74	96.35	96.36	242.93	284.84	242.92	243.62	285.43	395.57	194.44	143.91	395.56	261.49	280.20	244.06	456.14	143.70	125.36	227.77
AI-R10	0.17	0.23	0.24	0.17	0.12	0.23	0.24	0.24	0.27	0.22	0.15	0.14	0.13	0.25	0.18	0.11	0.27	0.11	0.11	0.16	0.16	0.17	0.29	0.17
AJ-R1	0.05	0.04	0.04	0.05	0.05	0.04	0.04	0.05	0.11	0.07	0.11	0.07	0.08	0.04	0.04	0.05	0.07	0.06	0.09	0.05	0.05	0.04	0.06	0.07
AJ-R2	1.69	1.10	1.90	1.50	1.70	1.36	1.88	2.06	3.75	1.17	2.37	2.36	2.49	1.49	1.11	1.11	2.28	2.08	4.33	1.76	3.07	2.12	2.09	2.33
AJ-R3	0.78	0.75	1.12	0.67	0.76	0.65	0.80	0.61	1.30	0.78	1.05	0.69	0.72	0.46	0.93	0.99	1.08	0.72	1.30	0.74	1.30	0.64	0.58	0.65
AJ-R4	19.41	25.12	28.78	26.28	30.29	28.86	23.16	24.75	8.13	8.74	8.13	27.76	25.79	21.10	21.52	17.92	17.76	17.95	16.70	13.13	28.12	29.56	22.57	25.90
AJ-R5	157.14	305.93	272.51	156.93	237.42	230.66	208.53	150.23	126.10	103.41	100.65	109.36	99.76	108.16	122.60	159.08	94.54	156.05	88.28	99.24	143.14	179.80	140.13	158.22
AJ-R6	7.78	9.89	8.85	9.29	11.61	8.28	6.99	10.12	5.75	4.73	4.62	8.00	7.80	8.06	8.65	7.54	7.18	7.87	7.34	10.02	12.73	10.82	7.24	7.20
AJ-R7	7.78	5.51	7.43	10.01	4.88	6.24	6.40	5.78	8.58	7.74	8.12	13.57	15.05	8.82	5.22	12.02	10.70	7.57	6.85	13.65	5.87	5.18	9.89	6.05
AJ-R8	190.91	143.93	133.46	185.38	185.33	198.58	176.71	153.37	370.81	227.86	227.75	143.41	131.17	198.46	369.16	425.77	423.84	249.51	143.65	267.26	115.38	344.56	456.01	133.53
AJ-R9	218.75	196.77	146.68	342.50	342.58	342.50	209.93	182.78	365.50	241.56	241.61	214.74	210.37	207.34	318.47	365.45	365.46	193.32	164.36	207.11	294.74	318.44	341.08	119.97
AJ-R10	0.17	0.18	0.21	0.17	0.17	0.17	0.17	0.22	0.08	0.08	0.08	0.17	0.16	0.11	0.13	0.09	0.10	0.17	0.12	0.23	0.26	0.18	0.16	0.17
AK-R1	0.05	0.05	0.03	0.06	0.06	0.04	0.05	0.07	0.07	0.07	0.05	0.08	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.04	0.05	0.03	0.08	0.03
AK-R2	1.69	1.57	1.27	2.15	1.49	1.14	2.16	2.15	1.73	1.09	1.56	1.69	2.37	0.96	1.84	1.67	1.77	1.14	1.35	1.35	1.27	1.27	3.77	1.69
AK-R3	0.78	0.49	0.70	0.67	0.88	0.66	0.92	1.05	0.76	0.71	0.47	1.06	0.74	1.06	0.61	0.47	0.51	0.57	0.86	0.93	0.77	0.70	1.30	0.75
AK-R4	19.41	16.27	28.70	15.92	17.97	26.05	25.22	12.29	8.71	8.12	25.79	12.47	31.10	20.25	20.97	17.32	16.71	10.04	29.74	29.56	13.93	28.71	22.47	24.38
AK-R5	157.14	160.95	238.60	159.23	108.35	152.27	141.02	143.08	117.82	110.08	174.58	89.62	252.60	191.20	178.59	101.92	103.53	81.42	192.16	159.89	247.78	238.12	138.37	174.45
AK-R6	7.78	7.38	11.94	5.62	5.37	9.13	10.37	5.45	4.38	5.46	7.57	4.43	12.21	8.27	9.09	8.84	4.01	6.50	8.20	13.34	8.01	11.65	4.62	11.57
AK-R7	7.78	5.16	6.21	5.41	5.13	6.47	8.82	7.81	7.09	4.39	5.83	7.13	4.94	8.14	7.65	10.40	13.82	5.80	5.51	7.20	5.09	5.08	7.78	7.77
AK-R8	7.02	9.65	8.74	9.86	9.58	7.34	6.63	6.61	5.37	7.64	6.79	7.28	5.30	8.11	7.75	7.63	7.43	7.45	6.71	8.16	12.57	12.42	5.33	9.11
AK-R9	190.91	196.38	146.38	141.12	126.65	212.15	237.99	237.96	164.23	265.17	186.78	156.23	143.70	220.79	133.47	281.44	301.50	281.39	175.63	209.65	267.30	200.22	122.11	395.49
AK-R10	0.17	0.12	0.18	0.11	0.12	0.14	0.21	0.16	0.09	0.13	0.12	0.10	0.19	0.20	0.18	0.13	0.15	0.14	0.14	0.24	0.18	0.25	0.18	0.25
AL-R1	0.05	0.05	0.07	0.07	0.05	0.05	0.03	0.04	0.05	0.05	0.06	0.05	0.05	0.06	0.04	0.09	0.06	0.05	0.03	0.05	0.07	0.05	0.06	0.03
AL-R2	1.69	2.73	2.28	3.05	1.63	1.48	1.66	1.74	2.41	2.02	3.27	2.05	2.06	2.16	1.96	3.05	4.04	1.18	1.27	1.64	1.57	1.23	1.19	1.31
AL-R3	0.78	0.89	0.79	1.14	0.51	0.57	0.60	0.70	0.84	0.86	0.76	0.74	0.71	0.94	0.78	1.14	1.22	0.43	0.40	0.55	0.49	0.78	0.75	0.84
AL-R4	19.41	29.56	22.57	13.17	14.28	15.30	20.00	26.60	13.86	23.16	24.75	20.97	20.97	20.39	26.05	10.04	27.68	8.13	27.76	25.80	8.71	19.66	11.09	25.70
AL-R5	157.14	211.33	103.97	103.62	104.55	109.62	242.38	205.84	105.92	141.70	132.14	190.38	177.52	145.29	176.86	104.45	199.77	64.67	96.32	94.10	88.49	159.07	130.56	201.50
AL-R6	1.00	1.93	0.70	0.87	0.98	1.03	1.00	0.75	0.95	1.36	1.27	0.88	1.15	0.62	2.09	0.75	1.40	0.65	0.78	0.69	0.75	0.97	0.88	0.96
AL-R7	1.00	1.93	0.70	0.87	0.98	1.03	1.00	0.75	0.95	1.36	1.27	0.88	1.15	0.62	2.09	0.75	1.40	0.65	0.78	0.69	0.75	0.97	0.88	0.96
AL-R8	7.78	12.02	5.00	4.99	8.17	8.01	8.56	7.60	5.09	6.81	6.81	6.62	6.62	8.27	12.14	4.12	6.76	5.48	7.28	7.44	4.36	4.92	5.00	6.73
AL-R9	6.20	6.68	6.94	7.46	4.60	4.65	5.54	5.89	6.62	6.40	6.72	7.43	7.96	5.40	5.23	6.81	12.72	6.47	4.07	6.50	5.60	4.90	6.81	9.65
AL-R10	7.02	4.00	6.44	7.65	5.49	6.93	9.33	11.76	7.81	7.28	7.28	9.46	6.79	9.01	4.50	7.37	6.84	10.03	9.39	11.35	6.71	10.14	7.11	7.29
AL-R11	5.46	6.18	6.79	4.34	4.36	3.73	3.88	5.32	7.23	8.90	8.72	8.90	8.90	6.33	6.33	7.95	7.84	5.98	5.78	5.66	4.87	4.26	7.67	7.34
AL-R12	6.20	6.68	6.94	7.46	4.60	4.65	5.54	5.89	6.62	6.40	6.72	7.43	7.96	5.40	5.23	6.81	12.72	6.47	4.07	6.50	5.60	4.90	6.81	9.65
AL-R13	4.71	4.25	4.00	8.96	7.31	4.98	3.68	3.08	4.82	7.59	7.43	5.56	5.19	4.40	4.77	5.16	8.08	4.94	3.69	4.74	4.08	2.44	10.32	6.52
AL-R14	218.75	176.40	142.77	171.52	150.28	522.61	164.63	206.08	225.39	261.08	423.00	265.08	266.84	320.18	261.02	306.30	227.18	343.98	394.71	300.99	322.42	164.65	169.07	212.38
AL-R15	190.91	103.42	96.33	178.55	183.68	318.96	150.85	249.93	192.46	190.86	217.03	275.75	233.22	290.24	255.31	264.69	203.79	264.75	277.88	277.86	277.84	150.67	199.28	401.18
AL-R16	0.17	0.27	0.15	0.16	0.17	0.14	0.25	0.23	0.11	0.21	0.21	0.20	0.16	0.13	0.17	0.20	0.17	0.07	0.13	0.10	0.07	0.11	0.11	0.24
AM-R1	0.05	0.05	0.05	0.06	0.07	0.05	0.10	0.05	0.06	0.04	0.04	0.03	0.05	0.05	0.04	0.05	0.04	0.03	0.06	0.06	0.06	0.05	0.06	0.04
AM-R2	1.69	1.14	1.25	1.12	1.83	1.97	2.47	2.02	3.27	1.67	1.47	1.63	1.69	1.67	1.22	1.14	1.02	1.04	2.45	1.67	1.19	1.69	2.21	1.62
AM-R3	0.78	0.79	0.76	0.80	0.85	0.85	1.05	0.86	0.76	0.78	0.78	0.53	0.45	0.57	0.82	1.08	1.05	0.50	1.05	0.80	0.80	0.58	0.69	0.60
AM-R4	19.41	19.05	12.75	9.99	8.13	25.79	10.75	23.16	24.75	15.19	16.27	28.70	27.75	19.89	25.83	12.78	25.83	27.59	25.75	10.75	10.04	18.95	20.97	20.97
AM-R5	1.00	0.66	0.66	0.86	0.70	1.05	0.81	1.36	1.27	1.22	1.33	1.47	0.60	0.68	1.31	0.87	0.88	1.18	1.19	0.81	0.75	0.91	0.80	1.37
AM-R6	1.00	1.19	1.27	0.60	0.42	0.58	0.54	0.88	0.82	1.05	1.07	1.56	1.22	1.07	0.88	0.90	1.40	1.23	1.10	0.98	0.92	1.04	1.16	1.20
AM-R7	1.00	1.19	1.49	0.82	0.85	1.05	1.05	1.47	1.37	0.79	0.72	1.10	1.05	1.42	1.22	0.82	1.38	1.12	0.88	0.85	0.79	0.59	0.69	0.91
AM-R8	1.00	0.96	0.97	0.64	0.73	1.00	0.79	0.90	0.84	1.06	1.16	1.40	0.74	1.07	1.12	0.64	0.85	0.88	1.59	0.74	0.74	1.15	1.02	0.80
AM-R9	1.00	0.64	0.75	0.77	0.51	0.99	0.79	0.87	0.87	1.05	1.10	2.19	1.03	0.73	1.38	1.43	1.23	1.41	1.28	0.84	0.79	1.01	0.69	0.78
AM-R10	157.14	151.79	132.55	120.46	88.34	152.77	109.30	218.88	137.71	245.55	179.97	231.85	150.44	159.28	195.61	141.34	292.01	306.88	217.80	130.06	121.41	152.05	119.41	138.93
AM-R11	7.78	7.30	5.24	4.08	5.22	7.46	4.31	7.61	12.31	7.93	6.12	11.45	6.91	11.81	8.97	5.87	10.11	11.44	9.93	6.38	4.22	7.51	9.54	6.35

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AM-R12	6.20	4.90	4.78	8.40	7.05	9.39	9.75	9.20	7.38	4.44	6.72	7.42	3.89	4.45	10.85	7.42	8.63	10.08	9.75	4.49	4.49	5.99	4.15	7.10
AM-R13	5.46	3.38	3.09	7.29	6.99	5.58	5.64	7.66	8.31	5.48	4.17	4.92	4.38	3.74	8.26	6.46	4.96	6.21	6.46	3.15	3.15	3.98	6.60	3.62
AM-R14	7.02	7.27	12.98	10.21	6.23	6.38	7.19	4.19	7.25	4.54	3.80	4.60	7.98	10.28	4.93	8.32	6.03	4.97	4.93	6.70	6.70	6.26	7.98	4.17
AM-R15	3.30	2.73	1.71	2.82	4.99	7.54	5.33	5.54	5.27	2.21	3.38	3.61	1.65	2.14	5.04	2.56	3.29	2.88	3.92	2.77	2.84	3.11	2.01	1.95
AM-R16	5.46	8.15	7.31	6.07	7.26	3.30	3.77	5.47	9.45	5.33	7.78	3.50	4.80	7.65	3.95	3.96	5.39	5.20	5.86	6.20	7.78	4.89	6.84	8.43
AM-R17	7.50	8.03	7.73	10.28	4.37	7.48	5.86	7.84	8.73	7.47	7.50	7.88	7.20	9.97	5.83	12.02	8.40	10.94	4.36	6.24	8.22	6.39	10.10	14.76
AM-R18	218.75	188.17	163.92	164.56	302.93	189.00	368.52	266.82	164.90	321.01	279.63	381.89	202.50	332.20	138.06	164.60	147.92	300.67	192.93	321.06	303.47	522.61	153.44	164.37
AM-R19	190.91	115.18	107.49	98.69	244.67	123.53	271.83	146.97	192.46	242.02	225.94	218.80	232.18	250.95	287.78	96.36	186.34	229.28	113.11	242.05	227.76	319.00	187.51	187.52
AM-R20	9.53	8.05	7.01	6.90	8.24	6.13	10.57	13.30	8.69	13.44	7.61	21.12	9.98	13.57	10.05	9.96	6.80	10.76	9.11	13.44	10.52	9.53	6.83	7.32
AM-R21	0.17	0.11	0.11	0.10	0.07	0.16	0.13	0.24	0.13	0.12	0.26	0.23	0.18	0.12	0.26	0.17	0.22	0.21	0.21	0.14	0.15	0.19	0.19	0.19
AN-R1	0.05	0.04	0.00	0.04	0.05	0.06	0.03	0.00	0.10	0.03	0.00	0.04	0.05	0.04	0.00	0.04	0.02	0.05	0.06	0.07	0.00	0.05	0.03	0.00
AN-R2	1.69	1.69	0.00	1.57	1.15	2.98	1.06	0.00	2.37	1.41	0.00	1.68	1.56	1.02	0.00	1.31	1.16	1.74	2.55	3.27	0.00	2.02	1.46	0.00
AN-R3	0.78	1.09	0.00	0.84	0.78	0.88	1.08	0.00	0.74	0.59	0.00	0.72	0.55	0.92	0.00	0.84	0.50	0.53	0.83	1.14	0.00	0.86	0.69	0.00
AN-R4	19.41	30.76	0.00	17.88	19.65	30.29	32.43	0.00	8.74	28.71	0.00	25.75	15.19	27.68	0.00	20.97	31.10	15.18	18.68	19.87	0.00	17.26	20.00	0.00
AN-R5	157.14	161.03	0.00	199.82	117.63	170.62	157.18	0.00	108.17	188.97	0.00	206.13	98.07	199.88	0.00	128.66	173.69	174.02	187.67	160.92	0.00	185.94	239.49	0.00
AN-R6	7.78	12.17	0.00	15.43	4.55	11.05	12.43	0.00	5.62	7.34	0.00	6.92	4.88	6.76	0.00	6.12	11.87	8.34	5.30	10.60	0.00	6.21	12.55	0.00
AN-R7	6.20	4.40	0.00	7.02	11.04	7.77	5.65	0.00	8.60	4.86	0.00	4.87	10.40	5.30	0.00	6.46	5.95	5.65	9.87	4.39	0.00	9.36	5.78	0.00
AN-R8	5.46	4.21	0.00	8.35	6.08	6.33	4.77	0.00	5.70	2.39	0.00	2.93	10.64	3.73	0.00	5.14	5.48	3.50	8.33	5.05	0.00	6.18	7.95	0.00
AN-R9	7.02	5.15	0.00	6.95	13.04	6.09	4.61	0.00	4.20	9.30	0.00	7.33	10.60	16.53	0.00	6.34	4.56	6.88	12.52	10.67	0.00	4.40	4.94	0.00
AN-R10	3.30	2.25	0.00	5.92	6.59	4.44	4.70	0.00	3.31	2.41	0.00	2.76	3.77	2.49	0.00	3.27	2.02	2.40	3.01	2.88	0.00	3.75	3.23	0.00
AN-R11	5.46	5.35	0.00	4.83	6.35	4.26	3.56	0.00	5.97	10.15	0.00	10.83	5.74	5.50	0.00	4.13	6.40	9.49	6.68	3.57	0.00	9.20	3.69	0.00
AN-R12	7.50	11.39	0.00	8.41	8.25	4.39	10.15	0.00	7.60	5.74	0.00	5.62	10.91	4.89	0.00	9.07	9.73	7.84	10.91	10.05	0.00	8.56	10.44	0.00
AN-R13	218.75	164.93	0.00	322.41	392.63	147.56	231.43	0.00	295.41	268.13	0.00	212.61	216.11	126.72	0.00	375.57	229.36	158.12	209.64	423.12	0.00	225.87	423.06	0.00
AN-R14	190.91	112.56	0.00	277.82	327.83	129.24	122.06	0.00	264.13	215.77	0.00	171.78	132.48	199.72	0.00	338.40	134.09	329.63	209.64	277.81	0.00	194.83	277.83	0.00
AN-R15	0.17	0.30	0.00	0.24	0.10	0.26	0.37	0.00	0.13	0.15	0.00	0.17	0.17	0.17	0.00	0.20	0.18	0.18	0.19	0.20	0.00	0.13	0.29	0.00
AN-R16	6.00	7.89	0.00	6.75	10.17	4.47	6.56	0.00	7.57	7.07	0.00	6.20	3.45	5.20	0.00	9.38	6.14	6.76	4.53	9.19	0.00	4.30	8.72	0.00
AO-R1	0.05	0.06	0.04	0.04	0.05	0.03	0.05	0.04	0.07	0.05	0.03	0.04	0.07	0.05	0.04	0.07	0.05	0.08	0.07	0.03	0.04	0.03	0.05	0.04
AO-R2	1.69	1.10	1.02	1.02	2.25	1.35	2.49	1.40	2.37	1.14	1.46	1.36	2.01	2.28	2.37	1.65	2.08	4.33	1.14	1.53	1.67	1.08	1.18	1.46
AO-R3	0.78	0.78	0.92	1.05	0.78	0.75	1.05	1.04	1.09	0.59	0.51	0.42	1.15	1.24	0.74	0.52	0.72	1.30	0.78	0.67	0.61	0.59	0.45	0.51
AO-R4	19.41	10.04	27.68	25.83	14.85	24.79	28.26	27.22	15.78	18.99	29.99	21.10	16.27	27.68	31.10	14.65	19.89	18.56	8.74	28.78	22.43	30.75	13.91	13.86
AO-R5	157.14	92.93	277.77	150.18	149.60	211.56	204.65	245.13	100.35	151.51	225.09	113.85	180.10	209.05	257.13	110.05	123.60	157.13	118.33	267.73	163.27	243.37	123.23	151.91
AO-R6	7.78	6.01	10.36	10.42	6.86	9.70	9.38	12.84	6.93	7.79	11.57	8.85	6.12	16.14	8.60	4.21	8.58	7.20	5.74	10.26	6.78	9.45	4.19	5.82
AO-R7	6.20	6.08	8.32	8.90	7.89	7.89	10.59	8.56	4.36	10.52	6.99	3.51	6.74	6.55	4.88	8.69	8.66	4.69	7.18	6.39	6.86	6.08	8.21	6.22
AO-R8	5.46	4.95	6.79	7.51	6.01	5.61	8.06	6.98	7.42	6.99	9.93	4.17	5.94	8.08	5.81	5.17	4.76	6.95	4.28	5.77	6.94	3.31	6.70	5.07
AO-R9	7.02	4.88	6.66	4.86	7.29	7.18	4.81	4.86	8.96	5.57	7.43	10.65	6.26	5.25	3.80	4.82	4.57	5.47	6.50	4.88	8.00	5.97	7.06	10.13
AO-R10	3.30	4.01	5.89	7.40	3.67	3.67	4.92	6.79	3.55	5.65	7.85	2.54	4.84	5.15	2.64	2.95	4.39	3.73	3.37	2.33	3.77	3.12	3.75	2.65
AO-R11	5.46	3.68	3.68	2.86	3.95	3.54	6.18	3.25	5.15	6.51	5.60	5.44	5.78	5.22	7.15	7.62	11.16	4.72	8.33	8.98	3.01	11.56	9.08	8.89
AO-R12	7.50	8.52	7.33	6.95	5.83	8.29	5.84	9.09	8.58	4.04	5.62	5.19	7.64	5.59	8.33	7.26	6.59	6.02	7.75	9.98	8.26	8.47	7.00	7.50
AO-R13	218.75	278.31	334.29	285.69	138.09	453.21	240.23	168.35	224.99	147.92	200.37	218.88	202.49	202.54	345.40	227.33	136.55	279.67	345.38	143.65	143.65	143.64	174.20	174.21
AO-R14	190.91	242.53	197.35	168.62	287.86	297.75	130.88	206.42	199.49	190.40	282.11	258.03	217.40	202.92	297.74	180.99	264.57	230.61	297.70	186.37	186.33	143.44	256.13	274.41
AO-R15	0.17	0.13	0.23	0.26	0.20	0.25	0.24	0.22	0.15	0.23	0.23	0.22	0.17	0.21	0.35	0.17	0.19	0.17	0.12	0.36	0.25	0.27	0.09	0.11
AO-R16	6.00	7.06	9.14	8.37	6.33	9.82	9.13	5.74	6.32	5.81	6.39	5.25	5.15	4.81	5.79	4.46	6.26	8.06	6.91	3.85	3.85	6.09	6.96	6.96
AP-R1	0.05	0.07	0.05	0.07	0.07	0.08	0.08	0.05	0.05	0.03	0.03	0.03	0.04	0.02	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.05	0.08	0.03
AP-R2	1.69	2.38	1.62	2.37	2.28	2.73	3.75	1.18	1.10	1.30	1.09	1.09	2.45	1.10	1.66	1.78	1.60	1.46	1.27	2.02	1.27	1.46	4.04	1.27
AP-R3	0.78	1.02	0.69	1.05	0.68	1.16	1.30	0.45	0.49	0.84	0.84	0.84	0.79	0.49	0.76	0.81	0.82	0.70	0.40	0.70	0.62	0.49	1.30	0.62
AP-R4	19.41	14.02	13.02	12.36	19.66	11.57	13.74	13.91	8.13	19.99	20.00	18.66	24.22	29.66	26.79	28.71	19.66	12.04	19.60	28.02	19.66	18.51	24.07	27.59
AP-R5	60.00	90.27	61.78	67.97	34.33	50.65	76.73	62.98	58.18	60.73	99.70	66.46	62.15	84.65	59.81	59.81	39.18	47.91	105.76	54.87	30.91	62.76	91.06	106.12
AP-R6	7.78	7.93	5.26	7.43	10.49	4.96	7.00	4.02	3.93	9.27	8.04	7.88	10.41	8.00	13.57	13.62	9.99	7.50	7.60	14.54	10.49	10.79	8.11	10.71
AP-R7	7.02	5.53	4.60	6.21	7.09	6.74	6.94	5.28	4.30	8.02	8.21	7.51	6.24	6.67	8.90	10.57	6.78	5.85	5.30	9.87	7.09	7.32	4.92	7.47
AP-R8	110.00	116.96	116.36	77.45	83.49	74.25	67.84	51.60	55.47	120.01	128.73	164.90	144.03	120.86	161.54	116.16	111.43	66.20	79.36	108.86	64.88	68.67	124.22	157.96
AP-R9	19.41	15.56	14.45	23.02	13.02	15.53	26.58	20.22	9.79	29.67	30.67	19.65	15.88	35.90	19.27	39.65	13.17	27.91	19.60	26.05	27.36	26.90	20.65	28.74
AP-R10	15.71	19.60	10.80	10.80	16.64	13.07	16.19	12.32	11.20	24.23	32.50	32.51	28.53	25.11	21.53	24.16	15.53	14.75	10.73	24.52	15.49	16.39	23.23	22.76
AP-R11	218.75	226.30	253.53	384.27	216.63	228.44	262.64	164.97	221.43	221.39	268.47	153.70	308.19	302.33	205.15	156.25	154.14	241.01	359.65	301.44	144.08	262.64	355.51	241.00
AP-R12	0.17	0.13	0.16	0.17	0.11	0.10	0.16	0.13	0.14	0.18	0.27	0.26	0.17	0.20	0.36	0.23	0.12	0.10	0.11	0.24	0.17	0.16	0.13	0.18
AP-R13	11.38	11.03	11.37	13.50	16.04	15.00	11.21	8.87	7.83	17.34	16.17	16.88	9.57	10.80	20.75	23.24	9.29	6.26	7.88	15.97	10.49	11.35	9.26	10.58
AP-R14	32.61	19.24	20.35	47.30	30.43	44.57	63.31	26.84	21.89	32.61	33.60	34.10	51.93	62.19	32.42	33.90	34.53	52.12	36.84	40.12	28.72	63.31	46.27	65.97
AP-R15	2.73	5.31	4.96	2.75	1.68	1.62	2.73	2.80	#DIV/0!	2.96	2.77	3.51	4.57	2.79	2.68	1.96	2.18	2.41	2.48	1.56	1.91	2.73	3.51	2.33
AP-R16	0.16	0.22	0.22	0.22	0.25	0.23	0.12	0.17	0.15	0.11	0.11	0.15	0.27	0.13	0.15	0.16	0.15	0.14	0.10	0.11	0.12	0.12	0.21	0.21
AP-R17	0.77	0.82	0.72	0.78	0.79	0.76	0.78	0.48	0.68	1.07	0.75	1.88	0.99	0.73	0.79	0.80	0.74	0.66	0.47	0.85	0.76	0.78	0.86	0.78
AP-R18	1.43	2.00	1.79	1.96	1.41	1.36	1.09	2.29	0.80	1.50	1.21	2.29	2.59	1.27	1.46	1.48	0.87	0.77	1.96	1.37	0.96	1.09	2.17	1.86
AP-R19	4.36	4.95	5.01	3.46	5.23	3.82	2.99	4.76	5.01	5.24	3.12	4.56	3.39	3.73	4.81	5.03	4.91	4.56	4.22	3.59	5.80	2.99	3.21	3.14
AP-R20	11.28	12.81	12.97	8.95	13.53	9.90	7.74	12.32	12.97	13.57	8.07	11.81	8.77	9.66	12.44	13.01	12.70	11.81	10.93	9.29	15.03	7.74	8.32	8.13
AP-R21	7.18	8.16	8.26	5.70	8.62	6.30	4.93	7.85	8.26	8.64	5.14	7.52	5.58	6.15	7.92	8.29	8.09	7.52	6.96	5.92	9.57	4.93	5.30	5.17
AP-R22	61.20	69.49	70.37	48.56	73.40	53.70	41.99	66.85	70.37	73.59	43.76	64.07	47.58	52.42	67.51	70.60	68.91	64.07	59.31	50.42	81.53	41.99	45.16	44.08
AP-R23	168.28	184.26	193.68	189.05	191.08	203.37	195.87	257.49	287.48	127.01	123.97	129.65	147.66	121.20	134.50	131.28	199.83	199.95	192.24	131.28	191.08	193.51	181.43	136.33
AQ-R1	0.16	0.15	0.20	0.12	0.24	0.14	0.21	0.14	0.33	0.18	0.16	0.22	0.13	0.15	0.11	0.15	0.15	0.23	0.11	0.16	0.23	0.25	0.12	0.22
AQ-R2	7.86	6.30	7.86	8.81	17.44	6.79	11.00	11.58	12.41	9.38	7.53	4.90	6.15	5.85	8.08	11.40	5.10	8.84	7.42	9.10	14.18	18.77	5.91	4.90

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AQ-R3	9.43	7.56	16.78	7.76	13.31	5.50	8.64	19.26	14.85	12.58	7.57	8.98	6.41	8.31	11.50	17.37	8.90	12.55	10.66	9.74	9.20	15.49	7.12	9.83
AQ-R4	7.78	7.44	10.42	6.37	12.47	5.00	13.62	10.92	8.42	7.13	7.46	6.86	7.20	7.88	7.65	10.79	5.68	6.99	5.64	5.99	14.69	8.97	4.14	5.58
AQ-R5	5.59	4.04	7.85	5.85	5.59	4.60	8.60	7.27	8.47	7.18	4.96	5.59	3.75	4.04	6.71	9.46	5.66	5.81	5.89	8.83	8.36	8.97	4.68	5.33
AQ-R6	193.17	285.64	257.78	286.32	256.65	173.80	137.95	187.48	129.17	133.83	221.09	87.01	240.44	147.38	219.84	205.20	208.68	208.67	131.05	322.75	285.65	147.80	287.53	309.47
AQ-R7	0.92	0.93	1.06	1.09	1.25	0.87	0.66	0.92	0.95	0.87	1.12	0.55	1.07	1.15	0.89	0.89	0.73	1.48	0.59	0.76	0.86	1.04	0.85	0.67
AQ-R8	0.45	0.49	0.45	0.47	0.53	0.75	0.53	0.68	0.89	0.44	0.52	0.61	0.39	0.70	0.54	0.59	0.37	0.66	0.60	0.26	0.21	0.48	0.30	0.27
AQ-R9	10.39	7.52	20.37	9.13	14.11	8.94	7.18	14.03	14.40	10.39	20.24	7.36	8.50	8.26	10.67	10.36	12.39	7.43	7.40	14.11	9.75	9.23	16.20	14.50
AQ-R10	1.77	1.68	1.33	1.29	0.88	2.07	1.93	1.31	1.79	2.61	1.05	2.89	1.46	1.50	1.13	1.76	1.77	1.85	3.87	1.82	1.29	2.45	1.90	1.79
AR-R1	0.13	0.12	0.08	0.10	0.08	0.09	0.09	0.20	0.13	0.08	0.16	0.20	0.21	0.08	0.13	0.13	0.11	0.13	0.10	0.16	0.12	0.11	0.14	0.10
AR-R2	0.16	0.14	0.15	0.19	0.33	0.22	0.09	0.16	0.14	0.35	0.15	0.16	0.14	0.26	0.20	0.12	0.11	0.11	0.16	0.15	0.22	0.12	0.13	0.35
AR-R3	9.43	9.42	13.99	14.97	14.70	11.16	11.50	5.77	6.74	15.75	9.90	6.88	8.34	9.70	11.16	5.30	9.93	5.49	11.45	5.89	8.93	9.54	13.55	15.75
AR-R4	7.78	5.26	10.62	9.96	12.73	6.66	8.17	9.86	12.34	12.74	7.78	7.47	5.92	9.94	9.95	7.71	7.54	7.26	8.17	5.62	15.05	5.09	9.02	8.56
AR-R5	5.59	5.21	4.82	4.81	6.13	11.43	4.12	5.33	6.68	7.90	3.49	5.24	4.73	8.71	5.50	3.55	3.42	4.93	3.35	5.59	4.99	5.16	4.75	9.92
AR-R6	37.50	33.03	77.14	52.03	59.82	50.01	38.66	37.50	37.50	61.30	41.18	23.74	29.36	37.38	51.83	39.88	39.39	23.58	39.22	34.71	50.84	21.82	44.64	63.61
AR-R7	8.44	5.41	6.62	11.73	9.16	5.40	10.07	12.30	11.48	11.65	8.17	11.18	9.54	5.79	11.48	10.71	8.34	5.41	5.90	7.29	9.76	7.78	12.88	10.27
AR-R8	26.09	26.40	26.80	27.28	37.02	28.00	28.81	37.24	37.24	34.02	21.81	26.02	19.56	26.94	25.70	22.39	20.26	19.86	15.03	16.88	41.78	21.12	24.85	27.42
AR-R9	2.68	2.64	2.04	1.84	2.49	2.09	2.05	2.64	2.64	2.97	2.76	1.84	2.69	1.80	2.97	3.33	3.24	3.26	3.18	2.56	2.48	2.74	5.94	2.00
AR-R10	193.17	142.66	136.49	127.14	235.92	109.47	184.04	264.55	264.56	292.77	117.40	185.28	221.77	197.75	256.17	252.04	157.26	113.19	184.72	167.28	193.17	153.76	307.51	205.34
AR-R11	0.92	0.70	0.55	0.57	0.75	0.36	0.72	1.27	1.36	0.93	0.57	0.93	1.44	1.06	1.17	1.24	0.89	0.51	1.23	1.36	0.92	1.35	1.34	1.22
AR-R12	15.42	14.61	21.08	11.51	17.47	14.60	17.38	21.05	21.05	14.29	10.63	21.90	18.68	16.46	19.16	19.16	11.90	15.09	7.62	12.64	34.50	20.02	22.44	16.52
AS-R1	7.86	5.67	5.79	10.45	4.57	11.01	4.78	9.96	12.48	12.84	8.00	0.00	8.50	0.00	8.30	7.88	11.19	11.19	11.76	0.00	7.70	8.05	10.04	11.99
AS-R2	19.41	19.60	10.03	19.41	26.99	20.48	11.86	17.79	21.19	21.46	20.45	0.00	20.97	0.00	28.70	25.79	28.98	23.16	19.27	0.00	19.65	33.50	28.71	29.56
AS-R3	60.00	39.16	41.22	45.23	88.43	34.17	76.14	58.29	43.25	45.15	66.69	0.00	60.01	0.00	44.97	84.01	58.80	63.00	38.38	0.00	49.79	49.68	78.41	45.16
AS-R4	7.78	5.87	5.36	10.60	8.03	9.78	7.97	15.90	10.80	12.74	7.78	0.00	5.85	0.00	11.61	6.79	10.97	10.97	12.70	0.00	7.26	8.64	7.47	11.31
AS-R5	110.00	79.33	79.31	101.16	112.20	121.39	98.42	169.12	141.26	155.39	68.69	0.00	130.65	0.00	123.77	105.88	150.62	150.67	110.01	0.00	96.98	156.00	148.68	152.80
AS-R6	15.71	16.62	11.86	15.71	11.25	11.91	16.82	16.59	20.92	25.68	17.26	0.00	24.70	0.00	27.51	10.22	15.59	14.55	19.51	0.00	9.88	27.12	19.66	20.21
AS-R7	218.75	140.42	216.57	211.56	240.15	194.33	291.38	218.80	206.10	164.65	240.05	0.00	306.43	0.00	223.48	305.34	204.99	219.65	217.92	0.00	328.78	180.72	200.75	115.88
AS-R8	2.56	2.65	1.25	2.54	2.75	2.82	1.73	3.57	3.90	4.29	1.72	0.00	2.91	0.00	3.77	2.40	3.64	4.84	3.91	0.00	2.61	3.06	3.38	4.02
AS-R9	0.17	0.17	0.12	0.15	0.09	0.18	0.12	0.18	0.27	0.23	0.11	0.00	0.14	0.00	0.18	0.21	0.29	0.27	0.16	0.00	0.11	0.19	0.23	0.26
AS-R10	0.30	0.22	0.28	0.35	0.34	0.39	0.30	0.19	0.28	0.22	0.22	0.00	0.41	0.00	0.23	0.44	0.19	0.22	0.30	0.00	0.43	0.33	0.60	0.16
AS-R11	0.25	0.16	0.34	0.25	0.33	0.24	0.33	0.30	0.17	0.12	0.23	0.00	0.46	0.00	0.22	0.20	0.37	0.24	0.22	0.00	0.27	0.21	0.33	0.21
AS-R12	0.09	0.08	0.13	0.09	0.06	0.21	0.12	0.10	0.14	0.13	0.14	0.00	0.09	0.00	0.06	0.07	0.06	0.07	0.06	0.00	0.16	0.09	0.06	0.07
AT-R1	7.86	4.82	12.32	9.35	5.17	7.88	0.00	8.74	4.55	0.00	6.10	8.26	15.20	0.00	5.84	5.17	0.00	11.55	8.52	0.00	12.58	7.49	0.00	13.65
AT-R2	19.41	8.12	19.99	23.05	20.61	14.11	0.00	16.27	8.13	0.00	22.21	24.72	28.26	0.00	16.02	15.92	0.00	29.92	12.72	0.00	28.78	22.43	0.00	33.73
AT-R3	7.78	3.93	9.27	7.22	8.14	4.98	0.00	8.37	4.42	0.00	12.40	14.14	10.86	0.00	6.01	5.11	0.00	13.29	5.08	0.00	13.00	7.38	0.00	13.00
AT-R4	110.00	51.09	109.77	121.87	79.05	136.71	0.00	79.99	85.77	0.00	122.44	150.52	95.85	0.00	81.15	116.52	0.00	164.10	72.08	0.00	176.11	81.68	0.00	110.02
AT-R5	15.71	7.93	30.33	13.66	10.34	16.79	0.00	16.16	7.10	0.00	13.72	15.43	30.39	0.00	16.23	11.71	0.00	17.68	22.96	0.00	17.19	25.90	0.00	32.04
AT-R6	218.75	220.90	197.00	210.10	167.08	154.91	0.00	212.21	291.06	0.00	375.54	354.59	239.35	0.00	280.77	417.31	0.00	311.42	163.92	0.00	223.34	261.10	0.00	160.58
AT-R7	0.87	0.83	0.83	0.90	1.17	1.21	0.00	0.94	0.52	0.00	0.52	0.79	0.85	0.00	0.52	0.55	0.00	0.96	1.21	0.00	0.44	0.61	0.00	0.86
AT-R8	0.17	0.07	0.24	0.21	0.12	0.18	0.00	0.17	0.11	0.00	0.19	0.15	0.17	0.00	0.12	0.17	0.00	0.25	0.21	0.00	0.28	0.17	0.00	0.21
AT-R9	0.30	0.27	0.24	0.29	0.22	0.31	0.00	0.42	0.34	0.00	0.48	0.59	0.33	0.00	0.40	0.26	0.00	0.30	0.24	0.00	0.21	0.35	0.00	0.17
AT-R10	0.25	0.18	0.16	0.17	0.19	0.17	0.00	0.36	0.18	0.00	0.45	0.40	0.28	0.00	0.34	0.37	0.00	0.39	0.11	0.00	0.17	0.26	0.00	0.17
AT-R11	5.59	3.58	8.53	6.64	7.46	5.71	0.00	6.27	3.76	0.00	4.42	4.81	7.83	0.00	5.87	3.86	0.00	6.32	8.55	0.00	9.87	6.73	0.00	8.29
AT-R12	1.76	1.19	2.13	2.09	1.32	1.18	0.00	1.99	2.34	0.00	1.91	2.83	1.19	0.00	1.38	2.09	0.00	2.23	1.23	0.00	1.79	1.32	0.00	1.35
AU-R1	7.86	8.50	7.29	5.63	10.70	5.02	11.40	12.00	0.00	6.64	4.51	6.92	0.00	8.81	4.70	0.00	12.41	0.00	7.10	8.73	9.87	0.00	9.08	6.12
AU-R2	19.41	15.18	29.73	18.51	17.88	12.90	28.70	28.42	0.00	20.97	8.71	27.59	0.00	18.79	25.79	0.00	21.43	0.00	9.99	16.27	20.97	0.00	25.75	9.37
AU-R3	7.78	4.86	10.17	10.79	6.88	6.49	11.04	8.97	0.00	6.07	4.36	7.97	0.00	8.83	5.47	0.00	8.86	0.00	4.40	5.74	9.35	0.00	7.01	6.14
AU-R4	0.16	0.15	0.11	0.10	0.21	0.11	0.17	0.18	0.00	0.11	0.13	0.21	0.00	0.11	0.13	0.00	0.13	0.00	0.14	0.15	0.22	0.00	0.19	0.12
AU-R5	15.71	23.44	15.45	16.39	21.93	13.61	14.92	25.35	0.00	23.63	12.32	14.67	0.00	12.55	15.01	0.00	12.09	0.00	12.56	19.52	15.71	0.00	20.66	15.78
AU-R6	218.75	241.05	318.04	251.02	236.45	245.65	369.90	281.75	0.00	366.86	148.05	206.74	0.00	339.95	220.62	0.00	190.58	0.00	137.40	253.58	195.80	0.00	162.98	218.73
AU-R7	0.25	0.24	0.38	0.42	0.30	0.22	0.33	0.35	0.00	0.44	0.24	0.30	0.00	0.59	0.27	0.00	0.36	0.00	0.25	0.19	0.20	0.00	0.39	0.17
AU-R8	190.91	165.29	256.89	309.46	145.20	167.93	242.98	155.21	0.00	335.77	180.93	190.82	0.00	256.31	221.17	0.00	369.27	0.00	134.13	165.74	128.84	0.00	209.69	221.80
AU-R9	44.87	46.35	68.49	75.17	43.63	63.23	59.88	87.16	0.00	52.86	27.77	27.10	0.00	43.56	39.19	0.00	65.32	0.00	42.86	52.60	36.13	0.00	30.76	45.04
AU-R10	0.36	0.29	0.36	0.37	0.49	0.50	0.35	0.45	0.00	0.29	0.18	0.50	0.00	0.39	0.24	0.00	0.41	0.00	0.29	0.36	0.45	0.00	0.46	0.28
AU-R11	5.59	4.38	4.01	3.79	5.60	5.78	8.58	8.99	0.00	4.75	5.33	5.38	0.00	6.14	5.61	0.00	4.16	0.00	2.81	3.49	4.75	0.00	6.46	4.36
AV-R1	2.38	1.87	1.67	1.79	2.38	1.60	0.00	1.63	3.24	0.00	3.37	4.61	1.79	0.00	2.05	3.30	0.00	1.83	1.79	0.00	1.61	1.61	0.00	2.31
AV-R2	1.66	1.55	1.63	1.63	1.39	1.69	0.00	1.71	1.63	0.00	1.58	1.81	0.86	0.00	1.32	2.12	0.00	1.33	1.68	0.00	1.65	1.29	0.00	2.46
AV-R3	0.70	0.83	0.97	0.91	0.59	1.05	0.00	1.05	0.50	0.00	0.47	0.39	0.48	0.00	0.64	0.64	0.00	0.73	0.94	0.00	1.02	0.80	0.00	1.06
AV-R4	0.34	0.35	0.33	0.23	0.35	0.30	0.00	0.24	0.37	0.00	0.36	0.52	0.16	0.00	0.37	0.29	0.00	0.35	0.26	0.00	0.21	0.45	0.00	0.46
AV-R5	0.13	0.10	0.13	0.19	0.10	0.09	0.00	0.19	0.16	0.00	0.18	0.13	0.21	0.00	0.11	0.13	0.00	0.09	0.20	0.00	0.29	0.11	0.00	0.08
AV-R6	0.05	0.07	0.05	0.05	0.05	0.12	0.00	0.07	0.04	0.00	0.05	0.06	0.04	0.00	0.05	0.08	0.00	0.06	0.07	0.00	0.08	0.09	0.00	0.11
AV-R7	7.78	7.20	14.05	15.05	6.11	3.61	0.00	9.32	10.32	0.00	6.21	4.84	14.84	0.00	9.29	5.83	0.00	9.49	5.46	0.00	7.20	5.11	0.00	5.44
AV-R8	9.43	10.02	13.72	13.72	10.07	6.04	0.00	14.95	9.43	0.00	10.31	3.70	12.68	0.00	12.61	8.21	0.00	7.36	9.26	0.00	9.90	6.82	0.00	5.17
AV-R9	0.16	0.12	0.28	0.28	0.18	0.10	0.00	0.19	0.19	0.00	0.15	0.15	0.22	0.00	0.14	0.12	0.00	0.19	0.10	0.00	0.10	0.15	0.00	0.11
AW-R1	7.86	7.92	6.19	5.31	13.02	0.00	12.58	10.63	14.83	17.95	0.00	7.25	0.00	7.88	5.85	0.00	5.62	14.45	5.91	0.00	8.42	8.05	3.75	8.70
AW-R2	19.41	13.17	10.04	12.98	27.67	0.00	26.86	20.31	27.58	33.23	0.00	12.04	0.00	22.47	21.10	0.00	19.46	26.05	20.45	0.00	14.07	20.05	14.65	13.72
AW-R3	60.00	39.81	59.92	46.38	45.15	0.00	39.16	40.58	69.76	41.96	0.00	83.37	0.00	60.95	103.01	0.00	73.82	49.01	84.30	0.00	66.69	61.98	41.22	51.61

ADDENDUM D

	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10	Project 11	Project 12	Project 13	Project 14	Project 15	Project 16	Project 17	Project 18	Project 19	Project 20	Project 21	Project 22	Project 23	Project 24
AW-R4	7.78	5.14	5.41	3.75	7.78	0.00	12.56	15.05	11.45	10.20	0.00	7.67	0.00	8.20	8.71	0.00	6.08	13.68	5.53	0.00	8.55	4.89	5.63	6.19
AW-R5	218.75	222.24	170.88	226.22	150.50	0.00	94.48	139.45	230.49	157.23	0.00	157.21	0.00	202.35	383.11	0.00	242.08	162.42	195.97	0.00	251.05	256.48	208.38	255.23
AW-R6	0.25	0.27	0.18	0.26	0.26	0.00	0.17	0.28	0.27	0.14	0.00	0.18	0.00	0.24	0.47	0.00	0.30	0.25	0.40	0.00	0.18	0.21	0.36	0.22
BA-R1	26.86	30.10	31.21	12.27	20.93	37.61	20.25	16.46	20.25	20.13	17.53	43.32	43.32	40.43	24.66	15.56	19.11	17.15	16.23	21.07	17.99	22.52	52.18	59.90
BA-R2	15.68	11.88	15.74	10.55	14.58	21.74	14.10	10.00	14.10	8.10	7.91	18.67	16.21	15.88	20.96	16.40	14.16	14.16	18.41	15.60	15.30	17.87	26.20	26.20
BA-R3	77.41	56.30	52.67	51.98	66.63	160.51	64.46	48.35	76.48	55.39	35.96	77.27	75.14	75.83	87.59	67.03	47.27	47.27	78.17	81.84	76.49	89.35	134.04	119.71
BA-R4	93.94	107.90	94.21	41.43	62.01	127.14	62.29	94.62	91.64	62.23	47.38	181.35	217.82	148.42	84.66	60.40	71.50	64.14	66.53	61.50	65.31	76.29	114.44	91.69
BB-R1	26.86	16.95	25.38	15.34	37.19	12.40	37.84	19.70	43.32	30.77	37.19	40.05	35.59	36.27	43.32	29.17	36.27	17.99	18.05	30.73	22.16	15.32	21.65	24.56
BB-R2	15.68	16.99	10.57	15.63	20.10	10.99	13.94	16.10	24.18	12.34	33.87	24.05	15.64	15.96	17.79	22.25	21.69	15.30	16.99	24.22	15.92	22.88	13.14	25.99
BB-R3	77.41	86.62	87.53	107.63	130.41	33.21	135.15	51.91	112.30	85.29	109.16	77.97	53.03	122.65	77.41	74.29	97.64	74.02	77.16	122.52	59.25	73.75	59.15	118.26
BB-R4	7.71	8.53	5.59	7.50	11.23	3.83	12.41	7.90	13.62	5.75	8.41	7.54	7.40	10.51	12.44	11.19	11.05	7.28	4.95	11.13	7.04	7.04	4.62	10.35
BC-R1	26.86	21.04	23.60	39.06	25.75	20.13	17.66	28.17	18.16	32.05	34.34	15.56	37.61	32.05	34.34	29.50	26.80	18.05	31.82	41.19	27.37	45.07	54.76	48.23
BC-R2	15.68	19.20	18.85	23.84	10.26	13.65	8.25	10.26	11.51	17.32	18.55	16.40	14.85	17.32	18.55	17.00	13.17	15.98	19.30	25.21	10.80	17.28	27.50	26.92
BC-R3	77.41	62.12	45.84	76.37	121.07	58.23	48.61	112.50	56.87	117.52	61.80	67.04	105.80	75.56	105.20	81.56	80.02	68.17	86.93	77.71	57.93	164.96	95.22	131.23
BC-R4	93.94	156.21	123.49	136.60	95.89	47.89	54.60	93.80	62.46	124.61	75.26	55.01	86.83	91.69	91.01	66.93	73.20	59.79	82.63	209.34	91.87	150.65	161.79	96.24
BC-R5	7.71	9.65	7.63	11.08	6.09	5.80	3.57	7.13	7.56	9.20	10.12	6.46	8.42	9.63	8.30	8.10	7.17	11.73	10.87	12.94	5.10	12.35	8.99	17.62
BD-R1	26.86	26.10	26.10	16.46	32.05	25.38	34.34	37.84	25.68	18.35	64.17	59.64	20.12	64.17	35.75	35.10	36.95	21.66	43.32	28.17	18.16	21.39	21.39	20.19
BD-R2	15.68	11.04	10.30	11.93	17.32	10.57	24.39	20.44	13.88	25.58	26.20	26.20	15.86	26.30	21.88	14.39	16.90	9.27	17.79	10.26	11.51	17.29	18.62	15.40
BD-R3	77.41	74.96	74.96	71.87	68.09	87.53	104.02	80.39	54.57	82.45	101.41	88.85	59.02	127.16	102.89	70.09	73.75	47.59	117.66	80.94	49.71	133.19	94.56	51.41
BD-R4	7.71	9.47	8.87	4.58	12.25	5.59	7.76	11.09	8.11	6.35	12.06	12.40	7.02	10.93	6.40	9.98	8.68	6.06	11.75	9.37	9.58	8.66	6.19	7.14
BE-R1	26.86	64.17	35.75	23.47	16.46	20.25	20.13	17.53	43.32	43.32	40.43	24.66	27.68	37.94	27.10	21.53	26.86	45.25	18.45	59.90	18.90	18.84	22.70	25.75
BE-R2	15.68	22.96	21.83	9.13	10.00	14.10	8.10	7.91	18.67	16.21	15.88	20.96	15.80	21.17	16.54	14.99	20.04	15.30	15.08	27.81	14.99	11.00	10.33	17.21
BE-R3	77.41	104.92	70.79	107.73	53.98	78.73	33.89	46.88	99.40	68.70	97.13	64.00	76.30	103.60	79.45	68.52	91.61	136.39	50.35	85.90	49.61	76.03	60.84	58.38
BE-R4	93.94	175.01	166.13	91.43	92.02	97.05	70.59	40.57	148.42	213.39	122.51	140.81	60.80	85.03	63.31	114.29	74.99	137.04	88.20	164.62	88.74	84.87	81.08	99.20
BF-R1	26.86	24.38	25.32	39.26	40.07	68.76	27.92	48.70	64.17	20.22	48.48	64.18	29.74	25.87	25.67	20.76	18.90	20.25	18.98	64.17	18.79	20.22	26.10	24.86
BF-R2	15.68	20.80	26.77	10.24	16.36	26.20	14.86	26.20	26.20	12.39	22.82	24.45	11.92	16.40	13.73	11.58	15.45	10.77	7.49	24.45	8.60	8.11	11.04	9.79
BF-R3	77.41	76.94	115.50	50.74	66.54	123.97	57.48	113.65	77.41	34.03	75.56	127.17	82.44	105.80	109.32	80.09	52.39	73.13	58.42	127.17	34.59	77.74	108.64	48.52
BF-R4	7.71	5.76	8.68	11.27	7.89	8.44	12.72	7.66	15.73	6.09	14.56	8.89	8.14	10.44	10.32	7.79	7.31	7.71	5.31	8.89	8.24	5.42	8.15	10.78
DA-R1	4.98	5.24	5.14	5.74	5.49	5.15	5.48	3.32	5.59	4.96	6.76	7.63	4.96	4.96	6.29	5.79	5.51	4.83	5.07	8.88	5.52	6.63	6.33	4.79
DB-R1	3.01	3.15	2.99	5.15	3.16	2.80	3.25	126.72	2.19	3.16	2.80	3.62	3.03	2.15	2.20	2.21	2.78	2.15	3.01	4.99	2.29	3.15	2.85	3.77
DC-R1	1.80	1.89	1.41	3.44	3.36	1.80	2.07	2.42	1.93	1.66	2.68	2.90	2.13	1.28	1.22	1.64	1.80	1.80	2.30	3.84	1.72	2.09	1.83	2.09
DD-R1	5.79	6.09	5.77	7.59	9.82	3.69	7.62	3.87	5.73	5.92	8.52	9.62	4.87	5.89	8.00	6.50	4.38	3.80	4.96	8.14	7.02	8.82	5.69	7.42
DE-R1	2.36	2.34	2.36	2.74	2.48	1.50	2.55	2.39	2.53	2.57	2.15	2.26	2.36	2.03	1.54	3.64	3.42	2.30	3.18	74.44	2.23	1.54	1.48	2.37
E-R1	0.68	0.51	0.73	0.84	0.95	0.71	0.81	0.44	0.73	1.01	1.01	0.75	0.51	0.50	0.71	0.45	0.65	0.49	0.68	0.83	0.47	0.75	0.60	0.97
E-R2	52.09	42.92	62.64	42.92	52.34	61.12	62.64	39.67	59.73	85.09	59.51	41.19	44.88	42.92	62.65	35.75	54.54	42.92	44.88	45.71	42.92	60.09	52.80	63.41
F-R1	0.34	0.22	0.26	0.23	0.24	0.23	0.46	0.46	0.46	0.44	0.24	0.25	0.24	0.56	0.23	0.25	0.21	0.15	0.33	0.44	0.25	0.39	0.33	0.31
F-R2	2.36	3.67	2.35	4.22	3.62	2.12	1.86	1.70	1.93	1.85	3.72	3.84	2.49	1.66	2.45	3.47	2.48	3.26	3.10	2.89	2.26	2.28	1.60	2.95
F-R3	0.79	0.80	0.62	0.97	0.88	0.48	0.86	0.77	0.90	0.81	0.88	0.97	0.59	0.93	0.56	0.88	0.53	0.50	1.01	1.27	0.57	0.89	0.52	0.92
F-R4	3.47	2.43	8.29	2.43	2.61	7.74	3.43	6.07	2.62	6.07	3.48	3.06	3.34	3.95	3.46	3.43	2.72	2.12	2.49	2.10	2.62	3.77	2.43	3.37
F-R5	1.16	1.14	1.81	0.64	0.60	1.94	1.12	1.79	0.85	1.78	1.14	0.66	1.26	1.17	1.19	0.71	0.61	0.82	1.06	1.07	0.69	1.65	0.78	1.82
G-R1	0.40	0.62	0.53	0.44	0.46	0.51	0.88	0.55	0.46	0.28	0.30	0.28	0.67	0.72	0.37	0.27	0.25	0.88	0.34	0.27	0.45	0.58	0.35	0.31
G-R2	0.10	0.19	0.12	0.14	0.13	0.13	0.17	0.13	0.22	0.10	0.07	0.06	0.18	0.20	0.10	0.07	0.10	0.14	0.06	0.12	0.10	0.09	0.07	0.10
G-R3	0.30	0.26	0.25	0.23	0.23	0.30	0.30	0.30	0.23	0.21	0.42	0.45	0.23	0.23	0.36	0.48	0.28	0.20	0.43	0.26	0.17	0.45	0.27	0.28
G-R4	1.69	1.92	1.11	1.25	1.11	2.32	2.70	2.31	1.89	1.52	1.13	1.06	1.67	1.67	1.73	2.25	1.92	1.69	1.23	1.46	1.10	2.98	0.98	2.01
G-R5	2.13	3.41	1.98	2.33	2.23	1.99	2.31	3.53	2.51	1.32	1.29	1.20	1.93	2.22	1.97	2.13	1.80	3.39	1.84	1.47	2.04	1.85	1.94	1.56
G-R6	0.30	0.28	0.17	0.44	0.42	0.39	0.49	0.26	0.53	0.29	0.30	0.28	0.44	0.47	0.35	0.31	0.34	0.74	0.18	0.23	0.30	0.26	0.17	0.32
G-R7	0.15	0.25	0.15	0.17	0.15	0.24	0.33	0.28	0.25	0.14	0.15	0.14	0.22	0.22	0.21	0.09	0.17	0.18	0.12	0.14	0.15	0.15	0.15	0.11
G-R8	0.16	0.23	0.25	0.21	0.14	0.10	0.09	0.10	0.12	0.20	0.10	0.09	0.08	0.12	0.10	0.23	0.22	0.18	0.19	0.10	0.21	0.19	0.15	0.15
G-R9	0.02	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.04	0.02
G-R10	0.12	0.23	0.25	0.16	0.17	0.13	0.12	0.12	0.08	0.08	0.10	0.09	0.09	0.08	0.10	0.17	0.08	0.13	0.18	0.09	0.07	0.19	0.11	0.08

ADDENDUM D

Quantity ratios

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AB-Q1	2.55	2.55	1.98	2.36	2.37	2.21	2.06	1.60	1.91	1.91	1.78	1.66	1.99	1.99	2.13	1.98	2.37	2.21	2.64	2.47	2.30
AB-Q2	1.25	1.25	1.04	1.16	1.16	1.16	1.16	0.90	1.00	1.00	1.00	1.00	1.12	1.12	1.12	1.12	1.24	1.24	1.39	1.39	1.39
AB-Q3	2.75	2.13	1.65	1.98	2.12	1.98	1.84	1.19	1.42	1.52	1.42	1.32	1.58	1.22	1.31	1.22	1.46	1.37	1.63	1.52	1.42
AB-Q4	2.44	2.44	1.89	2.26	2.26	2.26	2.11	1.41	1.69	1.69	1.69	1.58	1.88	1.88	1.36	1.27	1.51	1.41	1.69	1.69	1.57
AC-Q1	1.58	1.04	1.82	1.69	1.19	1.28	1.19	2.55	2.39	1.19	1.27	1.19	1.27	1.58	1.48	1.48	1.58	1.04	1.82	1.58	1.04
AC-Q2	20.69	12.75	22.38	20.67	15.33	16.07	15.15	23.41	22.23	15.27	16.73	15.10	15.64	22.08	19.53	19.43	21.67	13.33	22.00	21.20	12.71
AC-Q3	0.65	0.80	0.93	1.09	1.25	1.17	0.68	1.21	1.63	1.25	1.15	0.67	0.69	0.93	0.68	0.70	0.60	0.75	0.91	0.63	0.81
AC-Q4	0.19	0.25	0.09	0.09	0.13	0.13	0.25	0.14	0.14	0.13	0.12	0.25	0.24	0.09	0.19	0.19	0.18	0.24	0.09	0.19	0.25
AC-Q5	0.05	0.04	0.07	0.06	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.07	0.05	0.04
AC-Q6	0.59	0.39	0.58	0.58	0.42	0.42	0.45	0.70	0.64	0.42	0.42	0.45	0.48	0.56	0.55	0.55	0.59	0.39	0.58	0.59	0.39
AC-Q7	1.89	1.56	2.17	1.82	1.61	1.62	1.46	3.18	2.06	1.61	1.61	1.46	1.76	1.61	1.65	1.65	1.90	1.56	2.18	1.89	1.57
AC-Q8	1.55	1.19	1.55	1.44	1.52	1.63	1.95	1.63	1.69	1.53	1.63	1.96	1.39	2.02	2.05	2.06	1.55	1.19	1.55	1.55	1.19
AC-Q9	0.31	0.26	0.31	0.29	0.39	0.39	0.38	0.31	0.31	0.39	0.39	0.38	0.27	0.45	0.46	0.46	0.31	0.26	0.31	0.31	0.26
AC-Q10	0.15	0.21	0.16	0.14	0.18	0.15	0.18	0.29	0.29	0.18	0.14	0.18	0.15	0.14	0.15	0.15	0.14	0.20	0.16	0.15	0.21
AC-Q11	15.22	11.90	16.35	15.23	13.65	14.64	13.69	17.61	18.05	13.65	14.61	13.67	14.63	15.21	15.24	15.25	15.23	11.88	16.34	15.23	11.92
AC-Q12	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.55	1.39	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
AC-Q13	0.18	0.12	0.20	0.19	0.13	0.14	0.13	0.18	0.19	0.13	0.14	0.13	0.14	0.18	0.16	0.16	0.18	0.12	0.20	0.18	0.12
AC-Q14	0.08	0.08	0.08	0.08	0.07	0.08	0.08	0.07	0.05	0.07	0.07	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.08	0.08	0.08
AC-Q15	134.50	127.50	72.75	62.00	76.67	75.00	98.50	99.50	72.25	76.33	62.75	151.00	86.00	71.75	166.00	136.00	130.00	100.00	73.33	159.00	108.00
AC-Q16	269.00	255.00	291.00	248.00	230.00	225.00	197.00	398.00	289.00	229.00	251.00	302.00	172.00	287.00	332.00	272.00	260.00	200.00	220.00	318.00	216.00
AC-Q17	1.58	1.04	1.55	1.55	1.13	1.13	1.19	1.15	1.68	1.13	1.13	1.19	1.27	1.49	1.48	1.48	1.58	1.04	1.55	1.58	1.04
AD-Q1	0.12	0.11	0.11	0.15	0.15	0.15	0.11	0.10	0.20	0.22	0.11	0.11	0.18	0.23	0.22	0.15	0.13	0.14	0.14	0.14	0.14
AD-Q2	0.18	0.08	0.08	0.08	0.08	0.22	0.08	0.07	0.07	0.07	0.07	0.08	0.09	0.11	0.07	0.23	0.25	0.08	0.06	0.08	0.08
AD-Q3	1.10	0.69	0.74	0.56	0.52	0.56	0.36	0.35	0.46	0.40	0.40	0.36	0.46	0.78	0.40	0.56	0.44	0.43	0.46	0.49	0.49
AD-Q4	0.43	0.37	0.25	0.17	0.16	0.18	0.20	0.35	0.16	0.15	0.14	0.20	0.18	0.40	0.22	0.19	0.19	0.17	0.15	0.20	0.20
AD-Q5	0.48	0.49	0.33	0.26	0.22	0.23	0.38	0.66	0.36	0.38	0.36	0.38	0.37	0.83	0.80	0.34	0.37	0.39	0.35	0.30	0.28
AD-Q6	1.31	1.31	1.31	1.72	1.50	1.51	1.35	2.00	1.35	1.35	1.35	1.35	1.51	4.46	4.44	1.35	1.45	1.35	1.35	1.73	1.61
AD-Q7	3.36	3.61	3.86	1.41	1.50	1.37	3.16	1.85	2.95	3.16	2.95	3.15	2.39	1.50	1.51	2.17	2.22	2.49	2.24	1.50	1.34
AD-Q8	3.89	3.89	3.88	3.43	2.99	2.94	4.28	4.32	4.00	4.29	4.00	4.29	3.38	5.11	4.66	3.90	3.96	4.17	4.17	3.55	3.55
AD-Q9	4.88	6.65	5.46	4.35	4.65	4.34	6.73	4.75	4.29	4.29	6.28	6.72	3.62	4.18	4.28	4.65	3.92	5.34	4.47	4.03	3.62
AD-Q10	0.74	0.77	0.95	0.67	0.67	0.68	0.93	1.16	0.94	1.01	0.63	0.93	1.04	0.98	1.05	0.63	0.96	0.65	0.65	0.88	0.88
AD-Q11	0.63	1.40	1.62	0.98	0.99	0.67	0.81	1.13	1.49	1.50	0.81	0.81	1.14	1.60	1.50	0.63	0.74	0.84	0.99	1.17	1.10
AD-Q12	0.96	1.37	1.41	1.00	1.00	0.68	1.08	1.50	1.09	1.01	1.08	1.08	0.95	1.02	1.02	0.64	0.81	0.91	1.07	1.26	1.19
AD-Q13	0.42	1.21	1.68	0.92	0.93	0.93	0.93	1.35	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93
AD-Q14	0.09	0.29	0.22	0.20	0.22	0.08	0.17	0.25	0.23	0.14	0.15	0.22	0.19	0.19	0.22	0.07	0.06	0.22	0.26	0.19	0.19
AD-Q15	0.01	0.01	0.03	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AD-Q16	0.89	1.90	4.37	1.43	1.43	1.37	2.13	2.60	2.79	2.56	2.65	2.71	1.29	1.47	2.26	1.91	1.47	2.91	3.22	1.91	2.67
AE-Q1	4.59	4.88	4.54	4.54	5.87	5.49	4.38	4.25	4.22	5.84	5.40	4.38	4.46	5.00	5.09	5.03	4.51	4.88	4.57	4.54	4.87
AE-Q2	0.14	0.15	0.15	0.15	0.13	0.13	0.10	0.16	0.16	0.13	0.13	0.10	0.15	0.11	0.11	0.11	0.14	0.15	0.15	0.14	0.15
AE-Q3	6.98	5.69	6.92	6.43	8.79	8.84	8.38	5.07	5.80	8.76	8.69	8.42	6.10	9.93	10.26	10.10	6.85	5.71	6.93	6.90	5.69
AE-Q4	0.68	0.79	0.60	0.59	0.89	0.89	1.14	0.71	0.70	0.89	0.89	1.14	0.76	0.89	0.97	0.97	0.68	0.80	0.60	0.68	0.80
AE-Q5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AE-Q6	781.71	617.22	550.42	463.16	393.14	420.98	717.73	393.39	380.35	393.35	421.35	716.94	717.29	497.86	728.29	728.50	781.95	617.02	549.81	780.68	617.10
AE-Q7	2.57	2.39	5.18	5.17	4.95	5.31	3.40	3.94	4.85	4.95	5.31	3.41	2.42	6.55	3.65	3.64	2.57	2.39	5.17	2.57	2.40
AE-Q8	1.98	1.84	1.55	1.54	2.40	2.58	3.01	1.91	1.67	2.40	2.57	3.02	2.00	2.57	2.80	2.80	1.98	1.84	1.54	1.97	1.84
AF-Q1	8.56	9.17	12.13	12.12	12.13	8.79	10.12	15.64	15.61	8.55	9.16	15.62	16.75	12.12	12.11	11.30	11.31	12.93	12.95	10.43	10.43
AF-Q2	1.96	2.29	1.89	1.76	1.04	2.48	2.08	1.42	1.42	1.47	1.48	1.42	1.42	1.04	1.04	1.11	1.71	1.49	1.49	2.59	2.77
AF-Q3	0.57	0.54	0.52	0.48	0.96	0.86	0.51	0.41	0.41	0.37	0.41	0.64	0.59	0.96	0.90	0.97	0.44	0.39	0.37	0.81	0.81
AF-Q4	0.63	0.58	0.39	0.42	0.39	0.31	0.33	0.35	0.33	0.28	0.42	0.51	0.54	0.39	0.39	0.39	0.35	0.45	0.45	0.40	0.44
AF-Q5	0.03	0.05	0.04	0.05	0.05	0.02	0.02	0.04	0.05	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.05	0.06	0.06	0.03	0.03
AF-Q6	1.31	1.16	0.62	0.62	0.68	0.55	0.62	0.94	0.94	0.91	0.65	0.58	0.54	0.67	1.01	1.09	1.07	0.71	0.71	0.86	0.86
AF-Q7	0.05	0.09	0.11	0.11	0.13	0.06	0.06	0.13	0.15	0.16	0.13	0.07	0.08	0.12	0.11	0.12	0.14	0.13	0.14	0.08	0.07
AF-Q8	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.01
AF-Q9	1.50	1.40	0.47	0.42	0.49	0.75	0.88	0.75	0.80	0.75	0.81	0.54	0.51	0.49	0.61	0.61	0.65	0.44	0.47	0.77	0.72
AF-Q10	1.24	1.32	1.70	1.58	1.92	1.79	1.99	2.13	1.92	2.25	1.28	1.39	1.79	1.72	1.73	1.73	2.03	1.76	1.88	1.76	1.59
AF-Q11	21.27	8.95	8.94	9.27	9.72	19.38	30.86	16.05	8.47	10.00	9.00	16.82	11.50	6.37	12.74	13.00	12.53	11.35	10.13	11.18	11.13
AF-Q12	3.00	4.67	8.00	6.00	9.00	6.00	3.50	3.67	8.00	6.00	5.67	4.80	3.33	6.50	5.33	6.00	6.00	5.50	5.00	5.67	5.00
AF-Q13	0.11	0.19	0.08	0.15	0.09	0.07	0.08	0.07	0.08	0.07	0.08	0.07	0.18	0.07	0.08	0.08	0.07	0.12	0.13	0.07	0.08
AF-Q14	16.56	17.89	6.34	9.00	9.29	11.73	9.81	8.64	9.43	9.00	9.45	5.92	8.82	6.46	9.03	10.64	9.36	7.23	7.56	8.18	5.95
AF-Q15	0.40	0.35	0.33	0.37	0.34	0.46	0.45	0.37	0.38	0.30	0.51	0.39	0.39	0.29	0.33	0.42	0.51	0.45	0.45	0.58	0.99
AF-Q16	0.31	0.45	0.45	0.45	0.51	0.24	0.23	0.42	0.34	0.28	0.50	0.43	0.48	0.76	0.43	0.41	0.31	0.39	0.41	0.57	0.39
AF-Q17	0.08	0.09	0.08	0.08	0.12	0.15	0.16	0.18	0.11	0.06	0.11	0.06	0.05	0.06	0.08	0.06	0.06	0.07	0.07	0.07	0.08
AG-Q1	2.48	1.25	1.20	1.69	1.45	2.00	1.36	1.37	2.26	2.15	2.17	0.97	1.29	1.89	1.89	1.45	1.48	1.19	1.10	1.61	2.50
AG-Q2	0.74	0.27	0.29	0.26	0.30	0.46	0.54	0.46	0.49	0.46	0.49	0.33	0.31	0.26	0.26	0.30	0.29	0.30	0.25	0.42	0.58

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	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AG-Q3	8.74	3.68	4.07	4.19	3.64	4.77	4.96	5.08	6.00	6.18	7.70	3.44	2.51	6.63	6.27	3.61	3.68	4.19	4.13	5.49	3.92
AG-Q4	0.68	0.80	1.93	0.75	0.84	1.03	1.70	1.51	1.01	1.01	1.21	1.01	0.71	1.04	0.84	1.03	1.08	1.47	1.42	1.50	0.87
AG-Q5	1.63	2.51	2.94	2.06	1.68	1.44	5.07	4.63	1.57	1.41	1.63	2.04	1.95	2.01	2.01	1.85	2.42	2.05	2.04	3.32	2.09
AG-Q6	0.53	0.47	0.27	0.46	0.68	0.73	0.26	0.24	0.48	0.53	0.48	0.54	0.63	0.37	0.45	0.60	0.37	0.58	0.65	0.25	0.45
AG-Q7	0.68	0.80	1.93	0.75	0.84	1.03	1.70	1.51	1.01	1.01	1.21	1.01	0.71	1.04	0.84	1.03	1.08	1.47	1.42	1.50	0.87
AG-Q8	0.54	0.84	0.59	0.43	0.51	0.48	0.73	0.69	0.30	0.29	0.45	0.74	0.56	0.31	0.50	0.30	0.37	0.48	0.48	0.42	0.26
AG-Q9	0.67	0.55	0.39	0.53	0.50	0.50	0.22	0.23	0.51	0.99	0.49	0.77	0.59	0.55	0.55	0.41	0.50	0.74	0.82	0.53	0.74
AG-Q10	8.39	10.71	11.53	16.03	8.77	7.49	9.95	10.17	6.89	6.45	8.22	6.66	10.53	6.76	10.66	19.02	14.59	15.45	11.22	13.28	13.92
AG-Q11	0.10	0.10	0.11	0.17	0.11	0.09	0.10	0.11	0.12	0.13	0.09	0.10	0.15	0.10	0.12	0.13	0.09	0.11	0.07	0.12	0.10
AG-Q12	0.07	0.07	0.05	0.11	0.06	0.05	0.05	0.07	0.07	0.07	0.06	0.07	0.15	0.10	0.10	0.12	0.13	0.12	0.08	0.07	0.09
AG-Q13	50.84	22.50	41.42	24.44	36.63	37.73	17.60	17.90	44.00	52.31	29.09	38.35	38.00	37.56	23.95	44.19	30.95	33.79	33.88	32.35	27.89
AH-Q1	5.41	3.59	4.33	4.39	9.93	7.83	5.54	4.37	7.45	6.20	8.22	4.96	3.65	7.02	7.09	3.60	5.25	5.54	5.64	3.85	6.12
AH-Q2	2.82	3.59	3.32	2.83	9.93	9.25	3.11	3.31	5.65	5.78	4.82	3.57	4.13	4.11	4.13	2.81	3.27	3.11	3.19	5.05	3.43
AH-Q3	1.08	0.95	1.70	1.16	1.67	2.25	1.00	0.73	1.34	1.75	2.36	1.81	1.42	0.96	0.90	1.24	1.11	0.84	1.40	1.34	1.34
AH-Q4	0.74	0.99	0.72	0.78	0.53	0.79	0.67	0.67	0.68	0.60	0.84	1.01	1.09	0.55	0.58	1.33	0.81	0.49	0.52	0.95	0.67
AH-Q5	1.69	3.25	4.22	3.65	2.30	2.89	2.56	2.95	3.36	3.50	1.71	3.46	3.64	1.95	1.92	4.40	2.68	1.64	1.63	4.59	2.04
AH-Q6	0.56	0.63	0.61	0.69	0.51	0.42	0.35	0.52	0.53	0.64	0.36	0.77	0.82	0.42	0.42	0.60	0.36	0.58	0.58	0.60	0.50
AH-Q7	3.77	3.00	5.85	3.10	2.30	3.25	4.56	2.57	2.76	3.29	5.80	5.29	5.67	2.93	2.88	7.33	4.25	2.42	2.44	7.21	3.92
AH-Q8	12.25	19.50	19.00	31.00	23.00	26.00	20.50	19.67	15.67	18.67	19.33	30.00	25.50	10.25	9.20	22.00	12.75	11.50	13.00	25.25	12.75
AH-Q9	1.98	4.66	1.33	2.08	1.91	3.74	2.52	3.70	3.67	1.78	2.29	1.99	2.00	3.16	4.20	4.26	3.98	1.69	1.79	2.22	2.45
AH-Q10	0.20	0.29	0.27	0.26	0.25	0.33	0.23	0.34	0.22	0.19	0.17	0.20	0.20	0.28	0.40	0.26	0.26	0.26	0.25	0.29	0.27
AH-Q11	0.40	0.55	0.58	0.52	0.25	0.30	0.25	0.23	0.53	0.44	0.32	0.34	0.39	0.21	0.29	0.69	0.41	0.39	0.39	0.48	0.28
AH-Q12	0.36	0.57	0.35	0.34	0.49	0.42	0.28	0.46	0.26	0.30	0.24	0.47	0.33	0.40	0.23	0.32	0.32	0.40	0.36	0.25	0.27
AH-Q13	0.13	0.14	0.11	0.08	0.11	0.13	0.11	0.08	0.20	0.14	0.11	0.10	0.08	0.16	0.17	0.13	0.12	0.12	0.11	0.09	0.17
AH-Q14	0.13	0.08	0.11	0.12	0.13	0.12	0.08	0.09	0.09	0.11	0.12	0.09	0.09	0.09	0.12	0.08	0.08	0.18	0.20	0.08	0.10
AH-Q15	3.78	4.96	5.43	3.10	2.81	4.59	4.18	3.53	3.83	2.67	5.16	4.18	3.88	4.22	2.39	5.03	5.00	2.86	2.58	4.91	3.09
AH-Q16	1.34	1.70	2.05	1.64	2.14	2.95	3.25	1.36	2.10	2.67	1.93	1.36	1.27	1.54	2.56	2.86	3.04	1.95	2.09	3.09	2.27
AH-Q17	0.23	0.15	0.19	0.15	0.30	0.35	0.21	0.13	0.31	0.23	0.14	0.30	0.29	0.25	0.26	0.20	0.26	0.22	0.22	0.35	0.33
AH-Q18	16.82	26.67	16.02	15.19	21.33	40.03	16.16	22.12	33.78	22.85	12.39	23.38	23.27	29.08	39.10	25.99	33.78	14.18	14.18	26.70	23.48
AH-Q19	0.14	0.20	0.14	0.19	0.15	0.23	0.15	0.11	0.15	0.15	0.27	0.15	0.15	0.10	0.14	0.17	0.17	0.09	0.13	0.18	0.16
AH-Q20	0.15	0.37	0.11	0.21	0.19	0.21	0.16	0.20	0.32	0.13	0.12	0.12	0.11	0.19	0.23	0.30	0.24	0.16	0.18	0.13	0.14
AH-Q21	0.09	0.12	0.06	0.08	0.06	0.15	0.10	0.09	0.10	0.06	0.05	0.08	0.07	0.12	0.15	0.13	0.14	0.09	0.09	0.11	0.07
AH-Q22	143.96	353.85	151.61	123.31	202.47	301.22	185.54	313.46	199.21	206.17	179.55	104.73	102.17	170.50	232.17	187.33	228.18	144.55	145.65	147.80	211.36
AH-Q23	0.29	0.33	0.35	0.43	0.22	0.33	0.27	0.23	0.32	0.30	0.33	0.27	0.28	0.35	0.20	0.28	0.48	0.26	0.29	0.50	0.21
AH-Q24	0.27	0.40	0.36	0.52	0.47	0.70	0.48	0.30	0.34	0.45	0.80	0.27	0.27	0.46	0.44	0.95	0.72	0.41	0.44	0.68	0.55
AI-Q1	2.35	3.80	2.84	4.98	2.81	3.00	2.86	2.84	3.43	3.83	4.02	4.33	4.64	3.28	2.48	2.65	2.26	1.98	5.31	3.11	4.23
AI-Q2	0.25	0.73	0.25	0.25	0.23	0.23	0.23	0.25	0.30	0.36	0.25	0.78	0.83	0.25	0.21	0.28	0.32	0.28	0.56	0.39	0.57
AI-Q3	2.22	3.25	2.17	2.23	2.62	3.00	3.08	2.18	3.00	1.47	2.86	3.47	3.74	2.92	2.48	2.01	1.35	1.26	2.36	2.62	2.34
AI-Q4	0.50	0.48	0.28	0.16	0.43	0.40	0.44	0.28	0.40	0.30	0.29	0.45	0.36	0.38	0.46	0.38	0.45	0.45	0.35	0.30	0.45
AI-Q5	9.90	9.42	5.40	3.31	5.79	5.69	5.75	5.56	5.85	2.52	2.70	6.06	5.80	5.47	6.17	7.33	6.46	6.46	4.64	6.56	6.29
AI-Q6	0.38	0.35	0.42	0.21	0.42	0.42	0.42	0.42	0.37	0.30	0.32	0.32	0.33	0.32	0.32	0.33	0.43	0.46	0.22	0.47	0.31
AI-Q7	0.62	0.60	0.48	0.31	0.53	0.60	0.70	0.70	0.52	0.44	0.26	0.53	0.50	0.49	0.55	0.55	0.39	0.39	0.30	0.57	0.64
AI-Q8	0.05	0.07	0.11	0.07	0.07	0.10	0.10	0.11	0.07	0.17	0.16	0.14	0.08	0.08	0.09	0.05	0.09	0.10	0.10	0.07	0.10
AI-Q9	8.09	5.35	8.81	7.34	17.49	10.08	10.29	10.07	9.17	5.29	6.63	13.43	11.71	13.52	12.25	10.03	9.54	8.86	8.72	14.57	8.04
AI-Q10	0.02	0.04	0.04	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.01	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
AI-Q11	132.00	108.65	95.29	35.83	90.00	61.67	62.73	61.73	60.32	52.25	91.18	74.15	69.05	90.11	148.00	62.86	67.20	68.85	79.69	61.40	76.52
AJ-Q1	6.20	4.42	2.60	3.25	2.19	1.75	2.74	2.49	2.97	6.98	5.41	5.42	5.63	6.29	6.34	3.32	3.89	3.86	3.35	3.27	3.77
AJ-Q2	0.28	0.28	0.28	0.38	0.36	0.29	0.35	0.31	0.34	0.58	0.62	0.58	0.62	0.75	0.75	0.33	0.29	0.30	0.46	0.35	0.53
AJ-Q3	3.51	3.78	3.45	1.62	1.36	1.26	2.35	2.41	2.24	2.21	2.37	2.21	2.31	2.58	2.57	2.20	3.21	3.21	2.17	2.48	2.75
AJ-Q4	0.26	0.40	0.44	0.30	0.45	0.44	0.44	0.44	0.40	0.13	0.30	0.30	0.19	0.19	0.20	0.29	0.20	0.20	0.41	0.24	0.43
AJ-Q5	1.06	2.00	3.03	2.21	3.08	3.72	4.09	4.42	2.82	1.81	2.70	2.71	1.86	2.14	2.07	2.37	2.08	2.11	2.83	1.90	3.96
AJ-Q6	2.22	2.32	5.36	3.17	5.05	5.40	4.95	5.41	4.00	2.55	2.25	2.11	2.48	2.19	2.26	2.81	2.68	2.64	3.73	4.07	4.48
AJ-Q7	0.49	0.32	0.33	0.58	1.03	0.37	0.40	0.36	0.58	0.40	0.56	0.56	0.41	0.39	0.35	0.59	0.66	0.66	0.64	0.49	0.51
AJ-Q8	0.20	0.57	0.93	0.45	0.63	0.67	0.64	0.67	0.57	0.34	0.44	0.29	0.32	0.29	0.29	0.33	0.41	0.46	0.42	0.55	0.45
AJ-Q9	0.14	0.16	0.11	0.08	0.10	0.07	0.07	0.07	0.08	0.08	0.11	0.17	0.14	0.11	0.10	0.10	0.12	0.09	0.09	0.09	0.08
AJ-Q10	13.92	8.62	9.75	17.61	18.06	12.06	12.04	12.42	21.85	7.73	14.45	12.87	13.22	13.37	13.63	18.14	17.25	19.32	18.11	7.74	13.33
AJ-Q11	0.01	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.03
AJ-Q12	0.03	0.05	0.05	0.03	0.05	0.04	0.10	0.10	0.05	0.04	0.05	0.05	0.03	0.03	0.05	0.05	0.05	0.05	0.06	0.04	0.05
AJ-Q13	29.65	61.97	92.91	67.59	100.00	100.00	56.29	60.83	67.61	37.84	52.26	48.72	74.29	79.80	67.38	67.67	67.57	69.81	96.47	79.14	91.96
AK-Q1	1.22	1.50	2.43	1.44	1.88	2.96	1.90	2.70	1.63	2.28	2.73	2.29	2.36	1.84	2.05	1.72	1.81	2.83	1.76	1.34	1.05
AK-Q2	0.36	0.40	0.37	0.40	0.37	0.88	0.36	0.63	0.67	0.71	0.85	0.71	1.14	0.41	0.53	0.42	0.58	0.58	0.47	0.45	0.40
AK-Q3	1.96	2.17	2.02	2.51	1.39	2.09	2.06	2.37	2.54	2.19	2.43	2.18	3.24	1.63	2.10	1.80	2.21	1.91	1.85	1.39	1.69
AK-Q4	0.93	0.53	0.30	0.83	0.69	0.70	0.40	0.66	0.58	0.63	0.63	0.63	0.73	0.79	0.91	0.86	0.69	0.39	0.93	0.77	0.86
AK-Q5	62.00	28.27	17.44	27.56	21.67	20.22	20.88	27.00	31.30	32.29	33.00	18.56	36.60	24.09	30.83	26.82	28.44	18.20	28.50	21.43	42.86
AK-Q6	7.05	4.20	3.34	6.53	4.33	4.44	4.77	4.05	8.24	4.35	4.05	8.03	5.23	3.84	5.36	6.70	5.82	2.98	7.35	8.11	5.26
AK-Q7	0.95	0.77	0.42	0.47	0.37	0.58	0.59	0.39	0.65	0.63	0.63	0.63	0.77	0.57	0.74	0.83	0.59	0.44	0.92	0.50	0.60
AK-Q8	0.54	0.43	0.24	0.95	0.69	0.37	0.31	0.56	0.99	0.49	0.49	0.49	0.49	0.61	0.55	0.47	0.64	0.47	0.75	0.67	0.74

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	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AK-Q9	0.25	0.59	0.51	0.30	0.36	0.33	0.43	0.36	0.29	0.41	0.41	0.12	0.33	0.32	0.39	0.26	0.30	0.50	0.20	0.28	0.56
AK-Q10	0.17	0.31	0.30	0.26	0.23	0.26	0.32	0.26	0.29	0.37	0.33	0.33	0.25	0.30	0.29	0.37	0.31	0.24	0.36	0.42	0.24
AK-Q11	6.79	8.59	9.08	9.78	8.62	7.97	11.75	10.27	10.78	9.20	9.87	8.66	5.37	9.25	9.45	8.78	7.86	9.66	13.45	6.10	6.67
AK-Q12	0.04	0.04	0.04	0.04	0.04	0.02	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.04
AK-Q13	109.56	94.17	71.98	72.37	70.09	72.69	114.02	267.01	96.76	74.78	90.32	122.22	94.34	109.05	126.79	128.74	89.97	87.31	111.37	71.62	73.19
AL-Q1	1.64	2.71	3.38	3.38	2.65	2.43	1.71	2.24	3.83	2.57	2.44	2.62	2.54	2.73	2.59	2.34	3.16	3.49	2.43	1.88	4.89
AL-Q2	0.19	0.24	0.35	0.33	0.34	0.24	0.23	0.23	0.24	0.19	0.18	0.42	0.30	0.40	0.37	0.34	0.32	0.32	0.25	0.20	0.64
AL-Q3	2.04	3.06	1.85	1.72	1.99	1.28	1.44	2.49	2.82	1.75	1.76	2.85	2.17	3.05	2.85	1.92	1.68	1.68	1.43	1.87	3.27
AL-Q4	0.77	0.65	0.66	0.73	0.48	0.70	1.01	0.80	0.47	0.75	0.92	0.92	0.54	0.68	0.60	0.75	0.54	0.49	0.43	0.75	0.52
AL-Q5	1.35	1.08	1.24	0.87	1.08	1.20	2.09	1.29	0.73	0.73	0.84	1.05	1.39	1.05	1.05	1.13	1.00	0.69	0.83	1.82	0.74
AL-Q6	2.49	4.25	1.72	3.00	3.23	1.69	2.18	2.81	3.11	4.07	3.35	4.04	2.32	4.04	4.04	3.75	2.58	3.84	3.54	1.45	3.53
AL-Q7	3.37	4.60	2.13	2.60	3.48	2.03	4.56	3.62	2.27	2.95	2.80	4.25	3.21	4.23	4.25	4.23	2.58	2.64	2.94	2.65	2.62
AL-Q8	0.66	0.79	0.33	0.54	0.36	0.48	0.76	0.44	0.34	0.46	0.55	0.43	0.45	0.44	0.71	0.69	0.49	0.43	0.31	0.44	0.44
AL-Q9	0.45	0.66	0.49	0.48	0.36	0.33	0.58	0.58	0.44	0.30	0.48	0.71	0.61	0.81	0.69	0.61	0.48	0.45	0.31	0.43	0.29
AL-Q10	0.12	0.15	0.10	0.15	0.27	0.17	0.08	0.11	0.20	0.29	0.14	0.17	0.12	0.22	0.16	0.16	0.14	0.21	0.17	0.14	0.14
AL-Q11	0.58	0.27	0.47	0.32	0.33	0.44	0.24	0.33	0.40	0.29	0.32	0.30	0.43	0.21	0.23	0.24	0.25	0.34	0.31	0.37	0.34
AL-Q12	0.86	0.73	1.24	0.72	0.77	0.71	0.48	0.67	0.57	0.57	0.43	0.40	0.75	0.60	0.62	0.62	0.49	0.50	0.61	0.64	0.47
AL-Q13	15.70	14.57	10.45	9.40	14.09	9.00	8.50	8.15	12.21	13.46	13.67	20.91	8.00	13.57	15.33	15.00	7.88	9.11	9.54	10.82	9.76
AL-Q14	9.25	9.84	6.29	7.84	7.49	9.92	10.38	12.82	8.04	7.06	8.81	8.81	10.88	8.26	10.20	11.36	9.86	11.53	8.60	11.29	5.84
AL-Q15	0.02	0.04	0.03	0.03	0.02	0.04	0.02	0.03	0.02	0.05	0.03	0.03	0.05	0.04	0.04	0.04	0.03	0.03	0.04	0.03	0.02
AL-Q16	1.07	1.35	0.93	1.07	1.48	1.85	1.09	1.85	1.43	1.83	1.51	1.62	1.56	1.15	1.37	1.37	1.89	1.79	1.92	1.68	1.31
AL-Q17	475.00	741.43	479.03	596.23	476.47	485.33	857.89	600.00	491.23	749.02	469.41	653.25	531.82	392.08	757.53	701.59	471.60	463.64	520.31	540.96	421.43
AM-Q1	2.22	4.46	3.61	4.07	3.78	3.80	3.56	4.02	2.66	2.85	2.87	3.67	3.64	3.27	5.40	4.54	2.91	4.21	2.96	4.56	3.73
AM-Q2	0.56	0.43	0.56	0.64	0.91	0.75	0.70	0.41	0.45	0.41	0.47	0.38	0.66	0.82	0.98	0.74	0.65	1.07	0.40	0.53	0.62
AM-Q3	0.72	1.09	0.67	0.75	1.12	1.07	1.00	1.99	1.17	1.25	1.08	1.60	1.63	1.17	1.31	1.05	0.96	1.30	0.73	1.47	1.20
AM-Q4	0.79	0.31	0.86	0.79	0.44	0.65	0.65	0.63	0.85	0.79	0.68	0.61	0.68	0.60	0.43	0.40	0.56	0.98	0.48	0.62	0.62
AM-Q5	4.52	1.29	2.01	1.84	1.74	2.05	2.04	1.75	3.61	3.37	3.47	1.55	2.91	2.90	1.98	1.64	2.77	2.66	3.11	1.86	1.73
AM-Q6	0.42	1.35	0.85	0.88	0.95	1.10	1.18	1.56	0.44	0.44	0.49	1.45	0.77	0.83	0.91	1.09	0.85	0.98	0.48	0.90	0.96
AM-Q7	3.03	1.26	1.62	1.05	0.98	1.85	1.85	1.70	2.23	2.22	1.94	1.61	1.99	2.13	1.13	1.05	1.53	1.69	1.85	1.68	1.57
AM-Q8	2.10	3.45	1.66	2.58	4.26	2.30	2.08	2.56	2.77	2.97	2.14	4.13	2.07	2.90	1.89	2.12	2.98	3.18	2.03	1.87	1.88
AM-Q9	0.91	0.99	1.11	1.51	1.42	1.38	1.48	1.37	0.92	0.99	0.64	1.56	0.91	0.91	0.84	1.39	0.96	1.39	0.69	1.59	1.83
AM-Q10	0.94	0.58	0.40	0.39	0.60	0.44	0.57	0.47	0.76	0.82	0.76	0.79	0.54	0.71	0.71	0.63	1.03	0.59	0.98	0.41	0.44
AM-Q11	0.55	0.25	0.32	0.42	0.28	0.44	0.34	0.55	0.39	0.38	0.37	0.32	0.37	0.48	0.33	0.30	0.39	0.65	0.48	0.44	0.41
AM-Q12	0.15	0.25	0.19	0.15	0.26	0.15	0.21	0.24	0.14	0.15	0.17	0.18	0.12	0.20	0.19	0.24	0.22	0.14	0.14	0.18	0.15
AM-Q13	0.32	0.21	0.20	0.29	0.17	0.18	0.19	0.14	0.26	0.28	0.39	0.23	0.44	0.31	0.28	0.28	0.29	0.32	0.39	0.32	0.26
AM-Q14	1.66	0.47	1.04	0.89	0.87	0.74	0.72	0.61	1.84	1.88	0.88	0.46	0.98	0.62	0.64	0.54	0.88	0.59	0.80	0.73	0.62
AM-Q15	0.28	0.18	0.23	0.42	0.44	0.19	0.31	0.20	0.29	0.30	0.34	0.30	0.27	0.25	0.29	0.46	0.37	0.36	0.37	0.28	0.35
AM-Q16	20.20	38.00	34.00	24.80	29.00	23.00	31.75	34.50	19.40	16.83	17.50	24.33	31.67	36.25	34.80	23.29	26.20	35.75	26.33	21.50	25.33
AM-Q17	0.07	0.11	0.18	0.14	0.05	0.17	0.13	0.11	0.09	0.09	0.11	0.15	0.16	0.12	0.18	0.21	0.10	0.08	0.10	0.21	0.21
AM-Q18	8.60	8.35	9.45	6.50	12.07	4.91	10.21	12.51	7.63	9.08	7.35	7.53	6.41	6.66	9.67	6.23	12.79	12.40	13.13	5.25	8.65
AM-Q19	0.21	0.20	0.20	0.19	0.19	0.27	0.25	0.36	0.31	0.26	0.28	0.27	0.21	0.25	0.24	0.24	0.35	0.31	0.24	0.15	0.14
AM-Q20	0.39	0.26	0.37	0.34	0.36	0.39	0.39	0.45	0.52	0.47	0.54	0.52	0.30	0.32	0.32	0.34	0.45	0.57	0.63	0.38	0.39
AM-Q21	4.00	2.67	1.98	2.28	1.10	3.23	1.40	1.53	3.91	2.17	2.95	2.48	2.81	3.27	2.22	2.62	1.95	2.31	1.75	2.63	2.46
AM-Q22	1791.55	1338.67	561.33	1189.39	1438.60	994.87	1031.88	1040.50	873.98	1003.51	873.88	847.06	650.52	1100.99	1180.73	1041.49	1709.64	878.83	1124.44	1192.59	635.82
AN-Q1	1.74	1.24	1.31	1.61	1.86	2.58	0.00	1.54	2.07	2.07	2.07	1.19	0.00	0.93	2.13	2.07	1.15	1.32	1.29	1.00	1.70
AN-Q2	15.14	11.02	6.16	6.15	9.60	22.45	0.00	6.88	12.23	13.12	12.27	9.31	0.00	6.34	6.34	6.34	6.33	8.27	6.15	7.05	8.67
AN-Q3	5.97	4.45	3.54	6.66	5.11	8.18	0.00	5.02	4.32	4.63	4.32	6.21	0.00	4.63	4.61	4.87	5.79	2.90	5.81	3.67	3.60
AN-Q4	1.53	1.61	1.27	1.14	0.67	0.92	0.00	0.79	1.22	1.22	1.22	1.78	0.00	1.76	0.50	0.54	1.60	1.30	1.33	1.30	1.17
AN-Q5																					
AN-Q6	35.81	38.09	33.58	28.46	25.86	29.88	0.00	39.58	29.10	19.85	18.65	37.63	0.00	34.73	14.27	20.75	27.12	19.37	34.35	23.99	19.73
AN-Q7	1.46	1.47	1.47	1.12	1.04	1.04	0.00	1.19	1.06	3.12	3.27	1.20	0.00	1.57	2.48	1.44	2.31	2.60	1.21	2.28	1.53
AN-Q8	11.28	15.71	7.64	12.20	9.75	14.64	0.00	8.64	11.19	11.14	11.16	19.47	0.00	18.57	7.89	8.48	15.32	11.28	12.96	8.98	11.84
AN-Q9	11.40	13.20	13.25	12.00	8.17	12.25	0.00	8.33	12.50	19.50	21.25	10.00	0.00	15.40	19.80	9.33	12.33	19.50	10.00	18.20	13.00
AN-Q10	0.98	1.31	0.81	0.99	0.79	0.89	0.00	0.90	0.95	0.65	0.60	1.08	0.00	2.18	0.97	0.69	1.24	0.72	1.01	1.16	0.63
AN-Q11	11.21	14.62	9.94	8.70	6.81	7.91	0.00	5.47	12.02	7.41	6.00	10.11	0.00	14.69	7.03	4.49	11.88	9.69	8.98	7.28	6.78
AN-Q12	0.20	0.16	0.15	0.09	0.14	0.10	0.00	0.16	0.15	0.21	0.24	0.21	0.00	0.16	0.17	0.14	0.20	0.16	0.17	0.28	0.21
AN-Q13	0.23	0.22	0.22	0.30	0.22	0.29	0.00	0.13	0.31	0.13	0.15	0.23	0.00	0.28	0.19	0.20	0.17	0.18	0.17	0.13	0.27
AN-Q14	0.46	0.65	0.63	0.80	0.85	0.59	0.00	0.63	0.62	0.32	0.45	1.10	0.00	0.82	0.39	0.47	0.40	0.40	0.92	0.82	0.54
AN-Q15	0.19	0.10	0.09	0.14	0.20	0.16	0.00	0.16	0.15	0.17	0.09	0.25	0.00	0.10	0.13	0.19	0.21	0.14	0.17	0.15	0.14
AN-Q16	680.33	628.50	445.00	455.33	316.75	366.00	0.00	494.75	291.00	516.00	396.25	564.50	0.00	668.50	353.25	581.00	669.00	377.75	343.50	545.75	513.00
AN-Q17	0.23	0.12	0.20	0.08	0.11	0.10	0.00	0.10	0.09	0.10	0.12	0.08	0.00	0.12	0.13	0.12	0.08	0.13	0.12	0.13	0.12
AN-Q18	4.91	4.67	3.79	7.28	3.32	3.28	0.00	9.97	4.52	4.89	2.75	3.38	0.00	5.65	5.01	4.77	2.47	4.58	4.09	6.40	7.13
AN-Q19	0.12	0.31	0.29	0.17	0.16	0.22	0.00	0.26	0.11	0.13	0.21	0.14	0.00	0.21	0.28	0.22	0.14	0.17	0.22	0.22	0.16
AN-Q20	0.16	0.40	0.32	0.36	0.14	0.16	0.00	0.28	0.25	0.22	0.24	0.19	0.00	0.41	0.29	0.25	0.14	0.28	0.43	0.25	0.23
AN-Q21	19.56	21.45	18.66	19.78	18.82	25.87	0.00	28.73	25.23	19.25	21.08	12.96	0.00	21.34	30.03	29.61	10.13	18.33	24.53	26.66	38.75
AN-Q22	879.74	1214.49	978.02	822.89	724.00	898.16	0.00	618.44	909.38	629.27	870.88	1129.00	0.00	1681.76	645.21	679.53	796.43	662.72	763.33	970.22	869.49
AO-Q1	1.13	0.95	1.33	1.42	1.45	1.04	2.49	2.27	1.07	0.98	1.30	2.37	1.52	1.29	2.41	2.90	2.57	1.64	2.44	2.07	2.42

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AO-Q2	0.29	0.26	0.33	0.44	0.51	0.30	0.42	0.62	0.24	0.33	0.54	0.86	0.38	0.31	0.52	0.53	0.45	0.26	0.92	0.36	0.40
AO-Q3	1.13	2.18	1.30	1.96	2.01	2.15	2.85	2.28	2.81	1.30	1.91	3.35	1.31	1.13	2.05	1.95	3.91	1.58	2.28	1.25	2.01
AO-Q4	3.53	7.41	3.20	3.36	3.60	6.29	2.67	4.64	6.86	6.34	7.50	3.66	3.33	3.88	3.55	3.00	4.62	3.35	5.04	2.44	1.96
AO-Q5	4.55	10.15	5.22	4.09	4.11	5.91	5.47	6.03	8.73	7.36	13.33	6.06	5.88	5.28	4.97	3.96	4.06	5.58	6.44	4.54	3.92
AO-Q6	3.10	1.42	2.45	3.20	3.18	2.54	1.73	1.50	1.69	1.67	1.13	1.78	1.42	1.67	1.50	1.79	2.20	1.41	1.38	2.33	2.27
AO-Q7	23.50	34.25	35.25	32.75	20.57	48.75	17.33	36.20	48.00	46.00	48.00	32.33	33.33	26.40	29.80	24.75	44.67	44.67	58.00	18.14	24.50
AO-Q8	31.00	27.00	27.00	32.00	35.00	33.00	19.00	30.00	22.00	25.00	18.00	16.00	17.00	25.00	30.00	25.00	33.00	24.00	18.00	28.00	25.00
AO-Q9	3.07	6.37	4.41	3.36	4.97	4.76	3.06	3.62	4.92	4.18	5.00	3.18	4.17	4.13	3.47	2.68	3.53	4.62	5.04	2.65	4.45
AO-Q10	1.52	2.03	0.92	1.47	1.43	2.83	1.32	1.01	1.94	1.26	1.50	1.03	1.20	1.09	1.67	0.73	1.08	1.43	1.05	1.08	1.03
AO-Q11	0.21	0.11	0.21	0.21	0.23	0.22	0.10	0.14	0.20	0.16	0.10	0.16	0.15	0.10	0.14	0.11	0.20	0.10	0.14	0.10	0.11
AO-Q12	0.15	0.20	0.20	0.13	0.14	0.29	0.26	0.32	0.28	0.20	0.28	0.20	0.25	0.18	0.28	0.27	0.29	0.33	0.41	0.21	0.22
AO-Q13	0.59	0.95	0.65	0.91	0.92	0.59	0.52	0.59	0.59	1.00	0.57	0.86	1.00	0.88	1.00	0.82	0.88	1.13	1.00	0.60	0.44
AO-Q14	0.25	0.13	0.20	0.25	0.25	0.25	0.25	0.20	0.25	0.25	0.20	0.33	0.20	0.25	0.20	0.17	0.14	0.17	0.20	0.20	0.25
AO-Q15	2.82	6.23	1.78	2.18	2.18	2.87	1.63	2.92	4.00	3.35	3.08	1.98	1.85	2.49	2.29	1.90	4.06	2.13	3.14	1.34	1.75
AO-Q16	0.30	0.47	0.29	0.29	0.50	0.22	0.60	0.19	0.27	0.29	0.31	0.29	0.21	0.24	0.18	0.21	0.19	0.20	0.18	0.41	0.27
AO-Q17	7.80	6.29	7.39	10.35	7.80	12.45	6.77	7.45	6.63	9.35	11.59	6.30	9.14	6.99	9.19	5.63	6.72	8.63	9.43	7.69	7.10
AO-Q18	0.02	0.04	0.02	0.02	0.03	0.02	0.02	0.01	0.04	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.03	0.01
AO-Q19	0.01	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
AO-Q20	5.71	5.08	4.82	5.56	5.80	6.20	3.44	3.77	4.38	4.55	5.64	3.50	3.40	3.83	2.74	4.40	4.00	3.00	3.64	3.53	3.45
AO-Q21	39.50	45.29	52.81	28.48	27.69	60.00	24.64	26.97	57.49	31.56	59.41	41.28	40.32	31.50	22.37	18.71	30.59	40.85	32.13	32.90	27.84
AP-Q1	2.68	2.50	3.91	2.00	1.30	1.45	1.87	1.87	1.13	1.73	2.24	1.00	0.79	1.66	2.33	2.99	2.77	1.11	1.04	1.84	2.46
AP-Q2	3.41	2.25	3.23	2.02	2.26	3.13	2.14	2.14	1.56	2.80	2.82	1.74	1.59	2.38	2.76	5.53	3.73	1.68	1.57	2.22	3.24
AP-Q3	1.17	1.32	1.92	0.83	0.83	1.16	0.93	0.93	0.93	1.33	0.98	1.28	0.81	0.86	1.40	2.12	1.93	1.26	1.26	1.39	1.77
AP-Q4	4.69	4.05	2.37	1.59	5.02	5.66	4.08	4.39	5.22	3.87	3.85	5.61	5.67	2.76	3.06	2.70	4.70	5.86	5.84	2.52	2.61
AP-Q5	0.32	0.35	0.30	0.36	0.62	1.02	0.34	0.31	0.80	0.36	0.40	1.10	1.02	0.43	0.40	0.35	0.32	0.89	1.02	0.31	0.47
AP-Q6	1.76	1.96	1.34	1.49	2.73	4.17	2.53	2.73	4.06	4.63	1.58	4.44	4.44	2.79	2.38	1.83	1.67	4.43	4.44	2.54	2.48
AP-Q7	0.40	0.38	0.27	0.44	0.52	0.59	0.53	0.39	0.64	0.73	0.64	0.84	0.91	0.56	0.37	0.64	0.56	0.65	0.70	0.39	0.59
AP-Q8	0.22	0.25	0.15	0.12	0.29	0.38	0.20	0.23	0.21	0.25	0.21	0.28	0.32	0.14	0.32	0.31	0.16	0.38	0.38	0.22	0.14
AP-Q9	4.14	4.61	2.93	3.35	6.05	6.80	4.53	4.57	8.96	4.10	3.24	7.67	7.27	4.90	4.37	4.43	6.08	7.25	5.14	3.33	5.25
AP-Q10	13.32	13.47	6.01	6.56	10.94	21.37	9.27	8.95	21.53	16.78	12.38	15.58	14.81	14.70	13.65	8.55	12.88	22.35	22.63	12.98	13.69
AP-Q11	1.47	1.54	1.54	1.69	3.60	2.26	1.69	2.94	2.54	2.50	2.21	2.42	3.45	2.43	2.69	2.03	2.30	2.48	2.49	2.26	1.60
AP-Q12	504.55	870.71	384.80	395.87	1107.23	1774.58	789.19	786.09	1219.28	1019.05	488.03	1903.70	1159.42	741.90	767.86	957.33	1022.22	1277.38	1560.34	834.69	793.18
AP-Q13	0.33	0.49	0.32	0.44	0.44	0.77	0.30	0.45	0.65	0.44	0.58	0.82	0.74	0.44	0.30	0.47	0.44	0.49	0.77	0.54	0.45
AP-Q14	4.64	4.21	7.20	6.09	3.24	3.63	4.68	4.68	2.77	3.81	4.60	2.54	2.60	6.48	6.64	6.09	6.06	2.52	3.47	4.28	5.24
AP-Q15	2.97	1.35	2.23	2.00	1.35	2.70	1.85	1.85	1.37	1.51	2.10	1.97	1.98	3.23	3.01	3.87	2.00	1.84	1.89	1.40	2.46
AP-Q16	1.94	1.99	1.57	2.07	1.37	2.61	2.04	2.20	1.92	2.09	1.33	1.31	1.22	2.27	2.12	2.91	2.70	1.18	2.78	1.96	2.37
AP-Q17	0.93	0.98	1.23	0.63	0.91	0.88	1.02	0.75	0.95	0.76	0.75	1.27	1.27	1.55	1.55	1.00	1.02	0.99	1.20	0.66	1.24
AP-Q18	441.86	403.33	494.57	416.57	495.83	633.17	390.43	469.67	700.50	466.43	398.88	435.11	416.40	560.67	570.80	546.25	557.71	270.20	628.20	389.11	365.50
AP-Q19	0.64	0.67	0.70	1.07	0.97	1.27	1.09	1.10	0.73	1.01	0.88	1.00	1.00	0.97	1.49	1.40	0.92	0.63	1.36	0.89	1.19
AP-Q20	1.08	1.01	1.17	0.73	0.66	1.34	0.74	0.72	0.96	1.10	1.05	0.66	0.91	1.43	1.53	0.97	1.00	0.59	1.55	0.61	1.17
AP-Q21	5.55	6.04	5.08	4.86	12.27	8.64	6.46	11.20	12.87	10.84	6.14	13.82	12.59	9.25	6.79	7.07	8.39	19.57	13.80	8.61	6.51
AQ-Q1	1.55	1.67	1.49	2.69	1.62	1.73	3.00	1.63	2.32	1.17	3.24	3.24	3.30	1.84	3.03	2.58	1.52	1.02	3.02	3.76	3.04
AQ-Q2	12.72	12.66	8.65	7.50	12.59	17.35	4.62	8.91	5.87	13.58	8.66	9.80	8.13	8.29	4.59	6.03	8.33	15.80	6.80	9.43	8.97
AQ-Q3	0.16	0.16	0.18	0.12	0.12	0.14	0.08	0.08	0.08	0.17	0.08	0.11	0.11	0.12	0.06	0.07	0.08	0.14	0.10	0.11	0.08
AQ-Q4	0.57	0.57	0.41	0.41	0.33	0.51	0.30	0.27	0.30	0.42	0.40	0.27	0.25	0.69	0.22	0.25	0.30	0.73	0.31	0.29	0.42
AQ-Q5	6.22	5.26	4.56	5.45	5.59	5.47	5.82	9.14	8.96	5.99	5.34	5.56	7.75	6.12	3.73	8.65	5.57	4.19	7.59	8.20	3.02
AQ-Q6	1.28	1.16	0.83	0.63	0.53	0.53	1.39	0.99	0.87	1.19	1.10	0.77	0.88	0.76	0.56	1.23	0.82	0.88	1.14	1.08	0.49
AQ-Q7	32.47	27.63	10.66	17.66	17.94	17.95	32.37	23.65	33.70	17.93	20.43	9.86	12.09	18.03	11.80	24.06	11.16	11.47	15.27	16.67	9.86
AQ-Q8	2.33	2.11	1.45	1.12	1.13	1.02	2.49	1.94	1.51	1.10	2.24	1.47	1.52	2.23	0.69	1.45	1.49	1.55	2.19	2.00	0.79
AQ-Q9	371.00	387.33	237.33	327.00	341.00	333.50	488.50	457.00	533.00	350.50	529.00	281.67	252.00	419.00	200.33	527.50	334.00	343.50	751.00	545.50	278.00
AQ-Q10	31.80	38.73	20.34	14.86	13.12	13.08	33.69	22.85	24.23	20.62	27.13	12.61	18.67	15.52	10.36	30.14	20.88	26.42	39.53	27.28	15.89
AQ-Q11	1.15	1.21	0.57	0.69	0.68	0.61	1.07	1.29	1.29	1.28	1.05	0.52	0.84	0.90	0.56	1.23	0.75	0.83	1.21	0.77	0.43
AR-Q1	1.87	1.64	2.55	2.34	5.09	3.88	3.26	2.05	2.41	6.56	2.11	2.60	2.13	3.02	5.46	4.86	5.41	2.20	2.98	1.64	2.58
AR-Q2	16.59	18.90	11.99	12.31	12.20	10.25	8.05	14.77	12.32	4.27	12.86	6.72	14.73	10.55	5.83	6.19	7.67	9.94	9.52	14.01	13.64
AR-Q3	0.16	0.17	0.14	0.10	0.11	0.08	0.10	0.16	0.11	0.08	0.10	0.11	0.17	0.09	0.10	0.11	0.08	0.16	0.10	0.13	0.17
AR-Q4	0.44	0.67	0.32	0.50	0.28	0.34	0.36	0.40	0.50	0.18	0.72	0.28	0.60	0.46	0.25	0.40	0.39	0.40	0.49	0.63	0.42
AR-Q5	9.53	3.96	8.48	6.36	6.01	5.19	3.81	7.53	5.33	5.64	6.74	5.81	9.56	3.71	5.78	3.90	4.03	7.29	3.86	3.65	5.36
AR-Q6	1.13	1.05	1.71	0.92	0.73	0.63	1.63	1.03	0.60	1.40	1.07	0.66	1.48	0.97	1.41	1.36	1.15	1.18	1.16	1.10	1.56
AR-Q7	23.85	14.39	16.07	8.61	14.89	15.39	14.79	14.95	18.44	18.05	15.27	20.20	15.36	9.83	12.88	9.30	10.35	14.85	9.89	9.38	15.26
AR-Q8	3.46	2.00	2.73	3.96	1.62	2.30	2.70	2.52	1.97	1.73	2.46	1.94	3.32	4.22	5.13	5.73	3.70	3.43	2.45	2.72	2.36
AR-Q9	0.72	0.77	1.03	0.82	0.99	0.47	0.53	0.48	0.37	0.49	0.47	0.37	0.73	0.95	1.12	1.20	1.06	0.72	1.11	1.12	0.66
AR-Q10	0.54	0.67	0.69	1.09	0.75	0.63	0.73	0.76	0.49	1.08	1.11	0.49	1.00	0.76	1.18	1.01	0.69	0.72	0.72	0.84	1.12
AR-Q11	1.46	0.63	1.69	0.82	0.67	0.63	0.72	0.87	0.83	1.28	0.98	0.91	0.89	0.78	0.88	0.68	0.63	0.86	0.99	0.92	0.86
AR-Q12	5.12	3.14	7.61	4.17	4.86	3.93	4.82	3.04	2.70	7.73	4.08	2.95	4.99	3.74	6.66	4.80	4.99	3.76	4.71	3.60	8.01
AR-Q13	0.97	0.81	1.16	1.06	0.83	0.60	0.73	1.08	1.08	1.20	1.04	1.08	1.07	1.72	1.76	1.32	1.48	0.88	1.67	2.12	1.42
AS-Q1	2.74	3.29	4.03	6.05	0.00	4.25	3.11	6.61	0.00	5.59	2.58	3.70	3.15	0.00	3.39	1.75	2.46	0.00	2.91	4.05	3.79
AS-Q2	0.77	0.46	0.34	0.46	0.00	0.70	0.60	0.30	0.00	0.30	0.65	0.71	0.48	0.00	0.55	0.80	0.86	0.00	0.45	0.34	0.77

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AS-Q3	17.79	5.39	5.24	4.88	0.00	12.57	13.43	5.64	0.00	8.38	8.06	11.03	8.42	0.00	5.41	16.37	14.33	0.00	5.56	7.88	17.83
AS-Q4	0.81	0.47	0.48	0.57	0.00	0.75	0.70	0.38	0.00	0.52	0.59	0.69	0.47	0.00	0.63	0.85	0.82	0.00	0.47	0.71	0.80
AS-Q5	0.41	0.23	0.22	0.35	0.00	0.46	0.37	0.22	0.00	0.24	0.38	0.47	0.21	0.00	0.36	0.42	0.58	0.00	0.22	0.33	0.39
AS-Q6	0.78	0.35	0.61	0.34	0.00	0.72	0.70	0.55	0.00	0.33	0.43	0.45	0.70	0.00	0.40	0.83	0.49	0.00	0.44	0.36	0.65
AS-Q7	2.86	2.40	2.46	2.59	0.00	3.67	2.45	2.34	0.00	2.91	4.19	5.81	2.61	0.00	2.74	3.47	4.29	0.00	2.24	1.83	2.76
AS-Q8	0.13	0.06	0.09	0.06	0.00	0.09	0.10	0.07	0.00	0.07	0.12	0.13	0.09	0.00	0.10	0.15	0.15	0.00	0.06	0.09	0.15
AS-Q9	140.85	72.73	63.37	72.15	0.00	108.64	108.57	47.47	0.00	51.61	69.29	104.27	72.31	0.00	49.71	106.73	117.05	0.00	68.12	72.28	120.00
AS-Q10	0.25	0.38	0.35	0.28	0.00	0.22	0.25	0.21	0.00	0.21	0.20	0.25	0.28	0.00	0.47	0.16	0.32	0.00	0.29	0.19	0.13
AS-Q11	2.00	3.75	2.75	2.00	0.00	1.75	2.50	3.67	0.00	5.00	3.00	2.50	2.33	0.00	4.67	2.00	2.75	0.00	4.50	1.80	1.50
AS-Q12	3.95	3.89	3.13	2.58	0.00	3.05	3.33	2.88	0.00	2.79	3.32	2.91	3.32	0.00	3.02	4.21	2.07	0.00	2.64	2.53	2.93
AS-Q13	0.13	0.07	0.07	0.08	0.00	0.11	0.12	0.07	0.00	0.12	0.11	0.13	0.09	0.00	0.12	0.17	0.26	0.00	0.08	0.07	0.13
AS-Q14	3.70	5.91	4.44	5.06	0.00	4.55	3.45	3.31	0.00	5.75	4.97	4.07	5.51	0.00	4.00	5.19	5.14	0.00	6.92	2.80	2.34
AS-Q15	191.01	201.92	161.54	100.00	0.00	154.32	220.27	116.89	0.00	93.02	125.86	94.67	109.57	0.00	198.73	222.47	161.11	0.00	183.93	114.16	89.78
AT-Q1	7.75	0.00	7.76	10.00	0.00	8.88	24.43	7.21	18.17	0.00	0.00	6.68	6.08	9.38	0.00	7.20	0.00	18.00	17.40	14.92	0.00
AT-Q2	1.00	0.00	1.50	0.86	0.00	1.42	0.58	1.40	1.09	0.00	0.00	1.22	1.30	0.87	0.00	1.00	0.00	0.92	0.91	0.48	0.00
AT-Q3	14.60	0.00	16.41	7.36	0.00	9.50	3.61	7.59	4.88	0.00	0.00	10.23	10.57	4.92	0.00	8.72	0.00	6.98	7.58	5.61	0.00
AT-Q4	0.14	0.00	0.16	0.06	0.00	0.10	0.04	0.16	0.09	0.00	0.00	0.09	0.10	0.09	0.00	0.08	0.00	0.06	0.07	0.07	0.00
AT-Q5	0.49	0.00	0.46	0.50	0.00	0.49	0.30	0.52	0.33	0.00	0.00	0.61	0.59	0.30	0.00	0.52	0.00	0.46	0.28	0.43	0.00
AT-Q6	0.74	0.00	1.17	0.55	0.00	0.77	0.35	0.97	0.52	0.00	0.00	0.65	0.76	0.37	0.00	0.41	0.00	0.48	0.50	0.41	0.00
AT-Q7	48.78	0.00	48.84	41.38	0.00	42.50	20.59	51.85	19.67	0.00	0.00	22.92	26.00	27.66	0.00	32.61	0.00	17.14	27.03	13.48	0.00
AT-Q8	45.45	0.00	33.87	31.58	0.00	32.08	14.29	46.67	28.57	0.00	0.00	55.00	59.09	25.49	0.00	24.19	0.00	29.27	19.23	23.53	0.00
AT-Q9	222.22	0.00	233.33	109.09	0.00	188.89	87.50	147.37	92.31	0.00	0.00	200.00	216.67	118.18	0.00	166.67	0.00	150.00	166.67	171.43	0.00
AT-Q10	81.03	0.00	45.16	35.29	0.00	44.12	48.28	92.73	95.24	0.00	0.00	48.54	42.62	65.15	0.00	32.61	0.00	53.57	27.94	44.59	0.00
AT-Q11	33.81	0.00	16.37	33.33	0.00	31.91	32.56	37.50	41.67	0.00	0.00	37.31	33.33	25.75	0.00	28.04	0.00	24.59	19.39	21.57	0.00
AT-Q12	1.07	0.00	0.65	0.60	0.00	0.60	0.61	0.74	0.71	0.00	0.00	0.93	0.87	0.90	0.00	0.43	0.00	0.75	0.59	0.65	0.00
AT-Q13	2.61	0.00	2.00	1.88	0.00	1.88	2.00	2.22	2.22	0.00	0.00	2.63	2.36	2.26	0.00	2.50	0.00	1.76	1.00	2.36	0.00
AU-Q1	0.99	0.68	1.85	1.07	1.07	0.70	0.00	1.06	0.00	1.52	1.63	0.69	0.72	0.00	0.96	0.00	0.62	0.00	0.64	0.00	2.37
AU-Q2	1.98	1.79	1.69	2.19	2.18	1.40	0.00	1.78	0.00	1.66	2.05	1.41	1.47	0.00	2.06	0.00	2.21	0.00	2.16	0.00	1.01
AU-Q3	10.28	6.32	4.37	6.77	7.25	5.59	0.00	5.46	0.00	5.11	6.88	7.16	8.53	0.00	10.63	0.00	15.56	0.00	14.44	0.00	5.26
AU-Q4	0.24	0.35	0.26	0.42	0.42	0.20	0.00	0.36	0.00	0.20	0.28	0.26	0.28	0.00	0.27	0.00	0.44	0.00	0.41	0.00	0.14
AU-Q5	2.79	2.12	1.99	1.99	2.32	1.24	0.00	2.70	0.00	1.94	1.57	1.34	1.97	0.00	3.86	0.00	2.51	0.00	3.26	0.00	1.45
AU-Q6	0.17	0.13	0.14	0.25	0.24	0.23	0.00	0.21	0.00	0.16	0.16	0.25	0.17	0.00	0.35	0.00	0.27	0.00	0.17	0.00	0.08
AU-Q7	0.60	0.55	0.40	0.66	0.53	0.47	0.00	0.42	0.00	0.32	0.35	0.47	0.34	0.00	0.95	0.00	0.78	0.00	1.02	0.00	0.32
AU-Q8	9.28	8.30	6.41	7.20	10.55	7.53	0.00	9.86	0.00	5.71	6.98	8.27	7.82	0.00	11.89	0.00	11.73	0.00	12.14	0.00	4.84
AU-Q9	145.24	100.00	65.73	223.89	173.05	85.89	0.00	99.38	0.00	85.59	96.91	86.54	116.49	0.00	106.48	0.00	200.43	0.00	174.26	0.00	84.19
AU-Q10	53.38	58.13	56.40	57.57	36.92	40.86	0.00	48.30	0.00	36.38	39.25	40.50	54.75	0.00	79.86	0.00	39.08	0.00	39.11	0.00	19.36
AU-Q11	9.52	14.70	9.48	10.42	13.60	10.95	0.00	7.07	0.00	5.25	8.41	7.17	13.00	0.00	16.22	0.00	11.11	0.00	11.53	0.00	14.73
AV-Q1	0.55	0.00	0.59	0.61	0.00	1.63	1.04	0.70	0.72	0.00	0.00	0.57	0.53	0.68	0.00	0.74	0.00	0.71	0.93	0.94	0.00
AV-Q2	1.49	0.00	0.53	1.33	0.00	1.53	0.91	0.72	0.62	0.00	0.00	0.92	0.53	0.87	0.00	0.96	0.00	0.82	0.84	0.95	0.00
AV-Q3	1.28	0.00	0.74	1.22	0.00	1.26	0.87	1.01	1.04	0.00	0.00	0.85	0.94	0.92	0.00	0.65	0.00	0.60	0.92	1.14	0.00
AV-Q4	38.40	0.00	29.24	33.77	0.00	64.30	25.43	28.43	27.26	0.00	0.00	28.97	25.64	25.66	0.00	41.01	0.00	61.37	39.42	45.10	0.00
AV-Q5	30.33	0.00	26.33	31.67	0.00	32.00	44.00	17.43	19.00	0.00	0.00	30.50	36.50	27.75	0.00	16.75	0.00	10.25	22.33	22.75	0.00
AV-Q6	3.64	0.00	3.04	3.39	0.00	3.37	5.18	5.08	5.00	0.00	0.00	3.21	3.84	3.47	0.00	1.97	0.00	1.86	2.79	3.03	0.00
AV-Q7	0.11	0.00	0.11	0.10	0.00	0.07	0.07	0.07	0.06	0.00	0.00	0.17	0.12	0.14	0.00	0.21	0.00	0.13	0.19	0.11	0.00
AV-Q8	1.00	0.00	1.00	0.93	0.00	0.90	0.65	0.57	0.56	0.00	0.00	1.36	0.79	0.89	0.00	1.55	0.00	0.73	0.92	1.00	0.00
AV-Q9	4.78	0.00	5.02	9.33	0.00	5.15	4.37	6.92	8.44	0.00	0.00	6.32	6.25	6.21	0.00	7.11	0.00	8.15	8.73	7.87	0.00
AW-Q1	0.00	6.99	8.89	0.00	0.00	7.85	0.00	15.38	10.02	0.00	0.00	14.24	13.78	0.00	0.00	0.00	9.81	0.00	15.67	7.34	0.00
AW-Q2	0.00	0.79	1.90	0.00	0.00	1.76	0.00	1.16	1.59	0.00	0.00	0.92	1.18	0.00	0.00	0.00	1.40	0.00	0.80	1.31	0.00
AW-Q3	0.00	3.90	12.47	0.00	0.00	8.92	0.00	4.16	4.34	0.00	0.00	4.28	5.81	0.00	0.00	0.00	4.44	0.00	4.72	5.41	0.00
AW-Q4	0.00	0.85	2.17	0.00	0.00	1.14	0.00	0.76	1.15	0.00	0.00	1.22	1.25	0.00	0.00	0.00	1.17	0.00	1.20	2.43	0.00
AW-Q5	0.00	0.22	0.36	0.00	0.00	0.31	0.00	0.23	0.15	0.00	0.00	0.17	0.13	0.00	0.00	0.00	0.15	0.00	0.17	0.32	0.00
AW-Q6	0.00	0.03	0.06	0.00	0.00	0.03	0.00	0.02	0.03	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.03	0.00	0.03	0.05	0.00
AW-Q7	0.00	8.57	19.80	0.00	0.00	24.64	0.00	16.88	22.91	0.00	0.00	16.29	15.64	0.00	0.00	0.00	13.45	0.00	22.28	11.00	0.00
BA-Q1	6.46	6.30	8.43	7.11	7.35	6.50	9.57	6.58	6.61	6.65	6.55	7.27	21.43	21.50	9.77	9.81	8.75	9.58	7.08	10.10	9.40
BA-Q2	1.79	1.88	0.88	0.81	0.75	1.50	1.29	1.45	1.56	1.47	1.59	1.28	2.50	2.39	1.87	1.13	0.96	1.00	1.07	1.50	2.08
BA-Q3	1.79	1.76	1.57	1.31	1.29	1.71	2.00	1.78	2.27	2.50	2.70	1.78	3.33	1.95	2.15	1.04	1.77	1.05	1.67	1.30	1.67
BA-Q4	1.79	1.36	1.29	0.89	1.29	1.85	1.29	1.19	1.92	1.79	1.93	1.23	3.00	2.87	2.39	1.86	1.64	1.64	1.36	1.07	1.32
BA-Q5	5.00	7.50	7.33	4.25	3.00	4.80	5.50	10.67	5.00	5.00	5.40	5.33	10.00	10.75	7.17	4.33	3.83	5.75	3.00	7.50	5.00
BB-Q1	17.84	16.66	16.65	27.83	25.99	18.45	21.64	21.64	18.55	64.91	60.31	20.35	20.35	20.45	30.19	33.87	32.91	33.14	32.32	32.26	47.94
BB-Q2	7.96	7.44	7.97	11.65	10.94	12.31	16.88	18.07	20.31	21.00	20.97	12.68	7.08	6.49	11.47	19.03	13.17	9.64	20.83	18.08	14.11
BB-Q3	12.35	11.32	9.83	7.06	6.59	7.42	13.97	13.92	12.82	15.67	13.80	9.15	8.86	8.73	15.14	19.03	14.30	14.65	14.55	10.99	22.74
BB-Q4	12.35	8.00	8.18	16.38	16.57	17.01	10.85	9.74	10.31	19.63	20.16	11.42	6.23	6.11	14.63	17.19	13.77	10.04	9.98	18.08	16.89
BB-Q5	80.67	81.88	101.58	113.00	116.00	89.00	101.25	104.39	94.29	150.00	139.80	89.44	39.59	64.00	128.24	140.00	68.23	143.60	151.00	85.32	159.21
BC-Q1	50.22	115.47	67.68	67.68	44.18	45.64	79.39	141.40	51.28	54.94	50.23	79.39	54.75	76.67	123.17	122.68	102.72	63.17	63.16	114.96	102.38
BC-Q2	27.24	40.93	30.49	20.97	38.35	39.41	40.40	41.42	27.90	27.91	27.35	40.34	28.76	29.15	41.39	44.10	38.77	25.13	23.87	38.64	39.76
BC-Q3	3.67	5.85	2.81	5.16	3.91	4.04	3.72	5.63	2.57	2.57	2.52	3.72	2.95	2.67	4.22	5.20	3.34	2.32	2.81	5.39	4.05
BC-Q4	18.48	30.44	25.41	34.67	21.45	24.20	43.63	44.85	30.02	29.87	30.99	54.16	19.27	35.83	47.54	45.09	50.37	30.49	24.32	30.35	45.67

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
BC-Q5	273.60	451.00	222.85	169.04	230.76	217.41	268.25	276.74	191.92	125.74	128.69	314.13	283.38	168.70	205.23	273.33	310.18	200.61	147.52	321.29	312.18
BC-Q6	217.95	358.15	159.18	250.43	234.81	157.63	227.26	234.36	139.20	314.36	300.27	248.81	240.88	242.16	304.05	228.25	289.84	131.44	123.27	335.67	302.27
BD-Q1	36.19	28.39	21.08	18.50	33.14	39.56	33.16	39.61	19.54	28.13	19.69	24.55	18.40	16.51	25.18	16.13	29.26	18.47	21.22	50.85	16.87
BD-Q2	40.53	85.91	68.33	23.85	47.23	51.46	47.73	50.28	58.00	36.00	43.00	57.93	48.00	51.10	45.50	52.56	39.40	37.00	28.08	71.92	41.45
BD-Q3	114.83	105.00	76.88	44.29	76.75	95.57	87.50	64.64	47.45	63.00	51.60	73.73	48.00	46.45	39.81	59.13	73.88	41.63	60.83	95.89	57.00
BD-Q4	62.64	78.75	43.93	31.00	40.93	44.60	58.33	82.27	65.25	33.60	57.33	35.26	42.00	42.58	70.78	27.82	39.40	27.75	30.42	66.38	35.08
BD-Q5	25.52	21.98	22.78	8.61	19.19	37.17	18.75	29.19	22.70	21.00	20.64	15.60	16.00	17.62	20.55	21.50	26.86	12.81	24.33	25.38	19.00
BE-Q1	9.95	11.74	10.85	9.86	9.74	9.95	35.03	32.77	11.08	9.07	24.68	26.35	13.57	13.69	24.73	9.95	35.00	32.77	13.73	9.16	10.03
BE-Q2	0.91	0.91	0.62	0.69	1.23	1.56	1.62	1.63	0.97	1.32	1.38	1.38	1.07	1.02	0.93	1.54	1.58	1.61	0.88	1.32	0.93
BE-Q3	1.63	1.60	1.12	1.79	1.81	1.95	2.39	2.11	1.42	1.76	2.76	2.15	3.00	2.69	3.18	1.95	2.42	2.15	1.22	1.88	1.30
BE-Q4	0.74	1.26	0.97	0.68	1.00	1.08	1.77	1.63	1.09	0.93	1.04	1.46	1.07	1.10	1.52	1.16	1.13	2.32	1.40	0.75	1.00
BE-Q5	5.57	6.00	4.11	4.86	5.43	6.50	9.17	8.67	3.70	5.29	5.27	7.30	6.00	5.38	5.83	4.30	12.60	8.29	5.60	7.50	4.33
BF-Q1	12.57	8.05	15.98	7.45	7.50	7.86	12.42	8.57	11.98	16.08	13.63	9.92	15.46	18.42	20.63	7.80	19.53	17.43	18.26	6.90	9.82
BF-Q2	38.67	13.70	19.85	10.69	13.95	20.83	30.73	22.00	21.54	27.33	23.81	17.62	22.17	23.68	30.65	22.43	48.56	36.50	38.33	19.47	13.17
BF-Q3	9.28	4.63	9.68	4.89	7.36	4.63	6.76	5.42	4.91	7.32	10.89	8.81	8.58	10.23	7.55	6.16	12.14	8.26	11.50	7.36	6.08
BF-Q4	24.42	24.23	20.89	10.69	15.59	20.83	37.56	12.57	23.33	31.54	29.31	20.82	33.25	50.00	23.68	22.43	25.71	27.38	26.54	15.05	13.94
BF-Q5	35.69	11.25	28.36	7.13	12.05	15.63	24.14	13.04	16.47	15.77	18.14	21.81	24.18	26.47	24.81	16.53	29.13	29.20	28.75	13.24	13.94
C-Q1	0.26	0.45	0.46	0.23	0.28	0.49	0.30	0.34	0.23	0.25	0.44	0.43	0.22	0.29	0.40	0.28	0.23	0.31	0.21	0.25	0.23
C-Q2	2.00	2.62	3.16	1.78	1.47	2.56	1.73	5.88	3.11	1.55	2.32	3.11	3.34	1.59	2.90	1.62	1.67	3.50	2.60	1.78	2.85
C-Q3	0.14	0.26	0.24	0.11	0.19	0.23	0.25	0.08	0.09	0.19	0.25	0.20	0.13	0.19	0.26	0.20	0.17	0.13	0.10	0.14	0.12
C-Q4	0.57	0.63	0.55	0.74	0.90	0.40	0.71	0.35	0.55	0.62	0.44	0.49	0.63	0.76	0.43	0.75	0.87	0.43	0.56	0.56	0.56
C-Q5	0.27	0.33	0.49	0.27	0.40	0.26	0.45	0.22	0.34	0.40	0.28	0.43	0.55	0.63	0.42	0.40	0.77	0.42	0.60	0.34	0.46
C-Q6	0.48	0.48	0.14	0.38	0.53	0.45	0.45	0.53	0.47	0.29	0.31	0.14	0.15	0.15	0.19	0.35	0.21	0.18	0.20	0.60	0.26
C-Q7	0.14	0.21	0.20	0.12	0.13	0.11	0.12	0.17	0.22	0.15	0.17	0.18	0.24	0.14	0.16	0.21	0.26	0.19	0.20	0.11	0.27
DA-Q1	60.18	26.78	35.13	83.12	54.30	50.46	51.09	82.84	78.07	71.18	54.17	42.73	54.40	34.04	55.28	40.56	55.82	76.31	55.60	91.81	100.24
DB-Q1	164.17	115.98	136.11	262.65	122.78	117.96	121.68	201.39	185.75	157.36	191.01	114.98	163.06	120.41	165.26	120.45	161.14	238.24	238.51	144.53	242.81
DC-Q1	381.35	131.54	147.52	256.58	259.07	277.41	170.19	416.48	266.79	345.61	281.72	276.85	420.70	254.61	265.66	234.23	273.85	375.81	381.34	421.49	389.14
DD-Q1	72.01	37.14	36.69	36.69	42.95	47.67	53.43	94.84	104.72	63.00	37.28	71.36	101.29	41.61	47.87	28.46	29.27	40.08	44.03	57.50	50.98
DE-Q1	213.13	58.25	64.04	166.56	103.25	100.74	104.41	172.94	185.75	93.27	70.92	109.04	133.13	89.28	161.49	107.94	95.78	113.70	144.22	183.07	98.03
E-Q1	225.94	178.99	200.66	408.98	160.37	238.32	219.66	389.65	304.02	315.52	316.85	339.33	363.11	264.43	250.76	243.05	157.12	455.41	352.10	224.47	206.92
E-Q2	266.25	135.28	155.39	302.76	179.44	183.83	177.84	301.66	271.85	235.91	183.84	189.05	274.75	176.22	192.98	179.44	189.05	265.34	271.85	240.16	274.26
F-Q1	16.68	7.85	20.18	39.16	12.55	18.17	16.80	29.81	17.45	14.78	17.72	17.42	26.48	9.78	15.88	11.64	13.14	18.90	19.01	28.40	15.27
F-Q2	71.40	26.60	28.25	79.12	33.42	33.42	33.12	75.40	71.05	62.10	50.61	33.99	48.21	36.02	31.49	47.11	52.50	77.12	73.05	97.97	68.55
F-Q3	0.37	0.32	0.21	0.27	0.23	0.26	0.30	0.31	0.15	0.32	0.34	0.17	0.17	0.40	0.51	0.23	0.40	0.17	0.40	0.18	0.15
F-Q4	0.76	0.86	0.64	0.53	0.44	0.66	0.67	0.80	0.45	0.96	1.04	0.53	0.53	0.76	1.12	0.64	1.03	0.49	1.03	0.63	0.49
G-Q1	50.88	32.20	33.17	22.73	22.74	23.55	15.51	26.68	18.40	25.76	25.75	22.74	24.25	15.75	31.40	54.53	34.07	28.41	17.29	18.02	18.52
G-Q2	431.80	357.79	253.35	203.84	203.52	181.66	417.36	392.03	206.62	181.33	194.55	204.26	266.78	280.25	387.81	441.50	269.47	541.00	250.10	257.40	162.99
G-Q3	9.25	5.19	11.07	11.38	12.54	13.92	3.53	5.76	11.00	19.33	12.77	14.86	5.64	8.69	8.38	8.21	11.08	7.50	10.00	8.00	18.90
G-Q4	6.04	6.79	9.20	9.06	6.44	4.68	8.98	8.63	5.01	6.23	3.94	6.11	5.44	4.20	7.67	5.97	11.08	9.86	5.38	6.75	5.95
G-Q5	1.08	0.82	0.59	0.48	0.48	0.88	0.48	0.73	0.50	0.50	0.80	0.55	0.73	0.65	0.50	1.42	0.48	0.48	0.55	0.64	0.52
G-Q6	2.15	1.26	1.22	1.12	1.00	1.27	1.37	1.29	1.04	1.46	1.37	1.51	0.79	1.03	1.87	2.13	1.37	1.54	1.33	1.09	1.43
G-Q7	19.12	26.86	39.92	33.41	39.92	19.71	28.35	51.29	18.90	16.74	16.74	18.66	55.15	29.53	24.43	25.94	33.42	53.60	18.66	29.53	17.00
G-Q8	0.77	0.73	0.39	0.42	0.39	0.94	0.38	0.42	0.98	0.82	0.88	0.66	0.42	0.52	0.34	0.35	0.42	0.39	0.66	0.62	0.78
G-Q9	4.15	5.64	2.61	2.19	3.69	3.52	5.25	3.54	4.41	1.78	1.92	2.56	3.29	5.32	2.97	2.72	2.78	7.74	3.56	4.99	3.45
G-Q10	10.72	15.13	13.30	11.17	7.25	8.01	10.81	14.92	10.72	10.42	10.42	7.37	9.54	7.19	13.34	16.65	13.33	11.00	8.13	7.64	9.82
G-Q11	3.50	5.45	3.72	2.70	2.84	3.96	3.99	1.95	4.67	4.45	4.35	3.96	2.27	4.22	3.06	2.89	2.75	4.02	3.57	4.34	3.68

Rate ratios

AB-R1	4.05	3.78	3.53	3.78	4.05	3.78	3.53	4.43	5.29	4.94	4.61	4.61	4.61	2.79	2.60	2.79	3.89	3.89	3.89	4.18	4.17
AB-R2	1.01	1.01	1.01	1.31	1.17	1.09	1.09	1.32	1.47	1.37	1.37	1.47	1.37	0.48	0.48	0.97	0.90	0.90	0.65	0.54	0.65
AB-R3	12.18	12.18	11.38	11.33	9.45	9.43	9.44	9.47	11.36	11.31	8.50	7.61	7.62	10.39	9.69	6.98	6.99	5.42	6.97	7.47	6.98
AB-R4	9.83	9.82	9.21	9.83	9.81	7.93	7.93	9.83	11.77	10.24	10.23	8.50	8.47	4.58	4.27	4.58	4.27	4.28	4.88	4.50	4.89
AC-R1	199.97	214.25	214.25	192.39	192.39	192.39	192.39	203.27	192.39	192.39	192.38	192.39	167.43	199.97	167.43	167.43	199.97	214.25	214.25	199.97	214.25
AC-R2	21.88	23.44	25.12	24.25	25.98	24.25	25.98	22.02	24.25	25.98	24.25	25.98	21.88	21.88	21.88	21.88	21.88	23.44	25.12	21.88	23.44
AC-R3	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.13	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
AC-R4	0.37	0.37	0.24	0.24	0.24	0.35	0.38	0.15	0.24	0.24	0.35	0.38	0.20	0.22	0.37	0.37	0.37	0.37	0.24	0.37	0.37
AC-R5	0.56	0.52	1.25	1.09	1.17	0.60	0.60	0.55	1.09	1.17	0.60	0.60	0.95	0.95	0.52	0.52	0.56	0.52	1.25	0.56	0.52
AC-R6	0.22	0.21	0.24	0.21	0.23	0.22	0.22	0.19	0.21	0.23	0.22	0.22	0.23	0.24	0.22	0.22	0.22	0.21	0.24	0.22	0.21
AC-R7	0.46	0.55	0.58	0.57	0.62	0.56	0.52	0.47	0.57	0.62	0.56	0.52	0.47	0.50	0.51	0.51	0.46	0.55	0.58	0.46	0.55
AC-R8	0.25	0.25	0.27	0.23	0.21	0.20	0.28	0.24	0.23	0.21	0.20	0.28	0.21	0.21	0.17	0.17	0.25	0.25	0.27	0.25	0.25
AC-R9	0.42	0.45	0.48	0.29	0.31	0.29	0.45	0.40	0.29	0.31	0.29	0.45	0.27	0.29	0.28	0.28	0.42	0.45	0.48	0.42	0.45
AC-R10	0.59	0.63	0.63	0.57	0.57	0.57	0.57	0.28	0.57	0.57	0.57	0.57	0.49	0.59	0.49	0.49	0.59	0.63	0.63	0.59	0.63
AC-R11	0.70	0.70	0.70	0.68	0.68	0.68	0.68	1.00	0.68	0.68	0.68	0.68	0.75	0.70	0.75	0.75	0.70	0.70	0.70	0.70	0.70
AC-R12	7.26	7.77	8.33	8.37	8.96	8.37	8.96	5.25	8.37	8.96	8.37	8.96	6.77	7.26	6.77	6.77	7.26	7.77	8.33	7.26	7.77
AC-R13	1.08	1.16	1.16	1.01	1.01	1.01	1.01	0.87	1.01	1.01	1.01	1.01	1.08	1.08	1.08	1.08	1.08	1.16	1.16	1.08	1.16

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AC-R14	134.17	134.17	87.14	87.34	87.34	127.88	137.01	96.78	87.34	87.34	127.88	137.01	73.56	78.82	134.17	134.17	134.17	134.17	87.14	134.17	134.17
AC-R15	18.12	18.12	39.95	38.88	41.66	21.33	21.33	26.16	38.88	41.66	21.33	21.33	31.48	33.72	16.91	16.91	18.12	18.12	39.95	18.12	18.12
AC-R16	46.63	49.96	45.74	50.88	50.88	51.02	51.01	62.35	50.88	50.88	51.01	51.02	47.49	50.88	46.63	46.63	46.63	49.96	45.74	46.63	49.96
AC-R17	0.24	0.33	0.26	0.24	0.26	0.24	0.24	0.31	0.24	0.26	0.24	0.24	0.26	0.27	0.24	0.24	0.24	0.33	0.26	0.24	0.33
AD-R1	0.70	0.65	0.70	0.93	0.93	0.93	0.67	0.77	1.19	1.19	0.65	0.70	1.19	1.28	0.93	0.93	0.86	0.86	0.99	0.99	0.70
AD-R2	8.36	9.31	5.53	4.45	4.45	3.96	9.11	8.38	3.91	3.27	3.05	3.84	6.67	6.67	3.95	4.45	3.99	3.41	3.86	3.60	6.21
AD-R3	6.62	6.62	4.14	3.58	3.34	2.53	8.64	8.03	4.48	3.74	4.47	3.74	7.59	7.58	2.53	4.30	3.60	3.60	3.11	2.71	5.81
AD-R4	0.38	0.38	0.38	0.53	0.49	0.40	0.48	0.42	0.46	0.43	0.46	0.43	1.02	1.10	0.40	0.40	0.37	0.37	0.52	0.46	0.92
AD-R5	0.75	0.80	0.75	0.25	0.23	0.26	0.40	0.47	0.40	0.43	0.40	0.43	0.29	0.27	0.26	0.33	0.33	0.35	0.24	0.25	0.24
AD-R6	0.22	0.22	0.21	0.18	0.18	0.14	0.18	0.13	0.17	0.17	0.17	0.17	0.22	0.20	0.14	0.21	0.20	0.20	0.17	0.15	0.32
AD-R7	0.86	0.80	0.90	1.69	1.69	1.55	1.91	1.68	1.11	1.11	1.15	1.61	1.81	1.94	1.55	1.04	0.96	0.98	1.47	1.47	1.40
AD-R8	0.13	0.18	0.20	0.10	0.09	0.10	0.09	0.12	0.09	0.10	0.16	0.16	0.10	0.09	0.10	0.09	0.09	0.10	0.11	0.11	0.08
AD-R9	4.79	3.49	3.42	4.28	4.28	4.05	8.61	6.69	5.01	5.02	2.84	4.26	5.25	5.63	4.06	3.78	3.51	3.59	3.25	3.24	4.14
AD-R10	0.91	0.91	0.74	0.57	0.51	1.04	0.68	0.78	0.83	0.89	0.79	0.79	0.94	0.88	1.04	0.87	0.81	0.53	0.59	0.59	0.51
AD-R11	0.10	0.11	0.13	0.10	0.09	0.05	0.12	0.13	0.10	0.10	0.05	0.06	0.10	0.10	0.05	0.05	0.05	0.08	0.08	0.08	0.10
AD-R12	0.06	0.05	0.08	0.05	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.06
AD-R13	4.89	5.00	7.36	4.28	4.28	4.28	6.91	4.32	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	7.38
AD-R14	1.55	2.15	2.99	1.84	1.84	0.54	2.12	2.14	1.17	1.17	1.21	1.73	1.57	1.21	0.54	0.58	0.58	1.97	1.91	2.05	2.14
AD-R15	2.01	2.13	2.10	1.82	1.82	0.98	2.31	1.31	1.97	1.84	2.08	1.71	1.45	1.89	0.98	0.98	1.05	1.48	1.64	1.64	1.86
AD-R16	3.09	3.32	2.66	2.15	2.15	1.12	1.94	1.90	1.54	1.54	1.63	2.03	1.71	2.78	1.12	1.12	1.53	1.88	1.70	1.82	3.01
AD-R17	0.03	0.03	0.08	0.03	0.04	0.02	0.06	0.04	0.05	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.04	0.04
AE-R1	0.66	0.61	0.61	0.86	0.75	0.75	0.68	0.66	0.86	0.75	0.75	0.68	0.86	0.81	0.65	0.65	0.66	0.61	0.61	0.66	0.61
AE-R2	227.97	212.86	212.00	187.62	162.89	160.28	212.43	211.54	187.62	162.64	160.34	212.20	193.60	193.44	150.89	150.97	227.97	211.92	212.66	227.28	212.39
AE-R3	0.10	0.10	0.10	0.17	0.17	0.17	0.12	0.08	0.17	0.17	0.17	0.12	0.15	0.15	0.14	0.14	0.10	0.10	0.10	0.10	0.10
AE-R4	0.14	0.14	0.13	0.15	0.16	0.18	0.12	0.14	0.15	0.16	0.18	0.12	0.16	0.16	0.21	0.21	0.14	0.14	0.13	0.14	0.14
AE-R5	40.48	43.37	66.78	58.30	58.29	39.81	37.16	45.23	58.30	58.28	39.81	37.16	73.83	68.90	40.48	40.48	40.47	43.36	66.77	40.47	43.37
AE-R6	0.03	0.03	0.07	0.07	0.09	0.05	0.03	0.05	0.07	0.09	0.05	0.03	0.06	0.07	0.04	0.04	0.03	0.03	0.07	0.03	0.03
AE-R7	0.07	0.07	0.06	0.08	0.08	0.09	0.07	0.09	0.08	0.08	0.09	0.07	0.08	0.08	0.10	0.10	0.07	0.07	0.06	0.07	0.07
AF-R1	0.90	0.63	0.63	0.43	0.68	0.91	0.69	0.64	0.68	0.68	0.60	0.64	0.64	0.40	0.51	0.57	0.68	0.80	1.26	1.44	0.67
AF-R2	1.47	0.99	0.92	1.80	0.98	1.28	0.90	0.84	0.92	0.99	1.03	1.35	0.92	1.80	2.44	0.83	0.83	1.30	2.34	2.34	2.20
AF-R3	33.77	25.06	25.06	25.13	23.71	17.43	19.54	18.24	16.69	23.71	19.54	37.39	19.15	25.12	18.54	21.03	21.02	21.93	20.71	19.33	22.03
AF-R4	27.18	20.54	19.17	20.36	13.13	12.75	16.70	14.55	14.61	13.13	16.77	28.61	14.61	20.36	16.26	15.58	16.70	17.97	27.18	25.37	28.49
AF-R5	36.93	39.19	41.99	38.39	32.29	13.72	32.38	32.39	32.29	32.29	30.20	25.69	24.26	35.77	26.40	33.39	37.22	29.74	21.87	21.87	17.37
AF-R6	0.72	0.81	0.75	0.69	1.04	1.05	1.18	1.36	1.38	1.04	1.14	1.14	2.03	0.98	1.05	1.25	1.25	0.81	0.72	0.72	0.71
AF-R7	0.03	0.03	0.02	0.03	0.03	0.07	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.05	0.05	0.06
AF-R8	277.66	117.74	117.80	118.11	160.89	138.83	132.32	123.63	113.20	161.11	123.51	231.23	129.28	118.05	120.86	105.84	95.01	126.04	210.37	210.44	142.14
AF-R9	0.10	0.12	0.13	0.12	0.14	0.13	0.15	0.14	0.13	0.09	0.15	0.08	0.24	0.13	0.14	0.16	0.16	0.12	0.13	0.14	0.13
AF-R10	0.12	0.10	0.12	0.09	0.10	0.25	0.15	0.10	0.10	0.10	0.15	0.13	0.14	0.07	0.13	0.14	0.10	0.15	0.10	0.09	0.13
AF-R11	0.15	0.17	0.23	0.34	0.23	0.19	0.12	0.20	0.20	0.20	0.20	0.12	0.09	0.15	0.16	0.15	0.17	0.16	0.15	0.16	0.22
AF-R12	0.91	1.19	1.68	0.75	0.75	0.68	1.00	0.68	0.68	0.68	0.68	0.75	2.23	0.80	0.88	1.15	2.56	0.97	0.99	0.70	0.94
AF-R13	32.21	23.56	25.75	23.66	25.26	32.14	26.36	24.55	22.90	33.69	34.37	30.23	16.94	24.14	31.38	21.56	27.50	38.09	48.40	46.27	50.02
AF-R14	10.19	10.66	10.52	10.52	8.38	4.23	7.30	7.54	5.04	5.17	8.28	8.36	8.60	9.04	7.46	4.60	8.42	5.97	6.20	6.36	5.26
AF-R15	2.51	1.97	2.65	2.72	2.75	3.26	2.86	3.13	1.97	2.87	2.45	3.10	1.59	2.11	1.97	1.48	1.48	3.11	3.87	3.70	3.33
AF-R16	0.12	0.11	0.13	0.13	0.08	0.07	0.07	0.05	0.17	0.16	0.09	0.16	0.17	0.11	0.15	0.19	0.18	0.12	0.12	0.12	0.13
AG-R1	0.05	0.05	0.03	0.05	0.08	0.04	0.05	0.08	0.07	0.08	0.04	0.04	0.05	0.05	0.04	0.05	0.05	0.04	0.03	0.03	0.05
AG-R2	0.27	0.79	0.91	0.86	0.37	0.64	0.40	0.37	0.40	0.37	0.50	0.79	0.89	0.96	0.80	0.92	0.88	0.71	0.75	0.75	0.53
AG-R3	0.82	1.34	2.54	1.34	0.89	1.19	0.87	0.71	0.65	0.61	0.96	1.47	1.00	1.00	1.45	1.27	1.29	1.12	1.29	1.29	0.95
AG-R4	0.05	0.07	0.05	0.08	0.07	0.04	0.04	0.06	0.06	0.05	0.03	0.09	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.04
AG-R5	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
AG-R6	0.06	0.12	0.16	0.12	0.13	0.10	0.10	0.14	0.22	0.21	0.09	0.10	0.16	0.17	0.19	0.17	0.19	0.14	0.12	0.11	0.13
AG-R7	0.13	0.17	0.11	0.08	0.12	0.14	0.24	0.15	0.07	0.07	0.13	0.09	0.13	0.13	0.12	0.15	0.08	0.10	0.11	0.11	0.13
AG-R8	5.62	6.50	8.84	6.60	6.99	4.61	4.17	6.65	11.16	11.16	5.75	8.55	7.95	8.52	4.74	5.42	6.23	5.26	4.28	4.18	4.70
AG-R9	0.02	0.04	0.03	0.02	0.02	0.01	0.02	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.02	0.02	0.03
AG-R10	0.03	0.03	0.05	0.03	0.03	0.02	0.03	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.02	0.03	0.02
AG-R11	6.67	7.29	3.93	7.88	9.12	5.51	5.97	7.08	6.55	6.56	5.54	5.98	5.84	6.16	7.64	6.63	5.98	5.98	5.98	3.95	4.42
AH-R1	0.07	0.04	0.05	0.05	0.07	0.05	0.04	0.04	0.07	0.04	0.09	0.04	0.04	0.08	0.04	0.03	0.04	0.05	0.05	0.05	0.05
AH-R2	1.11	2.02	1.06	1.84	3.27	1.19	1.43	1.40	2.44	1.48	1.70	1.57	1.57	1.57	1.35	1.25	1.08	1.14	1.42	2.55	1.05
AH-R3	0.50	0.86	1.08	0.85	0.91	0.55	0.51	0.48	0.82	0.64	0.86	0.89	0.83	0.49	0.75	0.50	0.55	0.50	0.68	0.79	0.47
AH-R4	15.83	28.04	13.50	27.25	20.39	19.35	20.33	20.80	17.06	14.89	17.11	23.59	25.27	12.14	15.89	30.34	24.22	14.81	15.62	31.75	18.55
AH-R5	111.95	178.17	153.76	210.80	174.71	154.70	172.58	113.89	159.63	117.09	128.23	182.93	196.12	90.99	139.71	182.97	150.91	153.09	177.87	253.58	99.69
AH-R6	0.70	0.97	0.93	1.47	1.04	0.92	1.10	1.22	0.68	0.67	0.74	1.19	1.19	0.65	1.37	1.53	1.19	0.78	0.93	1.53	0.64
AH-R7	0.67	1.57	1.07	1.47	1.00	0.58	0.69	1.05	1.00	0.78	0.63	1.16	1.25	0.63	1.20	1.20	1.10	1.00	0.82	1.20	1.01
AH-R8	0.54	1.16	0.72	0.97	0.68	1.39	1.52	0.79	0.62	1.31	1.14	1.08	1.16	0.58	0.91	1.52	0.98	0.67	1.05	1.52	0.98
AH-R9	0.64	1.00	0.79	1.87	1.63	0.97	1.15	1.06	1.38	1.14	0.92	1.33	1.33	0.39	1.08	1.03	1.25	0.84	0.97	1.62	0.66
AH-R10	4.18	11.19	7.06	9.67	5.23	4.63	5.34	6.12	5.35	12.54	4.97	6.19	7.47	5.55	9.04	11.59	10.50	7.02	5.78	9.29	4.97
AH-R11	6.90	9.06	7.76	7.97	13.09	5.09	5.60	6.80	9.34	6.67	4.22	13.72	9.09	7.22	6.75	7.06	7.06	11.98	5.36	5.41	4.94
AH-R12	5.06	10.79	8.92	5.55	6.55	7.36	7.80	8.79	4.96	6.68	7.61	6.57	4.69	11.52	8.06	10.81	4.84	6.18	5.24	6.47	10.69

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AH-R13	7.99	8.19	12.64	7.72	8.23	5.61	7.51	6.17	7.32	9.63	7.50	6.03	5.41	6.82	6.85	5.54	5.42	8.56	8.69	5.63	7.50
AH-R14	6.30	7.63	7.65	5.45	6.33	10.35	9.66	8.04	7.51	10.66	8.14	8.95	8.95	6.08	6.22	6.96	6.48	6.07	8.28	8.05	8.05
AH-R15	15.89	14.10	16.16	14.48	24.24	36.99	35.68	21.48	18.99	26.97	20.96	18.44	17.21	27.99	20.27	30.03	26.10	22.54	28.72	27.92	21.72
AH-R16	1.68	0.73	0.75	0.70	1.47	1.75	0.78	1.61	1.46	0.87	0.78	1.33	1.56	1.03	0.77	0.74	0.66	1.11	1.25	1.25	0.89
AH-R17	34.76	97.03	46.92	55.40	54.63	49.31	74.89	51.61	35.69	45.23	76.14	48.38	39.16	39.40	67.49	53.16	60.43	48.20	66.66	73.19	84.50
AH-R18	228.75	290.67	213.40	201.91	228.16	144.08	273.04	210.85	252.64	196.74	187.73	118.48	110.36	139.46	314.56	188.16	213.92	182.84	225.00	170.71	237.07
AH-R19	165.32	203.37	186.41	296.82	136.77	150.05	304.64	124.44	190.46	192.40	204.22	166.83	130.08	196.28	254.09	264.81	301.05	240.14	203.55	227.52	290.71
AH-R20	0.08	0.23	0.17	0.17	0.18	0.14	0.16	0.13	0.12	0.13	0.16	0.16	0.17	0.09	0.12	0.20	0.14	0.12	0.13	0.20	0.11
AH-R21	24.07	18.24	19.79	27.84	17.08	45.58	21.83	22.42	23.21	24.97	25.43	25.11	28.58	16.52	16.97	20.08	28.43	23.58	30.65	29.08	14.38
AH-R22	21.96	17.20	9.16	15.80	16.90	27.31	15.02	10.40	11.99	22.38	22.29	11.31	16.86	18.27	15.71	24.85	18.80	14.13	20.61	20.51	9.88
AI-R1	0.03	0.05	0.07	0.07	0.04	0.04	0.04	0.03	0.05	0.05	0.05	0.06	0.05	0.03	0.03	0.03	0.03	0.03	0.05	0.07	0.06
AI-R2	1.27	4.33	1.62	1.15	1.35	1.35	1.15	1.30	2.08	1.94	4.33	4.04	4.04	1.19	1.23	1.14	1.46	1.36	2.11	2.98	1.70
AI-R3	0.70	1.30	0.68	0.77	1.05	1.12	1.27	0.84	0.72	0.68	1.30	1.31	1.22	0.86	0.78	0.78	0.51	0.42	1.05	1.13	1.05
AI-R4	24.37	28.42	8.12	8.75	25.92	28.89	25.11	19.99	20.97	20.97	28.42	25.23	30.35	29.66	32.12	32.12	25.75	27.59	27.23	26.05	25.22
AI-R5	1.81	2.39	0.70	0.75	1.35	1.61	1.35	1.61	0.80	0.80	2.39	1.40	1.68	1.68	1.94	2.23	1.19	1.28	1.21	1.28	1.40
AI-R6	153.61	189.51	103.00	113.78	191.04	227.95	190.85	227.91	182.61	182.21	189.44	140.80	156.93	168.13	184.14	197.20	213.75	213.17	183.42	129.08	140.97
AI-R7	12.27	11.40	5.31	5.18	10.38	13.74	12.58	17.62	9.28	7.22	12.67	11.24	12.53	12.53	12.77	12.77	7.97	7.97	11.18	12.41	8.70
AI-R8	6.34	4.42	7.28	4.35	4.80	7.36	7.51	7.13	7.65	10.82	6.94	5.91	4.79	5.02	4.80	4.48	7.97	7.44	6.96	8.35	6.66
AI-R9	138.32	344.61	456.02	133.52	143.67	257.82	307.93	257.82	307.95	152.06	200.22	176.71	188.51	188.51	138.33	129.11	237.28	169.76	176.69	267.27	185.46
AI-R10	0.24	0.26	0.12	0.09	0.16	0.19	0.17	0.19	0.14	0.23	0.18	0.15	0.20	0.17	0.22	0.23	0.16	0.13	0.16	0.15	0.15
AJ-R1	0.05	0.05	0.03	0.03	0.03	0.04	0.04	0.04	0.08	0.09	0.06	0.07	0.07	0.06	0.06	0.06	0.04	0.03	0.03	0.05	0.07
AJ-R2	1.11	1.11	1.45	1.27	1.27	1.14	1.69	1.14	2.28	2.73	2.28	2.73	2.30	2.15	1.49	1.94	1.35	1.11	1.07	2.33	2.55
AJ-R3	0.93	0.99	0.47	0.44	0.40	0.83	0.72	0.78	0.80	0.89	0.80	0.89	0.77	0.67	0.88	0.68	0.57	0.86	0.83	1.14	0.79
AJ-R4	24.07	29.74	24.76	28.25	25.75	27.59	25.75	27.59	11.52	10.76	20.97	20.98	16.02	15.91	17.97	11.00	28.70	18.67	20.00	19.66	19.66
AJ-R5	154.29	108.81	127.91	304.36	285.76	158.20	135.17	158.18	89.06	111.99	169.78	170.16	120.51	159.15	108.32	100.37	238.28	231.03	253.35	231.77	155.50
AJ-R6	5.54	9.72	15.15	10.57	10.64	10.58	10.80	10.58	7.11	4.42	9.63	6.74	5.97	5.62	5.37	7.39	8.61	8.65	9.27	7.61	6.04
AJ-R7	11.34	10.14	8.29	5.92	6.12	6.24	6.37	6.24	5.79	9.23	9.81	11.92	9.71	8.38	8.70	10.69	5.91	7.35	6.86	9.78	11.55
AJ-R8	249.51	267.37	202.10	188.50	200.23	129.09	125.37	164.24	321.50	344.63	129.12	262.32	128.79	149.98	142.26	146.91	122.13	128.77	215.98	299.43	284.36
AJ-R9	292.93	200.06	139.91	130.53	143.21	160.63	277.79	131.97	311.64	327.01	213.50	262.62	148.10	225.21	208.39	236.54	234.84	352.44	247.12	232.10	220.36
AJ-R10	0.18	0.17	0.23	0.21	0.22	0.15	0.14	0.18	0.10	0.09	0.13	0.14	0.23	0.17	0.17	0.17	0.23	0.24	0.24	0.24	0.16
AK-R1	0.03	0.07	0.07	0.04	0.05	0.05	0.08	0.05	0.05	0.07	0.07	0.07	0.04	0.04	0.06	0.06	0.07	0.05	0.04	0.07	0.02
AK-R2	1.14	1.14	1.14	1.14	1.27	1.14	2.49	2.16	1.64	2.21	2.37	2.21	1.68	1.22	1.69	2.51	1.64	1.69	1.11	2.02	1.10
AK-R3	0.74	0.74	0.78	0.92	0.46	0.85	1.14	0.92	1.22	0.69	0.74	0.69	0.99	0.63	0.98	1.07	0.76	1.00	0.50	0.86	0.49
AK-R4	28.42	8.13	8.74	25.93	24.40	14.28	13.99	16.79	22.61	19.66	19.66	19.65	28.77	24.71	26.05	25.23	15.91	23.71	27.59	11.52	28.26
AK-R5	233.21	112.97	78.26	137.19	151.62	154.88	150.24	136.45	233.70	159.20	159.07	159.22	169.56	128.97	227.13	225.24	100.85	198.53	161.07	100.99	157.07
AK-R6	7.29	3.49	4.21	13.16	5.27	5.76	5.61	15.06	11.45	7.78	7.78	7.78	14.09	10.72	6.90	6.84	8.38	10.78	9.51	6.40	10.90
AK-R7	15.12	10.31	8.64	7.42	7.47	7.62	8.41	8.80	10.74	11.51	4.02	3.76	9.03	5.51	4.97	5.45	11.54	5.97	6.72	7.44	7.78
AK-R8	9.54	11.06	4.88	9.85	7.19	6.85	7.87	8.54	9.27	9.27	8.38	7.27	6.04	6.42	12.76	7.78	8.24	8.34	6.37	10.47	7.00
AK-R9	250.14	257.76	176.79	176.72	182.94	120.50	207.29	142.99	200.18	200.18	176.73	188.60	122.36	128.42	301.47	281.38	259.58	219.32	143.67	257.73	423.87
AK-R10	0.27	0.08	0.08	0.15	0.10	0.23	0.15	0.18	0.16	0.11	0.12	0.16	0.29	0.22	0.23	0.23	0.12	0.17	0.16	0.11	0.22
AL-R1	0.08	0.08	0.07	0.05	0.04	0.05	0.08	0.07	0.05	0.05	0.03	0.08	0.05	0.05	0.04	0.07	0.05	0.07	0.05	0.07	0.06
AL-R2	1.84	2.73	2.28	2.73	1.35	1.94	3.50	1.29	1.14	1.14	1.27	3.77	2.02	2.16	2.38	2.84	2.21	2.54	1.96	3.27	2.21
AL-R3	1.11	0.89	0.80	0.89	1.05	0.61	1.22	1.05	0.78	0.83	0.70	1.31	0.86	0.92	0.72	0.80	0.69	0.79	0.78	1.14	0.69
AL-R4	11.10	19.37	22.05	20.16	17.08	19.46	19.66	11.57	25.91	25.79	28.71	22.47	19.41	27.23	19.38	13.06	26.60	19.66	14.37	19.87	20.97
AL-R5	180.43	117.07	114.62	141.13	160.98	166.27	157.08	96.70	145.46	150.85	264.05	112.52	125.93	217.69	227.54	169.79	222.00	102.28	115.62	163.92	210.79
AL-R6	0.87	0.98	0.65	1.12	0.89	1.03	0.62	0.61	0.75	0.69	1.09	0.75	1.28	1.11	1.25	0.93	0.75	0.66	0.75	0.67	0.80
AL-R7	0.87	0.98	0.65	1.12	0.89	1.03	0.62	0.61	0.75	0.69	1.09	0.75	1.28	1.11	1.25	0.93	0.75	0.66	0.75	0.67	0.80
AL-R8	7.11	7.88	7.88	8.08	6.85	5.79	7.56	7.56	4.55	4.66	11.29	7.80	13.90	10.65	11.27	8.20	9.71	8.49	7.32	5.50	9.02
AL-R9	7.74	8.60	5.91	6.52	9.23	6.08	9.37	7.39	6.17	6.45	6.41	6.13	5.24	4.68	3.98	6.54	5.07	7.70	6.18	5.74	6.26
AL-R10	5.17	5.48	7.71	10.92	12.58	4.69	7.45	10.99	13.04	13.58	7.02	6.35	7.35	5.74	6.28	5.11	11.76	7.07	8.11	8.01	7.65
AL-R11	8.29	10.09	8.12	5.91	6.51	6.02	8.15	5.77	4.26	3.90	4.26	3.37	5.90	5.79	5.88	3.68	4.96	8.28	5.46	3.42	4.16
AL-R12	7.74	8.60	5.91	6.52	9.23	6.08	9.37	7.39	6.17	6.45	6.41	6.13	5.24	4.68	3.98	6.54	5.07	7.70	6.18	5.74	6.26
AL-R13	6.18	7.02	4.57	3.35	6.70	6.64	4.67	4.99	4.38	4.71	4.38	6.45	5.09	4.87	4.49	5.33	3.96	4.57	10.51	5.16	2.80
AL-R14	295.39	352.78	295.45	473.17	171.28	147.58	161.55	166.89	368.56	260.94	345.43	322.60	297.31	331.43	223.32	342.24	247.16	150.10	254.24	175.27	218.74
AL-R15	194.36	216.65	194.44	288.86	145.14	148.96	121.06	173.80	277.86	210.86	297.66	277.85	188.01	195.60	131.81	220.77	143.13	197.13	191.66	182.55	244.08
AL-R16	0.13	0.16	0.15	0.24	0.23	0.19	0.20	0.13	0.17	0.11	0.18	0.11	0.18	0.19	0.21	0.12	0.14	0.11	0.12	0.14	0.17
AM-R1	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.03	0.04	0.03	0.06	0.06	0.05	0.04	0.07	0.07	0.04	0.05	0.12	0.06	0.05
AM-R2	2.73	1.96	1.69	1.62	1.64	1.64	1.12	1.77	1.27	1.16	2.67	1.15	2.37	2.21	2.73	2.55	1.75	2.58	2.12	1.89	1.96
AM-R3	0.93	0.61	0.51	0.51	0.55	0.51	1.00	0.55	0.77	0.75	1.12	1.27	0.74	0.69	0.81	0.79	0.68	0.94	1.87	0.78	0.75
AM-R4	20.59	14.85	25.80	29.74	18.35	19.66	18.51	28.71	17.57	29.20	22.48	19.17	27.23	19.38	16.03	13.07	25.22	30.28	12.98	15.78	16.90
AM-R5	1.53	0.68	1.00	0.99	0.60	0.60	0.62	1.09	1.35	1.61	0.80	0.74	0.92	1.03	0.84	0.78	1.05	1.58	0.65	0.75	0.75
AM-R6	1.20	0.95	0.95	1.04	1.17	1.35	1.39	1.42	1.02	1.13	1.34	0.88	1.45	1.52	1.14	1.00	1.33	1.56	0.50	0.90	0.90
AM-R7	1.52	0.88	0.88	0.63	1.01	1.01	1.04	0.96	1.21	1.45	1.16	0.82	1.43	1.50	0.83	0.67	0.90	1.15	0.68	0.83	0.83
AM-R8	1.42	0.70	0.70	1.08	0.71	0.76	0.72	1.52	1.62	2.26	1.19	0.63	1.06	1.00	0.92	0.84	1.12	1.02	0.46	0.66	0.66
AM-R9	1.63	0.97	1.05	1.43	0.99	0.99	1.00	1.38	1.30	1.48	0.78	0.70	0.94	1.00	0.74	0.93	1.36	1.44	0.67	1.12	1.20
AM-R10	246.47	155.70	111.37	116.14	161.18	137.45	93.80	142.15	221.72	242.69	192.61	130.83	230.48	247.04	181.44	140.48	209.27	244.82	146.78	113.60	101.86
AM-R11	8.26	5.96	5.36	8.05	6.01	5.42	10.36	15.63	7.73	9.05	6.71	4.37	8.43	7.84	6.04	5.84	8.14	7.95	5.46	7.60	8.14

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AM-R12	5.80	5.07	5.08	6.13	3.42	3.49	2.94	4.75	5.33	8.51	5.67	6.73	7.19	6.26	5.44	6.23	6.38	3.95	8.46	5.07	6.54
AM-R13	8.26	3.50	4.13	4.92	4.84	4.16	4.17	5.65	9.07	5.26	3.51	4.47	5.10	3.71	4.02	4.31	4.91	4.34	4.89	5.33	4.17
AM-R14	7.04	10.73	7.81	4.98	10.71	13.63	11.22	9.77	6.92	7.88	6.70	6.73	7.12	10.82	9.59	9.13	8.91	4.41	7.26	9.09	9.09
AM-R15	4.50	3.54	3.74	3.22	1.86	2.34	2.20	3.37	4.12	3.01	1.87	3.61	3.16	3.29	3.22	2.23	2.59	3.16	2.56	2.43	2.72
AM-R16	3.11	8.15	5.71	3.94	3.51	5.79	5.53	3.94	5.33	5.65	8.06	8.71	5.48	6.06	6.50	4.06	5.72	5.74	6.62	3.24	4.31
AM-R17	8.68	11.26	11.21	4.70	9.04	5.97	6.10	4.48	5.46	5.05	9.23	8.11	8.59	11.18	9.35	6.02	5.20	7.27	10.60	10.35	10.94
AM-R18	251.20	303.44	322.60	164.63	368.62	208.26	217.81	154.58	487.91	260.97	279.64	307.26	321.56	279.61	252.47	235.28	230.81	331.50	159.08	244.20	166.39
AM-R19	165.28	227.81	277.85	150.65	277.90	213.15	143.08	91.23	318.94	210.81	225.89	176.12	172.00	165.02	148.22	235.84	173.29	285.60	193.52	298.40	173.27
AM-R20	9.84	10.52	8.38	4.69	10.39	6.94	4.91	7.19	18.50	9.30	12.95	8.53	8.33	13.01	10.90	8.39	8.00	8.62	6.10	13.70	9.50
AM-R21	0.32	0.20	0.23	0.24	0.16	0.13	0.17	0.23	0.22	0.19	0.14	0.10	0.22	0.19	0.19	0.15	0.26	0.34	0.16	0.09	0.10
AN-R1	0.03	0.05	0.07	0.05	0.07	0.03	0.00	0.04	0.07	0.06	0.06	0.05	0.00	0.04	0.06	0.04	0.04	0.04	0.05	0.05	0.06
AN-R2	1.27	1.14	2.45	1.27	1.84	1.36	0.00	1.22	2.73	2.28	3.66	1.32	0.00	1.27	1.19	1.27	1.79	1.49	1.45	1.67	1.77
AN-R3	0.50	0.51	0.74	0.79	1.11	0.46	0.00	0.76	0.89	0.80	1.18	0.59	0.00	0.79	0.74	0.92	0.62	0.47	1.21	0.47	0.51
AN-R4	30.29	19.26	25.80	21.30	13.78	29.72	0.00	14.66	20.98	20.97	24.22	26.29	0.00	17.88	10.04	27.68	27.64	19.45	24.26	17.32	16.71
AN-R5	157.22	145.89	161.62	166.77	164.69	228.68	0.00	172.11	180.74	106.02	187.51	131.98	0.00	265.81	184.17	213.53	150.04	157.02	191.58	146.85	101.07
AN-R6	12.29	4.89	5.61	8.24	6.52	11.88	0.00	5.60	12.54	7.05	10.41	8.16	0.00	9.91	5.96	8.29	11.98	7.68	8.77	5.82	5.00
AN-R7	6.26	7.60	5.22	10.52	5.06	13.77	0.00	4.85	7.74	3.59	5.51	7.22	0.00	8.32	6.89	6.11	6.20	3.57	7.02	6.98	7.29
AN-R8	3.79	8.24	5.21	8.91	4.46	8.33	0.00	5.09	5.25	3.89	6.35	8.14	0.00	6.79	3.67	3.25	4.35	7.01	4.85	8.45	4.33
AN-R9	9.30	6.71	5.50	5.51	9.98	4.38	0.00	7.34	6.89	11.24	5.32	10.34	0.00	8.92	8.80	9.80	5.74	6.36	4.48	9.26	6.68
AN-R10	3.17	4.48	3.22	3.66	2.32	5.39	0.00	3.08	2.92	2.12	4.09	5.22	0.00	4.87	5.02	3.36	3.83	2.09	3.48	3.36	5.86
AN-R11	5.46	4.28	5.48	5.48	5.39	4.62	0.00	4.90	5.91	4.69	3.57	6.29	0.00	3.68	6.28	8.54	6.62	5.21	8.02	8.35	4.27
AN-R12	14.60	6.46	5.23	6.31	9.13	3.73	0.00	7.11	5.41	6.82	6.85	5.54	0.00	7.72	8.23	5.61	5.63	7.96	9.06	6.97	7.39
AN-R13	169.07	368.43	153.83	169.07	147.57	285.85	0.00	142.81	153.90	368.51	261.01	345.58	0.00	212.36	306.32	285.90	142.88	205.79	306.36	147.96	188.96
AN-R14	141.06	277.85	151.94	115.41	211.59	168.73	0.00	122.88	171.78	277.89	210.87	297.85	0.00	298.89	180.77	168.71	190.28	218.57	180.77	140.17	123.53
AN-R15	0.17	0.16	0.21	0.18	0.17	0.22	0.00	0.11	0.18	0.13	0.16	0.14	0.00	0.15	0.12	0.22	0.34	0.13	0.15	0.11	0.14
AN-R16	6.21	6.54	3.80	8.09	5.21	7.47	0.00	4.09	8.42	8.98	5.08	6.91	0.00	6.61	8.37	9.28	3.73	5.93	8.20	5.76	3.86
AO-R1	0.05	0.04	0.08	0.05	0.06	0.03	0.05	0.06	0.03	0.05	0.07	0.07	0.06	0.05	0.10	0.04	0.04	0.07	0.05	0.07	0.03
AO-R2	1.96	1.56	2.58	2.06	1.14	1.31	1.64	2.37	1.45	2.73	2.28	3.05	1.14	1.40	2.44	1.48	1.06	1.84	1.57	1.54	1.18
AO-R3	1.25	0.63	0.74	0.82	0.76	0.82	1.22	0.74	0.47	0.89	0.80	1.14	0.53	0.44	0.76	0.51	1.08	0.85	0.99	0.75	0.82
AO-R4	28.78	20.25	25.79	14.38	12.01	24.82	21.03	21.32	28.70	29.56	22.57	13.17	25.91	14.59	14.65	17.32	20.97	13.17	21.58	8.74	25.11
AO-R5	179.28	149.09	143.45	105.47	137.31	157.08	155.05	114.36	172.32	173.20	101.09	149.99	234.30	121.56	111.98	158.95	166.11	143.27	107.35	137.46	218.65
AO-R6	13.09	5.88	6.58	7.69	6.12	12.74	10.97	6.68	10.92	9.53	6.24	6.86	5.85	5.71	4.02	5.05	7.62	6.56	12.70	5.49	10.42
AO-R7	4.76	2.80	4.49	3.98	4.62	8.82	5.42	7.48	7.88	8.33	5.84	6.35	5.90	8.76	8.69	7.89	8.56	9.48	8.18	8.76	6.05
AO-R8	2.94	4.46	4.29	6.79	10.42	7.42	3.24	5.24	5.37	4.58	5.59	7.55	4.81	5.43	7.04	7.29	11.76	8.59	8.75	5.43	9.63
AO-R9	12.15	13.08	10.00	9.18	6.21	6.19	7.65	6.28	10.43	5.28	10.00	5.45	4.51	4.62	4.82	10.64	4.73	4.72	8.08	4.42	7.09
AO-R10	2.36	1.65	2.29	3.08	3.94	2.58	1.78	4.61	2.69	3.17	3.44	4.29	2.46	3.03	4.80	6.10	3.58	3.31	3.90	4.40	4.67
AO-R11	2.80	7.01	8.57	6.95	6.16	5.72	4.51	9.33	5.90	6.47	8.18	9.59	4.38	5.67	7.33	5.15	5.41	3.87	4.85	7.93	5.10
AO-R12	6.77	7.31	7.00	9.90	5.12	10.96	15.48	5.60	12.24	7.51	7.43	5.32	7.45	8.87	5.36	7.75	10.47	5.64	6.00	7.05	6.83
AO-R13	367.01	188.96	174.24	174.16	142.80	171.51	150.28	164.88	214.16	208.30	350.47	153.90	169.06	147.57	153.43	125.89	161.67	319.20	205.97	251.17	147.56
AO-R14	205.30	123.53	210.40	226.71	96.33	178.61	183.64	171.70	161.31	113.53	190.92	182.46	204.68	148.94	187.48	262.49	185.48	276.74	190.25	165.31	329.68
AO-R15	0.28	0.22	0.16	0.11	0.12	0.25	0.14	0.11	0.17	0.27	0.17	0.17	0.14	0.11	0.12	0.10	0.13	0.16	0.18	0.10	0.20
AO-R16	7.66	5.24	10.32	7.33	3.68	5.86	5.31	5.93	5.87	6.27	13.32	3.85	5.53	6.48	3.98	5.77	5.69	6.54	4.49	6.20	6.76
AP-R1	0.08	0.07	0.07	0.09	0.05	0.05	0.05	0.05	0.05	0.07	0.05	0.03	0.06	0.05	0.02	0.03	0.07	0.03	0.06	0.10	0.07
AP-R2	1.84	2.49	2.11	1.69	2.37	1.79	1.67	1.77	1.67	2.73	1.35	1.14	1.89	1.96	0.77	1.32	2.37	1.27	1.77	2.73	2.28
AP-R3	1.13	1.22	0.97	1.32	0.71	0.50	0.47	0.51	0.48	0.89	0.47	0.74	0.59	0.78	0.53	0.73	1.08	0.70	0.80	1.16	1.02
AP-R4	17.53	15.18	20.97	10.75	29.56	22.57	25.90	25.79	25.80	22.47	29.74	29.55	12.29	13.17	29.56	25.31	29.74	24.37	12.04	9.37	19.05
AP-R5	30.26	93.84	47.60	91.69	113.27	69.13	32.31	31.02	91.25	52.08	57.13	76.02	66.33	59.25	118.67	46.93	45.93	76.34	42.85	88.20	34.76
AP-R6	6.79	6.13	5.27	4.36	17.65	7.42	8.14	7.55	5.47	13.44	8.54	11.33	7.09	7.94	11.33	11.19	5.75	11.33	6.20	6.15	9.23
AP-R7	5.04	5.28	7.78	5.62	10.39	5.24	5.05	5.14	7.18	7.91	5.30	10.75	4.62	5.03	10.20	9.35	7.26	7.65	4.45	5.31	7.19
AP-R8	79.06	115.83	81.88	68.03	125.86	98.05	110.66	96.00	76.12	128.21	116.16	194.73	105.49	65.40	194.46	98.78	76.96	161.71	125.97	58.51	74.00
AP-R9	19.70	20.63	23.30	16.22	26.98	18.05	17.97	18.61	14.58	14.48	13.86	29.66	17.13	18.48	29.65	20.16	27.74	18.49	17.91	16.23	19.41
AP-R10	15.25	17.47	18.04	8.92	20.21	14.01	9.18	9.41	15.43	19.67	16.20	24.70	8.75	14.14	13.71	22.60	10.36	21.09	10.64	11.59	10.32
AP-R11	117.51	171.52	269.38	333.45	218.77	218.73	218.73	218.71	289.74	257.39	163.91	228.85	229.39	134.21	340.65	202.49	216.95	139.98	210.45	211.66	228.74
AP-R12	0.15	0.17	0.11	0.09	0.31	0.24	0.16	0.17	0.14	0.11	0.18	0.27	0.16	0.18	0.35	0.29	0.10	0.28	0.10	0.13	0.16
AP-R13	8.53	9.12	9.85	6.73	17.43	11.27	11.27	10.91	10.64	12.04	7.48	14.64	10.57	11.37	16.56	12.31	10.34	15.72	14.90	9.02	8.50
AP-R14	21.41	31.25	37.56	41.87	72.17	51.04	24.44	23.82	40.94	45.51	47.26	18.54	28.75	19.67	67.73	34.36	19.80	32.61	32.61	45.66	27.96
AP-R15	2.80	2.61	1.35	1.32	2.71	2.15	2.56	2.91	1.92	1.79	3.83	4.17	2.34	4.53	2.80	1.85	2.37	1.61	1.96	2.55	2.95
AP-R16	0.20	0.14	0.11	0.12	0.12	0.15	0.21	0.20	0.19	0.07	0.21	0.16	0.12	0.24	0.11	0.15	0.31	0.23	0.15	0.17	0.14
AP-R17	0.68	0.49	0.82	0.57	0.71	0.75	0.93	1.07	0.80	0.55	1.13	0.73	0.47	1.03	0.79	0.70	1.11	0.71	0.77	0.56	0.79
AP-R18	1.66	2.36	1.00	0.70	1.24	1.34	1.09	1.25	1.09	0.96	2.05	1.15	1.01	2.08	1.34	1.42	1.56	1.04	1.91	1.48	1.37
AP-R19	7.12	4.76	3.76	3.29	3.36	3.12	6.97	6.94	3.45	3.59	4.79	5.01	4.78	5.24	3.21	4.77	4.91	4.56	5.23	3.40	5.80
AP-R20	18.43	12.32	9.72	8.51	8.71	8.07	18.05	17.98	8.92	9.29	12.40	12.97	12.37	13.57	8.31	12.35	12.70	11.81	13.53	8.80	15.03
AP-R21	11.73	7.85	6.19	5.42	5.54	5.14	11.50	11.45	5.68	5.92	7.90	8.26	7.88	8.64	5.29	7.87	8.09	7.52	8.62	5.60	9.57
AP-R22	99.97	66.85	52.75	46.19	47.24	43.76	97.93	97.52	48.39	50.42	67.29	70.37	67.11	73.59	45.08	67.01	68.91	64.07	73.39	47.74	81.53
AP-R23	201.82	184.26	170.57	234.45	126.78	197.67	192.94	201.82	192.99	166.48	183.83	126.78	202.37	193.51	126.78	128.14	187.65	133.07	204.84	256.42	197.79
AQ-R1	0.20	0.16	0.23	0.18	0.14	0.15	0.15	0.15	0.11	0.25	0.16	0.17	0.11	0.17	0.12	0.31	0.10	0.23	0.11	0.15	0.15
AQ-R2	11.04	7.98	11.59	12.67	10.61	9.67	11.00	11.75	8.34	17.44	5.88	4.47	7.63	5.53	8.70	10.04	7.27	14.18	5.91	5.51	5.90

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AQ-R3	10.84	8.72	19.26	13.08	15.94	10.44	12.50	7.11	6.38	9.43	7.06	9.16	9.13	9.13	9.11	9.49	5.91	9.53	7.91	6.26	6.26
AQ-R4	11.01	6.88	11.97	9.99	6.64	7.97	9.89	5.61	6.01	12.43	5.79	5.19	9.55	5.83	6.19	7.49	7.99	11.24	5.62	7.24	7.20
AQ-R5	5.97	4.58	5.91	7.45	7.29	7.12	4.85	5.65	5.65	10.38	5.32	5.23	5.53	5.65	4.45	7.53	3.86	6.25	3.80	4.99	3.27
AQ-R6	129.48	75.46	203.55	142.06	152.22	147.80	241.40	256.23	295.95	195.64	195.61	229.38	127.32	197.45	202.02	184.70	202.00	284.37	281.19	167.65	405.95
AQ-R7	0.88	0.55	1.26	1.05	1.13	0.49	0.97	1.64	1.47	0.96	0.96	0.89	0.70	1.39	1.28	1.25	1.06	0.93	0.96	0.80	1.23
AQ-R8	0.78	0.72	0.41	0.41	0.41	0.44	0.41	0.34	0.45	0.64	0.68	0.48	0.72	0.61	0.50	0.50	0.78	0.49	0.32	0.32	0.31
AQ-R9	10.16	9.50	15.41	11.53	12.35	8.17	14.76	16.38	24.14	10.86	10.86	11.14	4.59	14.45	13.05	11.93	7.90	7.59	7.29	7.00	14.46
AQ-R10	2.52	4.62	1.16	1.55	1.55	1.80	2.10	1.88	1.28	1.79	1.67	1.27	2.45	1.72	1.73	1.77	1.63	1.82	1.64	1.66	0.79
AR-R1	0.21	0.09	0.13	0.13	0.16	0.11	0.12	0.09	0.08	0.13	0.09	0.10	0.09	0.16	0.17	0.33	0.08	0.08	0.09	0.08	0.17
AR-R2	0.12	0.22	0.15	0.17	0.25	0.16	0.17	0.22	0.33	0.16	0.23	0.21	0.22	0.10	0.23	0.10	0.12	0.15	0.28	0.24	0.21
AR-R3	9.38	12.29	8.35	6.03	9.60	6.37	10.69	13.17	14.70	6.37	8.98	12.62	8.62	10.19	9.57	5.90	9.84	14.76	10.64	16.12	10.12
AR-R4	7.25	8.08	5.49	8.51	6.13	5.10	5.97	8.14	12.73	7.65	13.11	10.86	10.86	5.16	7.57	5.12	6.12	8.58	14.74	9.00	5.61
AR-R5	5.97	8.04	5.88	8.11	5.95	5.92	4.66	7.90	6.13	3.70	8.14	8.86	10.39	3.85	4.36	2.41	3.44	5.69	7.54	7.02	6.50
AR-R6	27.51	84.13	40.54	40.91	30.05	27.90	40.81	54.27	59.80	39.96	40.87	51.10	52.19	38.91	26.82	27.08	40.44	35.59	64.12	61.51	30.67
AR-R7	5.71	6.52	8.19	11.82	7.26	13.61	12.76	9.58	8.33	5.43	12.39	11.82	11.03	11.40	20.16	8.88	8.35	10.86	10.52	14.77	8.46
AR-R8	25.46	27.23	40.84	24.70	15.74	29.60	29.53	16.87	25.02	28.15	33.08	24.70	23.06	26.56	43.59	31.69	18.10	25.27	39.66	39.88	25.55
AR-R9	1.96	2.02	1.88	3.94	3.75	3.58	3.57	5.20	1.94	1.64	2.98	3.75	3.73	3.19	2.56	2.31	3.75	1.84	1.92	2.02	1.80
AR-R10	223.07	118.87	196.47	245.50	110.35	192.82	218.65	213.09	184.71	132.91	277.73	245.50	150.17	257.70	238.06	208.55	126.90	117.76	294.78	174.08	204.95
AR-R11	1.12	0.74	0.92	0.81	0.63	0.48	0.93	1.34	0.73	0.61	1.36	1.35	0.39	1.48	0.66	0.91	0.63	0.57	0.92	0.41	1.31
AR-R12	11.73	11.84	26.42	15.42	9.91	17.49	22.17	16.36	15.06	11.23	16.28	15.42	13.63	18.13	27.04	14.72	14.89	12.32	32.63	24.64	15.64
AS-R1	12.58	7.25	7.53	7.11	0.00	6.30	13.17	7.31	0.00	5.67	11.97	14.33	14.53	0.00	10.63	14.83	17.95	0.00	7.25	7.86	4.70
AS-R2	28.77	12.04	14.37	20.97	0.00	18.51	32.12	13.86	0.00	8.74	28.90	24.76	27.01	0.00	20.31	27.58	33.23	0.00	12.04	29.56	22.57
AS-R3	39.16	54.70	87.25	101.07	0.00	100.25	44.96	84.84	0.00	48.38	54.71	69.46	40.76	0.00	40.58	69.76	41.96	0.00	83.37	45.16	84.02
AS-R4	12.46	4.28	4.80	9.02	0.00	5.58	9.77	5.39	0.00	3.69	11.86	7.04	10.38	0.00	15.05	11.45	10.20	0.00	7.67	11.31	5.17
AS-R5	120.28	144.65	151.12	95.47	0.00	104.92	180.47	104.83	0.00	84.12	104.62	108.02	144.92	0.00	98.19	157.27	188.86	0.00	74.47	165.71	74.04
AS-R6	41.06	14.45	16.19	18.42	0.00	15.71	18.11	11.74	0.00	8.45	33.18	20.17	13.74	0.00	21.31	24.42	26.64	0.00	9.74	14.31	14.01
AS-R7	145.74	164.91	227.98	242.77	0.00	333.67	111.53	213.48	0.00	180.08	218.15	154.37	273.86	0.00	129.65	180.09	93.80	0.00	232.14	157.22	369.87
AS-R8	4.84	2.54	2.51	4.11	0.00	2.61	3.07	1.95	0.00	1.85	3.91	3.34	3.18	0.00	2.12	2.62	3.29	0.00	2.11	3.82	1.87
AS-R9	0.22	0.14	0.17	0.18	0.00	0.10	0.27	0.13	0.00	0.12	0.19	0.21	0.21	0.00	0.16	0.24	0.26	0.00	0.12	0.26	0.16
AS-R10	0.13	0.20	0.34	0.45	0.00	0.49	0.22	0.33	0.00	0.26	0.29	0.44	0.22	0.00	0.37	0.34	0.15	0.00	0.17	0.28	0.43
AS-R11	0.18	0.25	0.26	0.39	0.00	0.41	0.15	0.28	0.00	0.15	0.19	0.22	0.24	0.00	0.25	0.20	0.14	0.00	0.25	0.21	0.35
AS-R12	0.07	0.06	0.14	0.06	0.00	0.09	0.14	0.13	0.00	0.13	0.11	0.18	0.06	0.00	0.09	0.06	0.06	0.00	0.09	0.10	0.15
AT-R1	6.28	0.00	12.00	9.70	0.00	11.61	8.05	4.43	8.22	0.00	0.00	14.50	6.64	11.00	0.00	5.21	0.00	6.50	7.86	6.15	0.00
AT-R2	14.46	0.00	28.42	20.62	0.00	25.11	29.74	24.40	14.28	0.00	0.00	28.90	11.10	24.78	0.00	8.13	0.00	20.55	22.47	15.19	0.00
AT-R3	6.15	0.00	12.14	5.92	0.00	6.82	5.75	7.67	5.34	0.00	0.00	8.04	5.13	13.00	0.00	4.93	0.00	8.24	5.99	7.78	0.00
AT-R4	48.36	0.00	181.12	116.98	0.00	155.34	113.79	74.48	104.03	0.00	0.00	167.30	56.65	153.98	0.00	56.61	0.00	72.69	177.33	84.62	0.00
AT-R5	12.40	0.00	18.10	16.58	0.00	21.03	15.87	14.89	15.71	0.00	0.00	23.89	18.05	18.44	0.00	11.33	0.00	18.27	17.83	16.99	0.00
AT-R6	219.38	0.00	147.81	311.63	0.00	298.94	195.54	192.42	175.26	0.00	0.00	142.88	228.76	157.22	0.00	152.50	0.00	230.61	248.11	181.80	0.00
AT-R7	0.52	0.00	0.83	0.44	0.00	0.93	0.92	0.87	1.46	0.00	0.00	1.27	0.83	0.89	0.00	1.78	0.00	0.73	0.83	0.86	0.00
AT-R8	0.12	0.00	0.18	0.17	0.00	0.15	0.17	0.16	0.20	0.00	0.00	0.32	0.11	0.24	0.00	0.07	0.00	0.19	0.23	0.17	0.00
AT-R9	0.30	0.00	0.19	0.21	0.00	0.44	0.42	0.52	0.29	0.00	0.00	0.29	0.28	0.17	0.00	0.33	0.00	0.28	0.22	0.28	0.00
AT-R10	0.24	0.00	0.11	0.25	0.00	0.36	0.31	0.33	0.33	0.00	0.00	0.23	0.26	0.17	0.00	0.26	0.00	0.16	0.19	0.28	0.00
AT-R11	4.02	0.00	8.79	6.01	0.00	5.06	5.78	5.03	3.75	0.00	0.00	7.18	3.46	6.16	0.00	3.97	0.00	6.42	6.40	4.48	0.00
AT-R12	1.63	0.00	1.40	1.32	0.00	2.59	1.24	1.82	1.78	0.00	0.00	2.09	2.46	2.43	0.00	1.17	0.00	1.24	1.24	1.44	0.00
AU-R1	12.14	5.52	5.26	9.16	8.21	5.40	0.00	8.89	0.00	4.70	9.47	10.23	7.41	0.00	8.56	0.00	10.66	0.00	7.49	0.00	8.17
AU-R2	25.92	22.97	23.43	28.71	28.70	19.66	0.00	28.71	0.00	25.79	30.57	19.02	11.06	0.00	28.57	0.00	24.37	0.00	22.43	0.00	13.86
AU-R3	9.89	7.24	7.39	11.83	11.83	9.99	0.00	12.39	0.00	5.69	8.20	7.50	5.24	0.00	7.06	0.00	11.33	0.00	7.38	0.00	7.76
AU-R4	0.16	0.12	0.12	0.20	0.18	0.10	0.00	0.27	0.00	0.11	0.24	0.19	0.15	0.00	0.23	0.00	0.28	0.00	0.16	0.00	0.11
AU-R5	18.48	13.81	14.09	17.12	15.66	9.93	0.00	22.60	0.00	13.72	32.02	15.73	16.62	0.00	31.67	0.00	15.37	0.00	11.67	0.00	9.78
AU-R6	174.63	178.28	293.83	267.67	403.94	462.65	0.00	239.26	0.00	300.52	317.93	183.71	211.84	0.00	214.19	0.00	181.15	0.00	346.94	0.00	446.75
AU-R7	0.34	0.21	0.26	0.31	0.25	0.28	0.00	0.19	0.00	0.25	0.37	0.22	0.27	0.00	0.26	0.00	0.22	0.00	0.40	0.00	0.38
AU-R8	190.89	238.62	261.38	233.16	265.31	303.93	0.00	157.14	0.00	172.18	208.84	107.80	142.92	0.00	283.66	0.00	98.35	0.00	302.72	0.00	293.52
AU-R9	34.25	58.80	41.57	41.05	65.39	59.84	0.00	36.88	0.00	39.29	29.37	40.85	45.36	0.00	43.51	0.00	51.32	0.00	32.06	0.00	47.39
AU-R10	0.31	0.52	0.36	0.58	0.58	0.37	0.00	0.41	0.00	0.34	0.61	0.52	0.36	0.00	0.38	0.00	0.39	0.00	0.45	0.00	0.28
AU-R11	8.03	5.96	3.69	8.04	8.72	5.92	0.00	6.29	0.00	7.80	6.44	5.99	3.69	0.00	8.11	0.00	7.95	0.00	4.77	0.00	5.20
AV-R1	2.84	0.00	3.05	3.34	0.00	2.05	3.64	1.69	1.69	0.00	0.00	2.20	1.20	1.64	0.00	4.00	0.00	3.32	1.56	2.52	0.00
AV-R2	2.63	0.00	2.32	2.31	0.00	1.00	1.74	1.60	1.50	0.00	0.00	1.59	1.28	1.59	0.00	1.70	0.00	1.73	1.06	1.06	0.00
AV-R3	0.93	0.00	0.76	0.69	0.00	0.49	0.48	0.95	0.88	0.00	0.00	0.72	1.06	0.97	0.00	0.43	0.00	0.52	0.68	0.42	0.00
AV-R4	0.43	0.00	0.47	0.40	0.00	0.40	0.53	0.24	0.21	0.00	0.00	0.27	0.21	0.32	0.00	0.36	0.00	0.24	0.25	0.42	0.00
AV-R5	0.09	0.00	0.13	0.16	0.00	0.10	0.09	0.15	0.16	0.00	0.00	0.18	0.17	0.20	0.00	0.13	0.00	0.18	0.17	0.11	0.00
AV-R6	0.06	0.00	0.04	0.04	0.00	0.04	0.06	0.07	0.07	0.00	0.00	0.04	0.05	0.07	0.00	0.05	0.00	0.04	0.12	0.04	0.00
AV-R7	7.33	0.00	11.47	9.29	0.00	10.36	6.80	6.11	5.80	0.00	0.00	13.06	13.06	6.02	0.00	5.48	0.00	5.25	5.08	10.90	0.00
AV-R8	12.34	0.00	13.72	8.64	0.00	13.13	5.49	6.06	7.07	0.00	0.00	9.70	9.70	6.97	0.00	7.51	0.00	10.45	5.90	8.93	0.00
AV-R9	0.15	0.00	0.14	0.20	0.00	0.14	0.22	0.22	0.15	0.00	0.00	0.16	0.17	0.16	0.00	0.10	0.00	0.14	0.10	0.22	0.00
AW-R1	0.00	11.63	8.25	0.00	0.00	8.22	0.00	7.32	8.30	0.00	0.00	5.04	11.46	0.00	0.00	0.00	7.48	0.00	5.17	5.31	0.00
AW-R2	0.00	29.56	29.57	0.00	0.00	13.17	0.00	24.07	28.70	0.00	0.00	25.80	31.10	0.00	0.00	0.00	22.47	0.00	14.28	12.98	0.00
AW-R3	0.00	40.31	51.84	0.00	0.00	46.37	0.00	96.77	37.45	0.00	0.00	57.37	45.16	0.00	0.00	0.00	81.03	0.00	124.33	37.87	0.00

ADDENDUM D

	Project 25	Project 26	Project 27	Project 28	Project 29	Project 30	Project 31	Project 32	Project 33	Project 34	Project 35	Project 36	Project 37	Project 38	Project 39	Project 40	Project 41	Project 42	Project 43	Project 44	Project 45
AW-R4	0.00	12.27	8.90	0.00	0.00	8.24	0.00	5.93	15.90	0.00	0.00	5.50	8.93	0.00	0.00	0.00	5.93	0.00	7.96	7.29	0.00
AW-R5	0.00	218.02	134.04	0.00	0.00	201.72	0.00	332.44	228.05	0.00	0.00	231.54	150.54	0.00	0.00	0.00	297.81	0.00	357.66	230.65	0.00
AW-R6	0.00	0.16	0.23	0.00	0.00	0.18	0.00	0.39	0.18	0.00	0.00	0.24	0.18	0.00	0.00	0.00	0.23	0.00	0.28	0.32	0.00
BA-R1	64.17	59.63	20.12	18.05	20.76	32.05	37.61	32.05	34.34	32.05	34.34	23.21	21.66	20.76	32.05	26.31	25.58	35.31	29.85	19.85	26.28
BA-R2	26.20	26.20	15.86	16.99	14.72	19.52	20.20	20.55	24.39	24.89	31.27	13.93	10.12	16.37	17.32	13.25	9.32	20.12	16.59	15.23	10.37
BA-R3	84.99	124.41	78.29	78.24	67.28	92.37	62.94	63.32	104.02	99.11	100.78	45.18	59.60	105.78	88.64	75.74	80.96	67.18	51.16	73.41	55.61
BA-R4	213.70	153.81	71.61	92.23	65.02	76.55	182.46	170.59	94.54	80.80	94.53	53.22	66.95	96.61	90.17	62.15	99.03	128.74	109.19	60.24	67.51
BB-R1	29.85	33.48	30.04	27.37	40.90	52.18	59.90	59.63	35.10	20.22	37.61	20.12	18.05	20.76	43.32	16.63	18.90	40.17	43.32	26.60	21.07
BB-R2	21.80	24.13	24.13	10.49	15.68	26.20	26.20	26.20	13.86	11.78	14.85	15.86	16.99	16.37	27.99	15.88	13.26	14.22	17.79	23.22	15.60
BB-R3	70.28	71.99	71.99	93.49	149.71	90.72	97.20	88.85	108.04	53.85	108.05	59.02	59.02	60.92	127.37	77.41	59.70	44.30	105.58	69.51	49.64
BB-R4	10.67	13.94	16.00	9.32	17.49	12.28	13.48	12.51	10.90	6.16	11.40	5.30	5.30	7.24	11.15	4.78	4.66	11.30	9.60	4.37	8.30
BC-R1	32.63	28.03	24.71	19.46	48.48	64.17	18.79	20.22	36.27	43.32	36.27	43.32	21.39	30.77	28.53	27.20	27.20	27.84	36.52	23.11	20.25
BC-R2	17.63	15.68	9.10	15.63	22.82	24.45	8.60	8.11	15.96	17.79	15.96	17.79	21.04	12.34	10.31	11.17	11.17	11.43	21.59	13.98	14.10
BC-R3	69.32	52.87	107.40	60.46	82.63	119.04	55.63	53.27	105.38	117.67	122.65	81.11	60.18	85.29	105.52	75.55	80.94	72.16	74.99	48.55	76.48
BC-R4	151.84	153.27	91.14	95.89	140.40	152.82	66.65	67.78	86.48	93.77	128.02	165.81	131.81	70.00	96.37	79.20	84.86	81.06	133.55	75.32	57.93
BC-R5	10.05	8.22	5.87	8.07	7.53	7.58	3.31	3.47	7.71	14.89	7.37	11.51	8.96	8.30	8.30	4.70	7.76	4.49	9.48	5.73	10.56
BD-R1	20.25	59.90	26.82	18.17	18.16	18.17	18.16	20.25	18.05	39.59	34.34	26.08	35.10	37.61	24.49	32.05	25.75	21.04	17.53	24.50	59.63
BD-R2	14.10	26.20	14.97	14.85	14.78	15.63	18.55	9.24	16.99	22.82	18.55	24.55	13.86	14.85	15.62	20.23	17.47	18.16	9.81	11.20	26.20
BD-R3	78.03	150.28	68.41	70.26	46.05	48.17	79.13	101.76	59.02	87.07	61.80	89.51	108.05	108.05	54.27	70.27	60.70	56.59	56.31	81.76	88.85
BD-R4	5.26	12.94	5.43	4.78	10.96	10.66	5.91	8.07	7.99	12.04	7.12	7.66	10.63	10.63	7.41	10.28	7.73	13.47	3.95	5.14	12.51
BE-R1	16.63	33.65	17.64	64.17	59.63	35.10	20.22	37.61	35.10	32.05	20.13	26.09	26.10	17.82	59.63	35.10	20.22	37.61	51.95	18.84	21.01
BE-R2	20.12	14.99	19.91	26.20	26.20	13.86	11.78	14.85	13.86	20.96	13.65	20.12	20.12	12.41	26.20	13.86	11.78	14.85	22.82	15.40	27.34
BE-R3	74.76	130.61	49.62	101.42	92.96	96.37	55.63	102.64	95.35	70.00	58.23	74.76	74.76	73.13	77.41	103.41	45.78	136.90	112.51	51.41	101.15
BE-R4	95.13	101.38	124.79	161.27	152.33	108.25	62.48	119.38	73.03	92.23	52.91	95.13	95.13	82.15	208.55	93.97	72.60	125.04	107.43	116.52	80.80
BF-R1	19.46	18.90	20.76	29.17	43.32	36.27	43.32	21.39	30.77	55.66	20.50	18.17	18.16	20.25	42.91	23.49	41.91	27.63	37.19	40.05	20.12
BF-R2	15.63	14.99	16.81	22.25	17.79	15.96	17.79	21.04	12.34	24.45	21.12	15.63	16.74	14.10	29.10	26.51	15.97	10.59	33.87	24.05	15.86
BF-R3	80.70	49.61	71.38	74.29	117.67	122.65	81.11	60.18	85.30	126.59	66.69	102.67	109.56	78.04	124.13	98.52	60.94	50.76	109.16	77.97	98.00
BF-R4	7.94	8.65	5.37	12.95	11.75	10.76	7.78	6.82	8.48	12.46	11.15	7.67	8.22	5.26	9.26	10.30	8.20	8.16	8.41	7.54	7.35
DA-R1	5.98	4.68	8.77	4.15	4.92	4.92	7.25	7.76	6.09	4.95	4.97	6.41	6.40	4.08	3.37	7.31	6.77	6.81	9.68	7.05	9.68
DB-R1	5.58	3.93	5.27	1.88	2.83	1.93	2.90	3.04	2.67	2.29	3.83	3.94	3.59	3.04	1.77	3.11	3.82	3.93	2.50	1.92	4.14
DC-R1	1.72	1.38	1.89	1.59	1.74	1.65	2.00	1.92	1.85	1.76	1.73	3.03	2.97	1.94	1.70	1.73	2.51	2.46	3.35	2.55	2.66
DD-R1	6.96	7.59	9.29	9.29	5.71	6.50	11.21	11.96	7.94	6.69	7.02	13.18	8.66	6.05	3.86	3.94	5.43	4.97	8.27	5.90	6.06
DE-R1	3.69	2.03	2.97	2.08	2.12	2.11	3.16	3.51	3.67	1.40	2.39	4.00	3.33	2.49	2.18	2.22	3.48	3.15	3.28	2.44	2.46
E-R1	0.68	0.89	1.12	0.62	0.45	0.60	0.94	1.01	0.77	0.78	0.79	1.73	1.12	0.53	0.64	0.68	0.73	0.83	0.86	0.46	0.62
E-R2	37.39	59.96	58.52	58.09	40.50	55.88	56.90	59.51	50.49	69.40	72.57	88.99	61.67	46.83	60.09	60.63	45.89	55.87	54.54	39.53	39.25
F-R1	0.74	0.34	0.20	0.34	0.26	0.25	0.25	0.32	0.37	0.41	0.38	0.23	0.40	0.29	0.25	0.34	0.48	0.45	0.54	0.24	0.50
F-R2	2.36	2.31	5.02	1.59	2.28	2.23	3.36	3.55	1.89	1.98	1.99	3.41	2.88	1.84	2.36	1.60	2.23	2.31	2.16	3.34	2.21
F-R3	1.75	0.78	1.01	0.53	0.60	0.56	0.82	1.12	0.70	0.82	0.76	0.77	1.15	0.54	0.58	0.54	1.08	1.05	1.17	0.79	1.10
F-R4	3.21	5.11	3.62	3.19	3.81	4.22	2.35	2.34	2.56	4.14	4.14	2.27	4.77	5.30	6.26	2.01	5.61	2.71	3.20	5.48	2.28
F-R5	1.25	1.71	1.16	0.68	0.80	1.22	1.16	0.91	0.74	1.35	1.45	0.73	1.40	1.39	1.69	1.22	1.55	1.14	1.07	1.67	0.74
G-R1	0.56	0.38	0.42	0.39	0.42	0.27	0.46	0.38	0.37	0.38	0.38	0.37	0.43	0.30	0.38	0.30	0.35	0.40	0.27	0.28	0.67
G-R2	0.13	0.09	0.06	0.06	0.07	0.07	0.08	0.21	0.07	0.07	0.07	0.11	0.14	0.10	0.14	0.07	0.07	0.22	0.10	0.09	0.10
G-R3	0.24	0.24	0.52	0.46	0.49	0.27	0.33	0.21	0.29	0.73	0.43	0.23	0.21	0.28	0.28	0.28	0.36	0.23	0.40	0.28	0.55
G-R4	1.53	1.22	1.61	1.61	1.32	1.51	1.15	1.91	1.77	1.74	1.65	1.26	1.83	1.15	2.45	1.23	1.10	2.13	1.65	1.07	2.46
G-R5	4.78	2.30	2.32	1.47	2.23	1.99	1.60	2.40	1.78	1.68	1.41	2.02	3.27	1.54	2.40	2.33	1.27	3.58	1.59	1.40	2.10
G-R6	0.44	0.32	0.44	0.31	0.37	0.38	0.34	0.43	0.35	0.31	0.21	0.31	0.46	0.31	0.46	0.13	0.27	0.59	0.30	0.17	0.44
G-R7	0.18	0.12	0.16	0.18	0.10	0.16	0.17	0.23	0.13	0.20	0.23	0.17	0.15	0.12	0.28	0.17	0.09	0.38	0.16	0.10	0.15
G-R8	0.17	0.25	0.15	0.14	0.16	0.10	0.12	0.20	0.23	0.14	0.14	0.23	0.17	0.25	0.12	0.10	0.14	0.20	0.17	0.14	0.17
G-R9	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.01
G-R10	0.09	0.12	0.17	0.16	0.16	0.12	0.11	0.11	0.11	0.09	0.08	0.20	0.14	0.19	0.11	0.11	0.16	0.12	0.08	0.10	0.09

	Material			Labour			Eng Design			Cur econ c			Cur econ f			Scope def			Rework			S change			Weather			Access			P size			P cond			Complex			Repitition			Year of construction
	Simple	Normal	Complex	Simple	Normal	Complex	Simple	Normal	Complex	Good	Normal	Volitile	Good	Normal	Volitile	Good	Normal	Poor	Little	Normal	Extensive	Few	Normal	Extensive	Good	Normal	Poor	Good	Normal	Poor	Large	Medium	Small	Good	Normal	Poor	Simple	Normal	Complex	Repittion	Occasion	None	
Project 1		■			■			■			■			■			■			■			■			■			■			■			■			■			■	2005
Project 2				■				■	■				■					■									■	■		■				■	■		■				2006
Project 3	■				■			■				■		■			■				■				■				■			■								1994
Project 4			■		■			■		■					■		■			■		■			■				■			■					■				1996
Project 5		■				■			■		■			■		■				■				■		■			■			■		■				■			1999
Project 6					■		■				■			■			■			■			■			■			■			■			■		■				2004
Project 7		■			■			■			■			■			■		■				■			■			■			■			■			■		■	2006
Project 8		■			■			■				■			■			■		■			■			■			■			■			■			■			2009
Project 9	■					■		■			■			■			■			■			■	■				■			■			■			■			2010
Project 10		■		■				■			■			■			■			■			■			■		■			■			■			■			2002
Project 11			■		■			■			■			■			■			■		■				■			■			■			■			■			2002
Project 12		■			■			■				■		■			■			■			■			■			■			■		■				■			2000
Project 13		■			■			■			■			■			■			■			■			■			■			■			■			■			1995
Project 14		■			■			■				■		■			■			■			■			■			■			■			■			■			1998
Project 15				■				■			■			■			■			■			■			■			■			■			■			■			1997
Project 16		■			■			■			■				■		■			■			■			■			■			■			■			■			2000
Project 17	■					■			■	■							■			■			■			■			■			■			■			■		2005
Project 18			■		■									■			■			■			■			■			■			■			■			■		■	2007
Project 19			■		■			■				■		■		■				■			■			■			■			■		■				■			1996
Project 20		■				■			■		■				■		■			■			■		■				■			■			■		■				1999
Project 21		■			■			■			■			■			■			■			■			■			■			■			■			■			2004
Project 22					■			■				■			■		■			■			■			■			■			■			■			■			1995
Project 23	■				■			■			■			■			■			■		■				■			■			■			■			■		■	1998
Project 24	■				■			■				■		■			■			■			■			■			■			■			■			■			1997
Project 25		■				■			■			■			■			■			■			■			■			■			■			■			■		2005
Project 26			■			■		■				■		■			■			■			■		■				■			■			■			■			2006
Project 27		■			■			■			■				■		■			■			■			■			■			■			■			■			1994
Project 28		■			■			■			■				■		■			■			■			■			■			■			■			■			1996
Project 29	■				■			■				■		■			■			■			■			■			■			■			■			■			1999
Project 30	■			■			■				■			■			■			■			■			■			■			■			■			■		■	2009
Project 31				■				■			■			■			■			■			■			■			■			■			■			■			2010
Project 32		■			■			■				■			■		■			■			■			■			■			■			■			■			2002
Project 33		■			■			■			■			■			■		■				■			■			■			■			■			■			1995
Project 34		■			■			■			■			■			■			■			■			■			■			■			■			■			1997
Project 35			■		■			■			■				■		■			■			■			■			■			■			■			■			1999
Project 36					■			■				■			■		■			■			■			■			■			■			■			■			1999
Project 37		■			■			■			■				■		■			■			■			■			■			■			■			■			2009
Project 38		■			■			■				■			■		■			■			■			■			■			■			■			■		■	2010
Project 39						■		■				■			■		■				■		■			■			■			■			■			■			2004
Project 40	■				■			■			■			■			■			■			■			■			■			■			■			■			2003
Project 41		■			■			■				■			■		■			■			■			■			■			■			■			■			2002
Project 42		■			■			■			■				■		■			■			■			■			■			■			■			■			1994
Project 43			■			■		■			■				■			■			■			■			■			■			■			■			■			1996
Project 44		■			■			■			■				■		■			■			■			■			■			■			■			■			1999
Project 45		■			■		■				■			■			■			■			■			■			■			■			■			■			2009

Key:

1	Material	Type of material used
2	Labour	Availibility of labour and skills at the time of construction
3	Eng design	Complexity of the engineering design
4	Cur econ c	Current economic conditions - at the time of construction
5	Cur econ f	Current economic factors - at the time of construction
6	Scope def	Level of scope definition at the time of construction
7	Rework	Amount of rework that was done on the project
8	S change	Level of scope changes that occurred
9	Weather	General weather conditions at the time of construction
10	Access	Access to the site when project was excecuted
11	P size	Size of the project
12	P cond	General conditions at the time of construction
13	Complex	Complexity of the project in general
14	Repitition	Level of repitition work that occurred

Project 1

Year of construction 2005

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	5,220	R	42.50	AB-Q1	1.35	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,863	R	12.75									
AB1.3	Back fill and compact	m3	4,833	R	44.00	AB-Q2	1.08	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,220	R	5.55	AB-Q3	1.00	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,437	R	7.45	AB-Q4	1.18	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.33	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.97	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					7.66	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					5.70	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	255,000.00									
AC1.2	EO for raking equipment	Item	1	R	45,000.00									
AC1.3	Number of piles	No	206											
AC1.4	Move rig to new position	No	206	R	355.00	AC-Q1	1.00	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15			AC-Q2	13.73	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	15	R	425.00	AC-Q3	1.00	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	105	R	175.00	AC-Q4	0.14	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,750	R	220.00	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	550	R	400.00	AC-Q6	0.37	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	115	R	650.00	AC-Q7	1.79	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	205	R	500.00	AC-Q8	1.00	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	690	R	550.00	AC-Q9	0.30	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	75	R	750.00	AC-Q10	0.20	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	20	R	10,500.00	AC-Q11	10.30	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	178	R	10,500.00	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,850	R	1,850.00	AC-Q13	0.11	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	200	R	1,850.00	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	155,000.00				/					
AC1.19	Load test to pile	No	3	R	50,000.00	AC-Q15	68.67	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	90,000.00	AC-Q16	206.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	206	R	450.00	AC-Q17	1.00	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					137.84	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.32	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.23	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.80	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.35	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.27	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.30	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.41	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					1.00	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					5.68	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.00	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					83.78	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					27.03	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					48.65	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	155	R	112.00	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,050	R	112.00									
AD1.3	Kerbing	m	311	R	174.00	AD-Q2	0.11	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,771											
AD1.5	Remove top soil	m3	831	R	45.00	AD-Q3	0.53	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,566	R	108.00	AD-Q4	0.27	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,048	R	7.45									
AD1.8	Reduce levels	m3	1,524	R	45.00	AD-Q5	0.50	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	762	R	74.00	AD-Q6	2.00	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	381	R	220.00	AD-Q7	2.00	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	375	R	220.00	AD-Q8	4.06	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,566	R	22.32	AD-Q9	4.11	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	320	R	15.00	AD-Q10	1.00	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	320	R	6.50	AD-Q11	1.03	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	288	R	744.00	AD-Q12	1.03	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	45	R	241.00	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	285.00	AD-Q14	0.14	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	8	R	312.00	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	615	R	6.50	AD-Q16	1.98	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.00	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					6.04	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					6.04	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.61	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.34	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.46	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.84	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.79	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.09	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.39	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.64	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.79	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	303	R	1,650.00	AE-Q1	6.73	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	45	R	1,650.00	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	348											
AE1.4	Rip and compact	m2	2,022	R	7.45									
AE1.5	Formwork to plinth	m2	299	R	185.00	AE-Q3	6.64	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	212	R	210.00	AE-Q4	0.70	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4	R	10,500.00	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,022	R	175.00	AE-Q6	483.73	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,011	R	72.00	AE-Q7	3.34	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	585	R	105.00	AE-Q8	1.93	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					1.00	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					221.48	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.11	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.13	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					60.00	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.06	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,793			AF-Q1	13.10	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	366	R	68.00	AF-Q2	1.54	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	238	R	105.00	AF-Q3	0.56	AF1.2	/	AF1.4				
AF1.4	Working space	m2	655	R	48.50	AF-Q4	0.43	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	159	R	1,650.00	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	244	R	85.00	AF-Q6	0.72	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	13	R	1,650.00	AF-Q7	0.08	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,650.00	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	175			AF-Q9	0.63	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	278	R	10.50									
AF1.11	Formwork to bases	m2	293	R	212.00	AF-Q10	1.84	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	173	R	225.00	AF-Q11	13.31	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	14	R	244.00	AF-Q12	4.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2	R	10,500.00	AF-Q13	0.11	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	19	R	10,500.00	AF-Q14	9.21	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	356	R	48.00	AF-Q15	0.45	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	41	R	266.00	AF-Q16	0.32	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	4,965.00	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	78	R	588.00									
	Base excavation / backfill					AF-R1					0.65	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.40	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					24.26	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					19.41	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					24.26	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.00	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					157.14	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.14	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.00	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					34.38	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					6.20	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.81	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	278	R	82.00	AG-Q1	1.67	AG1.1	/	AG1.4				
AG1.2	Working space	m2	722	R	48.50	AG-Q2	0.39	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	72	R	105.00	AG-Q3	3.86	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	166	R	1,650.00	AG-Q4	0.99	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	79	R	1,650.00	AG-Q5	2.10	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	245											
AG1.7	Wood float	m2	168	R	10.50	AG-Q6	0.47	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	168	R	85.00	AG-Q7	0.99	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	385	R	212.00	AG-Q8	0.43	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	154	R	212.00	AG-Q9	0.51	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	23	R	10,500.00	AG-Q10	10.65	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,458	R	48.00	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,265	R	55.00	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2	R	9,875.00	AG-Q13	32.92	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.59	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.28	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.13	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.36	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.98	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	312	R	82.00	AH-Q1	5.57	AH1.1	/	AH1.4				
AH1.2	Working space	m2	75	R	48.50	AH-Q2	4.16	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	212	R	105.00	AH-Q3	1.47	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	56	R	1,650.00	AH-Q4	0.74	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	22	R	1,650.00	AH-Q5	2.55	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	105	R	1,650.00	AH-Q6	0.53	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	15	R	1,650.00	AH-Q7	3.73	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	1,650.00	AH-Q8	18.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	201											
AH1.10	Blinding	m2	76	R	85.00	AH-Q9	2.64	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	785	R	10.50	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	148	R	212.00	AH-Q11	0.38	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	44	R	212.00	AH-Q12	0.34	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	27	R	235.00	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	180	R	220.00	AH-Q14	0.12	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	25	R	205.00	AH-Q15	4.20	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	52	R	75.00	AH-Q16	2.02	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2	R	10,500.00	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	9	R	10,500.00	AH-Q18	22.33	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	705	R	175.00	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	990	R	48.00	AH-Q20	0.20	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,065	R	55.00	AH-Q21	0.10	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1	R	9,875.00	AH-Q22	201.00	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	352	R	72.00	AH-Q23	0.30	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	229	R	105.00	AH-Q24	0.46	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.69	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.78	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.41	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					157.14	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.00	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.00	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.00	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.00	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.78	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.78	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.02	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.50	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.05	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					22.00	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.00	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					60.00	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					218.75	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					190.91	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.17	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					22.92	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					15.71	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	270	R	82.00	AI-Q1	3.97	AI1.1	/	AI1.5				
AI1.2	Working space	m2	720	R	48.50	AI-Q2	0.38	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	121	R	105.00	AI-Q3	2.23	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	225	R	85.00	AI-Q4	0.30	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	68	R	1,650.00	AI-Q5	4.25	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	16	R	1,650.00	AI-Q6	0.30	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	84											
AI1.8	Wood float	m2	225	R	10.50									
AI1.9	Formwork bases	m2	180	R	212.00	AI-Q7	0.38	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	160	R	212.00	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9	R	10,500.00	AI-Q9	9.33	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,245	R	55.00	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1	R	9,875.00	AI-Q11	68.00	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.69	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.78	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					19.41	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.00	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					157.14	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.78	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.78	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					190.91	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.17	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	345	R	82.00	AJ-Q1	3.92	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	776	R	48.50	AJ-Q2	0.44	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	138	R	105.00	AJ-Q3	2.50	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	293	R	85.00	AJ-Q4	0.30	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	88	R	1,650.00	AJ-Q5	2.10	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	26	R	1,650.00	AJ-Q6	3.38	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	42	R	1,650.00									
AJ1.8	Total concrete	m3	156											
AJ1.9	Wood float	m2	293	R	10.50	AJ-Q7	0.53	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	198	R	212.00	AJ-Q8	0.44	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	235	R	212.00	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	12	R	10,500.00	AJ-Q10	13.00	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,142	R	55.00	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,845	R	48.00	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1	R	9,875.00	AJ-Q13	67.69	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.69	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.78	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					19.41	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					157.14	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.78	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					7.78	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					190.91	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					218.75	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	455	R	82.00	AK-Q1	2.03	AK1.1	/	AK1.5				
AK1.2	Working space	m2	866	R	48.50	AK-Q2	0.53	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	212	R	105.00	AK-Q3	2.15	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	386	R	85.00	AK-Q4	0.58	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	224	R	1,650.00	AK-Q5	28.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	8	R	1,650.00									
AK1.7	Concrete plinth	m3	48	R	1,650.00	AK-Q6	4.67	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	280											
AK1.9	Wood float	m2	386	R	10.50	AK-Q7	0.58	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	459	R	212.00	AK-Q8	0.49	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	154	R	212.00	AK-Q9	0.31	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	33	R	235.00	AK-Q10	0.24	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	31	R	10,500.00	AK-Q11	9.03	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,845	R	55.00	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3	R	9,875.00	AK-Q13	112.00	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.69	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.78	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					19.41	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					157.14	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.78	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.78	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.02	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					190.91	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.17	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	389	R	82.00	AL-Q1	2.66	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,555	R	48.50	AL-Q2	0.25	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	199	R	105.00	AL-Q3	1.95	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	243	R	85.00	AL-Q4	0.60	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	146	R	1,650.00	AL-Q5	1.08	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	135	R	1,650.00	AL-Q6	2.50	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	54	R	1,650.00	AL-Q7	2.70	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	335											
AL1.9	Wood float	m2	327	R	10.50	AL-Q8	0.45	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	324	R	212.00	AL-Q9	0.45	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	900	R	235.00	AL-Q10	0.15	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	168	R	266.00	AL-Q11	0.32	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	84	R	302.00	AL-Q12	0.64	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	13	R	350.00	AL-Q13	10.38	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	38	R	10,500.00	AL-Q14	8.82	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	12,453	R	48.00	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	245	R	55.00	AL-Q16	1.37	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	1	R	9,875.00	AL-Q17	478.57	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.69	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.78	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.41	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					157.14	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.00	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.00	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.78	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.20	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.02	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.46	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.20	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.71	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					218.75	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					190.91	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.17	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,115	R	82.00	AM-Q1	3.72	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,840	R	48.50	AM-Q2	0.61	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	968	R	105.00	AM-Q3	1.15	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	500	R	85.00	AM-Q4	0.60	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	300	R	1,650.00									
AM1.6	Concrete column	m3	117	R	1,650.00	AM-Q5	2.56	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	180	R	1,650.00	AM-Q6	0.65	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	188	R	1,650.00	AM-Q7	1.60	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	55	R	1,650.00	AM-Q8	2.13	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	125	R	1,650.00	AM-Q9	0.94	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	965											
AM1.12	Wood float	m2	1,650	R	10.50	AM-Q10	0.58	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	720	R	212.00	AM-Q11	0.42	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	780	R	235.00	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	600	R	266.00	AM-Q13	0.30	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	200	R	302.00	AM-Q14	0.90	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	625	R	302.00	AM-Q15	0.30	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	500.00	AM-Q16	23.40	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	440	R	220.00	AM-Q17	0.13	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	116	R	10,500.00	AM-Q18	8.32	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,758	R	48.00	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,456	R	55.00	AM-Q20	0.39	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	45	R	1,102.00	AM-Q21	2.58	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1	R	9,875.00	AM-Q22	965.00	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.69	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.78	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					19.41	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.00	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.00	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.00	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.00	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.00	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					157.14	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.78	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.20	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.46	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.02	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.30	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.46	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.50	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					218.75	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					190.91	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.53	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.17	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,700	R	82.00	AN-Q1	1.50	AN1.1	/	AN1.5				
AN1.2	Working space	m2	288	R	48.50	AN-Q2	9.38	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	552	R	105.00	AN-Q3	4.89	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,500	R	85.00	AN-Q4	1.20	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,800	R	1,650.00	AN-Q5								
AN1.6	Concrete column	m3	60	R	1,650.00	AN-Q6	30.00	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	38	R	1,650.00	AN-Q7	1.58	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	156	R	1,650.00	AN-Q8	11.54	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	1,650.00	AN-Q9	12.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,059						/					
AN1.11	Wood float	m2	1,845	R	10.50	AN-Q10	0.98	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	192	R	212.00	AN-Q11	9.38	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	403	R	235.00	AN-Q12	0.15	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	192	R	266.00	AN-Q13	0.20	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	64	R	302.00	AN-Q14	0.59	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	33	R	302.00	AN-Q15	0.15	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	500.00	AN-Q16	450.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,280	R	220.00	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	432	R	10,500.00	AN-Q18	4.77	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	12,465	R	48.00	AN-Q19	0.17	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	8,442	R	55.00	AN-Q20	0.24	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	110	R	1,750.00	AN-Q21	18.72	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2	R	9,875.00	AN-Q22	900.00	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.69	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.78	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					19.41	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					157.14	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					7.78	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.20	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.46	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					7.02	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.30	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.46	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.50	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					218.75	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					190.91	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.17	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.00	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	245	R	82.00	AO-Q1	1.48	AO1.1	/	AO1.5				
AO1.2	Working space	m2	635	R	48.50	AO-Q2	0.39	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	122	R	105.00	AO-Q3	2.01	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	35	R	85.00	AO-Q4	4.71	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	165	R	1,650.00									
AO1.6	Concrete column	m3	27	R	1,650.00	AO-Q5	6.11	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	12	R	1,650.00	AO-Q6	2.25	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	1,650.00	AO-Q7	33.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,650.00	AO-Q8	27.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	45											
AO1.11	Wood float	m2	35	R	10.50	AO-Q9	4.71	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	113	R	212.00	AO-Q10	1.46	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	180	R	235.00	AO-Q11	0.15	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	58	R	266.00	AO-Q12	0.21	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	19	R	302.00	AO-Q13	0.63	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	302.00	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	58	R	500.00	AO-Q15	2.84	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	220.00	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6	R	10,500.00	AO-Q17	7.50	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,441	R	48.00	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,456	R	55.00	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	12	R	1,750.00	AO-Q20	3.75	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4	R	9,875.00	AO-Q21	41.25	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.69	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.78	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					19.41	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					157.14	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					7.78	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.20	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.46	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.02	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.30	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.46	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.50	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					218.75	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					190.91	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.00	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,400	R	82.00	AP-Q1	1.74	AP1.1	/	AP1.5				
AP1.2	Working space	m2	605	R	48.50	AP-Q2	2.31	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,105	R	105.00	AP-Q3	1.27	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	227	R	85.00	AP-Q4	3.54	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	803	R	1,650.00	AP-Q5	0.46	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,750	R	175.00									
AP1.7	Rough formwork	m2	302	R	212.00	AP-Q6	2.66	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,444	R	235.00	AP-Q7	0.56	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,500	R	15.00	AP-Q8	0.23	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	180	R	85.00	AP-Q9	4.46	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	60	R	105.00	AP-Q10	13.38	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	355	R	48.00	AP-Q11	2.26	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1	R	9,875.00	AP-Q12	803.00	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,745	R	295.00	AP-Q13	0.46	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,500			AP-Q14	4.36	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,750	R	145.00	AP-Q15	2.00	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,750	R	322.00	AP-Q16	2.00	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,500	R	108.00	AP-Q17	1.00	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	1,845.00	AP-Q18	437.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,500	R	385.00	AP-Q19	1.00	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,490	R	206.00	AP-Q20	1.00	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	93	R	10,500.00	AP-Q21	8.63	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	45,745.00									
AP1.24	Structural steel	Item	1	R	118,452.00									
AP1.25	Plumbing and drainage	Item	1	R	75,423.00									
AP1.26	Small power and lighting	Item	1	R	642,551.00									
AP1.27	External works	Item	1	R	277,655.00									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.69	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.78	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.41	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					60.00	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.78	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.02	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					110.00	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					19.41	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					15.71	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					218.75	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.17	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.38	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					32.61	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.73	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.16	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.77	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.43	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.36	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					11.28	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.18	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					61.20	AP1.26	/	AP1.22
	External works / concrete					AP-R23					168.28	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	89	R	1,650.00	AQ-Q1	2.27	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	202	R	210.00									
AQ1.3	Reinforcement	t	10	R	10,500.00	AQ-Q2	8.90	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	800	R	175.00	AQ-Q3	0.11	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	215	R	212.00	AQ-Q4	0.41	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	144	R	295.00	AQ-Q5	5.56	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	960	R	168.00	AQ-Q6	0.83	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	48	R	32,452.00	AQ-Q7	16.67	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	540	R	155.00	AQ-Q8	1.48	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	14,554.00	AQ-Q9	400.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	40	R	1,745.00	AQ-Q10	20.00	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	960	R	95.00	AQ-Q11	0.83	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	800											
	Concrete / reinforcement					AQ-R1					0.16	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.86	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.43	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.78	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.59	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					193.17	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.92	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.45	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.39	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.77	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	178	R	210.00	AR-Q1	3.24	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	55	R	1,650.00	AR-Q2	9.17	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6	R	10,500.00									
AR1.4	Mesh	m2	500	R	175.00	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	133	R	212.00	AR-Q4	0.41	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	90	R	295.00	AR-Q5	5.56	AR1.15	/	AR1.6				
AR1.7	Screed	m2	500	R	44.00	AR-Q6	1.00	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	36	R	32,452.00	AR-Q7	13.89	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	14	R	3,845.00	AR-Q8	2.57	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	50	R	1,244.00	AR-Q9	0.72	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	50	R	465.00	AR-Q10	0.72	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	575	R	168.00	AR-Q11	0.87	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	111	R	155.00	AR-Q12	4.50	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	34	R	2,105.00	AR-Q13	1.06	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	500											
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.16	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.43	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.78	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.59	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					37.50	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.44	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					26.09	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.68	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					193.17	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.92	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					15.42	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	302	R	210.00	AS-Q1	4.19	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	150	R	85.00	AS-Q2	0.48	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	72	R	1,650.00	AS-Q3	8.00	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	9	R	10,500.00									
AS1.5	Mesh	m2	150	R	175.00	AS-Q4	0.48	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	212	R	212.00	AS-Q5	0.34	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	150	R	15.00	AS-Q6	0.48	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	28	R	105.00	AS-Q7	2.57	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	789	R	48.00	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1	R	9,875.00	AS-Q9	72.00	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	36	R	295.00	AS-Q10	0.25	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	3,145.00	AS-Q11	3.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	50	R	645.00	AS-Q12	3.00	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	640	R	55.00	AS-Q13	0.11	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2	R	34,452.00	AS-Q14	4.50	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1	R	41,223.00	AS-Q15	150.00	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	150											
AS1.18	Total control room area	m2	9											
	Concrete / earthworks					AS-R1					7.86	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					19.41	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					60.00	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.78	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					110.00	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					15.71	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					218.75	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.56	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.17	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.30	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.25	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	175	R	210.00	AT-Q1	11.67	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	16	R	85.00	AT-Q2	0.94	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	15	R	1,650.00	AT-Q3	7.50	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2	R	10,500.00									
AT1.5	Formwork	m2	156	R	212.00	AT-Q4	0.10	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	32	R	15.00	AT-Q5	0.47	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	28	R	105.00	AT-Q6	0.54	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	1	R	48.00	AT-Q7	30.00	AT1.3	/	AT1.8				
AT1.9	Grout	m3	1	R	9,875.00	AT-Q8	30.00	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0	R	55.00	AT-Q9	150.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	1	R	34,452.00	AT-Q10	45.71	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1	R	41,223.00	AT-Q11	26.67	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	48	R	295.00	AT-Q12	0.67	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	18	R	168.00	AT-Q13	1.78	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	32											
	Concrete / earthworks					AT-R1					7.86	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					19.41	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					7.78	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					110.00	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					15.71	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					218.75	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.87	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.30	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.25	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					5.59	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.76	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	350	R	210.00	AU-Q1	1.04	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	250	R	85.00	AU-Q2	1.34	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	335	R	1,650.00									
AU1.4	Reinforcement	t	48	R	10,500.00	AU-Q3	6.98	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,260	R	212.00	AU-Q4	0.27	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	168	R	105.00	AU-Q5	1.99	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,168	R	48.00	AU-Q6	0.15	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	745	R	55.00	AU-Q7	0.45	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	45	R	234.00	AU-Q8	7.44	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3	R	41,223.00	AU-Q9	111.67	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	9	R	4,521.00	AU-Q10	37.22	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	25	R	295.00	AU-Q11	10.00	AU1.12	/	AU1.13				
AU1.13	Total area	m2	250											
	Concrete / earthworks					AU-R1					7.86	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					19.41	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.78	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.16	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.71	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					218.75	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.25	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					190.91	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					44.87	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.36	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.59	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,315	R	212.00	AV-Q1	0.70	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,214	R	89.00	AV-Q2	0.94	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,214	R	128.00	AV-Q3	0.94	AV1.10	/	AV1.3				
AV1.4	Pipework	m	75	R	625.00	AV-Q4	40.11	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	4,778.00	AV-Q5	18.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	23	R	1,650.00	AV-Q6	3.26	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	241	R	212.00	AV-Q7	0.10	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	25	R	175.00	AV-Q8	0.92	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	4	R	10,500.00	AV-Q9	5.75	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,008											
	Earthworks / lining					AV-R1					2.38	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.66	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.70	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.34	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.13	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					7.78	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					9.43	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.16	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,080	R	210.00	AW-Q1	10.00	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	90	R	85.00	AW-Q2	1.20	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	108	R	1,650.00	AW-Q3	6.35	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	17	R	10,500.00									
AW1.5	Mesh	m2	90	R	175.00	AW-Q4	1.20	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	475	R	212.00	AW-Q5	0.23	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,145	R	48.00	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3	R	41,223.00	AW-Q7	15.00	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	45											
	Concrete / earthworks					AW-R1					7.86	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					19.41	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					60.00	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					7.78	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					218.75	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.25	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	29											
BA1.2	Steel	t	3	R	33,442.00	BA-Q1	9.67	BA1.1	/	BA1.2				
BA1.3	Handrail	m	20	R	1,245.00	BA-Q2	1.45	BA1.1	/	BA1.3				
BA1.4	Grating	m2	16	R	2,133.00	BA-Q3	1.81	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	16	R	432.00	BA-Q4	1.81	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	356.00	BA-Q5	7.25	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					26.86	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.68	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					77.41	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					93.94	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,440											
BB1.2	Steel	t	53	R	33,442.00	BB-Q1	27.17	BB1.1	/	BB1.2				
BB1.3	Handrail	m	115	R	1,245.00	BB-Q2	12.52	BB1.1	/	BB1.3				
BB1.4	Grating	m2	120	R	2,133.00	BB-Q3	12.00	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	115	R	432.00	BB-Q4	12.52	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	16	R	4,335.00	BB-Q5	90.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					26.86	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.68	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					77.41	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.71	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	15,500											
BC1.2	Steel	t	212	R	33,442.00	BC-Q1	73.11	BC1.1	/	BC1.2				
BC1.3	Handrail	m	545	R	1,245.00	BC-Q2	28.44	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,000	R	2,133.00	BC-Q3	3.88	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	480	R	432.00	BC-Q4	32.29	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	72	R	356.00	BC-Q5	215.28	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	68	R	4,335.00	BC-Q6	227.94	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					26.86	BC1.2	/	BC1.3
	Steel / grating					BC-R2					15.68	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					77.41	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					93.94	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.71	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	540											
BD1.2	Steel	t	22	R	33,442.00	BD-Q1	24.55	BD1.1	/	BD1.2				
BD1.3	Handrail	m	12	R	1,245.00	BD-Q2	45.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	9	R	2,133.00	BD-Q3	60.00	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	432.00	BD-Q4	45.00	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	28	R	4,335.00	BD-Q5	19.29	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					26.86	BD1.1	/	BD1.2
	Steel / grating					BD-R2					15.68	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					77.41	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.71	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	44											
BE1.2	Steel	t	3	R	33,442.00	BE-Q1	14.67	BE1.1	/	BE1.2				
BE1.3	Handrail	m	46	R	1,245.00	BE-Q2	0.96	BE1.1	/	BE1.3				
BE1.4	Grating	m2	24	R	2,133.00	BE-Q3	1.83	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	42	R	432.00	BE-Q4	1.05	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	8	R	356.00	BE-Q5	5.50	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					26.86	BE1.2	/	BE1.3
	Steel / grating					BE-R2					15.68	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					77.41	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					93.94	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	320											
BF1.2	Steel	t	28	R	33,442.00	BF-Q1	11.43	BF1.1	/	BF1.2				
BF1.3	Handrail	m	15	R	1,245.00	BF-Q2	21.33	BF1.1	/	BF1.3				
BF1.4	Grating	m2	45	R	2,133.00	BF-Q3	7.11	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	15	R	432.00	BF-Q4	21.33	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	18	R	4,335.00	BF-Q5	17.78	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					26.86	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.68	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					77.41	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.71	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	22,450			C-Q1	0.34	C1.1	/	C1.2				
C1.2	Total work units	WU	66,450	R	436.00									
C1.3	Pipe supports	kg	8,545			C-Q2	2.63	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	12,441			C-Q3	0.19	C1.4	/	C1.2				
C1.5	Number of welds	No	12,441			C-Q4	0.55	C1.5	/	C1.1				
C1.6	Total fittings	No	7,412			C-Q5	0.33	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,665			C-Q6	0.36	C1.7	/	C1.6				
C1.8	Support number	No	1,642			C-Q7	0.19	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	66,450	R	436.00	DA-Q1	54.29	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,224	R	87.50									
	Average cost per examination / WU					DA-R1					4.98	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	66,450	R	436.00	DB-Q1	161.29	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	412	R	145.00									
	Average cost per examination / WU					DB-R1					3.01	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	66,450	R	436.00	DC-Q1	260.59	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	255	R	242.00									
	Average cost per examination / WU					DC-R1					1.80	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	66,450	R	436.00	DD-Q1	46.70	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,423	R	75.25									
	Average cost per examination / WU					DD-R1					5.79	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	66,450	R	436.00	DE-Q1	103.50	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	642	R	185.00									
	Average cost per examination / WU					DE-R1					2.36	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	66,450	R	436.00	E-Q1	233.16	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	285	R	642.00	E-Q2	207.01	E1.1	/	E1.3				
E1.3	Structural steel	t	321	R	33,442.00									
	WU cost / install mechanical weight - receive					E-R1					0.68	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					52.09	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	66,450	R	436.00									
F1.2	Painting to piping	m2	3,955	R	185.00	F-Q1	16.80	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,345	R	552.00	F-Q2	49.41	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	285	R	642.00									
F1.5	Painting to mechanical equipment	m2	1,244	R	185.00	F-Q3	0.23	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	425	R	552.00	F-Q4	0.67	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.34	F1.2	/	F1.3
	Work unit / paint					F-R2					2.36	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.79	F1.1	/	F1.3
	Install plant / paint					F-R4					3.47	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.16	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	35,425	R	74.50									
G1.2	Electrical cable terminations	No	1,442	R	188.00	G-Q1	24.57	G1.1	/	G1.2				
G1.3	Electrical equipment	No	128	R	745.00	G-Q2	276.76	G1.1	/	G1.3				
G1.4	DB's	No	15	R	2,452.00	G-Q3	8.53	G1.3	/	G1.4				
G1.5	Rack	m	6,223	R	245.00	G-Q4	5.69	G1.1	/	G1.5				
G1.6	Support steel	kg	8,475	R	35.00	G-Q5	0.73	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	25,442	R	28.50	G-Q6	1.39	G1.1	/	G1.7				
G1.8	Instruments	No	1,028	R	240.00	G-Q7	24.75	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,845	R	180.00	G-Q8	0.56	G1.8	/	G1.9				
G1.10	Light fittings	No	485	R	485.00	G-Q9	3.79	G1.10	/	G1.3				
G1.11	Conduit	m	3,554	R	44.00	G-Q10	9.97	G1.1	/	G1.11				
G1.12	Instrument stands	No	255	R	1,242.00	G-Q11	4.03	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.40	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.30	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.69	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.13	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.30	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.16	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.12	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,012	R	49.34	AB-Q1	1.98	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,536	R	10.05									
AB1.3	Back fill and compact	m3	6,328	R	66.07	AB-Q2	1.11	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	6,327	R	4.72	AB-Q3	1.11	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	5,945	R	5.66	AB-Q4	1.18	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.91	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.75	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					10.45	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.72	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	319,146.45									
AC1.2	EO for raking equipment	Item	1	R	38,925.33									
AC1.3	Number of piles	No	308	R	-									
AC1.4	Move rig to new position	No	224	R	341.39	AC-Q1	1.38	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	20.53	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	16	R	358.84	AC-Q3	0.94	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	153	R	195.99	AC-Q4	0.10	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,097	R	221.25	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	551	R	405.61	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	191	R	827.61	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	175	R	404.88	AC-Q8	1.76	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	734	R	515.50	AC-Q9	0.42	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	92	R	651.49	AC-Q10	0.16	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	20.03	R	9,388.68	AC-Q11	15.38	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	236.48	R	13,883.31	AC-Q12	1.30	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,060	R	1,659.52	AC-Q13	0.15	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	241	R	1,680.63	AC-Q14	0.06	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	232,991.82				/					
AC1.19	Load test to pile	No	4	R	33,706.03	AC-Q15	77.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	80,969.51	AC-Q16	308.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	308	R	516.33	AC-Q17	1.00	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.31	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					23.46	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.21	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.22	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.89	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.50	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.24	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.31	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.39	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					140.40	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					20.31	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					48.79	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.31	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	215	R	153.07	AD-Q1	0.19	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,114	R	94.91									
AD1.3	Kerbing	m	488	R	209.55	AD-Q2	0.18	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,752	R	-									
AD1.5	Remove top soil	m3	836	R	45.80	AD-Q3	0.33	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,543	R	162.93	AD-Q4	0.35	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,389	R	4.70									
AD1.8	Reduce levels	m3	1,587	R	40.63	AD-Q5	0.66	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	757	R	69.71	AD-Q6	2.10	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	565	R	269.31	AD-Q7	1.34	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	382	R	191.68	AD-Q8	4.15	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,357	R	29.61	AD-Q9	4.17	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	444	R	20.50	AD-Q10	1.08	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	339	R	5.51	AD-Q11	0.91	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	452	R	896.01	AD-Q12	0.69	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	45	R	227.04	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	290.05	AD-Q14	0.09	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	13	R	470.69	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	482	R	4.10	AD-Q16	0.99	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.61	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					9.74	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.64	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.58	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.26	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					2.34	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.50	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.78	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.08	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.38	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.25	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	259	R	1,336.11	AE-Q1	5.40	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	48	R	1,546.50	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	429	R	-									
AE1.4	Rip and compact	m2	2,025	R	6.66									
AE1.5	Formwork to plinth	m2	397	R	244.61	AE-Q3	8.27	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	236	R	188.38	AE-Q4	0.91	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.03	R	9,538.71	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,054	R	263.06	AE-Q6	607.16	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	906	R	48.54	AE-Q7	3.50	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	607	R	94.46	AE-Q8	2.34	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					200.62	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.16	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					36.26	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	7,770	R	-	AF-Q1	21.11	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	368	R	61.02	AF-Q2	1.08	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	340	R	149.29	AF-Q3	0.54	AF1.2	/	AF1.4				
AF1.4	Working space	m2	683	R	38.04	AF-Q4	0.52	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	192	R	1,404.09	AF-Q5	0.02	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	408	R	82.32	AF-Q6	0.44	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	9	R	2,363.03	AF-Q7	0.05	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,216.53	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	181	R	-	AF-Q9	0.40	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	450	R	12.29									
AF1.11	Formwork to bases	m2	283	R	195.62	AF-Q10	1.47	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	172	R	211.96	AF-Q11	19.11	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	14	R	248.32	AF-Q12	4.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.07	R	9,305.10	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	29.09	R	12,342.97	AF-Q14	6.22	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	370	R	47.29	AF-Q15	0.52	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	36	R	205.96	AF-Q16	0.25	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	4,449.74	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	92	R	661.89									
	Base excavation / backfill					AF-R1					0.41	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.60	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					23.01	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					17.06	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					38.73	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.87	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					114.25	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.14	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.20	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.75	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					29.69	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					11.47	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.12	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.15	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	218	R	51.78	AG-Q1	0.79	AG1.1	/	AG1.4				
AG1.2	Working space	m2	752	R	43.79	AG-Q2	0.29	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	82	R	136.50	AG-Q3	2.66	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	277	R	1,975.37	AG-Q4	1.81	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	55	R	1,511.51	AG-Q5	5.04	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	262	R	-									
AG1.7	Wood float	m2	233	R	9.01	AG-Q6	0.24	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	153	R	73.21	AG-Q7	1.81	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	379	R	211.36	AG-Q8	0.73	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	173	R	189.93	AG-Q9	0.32	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	38.14	R	13,369.06	AG-Q10	6.87	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,098	R	38.87	AG-Q11	0.12	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,472	R	51.55	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.25	R	14,142.89	AG-Q13	16.92	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.03	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.85	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					2.64	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.00	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.11	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.77	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					7.16	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	324	R	72.93	AH-Q1	3.41	AH1.1	/	AH1.4				
AH1.2	Working space	m2	82	R	45.80	AH-Q2	3.95	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	205	R	89.95	AH-Q3	1.58	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	95	R	2,152.32	AH-Q4	1.17	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	19	R	1,277.59	AH-Q5	5.00	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	107	R	1,478.77	AH-Q6	0.89	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	15	R	1,298.72	AH-Q7	6.33	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	1,509.84	AH-Q8	31.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	204	R	-									
AH1.10	Blinding	m2	81	R	106.42	AH-Q9	2.52	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,275	R	9.39	AH-Q10	0.16	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	116	R	280.31	AH-Q11	0.82	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	46	R	190.17	AH-Q12	0.33	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	27	R	337.71	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	187	R	142.40	AH-Q14	0.10	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	37	R	176.32	AH-Q15	2.89	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	49	R	93.90	AH-Q16	2.18	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.03	R	10,046.06	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	9.37	R	10,456.12	AH-Q18	21.77	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	550	R	129.57	AH-Q19	0.19	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,031	R	44.07	AH-Q20	0.20	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,863	R	75.17	AH-Q21	0.07	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.06	R	8,367.92	AH-Q22	192.45	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	402	R	61.76	AH-Q23	0.27	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	382	R	134.47	AH-Q24	0.28	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.59	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.81	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					20.22	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					229.21	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.68	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.46	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.66	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.43	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.68	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.83	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.47	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.97	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.39	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					15.75	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.96	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					80.70	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					237.26	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					139.10	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.26	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					23.94	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					11.00	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	277	R	75.12	AI-Q1	2.66	AI1.1	/	AI1.5				
AI1.2	Working space	m2	564	R	30.63	AI-Q2	0.49	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	126	R	94.81	AI-Q3	2.20	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	223	R	80.08	AI-Q4	0.47	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	104	R	1,939.61	AI-Q5	3.85	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	27	R	2,113.12	AI-Q6	0.43	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	59	R	-									
AI1.8	Wood float	m2	241	R	13.65									
AI1.9	Formwork bases	m2	249	R	253.81	AI-Q7	0.42	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	164	R	194.21	AI-Q8	0.16	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	12.25	R	14,223.45	AI-Q9	4.82	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,702	R	47.18	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.23	R	8,578.00	AI-Q11	84.55	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.45	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.79	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					24.22	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.92	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					142.10	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.64	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					10.88	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					301.47	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.23	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	394	R	70.34	AJ-Q1	2.92	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	773	R	64.13	AJ-Q2	0.51	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	200	R	94.19	AJ-Q3	1.97	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	303	R	77.22	AJ-Q4	0.45	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	135	R	1,939.61	AJ-Q5	2.05	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	28	R	1,398.18	AJ-Q6	4.82	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	66	R	1,987.13									
AJ1.8	Total concrete	m3	155	R	-									
AJ1.9	Wood float	m2	220	R	6.34	AJ-Q7	0.70	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	197	R	196.11	AJ-Q8	0.69	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	341	R	253.71	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	12.42	R	9,305.10	AJ-Q10	12.48	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	6,341	R	64.65	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,916	R	47.29	AJ-Q12	0.07	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.37	R	10,510.24	AJ-Q13	98.54	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.10	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.75	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					25.12	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					305.93	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					9.89	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.51	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					143.93	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					196.77	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.18	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	473	R	80.79	AK-Q1	1.90	AK1.1	/	AK1.5				
AK1.2	Working space	m2	911	R	51.62	AK-Q2	0.52	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	336	R	165.66	AK-Q3	1.41	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	513	R	99.92	AK-Q4	0.49	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	249	R	1,625.60	AK-Q5	24.90	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	1,756.14									
AK1.7	Concrete plinth	m3	72	R	1,427.26	AK-Q6	3.46	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	251	R	-									
AK1.9	Wood float	m2	401	R	10.10	AK-Q7	0.62	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	636	R	220.24	AK-Q8	0.39	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	158	R	276.54	AK-Q9	0.46	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	45	R	181.96	AK-Q10	0.22	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	35.36	R	9,410.33	AK-Q11	7.10	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,968	R	47.92	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.76	R	13,101.68	AK-Q13	66.76	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.57	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.49	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					16.27	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					160.95	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.38	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.16	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.65	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					196.38	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.12	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	349	R	112.07	AL-Q1	1.75	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,614	R	41.10	AL-Q2	0.22	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	276	R	126.45	AL-Q3	1.26	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	249	R	76.43	AL-Q4	0.80	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	199	R	2,259.08	AL-Q5	1.29	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	154	R	1,168.12	AL-Q6	1.81	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	85	R	1,987.13	AL-Q7	2.34	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	333	R	-									
AL1.9	Wood float	m2	329	R	10.69	AL-Q8	0.60	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	441	R	187.87	AL-Q9	0.45	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,383	R	292.11	AL-Q10	0.11	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	266	R	297.58	AL-Q11	0.32	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	88	R	321.43	AL-Q12	0.97	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	23	R	467.74	AL-Q13	6.70	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	29.66	R	7,774.02	AL-Q14	11.23	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	12,972	R	44.07	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	340	R	75.17	AL-Q16	0.98	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.74	R	8,367.92	AL-Q17	450.00	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.73	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.89	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					29.56	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					211.33	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.93	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.93	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					12.02	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.68	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					4.00	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					6.18	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.68	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.25	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					176.40	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					103.42	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.27	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,183	R	75.66	AM-Q1	3.58	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,886	R	66.18	AM-Q2	0.41	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	993	R	96.19	AM-Q3	1.19	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	501	R	76.00	AM-Q4	0.66	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	330	R	1,448.09									
AM1.6	Concrete column	m3	204	R	2,205.05	AM-Q5	1.62	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	140	R	1,221.63	AM-Q6	1.46	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	154	R	1,221.63	AM-Q7	2.14	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	38	R	1,515.00	AM-Q8	5.37	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	134	R	2,255.01	AM-Q9	1.52	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,337	R	-									
AM1.12	Wood float	m2	1,882	R	9.54	AM-Q10	0.71	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	887	R	198.25	AM-Q11	0.37	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,207	R	303.29	AM-Q12	0.17	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	514	R	249.54	AM-Q13	0.27	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	213	R	361.55	AM-Q14	0.66	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	906	R	276.65	AM-Q15	0.17	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	447.08	AM-Q16	40.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	698	R	188.70	AM-Q17	0.05	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	120.49	R	7,931.25	AM-Q18	11.10	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	7,917	R	42.15	AM-Q19	0.17	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	1,841	R	68.86	AM-Q20	0.73	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	45	R	985.36	AM-Q21	2.68	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.45	R	13,056.93	AM-Q22	922.07	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.14	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.79	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					19.05	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.66	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.19	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.19	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.96	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.64	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					151.79	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.30	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.90	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.38	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.27	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.73	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					8.15	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.03	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					188.17	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					115.18	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.05	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.11	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,024	R	102.67	AN-Q1	0.75	AN1.1	/	AN1.5				
AN1.2	Working space	m2	314	R	60.72	AN-Q2	6.45	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	650	R	93.89	AN-Q3	3.11	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,527	R	82.62	AN-Q4	1.77	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,709	R	2,541.00	AN-Q5								
AN1.6	Concrete column	m3	83	R	1,063.58	AN-Q6	32.64	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	40	R	1,520.81	AN-Q7	2.08	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	245	R	1,939.61	AN-Q8	11.06	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	1,480.12	AN-Q9	13.83	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,477	R	-				/					
AN1.11	Wood float	m2	2,787	R	15.78	AN-Q10	0.97	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	209	R	208.87	AN-Q11	12.96	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	282	R	206.59	AN-Q12	0.29	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	206	R	345.80	AN-Q13	0.19	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	89	R	361.55	AN-Q14	0.45	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	34	R	276.65	AN-Q15	0.18	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	5	R	677.31	AN-Q16	541.80	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	2,228	R	170.35	AN-Q17	0.11	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	602.41	R	9,305.10	AN-Q18	4.11	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	17,382	R	56.42	AN-Q19	0.14	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	9,208	R	82.67	AN-Q20	0.27	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	130	R	1,179.71	AN-Q21	19.05	AN1.10	/	AN1.22				
AN1.23	Grout	m3	3.49	R	8,367.92	AN-Q22	776.22	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.69	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					1.09	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					30.76	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					161.03	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					12.17	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					4.40	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					4.21	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					5.15	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.25	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.35	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					11.39	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					164.93	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					112.56	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.30	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					7.89	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	240	R	73.32	AO-Q1	1.95	AO1.1	/	AO1.5				
AO1.2	Working space	m2	652	R	66.40	AO-Q2	0.37	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	137	R	94.41	AO-Q3	1.75	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	62	R	116.38	AO-Q4	1.98	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	123	R	1,168.12									
AO1.6	Concrete column	m3	29	R	1,552.11	AO-Q5	4.24	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	16	R	1,554.40	AO-Q6	1.81	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	6	R	1,679.22	AO-Q7	20.50	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,450.55	AO-Q8	29.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	51	R	-									
AO1.11	Wood float	m2	58	R	12.57	AO-Q9	2.12	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	79	R	194.21	AO-Q10	1.56	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	193	R	318.33	AO-Q11	0.15	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	63	R	255.80	AO-Q12	0.25	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	313.74	AO-Q13	0.80	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	8	R	393.94	AO-Q14	0.13	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	51	R	387.15	AO-Q15	2.41	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	197.17	AO-Q16	0.35	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	8.70	R	12,565.73	AO-Q17	5.86	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,605	R	45.15	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	4,704	R	51.81	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	14	R	1,780.99	AO-Q20	3.64	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.37	R	8,681.32	AO-Q21	28.15	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.06	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.10	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.78	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					10.04	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					92.93	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.01	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.08	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.95	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.88	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.01	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.68	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.52	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					278.31	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					242.53	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.13	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					7.06	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,500	R	111.08	AP-Q1	1.88	AP1.1	/	AP1.5				
AP1.2	Working space	m2	657	R	46.64	AP-Q2	2.28	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,135	R	109.08	AP-Q3	1.32	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	386	R	110.88	AP-Q4	2.07	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	798	R	1,554.40	AP-Q5	0.61	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,312	R	105.67									
AP1.7	Rough formwork	m2	301	R	196.11	AP-Q6	2.65	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	2,093	R	281.23	AP-Q7	0.38	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,624	R	13.29	AP-Q8	0.22	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	276	R	99.92	AP-Q9	2.89	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	62	R	79.31	AP-Q10	12.87	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	591	R	42.15	AP-Q11	1.35	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.75	R	12,363.84	AP-Q12	1064.00	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,903	R	369.35	AP-Q13	0.42	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,124	R	-	AP-Q14	5.17	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,781	R	140.94	AP-Q15	2.32	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,634	R	495.88	AP-Q16	1.57	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,852	R	69.62	AP-Q17	0.85	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	1,700.54	AP-Q18	515.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	5,490	R	452.58	AP-Q19	0.75	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,886	R	184.79	AP-Q20	1.06	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	111.87	R	9,538.71	AP-Q21	7.13	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	47,187.73									
AP1.24	Structural steel	Item	1	R	122,187.81									
AP1.25	Plumbing and drainage	Item	1	R	77,801.73									
AP1.26	Small power and lighting	Item	1	R	662,816.14									
AP1.27	External works	Item	1	R	286,411.84									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.38	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.02	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					14.02	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					90.27	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.93	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.53	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					116.96	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					15.56	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					19.60	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					226.30	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.13	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.03	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					19.24	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					5.31	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.22	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.82	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.00	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.95	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.81	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.16	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					69.49	AP1.26	/	AP1.22
	External works / concrete					AP-R23					184.26	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	88	R	1,554.40	AQ-Q1	3.51	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	309	R	246.86									
AQ1.3	Reinforcement	t	10.39	R	10,344.74	AQ-Q2	8.47	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	801	R	205.72	AQ-Q3	0.11	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	286	R	208.87	AQ-Q4	0.31	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	160	R	384.81	AQ-Q5	5.46	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,559	R	150.22	AQ-Q6	0.56	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	37.62	R	42,908.69	AQ-Q7	23.21	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	562	R	139.04	AQ-Q8	1.55	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	20,914.80	AQ-Q9	436.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	63	R	1,129.53	AQ-Q10	13.86	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,339	R	89.50	AQ-Q11	0.65	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	873	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					6.30	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.56	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.44	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.04	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					285.64	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.93	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.49	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.52	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.68	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	194	R	180.62	AR-Q1	2.98	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	65	R	1,448.94	AR-Q2	6.20	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	10.48	R	10,685.96									
AR1.4	Mesh	m2	870	R	153.85	AR-Q3	0.07	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	104	R	275.60	AR-Q4	0.63	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	94	R	277.91	AR-Q5	5.80	AR1.15	/	AR1.6				
AR1.7	Screed	m2	448	R	43.87	AR-Q6	1.22	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	37.36	R	28,173.06	AR-Q7	14.59	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	21	R	5,208.49	AR-Q8	1.78	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	52	R	1,067.04	AR-Q9	0.72	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	50	R	403.93	AR-Q10	0.75	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	585	R	197.49	AR-Q11	0.93	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	161	R	138.59	AR-Q12	3.39	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	59	R	1,928.32	AR-Q13	0.63	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	545	R	-									
	Earthworks / concrete					AR-R1					0.12	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.14	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.42	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.26	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.21	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					33.03	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					5.41	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					26.40	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.64	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					142.66	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.70	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					14.61	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	455	R	262.93	AS-Q1	6.07	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	190	R	76.00	AS-Q2	0.39	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	75	R	1,489.83	AS-Q3	5.06	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	14.82	R	6,339.94									
AS1.5	Mesh	m2	136	R	161.88	AS-Q4	0.55	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	209	R	253.71	AS-Q5	0.36	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	168	R	18.78	AS-Q6	0.45	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	23	R	89.62	AS-Q7	3.26	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	1,313	R	45.15	AS-Q8	0.06	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.75	R	8,829.83	AS-Q9	100.00	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	36	R	228.42	AS-Q10	0.39	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	2,818.62	AS-Q11	3.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	71	R	561.99	AS-Q12	2.18	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	667	R	47.18	AS-Q13	0.11	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.99	R	29,317.32	AS-Q14	7.04	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.01	R	38,834.59	AS-Q15	153.47	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	155	R	-									
AS1.18	Total control room area	m2	14	R	-									
	Concrete / earthworks					AS-R1					5.67	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					19.60	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					39.16	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					5.87	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					79.33	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					16.62	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					140.42	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.65	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.17	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.22	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.16	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.08	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	254	R	206.89	AT-Q1	16.93	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	12	R	122.62	AT-Q2	1.25	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	15	R	996.28	AT-Q3	5.17	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.90	R	9,712.99									
AT1.5	Formwork	m2	170	R	253.71	AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	33	R	19.50	AT-Q5	0.45	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	44	R	125.71	AT-Q6	0.34	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.41	R	43.97	AT-Q7	36.59	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.81	R	13,376.82	AT-Q8	18.52	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.08	R	52.89	AT-Q9	187.50	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.73	R	35,791.33	AT-Q10	39.73	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.19	R	53,772.84	AT-Q11	24.37	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	73	R	277.91	AT-Q12	0.40	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	29	R	233.95	AT-Q13	1.00	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	29	R	-									
	Concrete / earthworks					AT-R1					4.82	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					8.12	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					3.93	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					51.09	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					7.93	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					220.90	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.83	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.07	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.27	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.18	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					3.58	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.19	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	356	R	182.97	AU-Q1	0.65	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	260	R	102.37	AU-Q2	2.09	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	544	R	1,554.40									
AU1.4	Reinforcement	t	51.04	R	10,685.96	AU-Q3	10.66	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,708	R	319.83	AU-Q4	0.32	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	179	R	66.30	AU-Q5	3.04	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,252	R	44.33	AU-Q6	0.24	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	886	R	64.65	AU-Q7	0.61	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	64	R	230.54	AU-Q8	8.50	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.13	R	43,874.79	AU-Q9	173.80	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	13	R	5,444.73	AU-Q10	41.85	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	32	R	355.27	AU-Q11	12.59	AU1.12	/	AU1.13				
AU1.13	Total area	m2	403	R	-									
	Concrete / earthworks					AU-R1					8.50	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					15.18	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					4.86	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.15	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					23.44	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					241.05	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.24	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					165.29	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					46.35	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.29	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.38	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	7,008	R	195.77	AV-Q1	0.66	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,418	R	104.62	AV-Q2	1.35	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,358	R	126.11	AV-Q3	1.06	AV1.10	/	AV1.3				
AV1.4	Pipework	m	80	R	560.88	AV-Q4	57.76	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	5,754.24	AV-Q5	20.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	36	R	1,554.40	AV-Q6	2.22	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	239	R	215.75	AV-Q7	0.15	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	25	R	155.09	AV-Q8	1.44	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	5.44	R	13,051.94	AV-Q9	6.62	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	4,621	R	-									
	Earthworks / lining					AV-R1					1.87	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.55	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.83	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.35	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.10	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.07	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					7.20	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					10.02	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.12	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,154	R	186.78	AW-Q1	8.42	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	142	R	112.39	AW-Q2	0.96	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	137	R	1,480.12	AW-Q3	7.76	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	17.66	R	9,538.71									
AW1.5	Mesh	m2	146	R	239.60	AW-Q4	0.94	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	505	R	288.16	AW-Q5	0.27	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	4,264	R	42.92	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3.18	R	34,931.73	AW-Q7	20.44	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	65	R	-									
	Concrete / earthworks					AW-R1					7.92	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					13.17	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					39.81	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.14	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					222.24	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.27	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	48	R	-									
BA1.2	Steel	t	2.25	R	32,947.51	BA-Q1	21.33	BA1.1	/	BA1.2				
BA1.3	Handrail	m	22	R	1,094.51	BA-Q2	2.18	BA1.1	/	BA1.3				
BA1.4	Grating	m2	19	R	2,772.86	BA-Q3	2.53	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	17	R	585.19	BA-Q4	2.82	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	7	R	305.36	BA-Q5	6.86	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					30.10	BA1.2	/	BA1.3
	Steel / grating					BA-R2					11.88	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					56.30	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					107.90	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,697	R	-									
BB1.2	Steel	t	53.95	R	32,505.84	BB-Q1	31.46	BB1.1	/	BB1.2				
BB1.3	Handrail	m	173	R	1,917.30	BB-Q2	9.81	BB1.1	/	BB1.3				
BB1.4	Grating	m2	131	R	1,913.39	BB-Q3	12.95	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	133	R	375.26	BB-Q4	12.76	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	17	R	3,810.99	BB-Q5	99.82	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					16.95	BB1.2	/	BB1.3
	Steel / grating					BB-R2					16.99	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					86.62	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					8.53	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	12,149	R	-									
BC1.2	Steel	t	220.79	R	37,644.19	BC-Q1	55.03	BC1.1	/	BC1.2				
BC1.3	Handrail	m	541	R	1,789.12	BC-Q2	22.46	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,119	R	1,961.06	BC-Q3	2.95	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	665	R	605.96	BC-Q4	18.27	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	74	R	240.99	BC-Q5	164.18	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	93	R	3,899.22	BC-Q6	130.63	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					21.04	BC1.2	/	BC1.3
	Steel / grating					BC-R2					19.20	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					62.12	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					156.21	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					9.65	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	405	R	-									
BD1.2	Steel	t	21.91	R	30,380.34	BD-Q1	18.48	BD1.1	/	BD1.2				
BD1.3	Handrail	m	17	R	1,164.22	BD-Q2	23.82	BD1.1	/	BD1.3				
BD1.4	Grating	m2	10	R	2,752.85	BD-Q3	40.50	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	405.27	BD-Q4	33.75	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	47	R	3,209.56	BD-Q5	8.62	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					26.10	BD1.1	/	BD1.2
	Steel / grating					BD-R2					11.04	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					74.96	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					9.47	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	45	R	-									
BE1.2	Steel	t	4.08	R	48,241.70	BE-Q1	11.03	BE1.1	/	BE1.2				
BE1.3	Handrail	m	52	R	751.74	BE-Q2	0.87	BE1.1	/	BE1.3				
BE1.4	Grating	m2	25	R	2,101.46	BE-Q3	1.80	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	44	R	459.79	BE-Q4	1.02	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	11	R	275.65	BE-Q5	4.09	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					64.17	BE1.2	/	BE1.3
	Steel / grating					BE-R2					22.96	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					104.92	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					175.01	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	506	R	-									
BF1.2	Steel	t	27.47	R	29,902.50	BF-Q1	18.42	BF1.1	/	BF1.2				
BF1.3	Handrail	m	23	R	1,226.59	BF-Q2	22.00	BF1.1	/	BF1.3				
BF1.4	Grating	m2	65	R	1,437.90	BF-Q3	7.78	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	16	R	388.65	BF-Q4	31.63	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	28	R	5,189.84	BF-Q5	18.07	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					24.38	BF1.1	/	BF1.2
	Steel / grating					BF-R2					20.80	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					76.94	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					5.76	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	39,216	R	-	C-Q1	0.57	C1.1	/	C1.2				
C1.2	Total work units	WU	68,798	R	410.00									
C1.3	Pipe supports	kg	8,934	R	-	C-Q2	4.39	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	13,571	R	-	C-Q3	0.20	C1.4	/	C1.2				
C1.5	Number of welds	No	16,934	R	-	C-Q4	0.43	C1.5	/	C1.1				
C1.6	Total fittings	No	13,540	R	-	C-Q5	0.35	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,902	R	-	C-Q6	0.14	C1.7	/	C1.6				
C1.8	Support number	No	1,795	R	-	C-Q7	0.20	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	68,798	R	410.00	DA-Q1	36.71	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,874	R	78.24									
	Average cost per examination / WU					DA-R1					5.24	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	68,798	R	410.00	DB-Q1	160.74	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	428	R	130.07									
	Average cost per examination / WU					DB-R1					3.15	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	68,798	R	410.00	DC-Q1	259.62	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	265	R	217.08									
	Average cost per examination / WU					DC-R1					1.89	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	68,798	R	410.00	DD-Q1	41.02	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,677	R	67.29									
	Average cost per examination / WU					DD-R1					6.09	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	68,798	R	410.00	DE-Q1	106.66	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	645	R	175.52									
	Average cost per examination / WU					DE-R1					2.34	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	68,798	R	410.00	E-Q1	233.16	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	295.07	R	803.81	E-Q2	179.44	E1.1	/	E1.3				
E1.3	Structural steel	t	383.40	R	34,496.71									
	WU cost / install mechanical weight - receive					E-R1					0.51	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					42.92	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	68,798	R	410.00									
F1.2	Painting to piping	m2	4,221	R	111.70	F-Q1	16.30	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,831	R	510.63	F-Q2	37.57	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	325.12	R	563.77									
F1.5	Painting to mechanical equipment	m2	1,360	R	231.63	F-Q3	0.24	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	485	R	493.58	F-Q4	0.67	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.22	F1.2	/	F1.3
	Work unit / paint					F-R2					3.67	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.80	F1.1	/	F1.3
	Install plant / paint					F-R4					2.43	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.14	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	38,480	R	107.47									
G1.2	Electrical cable terminations	No	1,481	R	172.62	G-Q1	25.98	G1.1	/	G1.2				
G1.3	Electrical equipment	No	137	R	576.85	G-Q2	280.88	G1.1	/	G1.3				
G1.4	DB's	No	20	R	2,197.54	G-Q3	6.85	G1.3	/	G1.4				
G1.5	Rack	m	7,099	R	384.55	G-Q4	5.42	G1.1	/	G1.5				
G1.6	Support steel	kg	9,266	R	31.47	G-Q5	0.77	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	29,023	R	39.02	G-Q6	1.33	G1.1	/	G1.7				
G1.8	Instruments	No	1,717	R	169.91	G-Q7	16.90	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,290	R	169.32	G-Q8	1.33	G1.8	/	G1.9				
G1.10	Light fittings	No	519	R	434.50	G-Q9	3.79	G1.10	/	G1.3				
G1.11	Conduit	m	3,861	R	56.02	G-Q10	9.97	G1.1	/	G1.11				
G1.12	Instrument stands	No	262	R	1,005.73	G-Q11	6.55	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.62	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.19	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.26	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.92	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					3.41	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.28	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.25	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.23	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.04	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.23	G1.7	/	G1.8

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Year of construction 1994

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7706	R	17.04	AB-Q1	2.83	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2724	R	2.99									
AB1.3	Back fill and compact	m3	5997	R	19.68	AB-Q2	1.28	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5223	R	1.31	AB-Q3	1.48	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4513	R	1.57	AB-Q4	1.71	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					5.70	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.87	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					13.01	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					10.85	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	84,525.01									
AC1.2	EO for raking equipment	Item	1	R	11,045.64									
AC1.3	Number of piles	No	278	R	-									
AC1.4	Move rig to new position	No	189	R	96.87	AC-Q1	1.47	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	19.86	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	14	R	101.83	AC-Q3	1.00	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	138	R	55.62	AC-Q4	0.10	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5504	R	58.60	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	498	R	115.10	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	172	R	234.85	AC-Q7	1.62	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	158	R	107.23	AC-Q8	1.76	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	618	R	136.53	AC-Q9	0.45	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	78	R	233.84	AC-Q10	0.18	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.09	R	2,664.18	AC-Q11	15.37	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	213.51	R	3,939.59	AC-Q12	1.30	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1860	R	439.52	AC-Q13	0.15	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	217	R	445.11	AC-Q14	0.06	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	66,114.86		1.00		/					
AC1.19	Load test to pile	No	3	R	8,926.94	AC-Q15	92.67	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	22,976.29	AC-Q16	278.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	278	R	146.52	AC-Q17	1.00	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.31	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.13	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.22	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.23	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.95	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.26	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.53	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.24	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.31	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.53	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					150.43	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					20.31	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					52.28	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.33	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	177	R	43.44	AD-Q1	0.18	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	989	R	26.93									
AD1.3	Kerbing	m	339	R	59.46	AD-Q2	0.12	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2903	R	-									
AD1.5	Remove top soil	m3	955	R	13.00	AD-Q3	0.42	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2296	R	43.15	AD-Q4	0.47	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2013	R	1.25									
AD1.8	Reduce levels	m3	1338	R	11.53	AD-Q5	0.66	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	798	R	18.33	AD-Q6	1.68	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	476	R	85.18	AD-Q7	1.68	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	345	R	50.77	AD-Q8	3.88	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1986	R	8.40	AD-Q9	4.17	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	365	R	5.82	AD-Q10	1.16	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	302	R	1.56	AD-Q11	1.08	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	314	R	254.26	AD-Q12	0.89	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	47	R	60.13	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	5	R	82.31	AD-Q14	0.14	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	12	R	124.66	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	406	R	1.09	AD-Q16	1.20	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.61	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					10.40	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					9.22	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.63	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.22	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.23	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					2.35	AD1.6	/	AD1.9

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Year of construction 1994

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.14	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.70	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.01	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.38	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.10	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	234	R	353.87	AE-Q1	5.85	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	40	R	409.59	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	361	R	-									
AE1.4	Rip and compact	m2	1828	R	1.89									
AE1.5	Formwork to plinth	m2	359	R	69.41	AE-Q3	8.98	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	213	R	49.89	AE-Q4	0.91	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.54	R	2,526.30	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2757	R	74.65	AE-Q6	607.27	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	764	R	12.85	AE-Q7	3.26	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	548	R	26.81	AE-Q8	2.34	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					187.23	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					33.84	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	6548	R	-	AF-Q1	19.72	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	332	R	17.25	AF-Q2	1.08	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	307	R	39.40	AF-Q3	0.58	AF1.2	/	AF1.4				
AF1.4	Working space	m2	576	R	11.52	AF-Q4	0.49	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	162	R	396.99	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	223	R	33.02	AF-Q6	0.75	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	309.37	AF-Q7	0.10	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	411.07	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	167	R	-	AF-Q9	0.41	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	406	R	3.72									
AF1.11	Formwork to bases	m2	255	R	51.62	AF-Q10	1.57	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	181	R	55.90	AF-Q11	10.65	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	16	R	61.40	AF-Q12	8.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.87	R	2,719.58	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	26.26	R	3,753.42	AF-Q14	6.36	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	312	R	12.47	AF-Q15	0.52	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	28	R	54.55	AF-Q16	0.61	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	1,262.68	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	95	R	222.58									
	Base excavation / backfill					AF-R1					0.44	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.50	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					23.01	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					12.02	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					17.93	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.04	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.06	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					106.72	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.18	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.72	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					31.84	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.67	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.78	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.18	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	184	R	13.71	AG-Q1	1.69	AG1.1	/	AG1.4				
AG1.2	Working space	m2	634	R	12.43	AG-Q2	0.29	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	113	R	39.82	AG-Q3	1.63	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	109	R	323.55	AG-Q4	0.79	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	74	R	429.90	AG-Q5	1.47	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	294	R	-									
AG1.7	Wood float	m2	169	R	2.96	AG-Q6	0.44	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	138	R	21.12	AG-Q7	0.79	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	342	R	53.34	AG-Q8	0.32	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	131	R	54.91	AG-Q9	0.56	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	34.44	R	3,753.42	AG-Q10	8.54	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1895	R	12.47	AG-Q11	0.16	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2926	R	13.51	AG-Q12	0.10	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.27	R	4,013.11	AG-Q13	22.63	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.91	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					2.90	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.16	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					11.60	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					12.40	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	293	R	20.31	AH-Q1	3.41	AH1.1	/	AH1.4				
AH1.2	Working space	m2	69	R	12.13	AH-Q2	4.25	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	205	R	25.52	AH-Q3	1.43	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	86	R	610.75	AH-Q4	0.92	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	15	R	338.37	AH-Q5	5.73	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	96	R	419.62	AH-Q6	0.90	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	12	R	343.96	AH-Q7	7.17	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	399.88	AH-Q8	28.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	184	R	-									
AH1.10	Blinding	m2	93	R	19.95	AH-Q9	1.98	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	710	R	3.50	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	178	R	52.80	AH-Q11	0.48	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	34	R	80.40	AH-Q12	0.35	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	24	R	46.08	AH-Q13	0.13	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	230	R	57.32	AH-Q14	0.07	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	23	R	53.49	AH-Q15	4.17	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	70	R	21.14	AH-Q16	1.37	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.83	R	3,502.50	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.47	R	3,502.50	AH-Q18	21.72	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	466	R	45.66	AH-Q19	0.21	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	869	R	13.53	AH-Q20	0.21	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2638	R	14.35	AH-Q21	0.07	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.91	R	3,348.16	AH-Q22	202.20	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	338	R	17.38	AH-Q23	0.28	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	286	R	35.61	AH-Q24	0.34	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.67	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.80	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					30.61	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					174.50	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.80	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.46	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.78	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.53	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.57	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					4.28	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					8.68	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.90	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					7.84	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					19.85	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.00	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					76.71	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					258.87	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					244.08	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.18	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					24.14	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					11.78	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	233	R	20.97	AI-Q1	2.48	AI1.1	/	AI1.5				
AI1.2	Working space	m2	843	R	15.79	AI-Q2	0.28	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	119	R	28.65	AI-Q3	1.96	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	239	R	25.06	AI-Q4	0.39	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	94	R	550.39	AI-Q5	4.70	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	20	R	430.54	AI-Q6	0.31	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	75	R	-									
AI1.8	Wood float	m2	305	R	2.74									
AI1.9	Formwork bases	m2	251	R	71.88	AI-Q7	0.37	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	138	R	51.16	AI-Q8	0.14	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	11.06	R	3,858.57	AI-Q9	6.78	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3119	R	20.82	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.04	R	2,317.74	AI-Q11	90.38	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.33	AI1.1	/	AI1.2

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	Trade / item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.73	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					21.96	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.28	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					200.87	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.66	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					8.42	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					185.33	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.24	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	332	R	30.77	AJ-Q1	4.74	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	931	R	16.18	AJ-Q2	0.36	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	139	R	27.40	AJ-Q3	2.39	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	318	R	23.96	AJ-Q4	0.22	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	70	R	689.46	AJ-Q5	1.40	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	24	R	596.15	AJ-Q6	2.92	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	50	R	353.87									
AJ1.8	Total concrete	m3	157	R	-									
AJ1.9	Wood float	m2	263	R	2.53	AJ-Q7	0.60	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	263	R	77.91	AJ-Q8	0.27	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	287	R	80.25	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	11.22	R	1,836.47	AJ-Q10	13.99	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	5725	R	13.76	AJ-Q11	0.01	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1615	R	12.52	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.15	R	3,215.24	AJ-Q13	60.87	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.90	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.12	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					28.78	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					272.51	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.85	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					7.43	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					133.46	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					146.68	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.21	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	398	R	20.13	AK-Q1	2.03	AK1.1	/	AK1.5				
AK1.2	Working space	m2	768	R	15.79	AK-Q2	0.52	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	303	R	28.65	AK-Q3	1.31	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	534	R	20.70	AK-Q4	0.37	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	196	R	594.11	AK-Q5	28.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	547.14									
AK1.7	Concrete plinth	m3	44	R	418.66	AK-Q6	4.45	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	378	R	-									
AK1.9	Wood float	m2	353	R	2.49	AK-Q7	0.56	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	425	R	49.76	AK-Q8	0.46	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	236	R	67.38	AK-Q9	0.19	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	23	R	62.59	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	28.46	R	3,021.34	AK-Q11	13.28	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5408	R	20.64	AK-Q12	0.07	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.29	R	3,294.02	AK-Q13	165.07	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.03	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.27	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.70	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					28.70	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					238.60	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					11.94	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					6.21	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.74	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					146.38	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.18	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	497	R	27.18	AL-Q1	2.32	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1419	R	11.90	AL-Q2	0.35	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	268	R	34.19	AL-Q3	1.85	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	222	R	17.78	AL-Q4	0.96	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	214	R	401.33	AL-Q5	2.40	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	89	R	572.20	AL-Q6	1.22	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	73	R	559.44	AL-Q7	2.93	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	307	R	-									
AL1.9	Wood float	m2	303	R	3.86	AL-Q8	0.71	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	453	R	80.25	AL-Q9	0.47	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1248	R	88.81	AL-Q10	0.07	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	240	R	80.65	AL-Q11	0.30	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	77	R	82.41	AL-Q12	0.95	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	19	R	139.84	AL-Q13	4.68	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	25.10	R	1,756.03	AL-Q14	12.23	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	10929	R	12.30	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	313	R	18.23	AL-Q16	0.98	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.64	R	2,694.72	AL-Q17	479.69	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.28	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.79	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					22.57	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					103.97	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.70	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.70	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					5.00	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.94	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.44	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					6.79	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.94	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.00	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					142.77	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					96.33	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.15	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1012	R	19.73	AM-Q1	3.40	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2483	R	15.79	AM-Q2	0.41	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	837	R	26.00	AM-Q3	1.21	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	452	R	32.23	AM-Q4	0.66	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	298	R	410.92									
AM1.6	Concrete column	m3	184	R	625.72	AM-Q5	1.62	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	118	R	323.55	AM-Q6	1.56	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	124	R	275.95	AM-Q7	2.40	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	48	R	422.76	AM-Q8	3.83	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	160	R	546.93	AM-Q9	1.15	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	883	R	-									
AM1.12	Wood float	m2	1530	R	3.10	AM-Q10	0.58	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	1104	R	78.47	AM-Q11	0.27	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	537	R	48.19	AM-Q12	0.34	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	551	R	67.65	AM-Q13	0.21	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	279	R	104.73	AM-Q14	0.42	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	540	R	74.79	AM-Q15	0.23	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	189.61	AM-Q16	36.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	423	R	54.66	AM-Q17	0.11	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	91.65	R	1,960.53	AM-Q18	9.63	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4351	R	11.96	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2999	R	18.24	AM-Q20	0.29	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	41	R	279.61	AM-Q21	2.24	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.20	R	3,705.10	AM-Q22	735.83	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.25	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.76	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					12.75	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.66	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.27	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.49	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.97	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.75	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					132.55	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.24	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.78	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.09	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					12.98	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					1.71	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					7.31	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.73	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					163.92	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					107.49	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					7.01	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.11	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	222	R	20.14	AO-Q1	2.04	AO1.1	/	AO1.5				
AO1.2	Working space	m2	845	R	19.71	AO-Q2	0.26	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	112	R	21.97	AO-Q3	1.98	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	51	R	20.67	AO-Q4	2.14	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	109	R	572.20									
AO1.6	Concrete column	m3	24	R	408.64	AO-Q5	4.54	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	604.27	AO-Q6	1.60	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	409.96	AO-Q7	21.80	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	410.92	AO-Q8	24.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	71	R	-									
AO1.11	Wood float	m2	23	R	2.06	AO-Q9	4.74	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	106	R	55.24	AO-Q10	1.03	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	216	R	61.32	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	53	R	72.59	AO-Q12	0.28	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	18	R	89.03	AO-Q13	0.83	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	8	R	111.79	AO-Q14	0.13	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	40	R	102.54	AO-Q15	2.73	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	16	R	55.95	AO-Q16	0.31	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	7.33	R	3,974.66	AO-Q17	9.69	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2142	R	11.89	AO-Q18	0.03	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	4415	R	20.14	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	434.81	AO-Q20	6.45	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.97	R	2,459.27	AO-Q21	27.46	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.02	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.92	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					27.68	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					277.77	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					10.36	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.32	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.79	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					6.66	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					5.89	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.68	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.33	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					334.29	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					197.35	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.23	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					9.14	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1679	R	21.40	AP-Q1	2.08	AP1.1	/	AP1.5				
AP1.2	Working space	m2	554	R	13.23	AP-Q2	3.03	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1024	R	30.95	AP-Q3	1.64	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	348	R	31.46	AP-Q4	2.32	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	807	R	409.59	AP-Q5	0.51	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1570	R	42.23									
AP1.7	Rough formwork	m2	401	R	77.91	AP-Q6	2.01	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1764	R	88.96	AP-Q7	0.46	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3272	R	3.52	AP-Q8	0.25	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	249	R	28.35	AP-Q9	3.24	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	47	R	37.94	AP-Q10	17.17	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	325	R	10.29	AP-Q11	2.48	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.22	R	2,505.59	AP-Q12	661.48	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2354	R	96.05	AP-Q13	0.34	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3204	R	-	AP-Q14	3.97	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1606	R	36.03	AP-Q15	2.00	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2445	R	128.17	AP-Q16	1.31	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2528	R	19.36	AP-Q17	1.27	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	439.52	AP-Q18	400.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3365	R	133.51	AP-Q19	0.95	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3509	R	53.67	AP-Q20	0.91	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	101.00	R	2,608.84	AP-Q21	7.99	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	13,070.00									
AP1.24	Structural steel	Item	1	R	33,843.43									
AP1.25	Plumbing and drainage	Item	1	R	21,549.43									
AP1.26	Small power and lighting	Item	1	R	183,586.00									
AP1.27	External works	Item	1	R	79,330.00									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.62	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.69	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					13.02	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					61.78	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					5.26	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					4.60	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					116.36	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					14.45	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					10.80	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					253.53	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.16	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.37	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					20.35	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					4.96	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.22	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.72	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.79	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.01	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.97	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.26	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					70.37	AP1.26	/	AP1.22
	External works / concrete					AP-R23					193.68	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	123	R	550.39	AQ-Q1	2.02	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	248	R	70.05									
AQ1.3	Reinforcement	t	10	R	2,739.77	AQ-Q2	12.30	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	503	R	32.81	AQ-Q3	0.24	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	207	R	52.82	AQ-Q4	0.59	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	145	R	70.09	AQ-Q5	7.87	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	851	R	31.37	AQ-Q6	1.34	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	43.06	R	8,086.62	AQ-Q7	26.50	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	690	R	33.24	AQ-Q8	1.65	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	3,612.81	AQ-Q9	380.33	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	38	R	639.07	AQ-Q10	30.03	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	977	R	23.60	AQ-Q11	1.17	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1141	R	-									
	Concrete / reinforcement					AQ-R1					0.20	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.86	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					16.78	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					10.42	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.85	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					257.78	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.06	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.45	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					20.37	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.33	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	240	R	50.68	AR-Q1	4.80	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	50	R	606.35	AR-Q2	10.00	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5	R	3,974.66									
AR1.4	Mesh	m2	614	R	43.34	AR-Q3	0.08	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	128	R	57.08	AR-Q4	0.39	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	55	R	125.83	AR-Q5	8.31	AR1.15	/	AR1.6				
AR1.7	Screed	m2	675	R	7.86	AR-Q6	0.68	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	32.95	R	8,284.74	AR-Q7	13.87	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	13	R	1,251.91	AR-Q8	2.53	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	70	R	309.09	AR-Q9	0.47	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	36	R	151.40	AR-Q10	0.92	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	552	R	60.70	AR-Q11	0.83	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	107	R	33.24	AR-Q12	4.27	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	27	R	393.04	AR-Q13	1.22	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	457	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.15	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					13.99	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					10.62	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.82	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					77.14	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					6.62	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					26.80	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.04	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					136.49	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.55	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					21.08	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	284	R	51.08	AS-Q1	4.12	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	171	R	29.48	AS-Q2	0.40	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	69	R	295.82	AS-Q3	11.50	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	6	R	2,501.34									
AS1.5	Mesh	m2	138	R	60.69	AS-Q4	0.50	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	282	R	55.24	AS-Q5	0.24	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	137	R	3.73	AS-Q6	0.50	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	25	R	24.95	AS-Q7	2.76	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	1065	R	11.55	AS-Q8	0.06	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.92	R	2,401.88	AS-Q9	75.00	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	33	R	102.30	AS-Q10	0.30	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	778.90	AS-Q11	2.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	69	R	236.22	AS-Q12	3.01	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	584	R	13.66	AS-Q13	0.12	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.85	R	8,805.08	AS-Q14	3.51	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.85	R	7,390.75	AS-Q15	244.71	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	208	R	-									
AS1.18	Total control room area	m2	10	R	-									
	Concrete / earthworks					AS-R1					5.79	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					10.03	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					41.22	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					5.36	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					79.31	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					11.86	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					216.57	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					1.25	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.12	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.28	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.34	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.13	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	239	R	50.68	AT-Q1	11.95	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	15	R	31.24	AT-Q2	1.33	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	20	R	624.59	AT-Q3	10.93	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.83	R	2,464.43									
AT1.5	Formwork	m2	163	R	67.38	AT-Q4	0.12	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	50	R	5.69	AT-Q5	0.40	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	18	R	20.59	AT-Q6	1.11	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.47	R	12.51	AT-Q7	42.55	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.60	R	2,576.69	AT-Q8	33.33	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.09	R	15.01	AT-Q9	222.22	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.65	R	10,156.32	AT-Q10	75.38	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.84	R	15,258.84	AT-Q11	26.63	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	48	R	73.23	AT-Q12	1.02	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	12	R	34.45	AT-Q13	4.08	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	49	R	-									
	Concrete / earthworks					AT-R1					12.32	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					19.99	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					9.27	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					109.77	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					30.33	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					197.00	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.83	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.24	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.24	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.16	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					8.53	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.13	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	277	R	57.99	AU-Q1	0.94	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	165	R	14.22	AU-Q2	1.78	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	294	R	422.76									
AU1.4	Reinforcement	t	75.43	R	3,981.83	AU-Q3	3.90	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	829	R	41.57	AU-Q4	0.35	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	158	R	27.36	AU-Q5	1.86	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2601	R	12.52	AU-Q6	0.11	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	749	R	15.50	AU-Q7	0.39	AU1.3	/	AU1.8				

Project 3

Year of construction 1994

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	37	R	58.14	AU-Q8	7.95	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.67	R	10,372.57	AU-Q9	110.11	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,170.97	AU-Q10	36.75	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	37	R	105.45	AU-Q11	5.22	AU1.12	/	AU1.13				
AU1.13	Total area	m2	193	R	-									
	Concrete / earthworks					AU-R1					7.29	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					29.73	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					10.17	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.11	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.45	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					318.04	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.38	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					256.89	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					68.49	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.36	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.01	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	6155	R	51.56	AV-Q1	0.47	AV1.10	/	AV1.1				
AV1.2	Lining	m2	4100	R	30.86	AV-Q2	0.70	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3015	R	31.70	AV-Q3	0.95	AV1.10	/	AV1.3				
AV1.4	Pipework	m	69	R	156.31	AV-Q4	41.54	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	1,161.46	AV-Q5	17.25	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	35	R	610.75	AV-Q6	1.97	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	166	R	43.47	AV-Q7	0.21	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	23	R	44.51	AV-Q8	1.52	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.29	R	2,188.85	AV-Q9	10.64	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2866	R	-									
	Earthworks / lining					AV-R1					1.67	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.63	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.97	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.33	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.13	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					14.05	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					13.72	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.28	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1295	R	52.30	AW-Q1	13.35	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	69	R	32.23	AW-Q2	1.41	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	97	R	323.55	AW-Q3	4.47	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	21.72	R	2,735.74									
AW1.5	Mesh	m2	82	R	45.66	AW-Q4	1.18	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	641	R	59.76	AW-Q5	0.15	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2877	R	16.01	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.71	R	14,893.94	AW-Q7	15.87	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	43	R	-									
	Concrete / earthworks					AW-R1					6.19	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					10.04	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					59.92	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.41	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					170.88	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.18	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	23	R	-									
BA1.2	Steel	t	2.74	R	8,333.31	BA-Q1	8.39	BA1.1	/	BA1.2				
BA1.3	Handrail	m	18	R	267.01	BA-Q2	1.28	BA1.1	/	BA1.3				
BA1.4	Grating	m2	22	R	529.48	BA-Q3	1.05	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	20	R	158.21	BA-Q4	1.15	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	88.45	BA-Q5	5.75	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					31.21	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.74	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					52.67	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					94.21	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2217	R	-									
BB1.2	Steel	t	46.39	R	8,726.05	BB-Q1	47.79	BB1.1	/	BB1.2				
BB1.3	Handrail	m	100	R	343.80	BB-Q2	22.17	BB1.1	/	BB1.3				
BB1.4	Grating	m2	108	R	825.90	BB-Q3	20.53	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	119	R	99.69	BB-Q4	18.63	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	16	R	1,560.89	BB-Q5	138.56	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					25.38	BB1.2	/	BB1.3
	Steel / grating					BB-R2					10.57	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					87.53	BB1.2	/	BB1.5

Project 3

Year of construction 1994

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					5.59	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	14247	R	-									
BC1.2	Steel	t	225.55	R	7,882.22	BC-Q1	63.17	BC1.1	/	BC1.2				
BC1.3	Handrail	m	802	R	333.97	BC-Q2	17.76	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5227	R	418.26	BC-Q3	2.73	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	739	R	171.95	BC-Q4	19.28	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	46	R	63.83	BC-Q5	309.72	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	63	R	1,032.70	BC-Q6	226.14	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					23.60	BC1.2	/	BC1.3
	Steel / grating					BC-R2					18.85	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					45.84	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					123.49	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.63	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	543	R	-									
BD1.2	Steel	t	23.89	R	8,046.14	BD-Q1	22.73	BD1.1	/	BD1.2				
BD1.3	Handrail	m	11	R	308.34	BD-Q2	49.36	BD1.1	/	BD1.3				
BD1.4	Grating	m2	11	R	781.16	BD-Q3	49.36	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	107.34	BD-Q4	45.25	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	18	R	906.96	BD-Q5	30.17	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					26.10	BD1.1	/	BD1.2
	Steel / grating					BD-R2					10.30	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					74.96	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					8.87	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	30	R	-									
BE1.2	Steel	t	2.75	R	11,597.25	BE-Q1	10.91	BE1.1	/	BE1.2				
BE1.3	Handrail	m	61	R	324.38	BE-Q2	0.49	BE1.1	/	BE1.3				
BE1.4	Grating	m2	23	R	531.20	BE-Q3	1.30	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	44	R	163.82	BE-Q4	0.68	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	12	R	69.81	BE-Q5	2.50	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					35.75	BE1.2	/	BE1.3
	Steel / grating					BE-R2					21.83	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					70.79	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					166.13	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	322	R	-									
BF1.2	Steel	t	24.57	R	12,247.36	BF-Q1	13.11	BF1.1	/	BF1.2				
BF1.3	Handrail	m	13	R	483.70	BF-Q2	24.77	BF1.1	/	BF1.3				
BF1.4	Grating	m2	61	R	457.45	BF-Q3	5.28	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	14	R	106.04	BF-Q4	23.00	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	26	R	1,411.45	BF-Q5	12.38	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					25.32	BF1.1	/	BF1.2
	Steel / grating					BF-R2					26.77	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					115.50	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.68	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	36143	R	-	C-Q1	0.60	C1.1	/	C1.2				
C1.2	Total work units	WU	60630	R	110.91									
C1.3	Pipe supports	kg	12189	R	-	C-Q2	2.97	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10577	R	-	C-Q3	0.17	C1.4	/	C1.2				
C1.5	Number of welds	No	11959	R	-	C-Q4	0.33	C1.5	/	C1.1				
C1.6	Total fittings	No	7125	R	-	C-Q5	0.20	C1.6	/	C1.1				
C1.7	Stud bolts	No	3329	R	-	C-Q6	0.47	C1.7	/	C1.6				
C1.8	Support number	No	1460	R	-	C-Q7	0.12	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	60630	R	110.91	DA-Q1	54.09	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1121	R	21.56									
	Average cost per examination / WU					DA-R1					5.14	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	60630	R	110.91	DB-Q1	173.23	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	350	R	37.06									
	Average cost per examination / WU					DB-R1					2.99	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

Project 3

Year of construction 1994

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	60630	R	110.91	DC-Q1	187.71	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	323	R	78.79									
	Average cost per examination / WU					DC-R1					1.41	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	60630	R	110.91	DD-Q1	45.59	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1330	R	19.23									
	Average cost per examination / WU					DD-R1					5.77	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	60630	R	110.91	DE-Q1	103.46	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	586	R	47.06									
	Average cost per examination / WU					DE-R1					2.36	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	60630	R	110.91	E-Q1	190.46	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	318.34	R	152.53	E-Q2	179.44	E1.1	/	E1.3				
E1.3	Structural steel	t	337.88	R	9,554.86									
	WU cost / install mechanical weight - receive					E-R1					0.73	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					62.64	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	60630	R	110.91									
F1.2	Painting to piping	m2	3697	R	47.23	F-Q1	16.40	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1859	R	179.73	F-Q2	32.61	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	260.64	R	256.51									
F1.5	Painting to mechanical equipment	m2	1519	R	30.94	F-Q3	0.17	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	384	R	141.43	F-Q4	0.68	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.26	F1.2	/	F1.3
	Work unit / paint					F-R2					2.35	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.62	F1.1	/	F1.3
	Install plant / paint					F-R4					8.29	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.81	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	43277	R	17.70									
G1.2	Electrical cable terminations	No	2015	R	33.71	G-Q1	21.48	G1.1	/	G1.2				
G1.3	Electrical equipment	No	88	R	152.78	G-Q2	491.78	G1.1	/	G1.3				
G1.4	DB's	No	14	R	623.58	G-Q3	6.29	G1.3	/	G1.4				
G1.5	Rack	m	8945	R	101.85	G-Q4	4.84	G1.1	/	G1.5				
G1.6	Support steel	kg	8612	R	8.93	G-Q5	1.04	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	40960	R	11.07	G-Q6	1.06	G1.1	/	G1.7				
G1.8	Instruments	No	647	R	45.00	G-Q7	63.31	G1.7	/	G1.8				
G1.9	Hook-ups	No	1778	R	44.84	G-Q8	0.36	G1.8	/	G1.9				
G1.10	Light fittings	No	414	R	115.08	G-Q9	4.70	G1.10	/	G1.3				
G1.11	Conduit	m	5321	R	15.90	G-Q10	8.13	G1.1	/	G1.11				
G1.12	Instrument stands	No	197	R	266.36	G-Q11	3.28	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.53	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.12	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.25	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.11	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.98	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.17	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.25	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.04	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.25	G1.7	/	G1.8

Project 4

Year of construction 1996

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,507	R	15.42	AB-Q1	2.83	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,300	R	2.36									
AB1.3	Back fill and compact	m3	5,064	R	17.80	AB-Q2	1.28	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,842	R	1.03	AB-Q3	1.69	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,811	R	1.42	AB-Q4	1.71	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					6.53	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.87	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					14.97	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					10.86	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	83,197.11									
AC1.2	EO for raking equipment	Item	1	R	9,103.25									
AC1.3	Number of piles	No	229	R	-									
AC1.4	Move rig to new position	No	145	R	79.84	AC-Q1	1.58	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	11	R	-	AC-Q2	20.82	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	11	R	89.91	AC-Q3	1.00	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	114	R	49.11	AC-Q4	0.10	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,234	R	51.74	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	410	R	101.63	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	142	R	207.37	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	113	R	88.38	AC-Q8	2.03	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	510	R	120.56	AC-Q9	0.45	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	74	R	244.70	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	15.04	R	2,124.09	AC-Q11	15.23	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	197.94	R	3,018.80	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,303	R	416.06	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	143	R	449.47	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	32,791.92		1.00		/					
AC1.19	Load test to pile	No	3	R	14,031.48	AC-Q15	76.33	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	21,167.82	AC-Q16	229.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	154	R	114.34	AC-Q17	1.49	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.96	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.22	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.95	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.50	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.59	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.26	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					78.82	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					33.72	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.27	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	139	R	35.80	AD-Q1	0.18	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	774	R	23.78									
AD1.3	Kerbing	m	363	R	52.51	AD-Q2	0.20	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,784	R	-									
AD1.5	Remove top soil	m3	581	R	10.71	AD-Q3	0.47	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,245	R	23.10	AD-Q4	0.16	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,583	R	2.26									
AD1.8	Reduce levels	m3	922	R	8.70	AD-Q5	0.26	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	574	R	16.56	AD-Q6	1.61	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	366	R	75.22	AD-Q7	1.57	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	284	R	44.83	AD-Q8	3.25	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,754	R	7.42	AD-Q9	4.79	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	288	R	4.79	AD-Q10	0.71	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	236	R	1.38	AD-Q11	0.79	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	336	R	224.51	AD-Q12	0.65	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	29	R	49.56	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	67.83	AD-Q14	0.08	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	6	R	66.73	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	723	R	1.98	AD-Q16	1.99	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.51	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.74	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.85	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.53	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.22	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.19	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.39	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.11	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.70	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.09	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.94	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.29	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.27	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	168	R	291.64	AE-Q1	5.09	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	33	R	361.67	AE-Q2	0.11	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	342	R	-									
AE1.4	Rip and compact	m2	1,521	R	1.51									
AE1.5	Formwork to plinth	m2	332	R	53.19	AE-Q3	10.06	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	149	R	47.23	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	2.98	R	2,551.04	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,484	R	37.02	AE-Q6	497.99	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,097	R	20.21	AE-Q7	6.53	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	431	R	24.70	AE-Q8	2.57	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.81	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					193.14	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.15	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					68.91	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,377	R	-	AF-Q1	21.09	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	255	R	14.99	AF-Q2	1.09	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	235	R	26.75	AF-Q3	0.50	AF1.2	/	AF1.4				
AF1.4	Working space	m2	507	R	11.89	AF-Q4	0.52	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	133	R	443.40	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	302	R	29.16	AF-Q6	0.45	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	7	R	254.97	AF-Q7	0.05	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	338.79	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	135	R	-	AF-Q9	0.48	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	279	R	3.07									
AF1.11	Formwork to bases	m2	210	R	45.58	AF-Q10	1.58	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	140	R	46.07	AF-Q11	20.00	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	50.60	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.42	R	2,241.34	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	17.90	R	3,314.34	AF-Q14	7.54	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	281	R	10.28	AF-Q15	0.47	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	22	R	47.97	AF-Q16	0.32	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	1,040.85	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	72	R	175.75									
	Base excavation / backfill					AF-R1					0.56	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.26	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					29.58	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					15.21	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					17.01	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.76	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.06	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					144.43	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.10	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.18	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					43.13	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.32	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.52	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.17	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	298	R	18.41	AG-Q1	3.39	AG1.1	/	AG1.4				
AG1.2	Working space	m2	532	R	10.39	AG-Q2	0.56	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	85	R	36.02	AG-Q3	3.51	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	88	R	254.97	AG-Q4	0.65	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	56	R	338.79	AG-Q5	1.57	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	252	R	-									
AG1.7	Wood float	m2	123	R	2.22	AG-Q6	0.46	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	136	R	17.41	AG-Q7	0.65	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	336	R	43.96	AG-Q8	0.26	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	109	R	45.25	AG-Q9	0.51	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	21.66	R	3,314.34	AG-Q10	11.63	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,940	R	10.28	AG-Q11	0.13	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,784	R	11.93	AG-Q12	0.09	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.57	R	3,543.64	AG-Q13	21.79	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.07	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.56	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.96	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.17	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					13.00	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.05	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					13.90	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	227	R	17.93	AH-Q1	3.20	AH1.1	/	AH1.4				
AH1.2	Working space	m2	84	R	15.10	AH-Q2	2.70	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	169	R	22.54	AH-Q3	1.34	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	71	R	539.31	AH-Q4	1.25	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	12	R	278.86	AH-Q5	5.92	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	79	R	370.53	AH-Q6	0.90	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	9	R	303.72	AH-Q7	7.89	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	353.10	AH-Q8	35.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	152	R	-									
AH1.10	Blinding	m2	57	R	17.45	AH-Q9	2.67	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	881	R	3.14	AH-Q10	0.17	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	103	R	45.25	AH-Q11	0.69	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	32	R	45.70	AH-Q12	0.28	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	14	R	33.87	AH-Q13	0.14	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	127	R	48.58	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	26	R	58.57	AH-Q15	3.04	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	58	R	22.42	AH-Q16	1.36	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.39	R	2,241.34	AH-Q17	0.16	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.68	R	2,221.39	AH-Q18	17.51	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	570	R	49.11	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	865	R	18.08	AH-Q20	0.18	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,740	R	11.74	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.01	R	3,295.56	AH-Q22	150.50	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	260	R	14.32	AH-Q23	0.30	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	263	R	29.35	AH-Q24	0.30	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.19	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.80	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					30.91	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					171.75	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.93	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.46	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.78	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.53	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.92	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.65	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					10.43	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.74	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.33	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					16.53	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.01	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					45.23	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					122.86	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					189.22	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					25.88	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					12.62	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	192	R	17.57	AI-Q1	2.91	AI1.1	/	AI1.5				
AI1.2	Working space	m2	801	R	13.94	AI-Q2	0.24	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	85	R	23.61	AI-Q3	2.26	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	160	R	20.65	AI-Q4	0.41	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	66	R	349.08	AI-Q5	5.08	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	463.04	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	73	R	-									
AI1.8	Wood float	m2	190	R	2.24									
AI1.9	Formwork bases	m2	181	R	70.75	AI-Q7	0.36	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	118	R	42.17	AI-Q8	0.11	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.18	R	3,407.18	AI-Q9	7.95	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,980	R	18.38	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.76	R	2,046.60	AI-Q11	86.84	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.26	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.74	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					16.90	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.75	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					155.84	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					4.93	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					10.98	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					185.37	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.17	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	341	R	23.01	AJ-Q1	3.13	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	767	R	15.36	AJ-Q2	0.44	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	107	R	34.26	AJ-Q3	3.19	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	245	R	17.20	AJ-Q4	0.44	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	109	R	451.97	AJ-Q5	4.74	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	32	R	526.41	AJ-Q6	3.41	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	23	R	291.64									
AJ1.8	Total concrete	m3	115	R	-									
AJ1.9	Wood float	m2	186	R	2.88	AJ-Q7	0.62	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	146	R	48.67	AJ-Q8	0.75	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	231	R	52.58	AJ-Q9	0.14	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	11.86	R	3,325.70	AJ-Q10	9.70	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,203	R	17.94	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,541	R	9.71	AJ-Q12	0.07	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.61	R	2,704.95	AJ-Q13	67.70	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.50	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.67	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					26.28	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					156.93	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					9.29	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					10.01	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					185.38	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					342.50	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	522	R	22.92	AK-Q1	3.26	AK1.1	/	AK1.5				
AK1.2	Working space	m2	592	R	10.68	AK-Q2	0.88	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	237	R	34.20	AK-Q3	2.20	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	444	R	22.21	AK-Q4	0.36	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	160	R	353.49	AK-Q5	17.78	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	474.38									
AK1.7	Concrete plinth	m3	34	R	371.08	AK-Q6	4.71	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	200	R	-									
AK1.9	Wood float	m2	372	R	2.22	AK-Q7	0.43	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	500	R	62.91	AK-Q8	0.32	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	149	R	68.56	AK-Q9	0.23	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	27	R	48.12	AK-Q10	0.33	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.09	R	2,177.42	AK-Q11	7.38	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,767	R	15.43	AK-Q12	0.03	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.47	R	3,127.74	AK-Q13	80.97	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.15	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.67	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					15.92	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					159.23	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.62	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.41	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.86	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					141.12	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.11	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	480	R	26.16	AL-Q1	4.25	AL1.1	/	AL1.5				
AL1.2	Working space	m2	861	R	8.57	AL-Q2	0.56	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	147	R	23.02	AL-Q3	3.27	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	240	R	26.83	AL-Q4	0.47	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	113	R	353.35	AL-Q5	1.09	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	104	R	404.39	AL-Q6	1.93	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	54	R	482.37	AL-Q7	2.09	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	248	R	-									
AL1.9	Wood float	m2	334	R	3.41	AL-Q8	0.34	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	298	R	70.86	AL-Q9	0.38	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,029	R	52.85	AL-Q10	0.10	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	185	R	64.63	AL-Q11	0.29	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	90	R	111.03	AL-Q12	0.60	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	13	R	53.86	AL-Q13	8.00	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	28.58	R	2,310.38	AL-Q14	8.68	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	13,848	R	13.47	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	173	R	12.94	AL-Q16	1.43	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.54	R	2,226.09	AL-Q17	459.26	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					3.05	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.14	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					13.17	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					103.62	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.87	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.87	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					4.99	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					7.46	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.65	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.34	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					7.46	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					8.96	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					171.52	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					178.55	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.16	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	932	R	17.78	AM-Q1	4.22	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,339	R	15.85	AM-Q2	0.70	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	704	R	22.23	AM-Q3	1.32	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	535	R	29.77	AM-Q4	0.41	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	221	R	297.54									
AM1.6	Concrete column	m3	138	R	345.90	AM-Q5	1.60	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	96	R	493.18	AM-Q6	1.44	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	141	R	363.06	AM-Q7	1.57	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	61	R	463.04	AM-Q8	2.26	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	88	R	388.08	AM-Q9	1.57	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	745	R	-									
AM1.12	Wood float	m2	1,215	R	2.47	AM-Q10	0.61	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	849	R	73.01	AM-Q11	0.26	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	414	R	33.87	AM-Q12	0.33	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	424	R	58.74	AM-Q13	0.23	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	196	R	67.64	AM-Q14	0.49	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	455	R	63.93	AM-Q15	0.31	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	175.13	AM-Q16	27.60	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	356	R	45.05	AM-Q17	0.17	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	70.50	R	1,622.54	AM-Q18	10.57	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,586	R	9.86	AM-Q19	0.21	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,755	R	16.44	AM-Q20	0.27	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	31	R	235.23	AM-Q21	2.27	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.99	R	3,117.05	AM-Q22	752.53	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.12	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.80	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					9.99	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.86	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.60	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.82	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.64	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.77	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					120.46	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					4.08	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					8.40	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					7.29	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					10.21	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.82	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					6.07	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					10.28	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					164.56	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					98.69	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					6.90	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.10	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,605	R	18.44	AN-Q1	1.22	AN1.1	/	AN1.5				
AN1.2	Working space	m2	233	R	11.78	AN-Q2	11.18	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	428	R	22.04	AN-Q3	6.09	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,213	R	26.38	AN-Q4	1.76	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,132	R	471.58	AN-Q5								
AN1.6	Concrete column	m3	30	R	360.84	AN-Q6	71.07	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	29	R	533.58	AN-Q7	1.03	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	120	R	378.80	AN-Q8	17.77	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	409.21	AN-Q9	7.50	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,480	R	-				/					
AN1.11	Wood float	m2	1,299	R	2.36	AN-Q10	1.64	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	102	R	30.56	AN-Q11	20.90	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	285	R	51.90	AN-Q12	0.11	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	197	R	75.99	AN-Q13	0.15	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	47	R	63.89	AN-Q14	0.62	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	36	R	84.75	AN-Q15	0.11	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	90.16	AN-Q16	710.67	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,035	R	45.05	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	305.01	R	3,314.34	AN-Q18	8.13	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	12,812	R	10.28	AN-Q19	0.19	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	6,197	R	11.93	AN-Q20	0.40	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	119	R	491.10	AN-Q21	20.84	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.50	R	1,997.66	AN-Q22	1421.33	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.57	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.84	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					17.88	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					199.82	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					15.43	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.02	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.35	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.95	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					5.92	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.83	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					8.41	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					322.41	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					277.82	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.24	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.75	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	209	R	17.78	AO-Q1	1.29	AO1.1	/	AO1.5				
AO1.2	Working space	m2	680	R	17.40	AO-Q2	0.31	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	78	R	16.90	AO-Q3	2.68	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	26	R	18.26	AO-Q4	6.23	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	162	R	471.58									
AO1.6	Concrete column	m3	20	R	360.84	AO-Q5	8.10	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	12	R	533.58	AO-Q6	1.67	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	337.87	AO-Q7	40.50	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	297.54	AO-Q8	20.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	53	R	-									
AO1.11	Wood float	m2	19	R	3.14	AO-Q9	8.53	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	80	R	45.25	AO-Q10	2.03	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	185	R	74.18	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	45	R	59.96	AO-Q12	0.27	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	14	R	71.03	AO-Q13	0.86	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	6	R	104.00	AO-Q14	0.17	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	31	R	72.07	AO-Q15	5.23	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	12	R	48.58	AO-Q16	0.33	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.17	R	2,999.79	AO-Q17	8.59	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,776	R	10.50	AO-Q18	0.03	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,335	R	17.79	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	358.35	AO-Q20	5.30	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.95	R	1,780.71	AO-Q21	54.92	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.02	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.05	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					25.83	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					150.18	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					10.42	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.90	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					7.51	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.86	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					7.40	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					2.86	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					6.95	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					285.69	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					168.62	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.26	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					8.37	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,439	R	25.88	AP-Q1	2.43	AP1.1	/	AP1.5				
AP1.2	Working space	m2	467	R	10.93	AP-Q2	3.08	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	814	R	24.70	AP-Q3	1.77	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	268	R	29.27	AP-Q4	2.21	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	593	R	361.67	AP-Q5	0.53	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,112	R	47.94									
AP1.7	Rough formwork	m2	222	R	48.67	AP-Q6	2.67	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,419	R	58.28	AP-Q7	0.42	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,546	R	4.67	AP-Q8	0.23	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	174	R	15.71	AP-Q9	3.41	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	74	R	33.50	AP-Q10	8.01	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	196	R	8.48	AP-Q11	3.03	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.70	R	2,107.93	AP-Q12	847.14	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,940	R	84.81	AP-Q13	0.31	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,464	R	-	AP-Q14	4.16	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,085	R	26.80	AP-Q15	2.27	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,262	R	68.89	AP-Q16	1.95	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,597	R	30.86	AP-Q17	0.69	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	6	R	390.33	AP-Q18	410.67	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,799	R	108.04	AP-Q19	0.65	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,705	R	43.23	AP-Q20	0.91	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	75.22	R	3,258.59	AP-Q21	7.88	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	11,265.03									
AP1.24	Structural steel	Item	1	R	29,169.65									
AP1.25	Plumbing and drainage	Item	1	R	18,573.45									
AP1.26	Small power and lighting	Item	1	R	158,232.77									
AP1.27	External works	Item	1	R	68,374.53									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.37	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.05	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					12.36	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					67.97	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.43	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					6.21	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					77.45	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					23.02	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					10.80	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					384.27	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.17	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					13.50	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					47.30	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.75	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.22	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.78	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.96	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.46	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.95	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.70	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					48.56	AP1.26	/	AP1.22
	External works / concrete					AP-R23					189.05	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	86	R	388.08	AQ-Q1	2.56	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	220	R	44.07									
AQ1.3	Reinforcement	t	11.22	R	3,258.59	AQ-Q2	7.66	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	868	R	50.00	AQ-Q3	0.10	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	158	R	60.95	AQ-Q4	0.54	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	170	R	66.34	AQ-Q5	3.93	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	742	R	40.82	AQ-Q6	0.90	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	46.32	R	11,687.63	AQ-Q7	14.42	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	437	R	44.56	AQ-Q8	1.53	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	5,481.74	AQ-Q9	334.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	33	R	372.49	AQ-Q10	20.24	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	693	R	31.70	AQ-Q11	0.96	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	668	R	-									
	Concrete / reinforcement					AQ-R1					0.12	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					8.81	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.76	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.37	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.85	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					286.32	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.09	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.47	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					9.13	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.29	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	135	R	44.43	AR-Q1	1.93	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	70	R	463.04	AR-Q2	17.50	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4	R	2,469.58									
AR1.4	Mesh	m2	360	R	30.93	AR-Q3	0.19	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	137	R	46.47	AR-Q4	0.51	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	66	R	96.25	AR-Q5	8.11	AR1.15	/	AR1.6				
AR1.7	Screed	m2	471	R	8.90	AR-Q6	1.14	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	28.42	R	6,968.40	AR-Q7	18.82	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	12	R	594.16	AR-Q8	2.37	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	56	R	255.42	AR-Q9	0.51	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	49	R	138.99	AR-Q10	0.58	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	445	R	54.81	AR-Q11	1.20	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	93	R	31.36	AR-Q12	5.75	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	42	R	605.20	AR-Q13	0.68	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	535	R	-									
	Earthworks / concrete					AR-R1					0.10	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.19	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					14.97	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					9.96	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.81	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					52.03	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.73	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					27.28	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.84	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					127.14	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.57	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					11.51	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	222	R	45.10	AS-Q1	3.00	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	147	R	24.29	AS-Q2	0.50	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	74	R	471.40	AS-Q3	10.57	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	7	R	2,221.39									
AS1.5	Mesh	m2	163	R	49.11	AS-Q4	0.45	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	164	R	44.49	AS-Q5	0.45	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	121	R	4.66	AS-Q6	0.61	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	33	R	30.01	AS-Q7	2.24	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	391	R	10.50	AS-Q8	0.19	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.76	R	3,193.42	AS-Q9	97.37	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	35	R	60.41	AS-Q10	0.23	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	636.22	AS-Q11	4.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	39	R	185.44	AS-Q12	3.10	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	535	R	12.37	AS-Q13	0.14	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.45	R	6,368.32	AS-Q14	5.52	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.96	R	8,819.80	AS-Q15	126.04	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	121	R	-									
AS1.18	Total control room area	m2	8	R	-									
	Concrete / earthworks					AS-R1					10.45	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					19.41	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					45.23	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					10.60	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					101.16	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					15.71	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					211.56	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.54	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.15	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.35	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.25	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	122	R	44.83	AT-Q1	6.78	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	12	R	18.19	AT-Q2	1.50	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	18	R	419.24	AT-Q3	12.86	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.40	R	2,168.27									
AT1.5	Formwork	m2	178	R	58.07	AT-Q4	0.10	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	35	R	3.44	AT-Q5	0.51	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	28	R	30.70	AT-Q6	0.64	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.36	R	10.32	AT-Q7	50.00	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.40	R	2,022.09	AT-Q8	45.00	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.09	R	11.41	AT-Q9	200.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.50	R	7,354.16	AT-Q10	48.00	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.13	R	13,012.08	AT-Q11	21.24	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	38	R	63.17	AT-Q12	0.63	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	10	R	30.29	AT-Q13	2.40	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	24	R	-									
	Concrete / earthworks					AT-R1					9.35	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					23.05	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					7.22	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					121.87	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					13.66	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					210.10	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.90	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.21	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.29	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.17	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.64	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.09	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	258	R	62.77	AU-Q1	1.04	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	268	R	19.09	AU-Q2	0.92	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	247	R	353.35									
AU1.4	Reinforcement	t	56.62	R	3,602.17	AU-Q3	4.36	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	670	R	32.76	AU-Q4	0.37	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	119	R	21.56	AU-Q5	2.08	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,228	R	14.35	AU-Q6	0.11	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	547	R	11.64	AU-Q7	0.45	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	36	R	47.92	AU-Q8	6.86	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.62	R	8,548.54	AU-Q9	94.27	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	6	R	965.06	AU-Q10	41.17	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	24	R	93.12	AU-Q11	8.21	AU1.12	/	AU1.13				
AU1.13	Total area	m2	197	R	-									
	Concrete / earthworks					AU-R1					5.63	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					18.51	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					10.79	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.10	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					16.39	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					251.02	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.42	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					309.46	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					75.17	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.37	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					3.79	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,175	R	45.53	AV-Q1	0.74	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,157	R	25.44	AV-Q2	0.75	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,338	R	27.99	AV-Q3	1.01	AV1.10	/	AV1.3				
AV1.4	Pipework	m	84	R	194.63	AV-Q4	28.13	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	1,025.59	AV-Q5	28.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	29	R	539.31	AV-Q6	2.90	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	128	R	35.83	AV-Q7	0.23	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	19	R	39.30	AV-Q8	1.53	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	2.53	R	1,932.79	AV-Q9	11.46	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,363	R	-									
	Earthworks / lining					AV-R1					1.79	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.63	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.91	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.23	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.19	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					15.05	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					13.72	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.28	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	751	R	44.83	AW-Q1	13.18	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	66	R	18.32	AW-Q2	0.86	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	57	R	237.84	AW-Q3	4.75	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	12.00	R	2,318.76									
AW1.5	Mesh	m2	93	R	50.00	AW-Q4	0.61	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	533	R	63.37	AW-Q5	0.11	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,188	R	10.25	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	1.59	R	8,799.51	AW-Q7	20.13	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	32	R	-									
	Concrete / earthworks					AW-R1					5.31	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					12.98	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					46.38	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					3.75	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					226.22	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.26	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	31	R	-									
BA1.2	Steel	t	2.32	R	4,820.49	BA-Q1	13.36	BA1.1	/	BA1.2				
BA1.3	Handrail	m	16	R	392.99	BA-Q2	1.94	BA1.1	/	BA1.3				
BA1.4	Grating	m2	11	R	456.78	BA-Q3	2.82	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	18	R	92.73	BA-Q4	1.72	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	116.36	BA-Q5	10.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					12.27	BA1.2	/	BA1.3
	Steel / grating					BA-R2					10.55	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					51.98	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					41.43	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,083	R	-									
BB1.2	Steel	t	58.94	R	7,155.03	BB-Q1	18.37	BB1.1	/	BB1.2				
BB1.3	Handrail	m	81	R	466.51	BB-Q2	13.37	BB1.1	/	BB1.3				
BB1.4	Grating	m2	64	R	457.84	BB-Q3	16.92	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	81	R	66.48	BB-Q4	13.37	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	16	R	953.86	BB-Q5	67.69	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					15.34	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.63	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					107.63	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.50	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	11,770	R	-									
BC1.2	Steel	t	208.27	R	10,414.03	BC-Q1	56.51	BC1.1	/	BC1.2				
BC1.3	Handrail	m	560	R	266.61	BC-Q2	21.02	BC1.1	/	BC1.3				
BC1.4	Grating	m2	2,803	R	436.77	BC-Q3	4.20	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	371	R	136.36	BC-Q4	31.73	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	53	R	76.24	BC-Q5	222.08	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	43	R	940.14	BC-Q6	273.72	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					39.06	BC1.2	/	BC1.3
	Steel / grating					BC-R2					23.84	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					76.37	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					136.60	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					11.08	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	377	R	-									
BD1.2	Steel	t	17.01	R	6,651.35	BD-Q1	22.16	BD1.1	/	BD1.2				
BD1.3	Handrail	m	10	R	403.99	BD-Q2	37.70	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	557.39	BD-Q3	47.13	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	16	R	92.55	BD-Q4	23.56	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	14	R	1,451.62	BD-Q5	26.93	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					16.46	BD1.1	/	BD1.2
	Steel / grating					BD-R2					11.93	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					71.87	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					4.58	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	22	R	-									
BE1.2	Steel	t	2.28	R	7,161.56	BE-Q1	9.65	BE1.1	/	BE1.2				
BE1.3	Handrail	m	45	R	305.13	BE-Q2	0.49	BE1.1	/	BE1.3				
BE1.4	Grating	m2	26	R	784.18	BE-Q3	0.85	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	41	R	66.48	BE-Q4	0.54	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	78.33	BE-Q5	3.67	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					23.47	BE1.2	/	BE1.3
	Steel / grating					BE-R2					9.13	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					107.73	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					91.43	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	343	R	-									
BF1.2	Steel	t	21.65	R	7,865.49	BF-Q1	15.84	BF1.1	/	BF1.2				
BF1.3	Handrail	m	17	R	200.36	BF-Q2	20.18	BF1.1	/	BF1.3				
BF1.4	Grating	m2	56	R	768.20	BF-Q3	6.13	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	16	R	155.02	BF-Q4	21.44	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	11	R	697.64	BF-Q5	31.18	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					39.26	BF1.1	/	BF1.2
	Steel / grating					BF-R2					10.24	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					50.74	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					11.27	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	17,362	R	-	C-Q1	0.31	C1.1	/	C1.2				
C1.2	Total work units	WU	55,516	R	160.29									
C1.3	Pipe supports	kg	10,583	R	-	C-Q2	1.64	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	6,449	R	-	C-Q3	0.12	C1.4	/	C1.2				
C1.5	Number of welds	No	9,431	R	-	C-Q4	0.54	C1.5	/	C1.1				
C1.6	Total fittings	No	7,153	R	-	C-Q5	0.41	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,155	R	-	C-Q6	0.30	C1.7	/	C1.6				
C1.8	Support number	No	1,435	R	-	C-Q7	0.14	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	55,516	R	160.29	DA-Q1	44.45	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,249	R	27.93									
	Average cost per examination / WU					DA-R1					5.74	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	55,516	R	160.29	DB-Q1	182.62	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	304	R	31.14									
	Average cost per examination / WU					DB-R1					5.15	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	55,516	R	160.29	DC-Q1	213.52	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	260	R	46.61									
	Average cost per examination / WU					DC-R1					3.44	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	55,516	R	160.29	DD-Q1	53.43	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,039	R	21.12									
	Average cost per examination / WU					DD-R1					7.59	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	55,516	R	160.29	DE-Q1	77.54	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	716	R	58.40									
	Average cost per examination / WU					DE-R1					2.74	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	55,516	R	160.29	E-Q1	216.77	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	256.10	R	191.89	E-Q2	204.24	E1.1	/	E1.3				
E1.3	Structural steel	t	271.82	R	8,235.33									
	WU cost / install mechanical weight - receive					E-R1					0.84	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					42.92	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	55,516	R	160.29									
F1.2	Painting to piping	m2	3,054	R	37.99	F-Q1	18.18	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,040	R	164.99	F-Q2	53.38	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	280.09	R	98.79									
F1.5	Painting to mechanical equipment	m2	935	R	40.71	F-Q3	0.30	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	473	R	154.91	F-Q4	0.59	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.23	F1.2	/	F1.3
	Work unit / paint					F-R2					4.22	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.97	F1.1	/	F1.3
	Install plant / paint					F-R4					2.43	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.64	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	27,396	R	17.52									
G1.2	Electrical cable terminations	No	715	R	39.46	G-Q1	38.32	G1.1	/	G1.2				
G1.3	Electrical equipment	No	68	R	125.91	G-Q2	402.88	G1.1	/	G1.3				
G1.4	DB's	No	11	R	550.63	G-Q3	6.18	G1.3	/	G1.4				
G1.5	Rack	m	3,956	R	39.43	G-Q4	6.93	G1.1	/	G1.5				
G1.6	Support steel	kg	6,235	R	7.52	G-Q5	0.63	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	24,995	R	8.15	G-Q6	1.10	G1.1	/	G1.7				
G1.8	Instruments	No	748	R	52.49	G-Q7	33.42	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,310	R	38.42	G-Q8	0.57	G1.8	/	G1.9				
G1.10	Light fittings	No	378	R	101.61	G-Q9	5.56	G1.10	/	G1.3				
G1.11	Conduit	m	4,386	R	14.04	G-Q10	6.25	G1.1	/	G1.11				
G1.12	Instrument stands	No	141	R	219.52	G-Q11	5.30	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.44	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.14	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.25	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.33	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.44	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.17	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.21	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.04	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.16	G1.7	/	G1.8

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Year of construction 1999

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,840	R	12.26	AB-Q1	2.46	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,776	R	2.60									
AB1.3	Back fill and compact	m3	6,110	R	13.27	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,635	R	0.92	AB-Q3	1.48	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,598	R	1.44	AB-Q4	1.49	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.72	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.92	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					13.33	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.51	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	120,393.69									
AC1.2	EO for raking equipment	Item	1	R	15,173.13									
AC1.3	Number of piles	No	207	R	-									
AC1.4	Move rig to new position	No	200	R	120.08	AC-Q1	1.04	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	16	R	-	AC-Q2	12.94	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	13	R	149.87	AC-Q3	1.23	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	134	R	85.17	AC-Q4	0.12	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,655	R	77.83	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	451	R	133.75	AC-Q6	0.46	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	167	R	359.63	AC-Q7	1.24	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	125	R	142.42	AC-Q8	1.66	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	600	R	182.13	AC-Q9	0.35	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	79	R	354.10	AC-Q10	0.20	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.43	R	3,540.40	AC-Q11	11.88	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	179.25	R	5,235.29	AC-Q12	1.15	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,792	R	625.79	AC-Q13	0.12	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	212	R	633.75	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	54,656.98		1.00		/					
AC1.19	Load test to pile	No	4	R	24,333.76	AC-Q15	51.75	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	31,838.53	AC-Q16	207.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	169	R	150.47	AC-Q17	1.22	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.25	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.09	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.57	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					38.88	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	175	R	57.72	AD-Q1	0.19	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	908	R	35.79									
AD1.3	Kerbing	m	398	R	79.02	AD-Q2	0.18	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,243	R	-									
AD1.5	Remove top soil	m3	681	R	17.27	AD-Q3	0.33	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,073	R	61.44	AD-Q4	0.35	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	1,947	R	1.77									
AD1.8	Reduce levels	m3	1,294	R	15.32	AD-Q5	0.66	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	617	R	26.29	AD-Q6	2.10	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	460	R	101.55	AD-Q7	1.34	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	311	R	72.28	AD-Q8	4.16	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,921	R	11.17	AD-Q9	4.18	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	362	R	7.73	AD-Q10	1.08	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	277	R	2.08	AD-Q11	0.91	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	368	R	337.88	AD-Q12	0.70	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	36	R	85.61	AD-Q13	0.92	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	109.37	AD-Q14	0.09	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	11	R	177.49	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	393	R	1.55	AD-Q16	0.99	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.61	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					9.76	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.66	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.58	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.26	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					2.34	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.50	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.78	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.08	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.38	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.25	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	184	R	469.98	AE-Q1	4.72	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	39	R	546.38	AE-Q2	0.10	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	367	R	-									
AE1.4	Rip and compact	m2	1,762	R	2.51									
AE1.5	Formwork to plinth	m2	301	R	92.24	AE-Q3	7.72	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	205	R	71.04	AE-Q4	1.11	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.44	R	3,596.97	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,748	R	61.71	AE-Q6	393.69	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,292	R	35.04	AE-Q7	7.02	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	474	R	37.14	AE-Q8	2.58	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					187.24	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					58.29	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,502	R	-	AF-Q1	11.30	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	310	R	23.07	AF-Q2	0.88	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	353	R	55.77	AF-Q3	0.56	AF1.2	/	AF1.4				
AF1.4	Working space	m2	556	R	18.21	AF-Q4	0.66	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	205	R	981.67	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	163	R	19.76	AF-Q6	1.29	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	12	R	587.54	AF-Q7	0.06	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	519.97	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	210	R	-	AF-Q9	0.99	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	212	R	2.99									
AF1.11	Formwork to bases	m2	259	R	70.20	AF-Q10	1.26	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	154	R	76.11	AF-Q11	12.83	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	13	R	83.59	AF-Q12	4.33	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.67	R	5,421.06	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	21.08	R	2,803.12	AF-Q14	9.96	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	331	R	17.03	AF-Q15	0.62	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	30	R	67.62	AF-Q16	0.40	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	1,684.40	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	88	R	265.45									
	Base excavation / backfill					AF-R1					0.41	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.27	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					42.55	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					49.68	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					25.47	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.53	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					328.32	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.07	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.13	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.16	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.93	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					57.64	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.69	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.70	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.16	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	248	R	27.18	AG-Q1	2.61	AG1.1	/	AG1.4				
AG1.2	Working space	m2	671	R	23.78	AG-Q2	0.37	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	98	R	47.40	AG-Q3	2.53	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	95	R	569.98	AG-Q4	0.64	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	69	R	842.84	AG-Q5	1.38	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	277	R	-									
AG1.7	Wood float	m2	145	R	3.36	AG-Q6	0.48	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	149	R	38.60	AG-Q7	0.64	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	370	R	75.31	AG-Q8	0.26	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	129	R	61.90	AG-Q9	0.53	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	25.52	R	3,548.56	AG-Q10	10.85	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,285	R	21.66	AG-Q11	0.12	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,280	R	18.38	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.03	R	3,329.66	AG-Q13	22.77	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.87	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.74	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.13	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.07	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.23	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.84	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	250	R	37.00	AH-Q1	6.94	AH1.1	/	AH1.4				
AH1.2	Working space	m2	65	R	22.90	AH-Q2	3.85	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	281	R	35.40	AH-Q3	0.89	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	36	R	822.69	AH-Q4	0.55	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	19	R	558.14	AH-Q5	1.89	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	85	R	894.13	AH-Q6	0.42	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	402.75	AH-Q7	2.77	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	535.14	AH-Q8	9.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	154	R	-									
AH1.10	Blinding	m2	66	R	41.67	AH-Q9	2.33	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	887	R	4.74	AH-Q10	0.17	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	124	R	73.23	AH-Q11	0.29	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	36	R	73.95	AH-Q12	0.36	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	22	R	77.21	AH-Q13	0.18	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	221	R	110.07	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	28	R	105.65	AH-Q15	3.04	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	59	R	33.86	AH-Q16	1.44	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.67	R	3,627.14	AH-Q17	0.14	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	11.63	R	2,440.46	AH-Q18	13.24	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	471	R	62.31	AH-Q19	0.18	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,311	R	17.83	AH-Q20	0.12	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,790	R	19.44	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.11	R	5,333.17	AH-Q22	138.74	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	307	R	23.17	AH-Q23	0.28	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	310	R	52.95	AH-Q24	0.27	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.62	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					1.05	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.74	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					173.56	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.47	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.92	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					2.04	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.54	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.23	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					5.45	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.93	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.07	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.46	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					26.41	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.49	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					39.17	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					136.87	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					125.54	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.15	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					38.59	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					16.89	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	227	R	28.43	AI-Q1	2.58	AI1.1	/	AI1.5				
AI1.2	Working space	m2	898	R	18.02	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	102	R	42.14	AI-Q3	2.23	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	193	R	50.57	AI-Q4	0.46	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	88	R	383.50	AI-Q5	8.00	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	11	R	587.54	AI-Q6	0.45	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	111	R	-									
AI1.8	Wood float	m2	195	R	3.71									
AI1.9	Formwork bases	m2	199	R	114.49	AI-Q7	0.44	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	139	R	68.24	AI-Q8	0.08	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	11.59	R	5,513.80	AI-Q9	9.58	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,352	R	27.77	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.85	R	3,311.99	AI-Q11	103.53	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.07	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.58	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.67	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					7.58	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.65	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					103.37	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					3.35	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					8.61	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					198.55	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.12	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	289	R	42.34	AJ-Q1	2.95	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	910	R	24.86	AJ-Q2	0.32	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	146	R	55.44	AJ-Q3	1.98	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	255	R	27.83	AJ-Q4	0.38	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	98	R	842.84	AJ-Q5	2.72	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	22	R	533.69	AJ-Q6	4.45	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	36	R	553.40									
AJ1.8	Total concrete	m3	202	R	-									
AJ1.9	Wood float	m2	196	R	3.55	AJ-Q7	1.03	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	176	R	72.62	AJ-Q8	0.56	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	199	R	109.45	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	14.08	R	5,381.94	AJ-Q10	14.35	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,373	R	29.04	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,608	R	15.71	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.44	R	5,044.29	AJ-Q13	68.06	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.70	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.76	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					30.29	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					237.42	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					11.61	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					4.88	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					185.33	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					342.58	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	615	R	32.91	AK-Q1	3.27	AK1.1	/	AK1.5				
AK1.2	Working space	m2	698	R	22.03	AK-Q2	0.88	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	279	R	37.30	AK-Q3	2.20	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	488	R	32.62	AK-Q4	0.39	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	188	R	586.15	AK-Q5	18.80	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	761.65									
AK1.7	Concrete plinth	m3	41	R	542.12	AK-Q6	4.59	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	240	R	-									
AK1.9	Wood float	m2	499	R	5.41	AK-Q7	0.38	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	589	R	109.08	AK-Q8	0.32	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	175	R	105.70	AK-Q9	0.23	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	29	R	79.49	AK-Q10	0.34	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	29.77	R	3,596.97	AK-Q11	8.06	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,725	R	28.40	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.93	R	5,061.58	AK-Q13	81.91	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.49	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.88	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					17.97	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					108.35	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.37	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.13	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.58	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					126.65	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.12	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	329	R	26.52	AL-Q1	2.74	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,333	R	16.27	AL-Q2	0.25	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	257	R	52.35	AL-Q3	1.28	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	281	R	39.25	AL-Q4	0.43	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	120	R	560.39	AL-Q5	1.05	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	114	R	571.41	AL-Q6	1.61	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	71	R	728.57	AL-Q7	1.69	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	292	R	-									
AL1.9	Wood float	m2	421	R	5.36	AL-Q8	0.29	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	335	R	68.57	AL-Q9	0.36	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	837	R	104.17	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	169	R	158.26	AL-Q11	0.42	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	101	R	167.09	AL-Q12	0.70	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	99.69	AL-Q13	11.40	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	32.93	R	3,405.44	AL-Q14	8.87	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	16,062	R	22.66	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	196	R	18.54	AL-Q16	1.49	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.61	R	3,337.34	AL-Q17	478.69	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.63	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.51	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					14.28	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					104.55	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.98	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.98	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.17	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					4.60	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					5.49	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.36	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					4.60	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					7.31	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					150.28	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					183.68	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.17	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,409	R	29.74	AM-Q1	4.84	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,544	R	16.21	AM-Q2	0.91	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,155	R	35.09	AM-Q3	1.22	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	504	R	49.36	AM-Q4	0.58	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	291	R	401.07									
AM1.6	Concrete column	m3	124	R	573.49	AM-Q5	2.35	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	244	R	958.19	AM-Q6	0.51	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	159	R	469.98	AM-Q7	1.83	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	75	R	546.38	AM-Q8	1.65	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	76	R	779.02	AM-Q9	1.63	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	783	R	-									
AM1.12	Wood float	m2	2,349	R	4.54	AM-Q10	0.33	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	429	R	76.88	AM-Q11	0.68	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	665	R	92.06	AM-Q12	0.19	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	533	R	135.88	AM-Q13	0.46	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	222	R	137.15	AM-Q14	1.10	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	581	R	107.28	AM-Q15	0.27	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	191.89	AM-Q16	24.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	322	R	125.16	AM-Q17	0.23	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	97.02	R	5,164.88	AM-Q18	8.07	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,230	R	17.05	AM-Q19	0.19	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,359	R	21.11	AM-Q20	0.33	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	64	R	626.92	AM-Q21	1.52	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.23	R	5,597.49	AM-Q22	636.59	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.07	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.83	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.85	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					8.13	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.70	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.42	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.85	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.73	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.51	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					88.34	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.22	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					7.05	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					6.99	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.23	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					4.99	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					7.26	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					4.37	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					302.93	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					244.67	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.24	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.07	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,381	R	27.71	AN-Q1	2.22	AN1.1	/	AN1.5				
AN1.2	Working space	m2	327	R	24.18	AN-Q2	10.34	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	491	R	35.52	AN-Q3	6.89	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,411	R	27.84	AN-Q4	1.08	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,524	R	546.99	AN-Q5								
AN1.6	Concrete column	m3	53	R	779.02	AN-Q6	28.75	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	54	R	938.67	AN-Q7	0.98	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	126	R	586.15	AN-Q8	12.10	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	620.32	AN-Q9	13.25	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,647	R	-				/					
AN1.11	Wood float	m2	2,097	R	4.65	AN-Q10	0.73	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	236	R	120.17	AN-Q11	6.46	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	294	R	59.74	AN-Q12	0.18	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	166	R	85.00	AN-Q13	0.33	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	71	R	154.27	AN-Q14	0.76	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	31	R	97.68	AN-Q15	0.13	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	142.42	AN-Q16	508.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,136	R	71.07	AN-Q17	0.11	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	544.84	R	6,097.58	AN-Q18	3.02	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	11,590	R	15.53	AN-Q19	0.14	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	6,751	R	18.60	AN-Q20	0.24	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	94	R	599.50	AN-Q21	17.52	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.77	R	5,597.49	AN-Q22	861.02	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.15	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.78	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					19.65	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					117.63	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					4.55	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					11.04	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					6.08	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					13.04	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					6.59	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					6.35	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					8.25	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					392.63	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					327.83	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.10	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					10.17	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	289	R	27.74	AO-Q1	2.06	AO1.1	/	AO1.5				
AO1.2	Working space	m2	564	R	12.33	AO-Q2	0.51	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	103	R	35.62	AO-Q3	2.81	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	47	R	38.37	AO-Q4	2.98	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	140	R	569.98									
AO1.6	Concrete column	m3	20	R	842.84	AO-Q5	7.00	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	10	R	613.00	AO-Q6	2.00	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	662.23	AO-Q7	35.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	538.21	AO-Q8	20.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	55	R	-									
AO1.11	Wood float	m2	31	R	3.81	AO-Q9	4.52	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	95	R	83.05	AO-Q10	1.47	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	249	R	115.59	AO-Q11	0.08	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	41	R	77.67	AO-Q12	0.24	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	16	R	102.06	AO-Q13	0.63	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	6	R	136.29	AO-Q14	0.17	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	49	R	167.09	AO-Q15	2.86	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	113.58	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.97	R	3,848.63	AO-Q17	11.07	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,079	R	27.87	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,415	R	13.37	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	608.24	AO-Q20	5.50	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.84	R	2,872.89	AO-Q21	49.30	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.25	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.78	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					14.85	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					149.60	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.86	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					7.89	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.01	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.29	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.67	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.95	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.83	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					138.09	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					287.86	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.20	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.33	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,654	R	37.00	AP-Q1	2.10	AP1.1	/	AP1.5				
AP1.2	Working space	m2	511	R	16.21	AP-Q2	3.24	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	942	R	54.21	AP-Q3	1.76	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	206	R	28.75	AP-Q4	3.82	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	787	R	565.24	AP-Q5	0.37	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,154	R	99.20									
AP1.7	Rough formwork	m2	221	R	53.89	AP-Q6	3.56	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,221	R	79.72	AP-Q7	0.64	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,953	R	6.77	AP-Q8	0.20	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	215	R	43.42	AP-Q9	3.66	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	49	R	33.96	AP-Q10	16.06	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	334	R	15.72	AP-Q11	2.36	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.85	R	5,223.29	AP-Q12	925.88	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,448	R	108.13	AP-Q13	0.54	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,294	R	-	AP-Q14	5.46	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,977	R	35.25	AP-Q15	2.17	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,513	R	111.92	AP-Q16	2.84	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,522	R	64.25	AP-Q17	0.95	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	5	R	428.82	AP-Q18	858.80	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,107	R	137.09	AP-Q19	1.38	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,955	R	76.53	AP-Q20	1.45	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	80.59	R	3,405.44	AP-Q21	9.77	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	17,794.12									
AP1.24	Structural steel	Item	1	R	46,076.05									
AP1.25	Plumbing and drainage	Item	1	R	29,338.42									
AP1.26	Small power and lighting	Item	1	R	249,942.70									
AP1.27	External works	Item	1	R	108,003.63									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.28	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.68	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.66	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					34.33	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					10.49	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.09	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					83.49	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					13.02	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					16.64	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					216.63	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.11	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					16.04	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					30.43	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.68	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.25	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.79	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.41	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.23	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					13.53	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.62	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					73.40	AP1.26	/	AP1.22
	External works / concrete					AP-R23					191.08	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	101	R	894.13	AQ-Q1	1.73	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	175	R	51.26									
AQ1.3	Reinforcement	t	13	R	3,730.06	AQ-Q2	7.77	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	734	R	67.16	AQ-Q3	0.14	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	182	R	71.71	AQ-Q4	0.55	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	186	R	159.86	AQ-Q5	3.48	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	641	R	41.01	AQ-Q6	1.01	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	42.61	R	10,525.09	AQ-Q7	15.21	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	456	R	51.33	AQ-Q8	1.42	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	1	R	5,585.40	AQ-Q9	648.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	34	R	578.48	AQ-Q10	19.06	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	789	R	46.57	AQ-Q11	0.82	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	648	R	-									
	Concrete / reinforcement					AQ-R1					0.24	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					17.44	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					13.31	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					12.47	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.59	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					256.65	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.25	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.53	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.11	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					0.88	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	179	R	68.79	AR-Q1	2.18	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	82	R	872.75	AR-Q2	23.50	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	3.49	R	2,680.34									
AR1.4	Mesh	m2	446	R	59.36	AR-Q3	0.18	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	124	R	68.57	AR-Q4	0.66	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	123	R	142.47	AR-Q5	2.84	AR1.15	/	AR1.6				
AR1.7	Screed	m2	285	R	14.59	AR-Q6	1.22	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	31.43	R	15,908.38	AR-Q7	11.10	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	16	R	1,735.84	AR-Q8	1.96	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	42	R	429.73	AR-Q9	0.75	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	43	R	172.76	AR-Q10	0.73	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	485	R	67.43	AR-Q11	0.72	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	92	R	50.56	AR-Q12	3.79	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	43	R	910.79	AR-Q13	0.73	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	349	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.33	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					14.70	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					12.73	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					6.13	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					59.82	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					9.16	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					37.02	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.49	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					235.92	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.75	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					17.47	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	381	R	121.95	AS-Q1	4.23	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	105	R	20.66	AS-Q2	0.86	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	90	R	557.63	AS-Q3	8.80	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	10.23	R	5,235.29									
AS1.5	Mesh	m2	133	R	59.20	AS-Q4	0.68	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	199	R	69.44	AS-Q5	0.45	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	127	R	4.97	AS-Q6	0.71	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	25	R	49.57	AS-Q7	3.60	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	734	R	21.80	AS-Q8	0.12	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.00	R	5,875.13	AS-Q9	90.00	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	35	R	99.47	AS-Q10	0.37	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	1,657.89	AS-Q11	6.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	48	R	202.64	AS-Q12	2.71	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	595	R	26.96	AS-Q13	0.15	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.50	R	15,271.86	AS-Q14	5.20	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.61	R	15,820.17	AS-Q15	213.11	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	130	R	-									
AS1.18	Total control room area	m2	13	R	-									
	Concrete / earthworks					AS-R1					4.57	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					26.99	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					88.43	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					8.03	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					112.20	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					11.25	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					240.15	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.75	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.09	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.34	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.33	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	148	R	108.23	AT-Q1	10.57	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	17	R	27.16	AT-Q2	0.82	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	14	R	559.65	AT-Q3	7.14	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.96	R	2,562.94									
AT1.5	Formwork	m2	199	R	68.76	AT-Q4	0.07	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	36	R	7.08	AT-Q5	0.39	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	25	R	54.11	AT-Q6	0.56	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.48	R	15.34	AT-Q7	29.17	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.71	R	4,484.63	AT-Q8	19.72	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.12	R	13.10	AT-Q9	116.67	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.62	R	11,638.89	AT-Q10	58.06	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.15	R	13,172.48	AT-Q11	31.30	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	35	R	74.99	AT-Q12	1.03	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	15	R	56.99	AT-Q13	2.40	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	36	R	-									
	Concrete / earthworks					AT-R1					5.17	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					20.61	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					8.14	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					79.05	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					10.34	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					167.08	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					1.17	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.12	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.22	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.19	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					7.46	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.32	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	312	R	69.62	AU-Q1	0.68	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	232	R	41.67	AU-Q2	1.97	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	456	R	744.90									
AU1.4	Reinforcement	t	27.35	R	3,627.14	AU-Q3	16.67	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,100	R	108.29	AU-Q4	0.41	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	190	R	33.96	AU-Q5	2.40	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,874	R	15.34	AU-Q6	0.24	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	662	R	24.98	AU-Q7	0.69	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	43	R	83.13	AU-Q8	10.60	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.51	R	12,036.34	AU-Q9	181.67	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	10	R	1,527.91	AU-Q10	45.60	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	23	R	133.13	AU-Q11	10.91	AU1.12	/	AU1.13				
AU1.13	Total area	m2	251	R	-									
	Concrete / earthworks					AU-R1					10.70	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					17.88	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					6.88	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.21	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					21.93	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					236.45	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.30	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					145.20	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					43.63	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.49	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.60	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,451	R	71.48	AV-Q1	0.88	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,794	R	30.08	AV-Q2	1.08	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,344	R	51.37	AV-Q3	0.70	AV1.10	/	AV1.3				
AV1.4	Pipework	m	60	R	203.87	AV-Q4	50.35	AV1.10	/	AV1.4				
AV1.5	Manholes	No	5	R	2,067.34	AV-Q5	12.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	29	R	598.34	AV-Q6	2.07	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	278	R	97.90	AV-Q7	0.10	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	21	R	59.44	AV-Q8	1.38	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.72	R	3,396.23	AV-Q9	7.80	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,021	R	-									
	Earthworks / lining					AV-R1					2.38	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.39	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.59	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.35	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.10	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					6.11	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					10.07	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.18	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	657	R	59.82	AW-Q1	5.76	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	78	R	28.15	AW-Q2	1.46	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	114	R	779.02	AW-Q3	7.55	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	15.09	R	2,562.94									
AW1.5	Mesh	m2	57	R	56.76	AW-Q4	2.00	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	403	R	100.09	AW-Q5	0.28	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,872	R	17.03	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.54	R	10,020.13	AW-Q7	14.57	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	37	R	-									
	Concrete / earthworks					AW-R1					13.02	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					27.67	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					45.15	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					7.78	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					150.50	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.26	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	27	R	-									
BA1.2	Steel	t	4.36	R	11,276.00	BA-Q1	6.19	BA1.1	/	BA1.2				
BA1.3	Handrail	m	12	R	538.69	BA-Q2	2.25	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	773.49	BA-Q3	1.93	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	18	R	169.24	BA-Q4	1.50	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	181.85	BA-Q5	9.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.93	BA1.2	/	BA1.3
	Steel / grating					BA-R2					14.58	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					66.63	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					62.01	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	916	R	-									
BB1.2	Steel	t	45.00	R	16,449.89	BB-Q1	20.36	BB1.1	/	BB1.2				
BB1.3	Handrail	m	153	R	442.28	BB-Q2	5.99	BB1.1	/	BB1.3				
BB1.4	Grating	m2	113	R	818.58	BB-Q3	8.11	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	82	R	126.14	BB-Q4	11.17	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	1,465.05	BB-Q5	70.46	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					37.19	BB1.2	/	BB1.3
	Steel / grating					BB-R2					20.10	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					130.41	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.23	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	18,315	R	-									
BC1.2	Steel	t	188.20	R	11,908.10	BC-Q1	97.32	BC1.1	/	BC1.2				
BC1.3	Handrail	m	461	R	462.54	BC-Q2	39.73	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,238	R	1,160.30	BC-Q3	5.66	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	393	R	98.36	BC-Q4	46.60	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	60	R	124.18	BC-Q5	305.25	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	80	R	1,956.30	BC-Q6	228.94	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					25.75	BC1.2	/	BC1.3
	Steel / grating					BC-R2					10.26	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					121.07	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					95.89	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					6.09	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	470	R	-									
BD1.2	Steel	t	13.44	R	14,824.15	BD-Q1	34.97	BD1.1	/	BD1.2				
BD1.3	Handrail	m	10	R	462.54	BD-Q2	47.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	11	R	856.08	BD-Q3	42.73	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	10	R	217.70	BD-Q4	47.00	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	25	R	1,210.30	BD-Q5	18.80	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					32.05	BD1.1	/	BD1.2
	Steel / grating					BD-R2					17.32	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					68.09	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					12.25	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	57	R	-									
BE1.2	Steel	t	2.40	R	10,763.80	BE-Q1	23.75	BE1.1	/	BE1.2				
BE1.3	Handrail	m	50	R	653.78	BE-Q2	1.14	BE1.1	/	BE1.3				
BE1.4	Grating	m2	31	R	1,076.87	BE-Q3	1.84	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	28	R	199.41	BE-Q4	2.04	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	116.97	BE-Q5	8.14	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					16.46	BE1.2	/	BE1.3
	Steel / grating					BE-R2					10.00	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					53.98	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					92.02	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	404	R	-									
BF1.2	Steel	t	23.68	R	12,127.13	BF-Q1	17.06	BF1.1	/	BF1.2				
BF1.3	Handrail	m	10	R	302.62	BF-Q2	40.40	BF1.1	/	BF1.3				
BF1.4	Grating	m2	43	R	741.36	BF-Q3	9.40	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	12	R	182.24	BF-Q4	33.67	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	22	R	1,537.72	BF-Q5	18.36	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					40.07	BF1.1	/	BF1.2
	Steel / grating					BF-R2					16.36	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					66.54	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.89	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	19,599	R	-	C-Q1	0.23	C1.1	/	C1.2				
C1.2	Total work units	WU	85,860	R	236.27									
C1.3	Pipe supports	kg	5,709	R	-	C-Q2	3.43	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,044	R	-	C-Q3	0.13	C1.4	/	C1.2				
C1.5	Number of welds	No	11,061	R	-	C-Q4	0.56	C1.5	/	C1.1				
C1.6	Total fittings	No	7,119	R	-	C-Q5	0.36	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,256	R	-	C-Q6	0.32	C1.7	/	C1.6				
C1.8	Support number	No	1,408	R	-	C-Q7	0.25	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	85,860	R	236.27	DA-Q1	50.65	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,695	R	43.04									
	Average cost per examination / WU					DA-R1					5.49	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	85,860	R	236.27	DB-Q1	244.62	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	351	R	74.86									
	Average cost per examination / WU					DB-R1					3.16	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	85,860	R	236.27	DC-Q1	474.36	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	181	R	70.40									
	Average cost per examination / WU					DC-R1					3.36	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	85,860	R	236.27	DD-Q1	71.14	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,207	R	24.05									
	Average cost per examination / WU					DD-R1					9.82	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	85,860	R	236.27	DE-Q1	139.16	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	617	R	95.34									
	Average cost per examination / WU					DE-R1					2.48	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	85,860	R	236.27	E-Q1	338.86	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	253.38	R	248.54	E-Q2	274.76	E1.1	/	E1.3				
E1.3	Structural steel	t	312.49	R	13,008.44									
	WU cost / install mechanical weight - receive					E-R1					0.95	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					52.34	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	85,860	R	236.27									
F1.2	Painting to piping	m2	3,337	R	65.24	F-Q1	25.73	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,678	R	268.64	F-Q2	51.17	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	190.41	R	156.71									
F1.5	Painting to mechanical equipment	m2	1,104	R	60.00	F-Q3	0.17	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	378	R	260.62	F-Q4	0.50	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.24	F1.2	/	F1.3
	Work unit / paint					F-R2					3.62	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.88	F1.1	/	F1.3
	Install plant / paint					F-R4					2.61	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.60	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	29,962	R	25.27									
G1.2	Electrical cable terminations	No	1,186	R	54.89	G-Q1	25.26	G1.1	/	G1.2				
G1.3	Electrical equipment	No	74	R	190.18	G-Q2	404.89	G1.1	/	G1.3				
G1.4	DB's	No	13	R	831.68	G-Q3	5.69	G1.3	/	G1.4				
G1.5	Rack	m	4,348	R	59.80	G-Q4	6.89	G1.1	/	G1.5				
G1.6	Support steel	kg	7,344	R	11.35	G-Q5	0.59	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	32,815	R	13.46	G-Q6	0.91	G1.1	/	G1.7				
G1.8	Instruments	No	822	R	80.92	G-Q7	39.92	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,543	R	92.93	G-Q8	0.53	G1.8	/	G1.9				
G1.10	Light fittings	No	445	R	164.44	G-Q9	6.01	G1.10	/	G1.3				
G1.11	Conduit	m	5,165	R	22.72	G-Q10	5.80	G1.1	/	G1.11				
G1.12	Instrument stands	No	155	R	331.57	G-Q11	5.30	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.46	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.13	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.11	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.23	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.42	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.14	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.04	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.17	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,471	R	27.80	AB-Q1	2.18	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,969	R	6.88									
AB1.3	Back fill and compact	m3	5,279	R	27.45	AB-Q2	1.23	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,460	R	3.33	AB-Q3	1.45	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,096	R	4.90	AB-Q4	1.58	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.04	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.01	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					8.35	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					5.67	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	178,488.31									
AC1.2	EO for raking equipment	Item	1	R	24,101.52									
AC1.3	Number of piles	No	220	R	-									
AC1.4	Move rig to new position	No	184	R	178.03	AC-Q1	1.20	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	15.71	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	222.18	AC-Q3	1.17	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	109	R	135.28	AC-Q4	0.13	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,015	R	115.38	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	518	R	212.45	AC-Q6	0.42	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	136	R	571.25	AC-Q7	1.62	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	144	R	197.07	AC-Q8	1.53	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	561	R	289.30	AC-Q9	0.39	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	81	R	524.97	AC-Q10	0.17	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.08	R	5,623.69	AC-Q11	13.68	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	189.78	R	8,315.91	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,653	R	927.76	AC-Q13	0.13	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	193	R	939.56	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	81,031.09		1.00		/					
AC1.19	Load test to pile	No	3	R	38,652.58	AC-Q15	73.33	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	47,201.85	AC-Q16	220.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	194	R	239.01	AC-Q17	1.13	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.98	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.17	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.62	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.31	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					41.66	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	157	R	50.70	AD-Q1	0.18	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	879	R	58.69									
AD1.3	Kerbing	m	301	R	159.68	AD-Q2	0.12	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,580	R	-									
AD1.5	Remove top soil	m3	848	R	36.02	AD-Q3	0.42	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,041	R	44.70	AD-Q4	0.47	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	1,789	R	4.10									
AD1.8	Reduce levels	m3	1,189	R	23.57	AD-Q5	0.66	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	710	R	55.09	AD-Q6	1.67	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	423	R	104.16	AD-Q7	1.68	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	306	R	120.56	AD-Q8	3.89	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,766	R	17.44	AD-Q9	4.17	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	325	R	12.01	AD-Q10	1.16	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	268	R	3.69	AD-Q11	1.08	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	279	R	669.88	AD-Q12	0.89	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	42	R	90.83	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	153.58	AD-Q14	0.14	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	10	R	280.92	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	361	R	2.69	AD-Q16	1.20	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.86	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					8.79	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					5.75	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.43	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.53	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.81	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.17	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					2.56	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.53	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.02	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.20	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.57	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.96	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.76	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	213	R	650.32	AE-Q1	5.76	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	37	R	867.90	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	378	R	-									
AE1.4	Rip and compact	m2	1,625	R	3.99									
AE1.5	Formwork to plinth	m2	319	R	146.52	AE-Q3	8.62	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	189	R	105.31	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.04	R	5,332.65	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,586	R	91.49	AE-Q6	392.57	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,052	R	55.66	AE-Q7	4.94	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	510	R	55.07	AE-Q8	2.39	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.75	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					162.99	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					58.29	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.09	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,219	R	-	AF-Q1	10.55	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	305	R	36.64	AF-Q2	0.94	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	324	R	47.53	AF-Q3	0.56	AF1.2	/	AF1.4				
AF1.4	Working space	m2	547	R	25.41	AF-Q4	0.66	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	202	R	1,154.48	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	150	R	44.04	AF-Q6	1.38	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	11	R	834.47	AF-Q7	0.05	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	915.26	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	207	R	-	AF-Q9	1.06	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	195	R	4.14									
AF1.11	Formwork to bases	m2	238	R	111.51	AF-Q10	1.18	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	155	R	112.84	AF-Q11	14.09	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	14	R	123.92	AF-Q12	7.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.86	R	8,610.99	AF-Q13	0.27	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	10.62	R	4,155.73	AF-Q14	19.49	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	305	R	25.24	AF-Q15	0.66	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	28	R	100.67	AF-Q16	0.39	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	2,496.67	AF-Q17	0.05	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	97	R	430.43									
	Base excavation / backfill					AF-R1					0.77	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.44	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					31.51	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					26.21	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					22.77	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.79	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					278.86	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.10	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.14	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.14	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.07	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					45.74	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.29	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.68	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.17	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	245	R	43.11	AG-Q1	1.76	AG1.1	/	AG1.4				
AG1.2	Working space	m2	1,008	R	38.82	AG-Q2	0.24	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	42	R	43.46	AG-Q3	5.83	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	139	R	907.46	AG-Q4	0.69	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	84	R	908.80	AG-Q5	1.65	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	219	R	-									
AG1.7	Wood float	m2	136	R	5.44	AG-Q6	0.62	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	201	R	58.42	AG-Q7	0.69	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	313	R	122.12	AG-Q8	0.44	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	94	R	91.77	AG-Q9	0.89	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	18.77	R	5,636.66	AG-Q10	11.67	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,669	R	38.35	AG-Q11	0.08	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,713	R	27.25	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.93	R	5,193.14	AG-Q13	43.52	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.90	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.01	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.06	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.13	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.10	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.21	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.72	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	339	R	65.52	AH-Q1	5.65	AH1.1	/	AH1.4				
AH1.2	Working space	m2	81	R	24.03	AH-Q2	4.19	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	170	R	73.93	AH-Q3	1.99	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	60	R	867.38	AH-Q4	0.66	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	15	R	1,320.80	AH-Q5	4.00	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	84	R	682.96	AH-Q6	0.71	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	17	R	907.46	AH-Q7	3.53	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	908.80	AH-Q8	30.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	241	R	-									
AH1.10	Blinding	m2	91	R	44.04	AH-Q9	2.65	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	973	R	7.22	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	114	R	122.12	AH-Q11	0.53	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	29	R	91.77	AH-Q12	0.59	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	22	R	126.15	AH-Q13	0.09	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	203	R	175.79	AH-Q14	0.07	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	25	R	111.93	AH-Q15	3.36	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	64	R	39.43	AH-Q16	1.31	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.54	R	7,346.70	AH-Q17	0.17	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	9.13	R	8,595.49	AH-Q18	26.40	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	590	R	88.83	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,056	R	38.02	AH-Q20	0.23	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,845	R	27.58	AH-Q21	0.13	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.97	R	5,015.23	AH-Q22	248.45	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	384	R	49.48	AH-Q23	0.22	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	305	R	80.08	AH-Q24	0.28	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.08	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.73	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.89	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.70	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					120.14	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.66	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.27	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.96	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.95	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.10	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					9.89	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.20	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.51	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.10	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					17.32	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.85	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					96.76	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					226.08	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					311.66	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.17	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					13.80	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					8.53	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	219	R	42.49	AI-Q1	3.17	AI1.1	/	AI1.5				
AI1.2	Working space	m2	800	R	39.64	AI-Q2	0.27	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	99	R	51.15	AI-Q3	2.21	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	254	R	67.55	AI-Q4	0.27	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	69	R	1,350.72	AI-Q5	5.31	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	837.49	AI-Q6	0.34	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	90	R	-									
AI1.8	Wood float	m2	201	R	5.27									
AI1.9	Formwork bases	m2	174	R	107.67	AI-Q7	0.40	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	175	R	145.70	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.69	R	6,048.17	AI-Q9	11.70	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,995	R	34.22	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.85	R	5,927.22	AI-Q11	81.18	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.07	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.83	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					20.00	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.61	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					256.30	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.54	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.75	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					176.74	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.23	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	428	R	53.63	AJ-Q1	4.46	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	960	R	39.49	AJ-Q2	0.45	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	137	R	82.19	AJ-Q3	3.12	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	238	R	44.20	AJ-Q4	0.40	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	96	R	1,275.54	AJ-Q5	2.67	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	22	R	865.37	AJ-Q6	4.36	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	36	R	990.37									
AJ1.8	Total concrete	m3	173	R	-									
AJ1.9	Wood float	m2	232	R	5.53	AJ-Q7	0.75	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	238	R	154.07	AJ-Q8	0.40	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	291	R	138.66	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	14.85	R	8,548.85	AJ-Q10	11.65	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,112	R	43.05	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,502	R	24.96	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.42	R	7,633.88	AJ-Q13	67.61	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.36	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.65	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					28.86	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					230.66	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.28	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.24	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					198.58	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					342.50	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	344	R	44.24	AK-Q1	1.25	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,068	R	38.69	AK-Q2	0.32	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	269	R	67.20	AK-Q3	1.28	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	304	R	44.60	AK-Q4	0.90	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	275	R	1,161.80	AK-Q5	45.83	AK1.5		AK1.6				
AK1.6	Concrete column	m3	6	R	908.80									
AK1.7	Concrete plinth	m3	38	R	981.78	AK-Q6	7.24	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	299	R	-									
AK1.9	Wood float	m2	464	R	7.63	AK-Q7	0.59	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	392	R	127.25	AK-Q8	0.70	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	171	R	151.79	AK-Q9	0.22	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	26	R	123.75	AK-Q10	0.23	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	37.30	R	7,630.97	AK-Q11	8.02	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	8,485	R	35.97	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.09	R	8,039.99	AK-Q13	96.76	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.66	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					26.05	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					152.27	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					9.13	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					6.47	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.34	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					212.15	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.14	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	332	R	43.01	AL-Q1	3.02	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,329	R	29.11	AL-Q2	0.25	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	221	R	75.18	AL-Q3	1.50	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	308	R	58.19	AL-Q4	0.36	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	110	R	890.15	AL-Q5	0.96	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	115	R	865.37	AL-Q6	2.50	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	46	R	990.37	AL-Q7	2.39	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	280	R	-									
AL1.9	Wood float	m2	405	R	8.12	AL-Q8	0.27	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	322	R	111.19	AL-Q9	0.34	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	733	R	124.82	AL-Q10	0.16	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	214	R	212.93	AL-Q11	0.21	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	99	R	265.41	AL-Q12	0.46	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	198.90	AL-Q13	11.50	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	46.06	R	9,453.99	AL-Q14	6.08	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	8,362	R	18.09	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	204	R	29.64	AL-Q16	1.37	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.65	R	6,144.93	AL-Q17	430.77	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.48	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.57	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					15.30	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					109.62	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.03	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.03	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.01	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					4.65	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.93	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					3.73	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					4.65	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.98	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					522.61	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					318.96	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.14	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,319	R	47.23	AM-Q1	6.83	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,529	R	24.03	AM-Q2	0.86	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,161	R	55.77	AM-Q3	1.14	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	621	R	33.64	AM-Q4	0.31	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	193	R	867.71									
AM1.6	Concrete column	m3	100	R	826.39	AM-Q5	1.93	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	218	R	1,485.63	AM-Q6	0.46	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	168	R	827.46	AM-Q7	1.15	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	42	R	865.37	AM-Q8	2.38	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	103	R	876.37	AM-Q9	0.97	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	818	R	-									
AM1.12	Wood float	m2	1,287	R	5.68	AM-Q10	0.64	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	782	R	116.28	AM-Q11	0.25	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	666	R	129.43	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	554	R	158.27	AM-Q13	0.39	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	274	R	266.37	AM-Q14	0.80	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	739	R	265.41	AM-Q15	0.23	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	197.07	AM-Q16	25.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	358	R	115.72	AM-Q17	0.12	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	91.67	R	4,753.37	AM-Q18	8.92	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,726	R	25.15	AM-Q19	0.14	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,044	R	38.48	AM-Q20	0.27	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	26	R	775.94	AM-Q21	3.53	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.82	R	5,439.02	AM-Q22	997.56	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.97	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.85	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					25.79	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.05	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.58	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.05	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.00	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.99	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					152.77	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.46	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					9.39	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.58	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.38	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					7.54	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.30	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.48	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					189.00	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					123.53	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					6.13	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.16	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,606	R	75.64	AN-Q1	1.62	AN1.1	/	AN1.5				
AN1.2	Working space	m2	266	R	25.35	AN-Q2	9.80	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	440	R	85.82	AN-Q3	5.92	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,385	R	41.40	AN-Q4	1.16	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,608	R	1,254.08	AN-Q5								
AN1.6	Concrete column	m3	72	R	1,134.02	AN-Q6	22.33	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	22	R	1,161.80	AN-Q7	3.27	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	127	R	848.08	AN-Q8	12.66	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	981.78	AN-Q9	18.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,204	R	-				/					
AN1.11	Wood float	m2	2,640	R	7.35	AN-Q10	0.61	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	107	R	113.54	AN-Q11	15.03	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	345	R	186.12	AN-Q12	0.21	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	172	R	149.56	AN-Q13	0.13	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	50	R	183.43	AN-Q14	0.44	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	37	R	230.32	AN-Q15	0.11	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	261.39	AN-Q16	536.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,040	R	193.35	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	398.76	R	6,247.67	AN-Q18	3.02	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	17,056	R	42.34	AN-Q19	0.07	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	9,988	R	48.34	AN-Q20	0.12	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	94	R	1,398.32	AN-Q21	12.81	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.85	R	4,892.40	AN-Q22	869.19	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.06	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.98	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.88	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					30.29	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					170.62	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					11.05	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.77	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					6.33	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.09	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					4.44	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.26	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					4.39	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					147.56	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					129.24	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.26	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					4.47	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	200	R	44.02	AO-Q1	1.11	AO1.1	/	AO1.5				
AO1.2	Working space	m2	446	R	32.54	AO-Q2	0.45	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	99	R	59.04	AO-Q3	2.02	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	38	R	51.63	AO-Q4	4.74	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	180	R	1,279.91									
AO1.6	Concrete column	m3	23	R	1,318.42	AO-Q5	7.83	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	9	R	908.80	AO-Q6	2.56	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	981.78	AO-Q7	45.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	854.91	AO-Q8	23.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	54	R	-									
AO1.11	Wood float	m2	28	R	6.05	AO-Q9	6.43	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	93	R	131.92	AO-Q10	1.94	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	245	R	183.61	AO-Q11	0.09	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	35	R	115.14	AO-Q12	0.26	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	16	R	162.12	AO-Q13	0.56	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	241.31	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	48	R	247.72	AO-Q15	3.75	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	20	R	118.48	AO-Q16	0.20	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.89	R	8,610.99	AO-Q17	11.04	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,031	R	19.00	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,219	R	28.92	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	876.48	AO-Q20	5.40	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.80	R	5,172.39	AO-Q21	64.29	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.35	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.75	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					24.79	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					211.56	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					9.70	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					7.89	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.61	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.18	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.67	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.54	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.29	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					453.21	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					297.75	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.25	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					9.82	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,520	R	65.52	AP-Q1	1.96	AP1.1	/	AP1.5				
AP1.2	Working space	m2	503	R	24.03	AP-Q2	3.02	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,307	R	56.55	AP-Q3	1.16	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	203	R	71.17	AP-Q4	3.82	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	775	R	823.41	AP-Q5	0.37	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,121	R	142.48									
AP1.7	Rough formwork	m2	203	R	165.95	AP-Q6	3.82	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,203	R	122.20	AP-Q7	0.64	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,338	R	11.09	AP-Q8	0.18	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	197	R	53.03	AP-Q9	3.93	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	51	R	63.02	AP-Q10	15.20	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	328	R	31.59	AP-Q11	2.36	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.37	R	8,296.85	AP-Q12	565.69	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,423	R	154.72	AP-Q13	0.54	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,346	R	-	AP-Q14	5.61	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,124	R	54.88	AP-Q15	3.87	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,493	R	161.92	AP-Q16	2.91	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,453	R	95.26	AP-Q17	0.98	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	5	R	681.16	AP-Q18	869.20	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,855	R	203.24	AP-Q19	1.52	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,715	R	113.46	AP-Q20	1.60	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	111.53	R	7,216.46	AP-Q21	6.95	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	27,588.86									
AP1.24	Structural steel	Item	1	R	71,438.54									
AP1.25	Plumbing and drainage	Item	1	R	45,487.70									
AP1.26	Small power and lighting	Item	1	R	387,523.24									
AP1.27	External works	Item	1	R	167,454.05									
	Excavations / concrete					AP-R1					0.08	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.73	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.16	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					11.57	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					50.65	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					4.96	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					6.74	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					74.25	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					15.53	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					13.07	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					228.44	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.10	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					15.00	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					44.57	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.62	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.23	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.76	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.36	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.82	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					9.90	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					6.30	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					53.70	AP1.26	/	AP1.22
	External works / concrete					AP-R23					203.37	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	95	R	746.96	AQ-Q1	1.91	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	181	R	110.04									
AQ1.3	Reinforcement	t	7.97	R	5,348.83	AQ-Q2	11.92	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	943	R	135.75	AQ-Q3	0.10	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	264	R	149.27	AQ-Q4	0.36	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	112	R	162.48	AQ-Q5	5.81	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	741	R	97.93	AQ-Q6	0.88	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	41.01	R	17,019.94	AQ-Q7	15.87	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	639	R	85.37	AQ-Q8	1.02	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	12,837.15	AQ-Q9	325.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	35	R	875.11	AQ-Q10	18.60	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,341	R	47.26	AQ-Q11	0.49	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	651	R	-									
	Concrete / reinforcement					AQ-R1					0.14	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					6.79	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					5.50	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.00	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.60	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					173.80	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.87	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.75	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					8.94	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.07	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	149	R	106.59	AR-Q1	2.81	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	53	R	1,190.26	AR-Q2	8.83	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6	R	5,529.96									
AR1.4	Mesh	m2	510	R	106.68	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	173	R	178.80	AR-Q4	0.31	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	53	R	104.14	AR-Q5	11.17	AR1.15	/	AR1.6				
AR1.7	Screed	m2	390	R	23.80	AR-Q6	1.52	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	33.52	R	16,965.30	AR-Q7	17.66	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	16	R	3,142.61	AR-Q8	2.10	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	41	R	605.95	AR-Q9	0.82	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	46	R	289.36	AR-Q10	0.73	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	462	R	154.97	AR-Q11	1.28	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	118	R	55.86	AR-Q12	5.02	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	30	R	1,162.14	AR-Q13	1.12	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	592	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.22	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					11.16	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					6.66	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					11.43	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					50.01	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					5.40	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					28.00	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.09	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					109.47	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.36	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					14.60	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	375	R	83.11	AS-Q1	6.58	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	96	R	44.70	AS-Q2	0.59	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	57	R	915.26	AS-Q3	5.18	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	11	R	5,130.23									
AS1.5	Mesh	m2	117	R	150.12	AS-Q4	0.49	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	167	R	93.63	AS-Q5	0.34	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	160	R	7.54	AS-Q6	0.36	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	23	R	76.86	AS-Q7	2.48	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	705	R	26.40	AS-Q8	0.08	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.97	R	5,179.09	AS-Q9	58.76	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	44	R	247.86	AS-Q10	0.25	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	1,190.22	AS-Q11	5.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	42	R	324.34	AS-Q12	2.98	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	795	R	46.21	AS-Q13	0.07	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.28	R	13,038.32	AS-Q14	8.59	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.81	R	21,620.02	AS-Q15	154.32	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	125	R	-									
AS1.18	Total control room area	m2	11	R	-									
	Concrete / earthworks					AS-R1					11.01	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					20.48	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					34.17	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					9.78	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					121.39	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					11.91	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					194.33	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.82	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.18	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.39	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.24	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.21	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	199	R	114.81	AT-Q1	16.58	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	13	R	64.14	AT-Q2	0.92	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	905.01	AT-Q3	10.91	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.10	R	5,443.55									
AT1.5	Formwork	m2	131	R	181.86	AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	35	R	6.62	AT-Q5	0.34	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	32	R	53.91	AT-Q6	0.38	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.41	R	35.14	AT-Q7	29.27	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.60	R	5,162.46	AT-Q8	20.00	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.06	R	29.03	AT-Q9	200.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.89	R	17,677.86	AT-Q10	30.34	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.01	R	32,209.18	AT-Q11	26.73	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	66	R	158.36	AT-Q12	0.41	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	21	R	134.24	AT-Q13	1.29	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	27	R	-									
	Concrete / earthworks					AT-R1					7.88	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					14.11	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					4.98	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					136.71	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					16.79	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					154.91	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					1.21	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.18	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.31	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.17	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					5.71	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.18	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	214	R	170.98	AU-Q1	0.91	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	204	R	66.53	AU-Q2	1.15	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	235	R	858.01									
AU1.4	Reinforcement	t	39.02	R	7,759.97	AU-Q3	6.02	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,511	R	132.26	AU-Q4	0.16	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	137	R	63.02	AU-Q5	1.72	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,708	R	31.59	AU-Q6	0.14	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	594	R	46.21	AU-Q7	0.40	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	51	R	122.72	AU-Q8	4.61	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	4.10	R	34,635.03	AU-Q9	57.32	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,710.97	AU-Q10	29.38	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	23	R	148.34	AU-Q11	13.78	AU1.12	/	AU1.13				
AU1.13	Total area	m2	317	R	-									
	Concrete / earthworks					AU-R1					5.02	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					12.90	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					6.49	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.11	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					13.61	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					245.65	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.22	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					167.93	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					63.23	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.50	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.78	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	2,533	R	113.81	AV-Q1	1.01	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,507	R	71.11	AV-Q2	1.03	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,650	R	67.41	AV-Q3	0.70	AV1.10	/	AV1.3				
AV1.4	Pipework	m	60	R	381.00	AV-Q4	42.83	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	4,029.78	AV-Q5	15.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	21	R	582.48	AV-Q6	2.86	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	190	R	161.13	AV-Q7	0.11	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	19	R	96.39	AV-Q8	1.11	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.09	R	6,120.39	AV-Q9	6.80	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,570	R	-									
	Earthworks / lining					AV-R1					1.60	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.69	AV1.1	/	AV1.3
	Lining / paving					AV-R3					1.05	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.30	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.09	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.12	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					3.61	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					6.04	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.10	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	24	R	-									
BA1.2	Steel	t	3.72	R	24,480.09	BA-Q1	6.45	BA1.1	/	BA1.2				
BA1.3	Handrail	m	15	R	650.86	BA-Q2	1.60	BA1.1	/	BA1.3				
BA1.4	Grating	m2	13	R	1,126.02	BA-Q3	1.85	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	9	R	152.51	BA-Q4	2.67	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	192.54	BA-Q5	8.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					37.61	BA1.2	/	BA1.3
	Steel / grating					BA-R2					21.74	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					160.51	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					127.14	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,573	R	-									
BB1.2	Steel	t	30.35	R	12,656.08	BB-Q1	51.83	BB1.1	/	BB1.2				
BB1.3	Handrail	m	93	R	1,021.02	BB-Q2	16.91	BB1.1	/	BB1.3				
BB1.4	Grating	m2	92	R	1,151.61	BB-Q3	17.10	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	70	R	381.04	BB-Q4	22.47	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	3,306.11	BB-Q5	121.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					12.40	BB1.2	/	BB1.3
	Steel / grating					BB-R2					10.99	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					33.21	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					3.83	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	16,526	R	-									
BC1.2	Steel	t	169.04	R	13,180.58	BC-Q1	97.76	BC1.1	/	BC1.2				
BC1.3	Handrail	m	643	R	654.87	BC-Q2	25.70	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,343	R	965.61	BC-Q3	3.81	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	399	R	226.36	BC-Q4	41.42	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	88	R	275.21	BC-Q5	187.80	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	53	R	2,273.56	BC-Q6	311.81	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					20.13	BC1.2	/	BC1.3
	Steel / grating					BC-R2					13.65	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					58.23	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					47.89	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					5.80	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	379	R	-									
BD1.2	Steel	t	17.88	R	18,419.42	BD-Q1	21.20	BD1.1	/	BD1.2				
BD1.3	Handrail	m	13	R	725.70	BD-Q2	29.15	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	1,743.35	BD-Q3	54.14	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	10	R	210.43	BD-Q4	37.90	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	23	R	3,294.81	BD-Q5	16.48	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					25.38	BD1.1	/	BD1.2
	Steel / grating					BD-R2					10.57	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					87.53	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					5.59	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	42	R	-									
BE1.2	Steel	t	2.35	R	17,327.21	BE-Q1	17.87	BE1.1	/	BE1.2				
BE1.3	Handrail	m	48	R	855.67	BE-Q2	0.88	BE1.1	/	BE1.3				
BE1.4	Grating	m2	21	R	1,228.64	BE-Q3	2.00	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	47	R	220.07	BE-Q4	0.89	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	178.53	BE-Q5	6.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					20.25	BE1.2	/	BE1.3
	Steel / grating					BE-R2					14.10	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					78.73	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					97.05	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	384	R	-									
BF1.2	Steel	t	22.78	R	30,848.20	BF-Q1	16.86	BF1.1	/	BF1.2				
BF1.3	Handrail	m	10	R	448.65	BF-Q2	38.40	BF1.1	/	BF1.3				
BF1.4	Grating	m2	36	R	1,177.60	BF-Q3	10.67	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	17	R	248.84	BF-Q4	22.59	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	11	R	3,656.15	BF-Q5	34.91	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					68.76	BF1.1	/	BF1.2
	Steel / grating					BF-R2					26.20	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					123.97	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.44	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	18,266	R	-	C-Q1	0.21	C1.1	/	C1.2				
C1.2	Total work units	WU	86,611	R	233.52									
C1.3	Pipe supports	kg	5,017	R	-	C-Q2	3.64	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	9,705	R	-	C-Q3	0.11	C1.4	/	C1.2				
C1.5	Number of welds	No	14,128	R	-	C-Q4	0.77	C1.5	/	C1.1				
C1.6	Total fittings	No	5,958	R	-	C-Q5	0.33	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,073	R	-	C-Q6	0.35	C1.7	/	C1.6				
C1.8	Support number	No	1,294	R	-	C-Q7	0.26	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	86,611	R	233.52	DA-Q1	51.89	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,669	R	45.34									
	Average cost per examination / WU					DA-R1					5.15	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	86,611	R	233.52	DB-Q1	177.85	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	487	R	83.52									
	Average cost per examination / WU					DB-R1					2.80	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	86,611	R	233.52	DC-Q1	486.58	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	178	R	129.61									
	Average cost per examination / WU					DC-R1					1.80	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	86,611	R	233.52	DD-Q1	75.05	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,154	R	63.22									
	Average cost per examination / WU					DD-R1					3.69	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	86,611	R	233.52	DE-Q1	118.81	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	729	R	155.43									
	Average cost per examination / WU					DE-R1					1.50	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	86,611	R	233.52	E-Q1	374.73	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	231.13	R	329.98	E-Q2	288.39	E1.1	/	E1.3				
E1.3	Structural steel	t	300.33	R	20,168.91									
	WU cost / install mechanical weight - receive					E-R1					0.71	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					61.12	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	86,611	R	233.52									
F1.2	Painting to piping	m2	5,392	R	110.08	F-Q1	16.06	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	822	R	486.88	F-Q2	105.37	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	232.56	R	564.22									
F1.5	Painting to mechanical equipment	m2	1,492	R	72.91	F-Q3	0.16	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	346	R	290.35	F-Q4	0.67	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.23	F1.2	/	F1.3
	Work unit / paint					F-R2					2.12	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.48	F1.1	/	F1.3
	Install plant / paint					F-R4					7.74	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.94	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	29,433	R	52.46									
G1.2	Electrical cable terminations	No	1,772	R	103.55	G-Q1	16.61	G1.1	/	G1.2				
G1.3	Electrical equipment	No	73	R	390.73	G-Q2	403.19	G1.1	/	G1.3				
G1.4	DB's	No	12	R	1,302.34	G-Q3	6.08	G1.3	/	G1.4				
G1.5	Rack	m	3,408	R	133.95	G-Q4	8.64	G1.1	/	G1.5				
G1.6	Support steel	kg	7,111	R	26.41	G-Q5	0.48	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	27,616	R	15.63	G-Q6	1.07	G1.1	/	G1.7				
G1.8	Instruments	No	826	R	124.42	G-Q7	33.43	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,183	R	154.41	G-Q8	0.38	G1.8	/	G1.9				
G1.10	Light fittings	No	395	R	214.19	G-Q9	5.41	G1.10	/	G1.3				
G1.11	Conduit	m	4,632	R	22.59	G-Q10	6.35	G1.1	/	G1.11				
G1.12	Instrument stands	No	150	R	909.16	G-Q11	5.51	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.51	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.13	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.30	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.32	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.99	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.39	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.24	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.13	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,337	R	49.40	AB-Q1	2.18	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,367	R	12.15									
AB1.3	Back fill and compact	m3	5,986	R	66.44	AB-Q2	1.23	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,720	R	4.62	AB-Q3	1.55	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,644	R	6.73	AB-Q4	1.58	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.07	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.74	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					10.69	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					7.34	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	339,054.18									
AC1.2	EO for raking equipment	Item	1	R	42,730.76									
AC1.3	Number of piles	No	249	R	-									
AC1.4	Move rig to new position	No	195	R	338.18	AC-Q1	1.28	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	16.60	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	13	R	617.94	AC-Q3	1.15	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	124	R	131.57	AC-Q4	0.12	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,687	R	219.77	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	588	R	381.05	AC-Q6	0.42	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	154	R	991.97	AC-Q7	1.62	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	152	R	343.70	AC-Q8	1.64	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	636	R	502.36	AC-Q9	0.39	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	103	R	997.22	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.01	R	9,970.51	AC-Q11	14.64	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	215.19	R	14,743.68	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,750	R	1,762.37	AC-Q13	0.14	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	204	R	1,784.78	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	225,367.76		1.00		/					
AC1.19	Load test to pile	No	4	R	37,591.32	AC-Q15	62.25	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	89,907.29	AC-Q16	249.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	220	R	428.68	AC-Q17	1.13	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.25	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.35	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.56	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.20	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					127.88	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					21.33	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.01	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	105	R	88.06	AD-Q1	0.11	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	948	R	109.21									
AD1.3	Kerbing	m	440	R	277.33	AD-Q2	0.16	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,770	R	-									
AD1.5	Remove top soil	m3	1,316	R	67.03	AD-Q3	1.36	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	969	R	77.64	AD-Q4	0.46	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,889	R	7.12									
AD1.8	Reduce levels	m3	1,278	R	40.94	AD-Q5	0.44	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,122	R	102.51	AD-Q6	1.14	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	289	R	180.90	AD-Q7	3.88	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	331	R	209.39	AD-Q8	3.86	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,565	R	21.83	AD-Q9	5.42	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	419	R	14.67	AD-Q10	0.62	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	289	R	9.68	AD-Q11	0.95	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	396	R	534.86	AD-Q12	0.66	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	32	R	230.21	AD-Q13	0.90	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	259.27	AD-Q14	0.07	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	11	R	510.26	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	381	R	4.67	AD-Q16	0.87	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.81	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					9.41	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					5.75	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.57	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.76	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.12	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.56	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.53	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					1.93	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.83	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.93	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.84	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	225	R	1,134.22	AE-Q1	5.49	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	41	R	1,507.07	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	477	R	-									
AE1.4	Rip and compact	m2	1,720	R	7.07									
AE1.5	Formwork to plinth	m2	361	R	259.77	AE-Q3	8.80	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	200	R	200.05	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.27	R	10,129.83	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,799	R	254.45	AE-Q6	421.31	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,193	R	54.13	AE-Q7	5.30	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	579	R	104.89	AE-Q8	2.57	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.75	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					160.43	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.18	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					39.81	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.05	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.09	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,406	R	-	AF-Q1	9.84	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	346	R	68.19	AF-Q2	2.15	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	161	R	82.56	AF-Q3	0.58	AF1.2	/	AF1.4				
AF1.4	Working space	m2	592	R	47.29	AF-Q4	0.55	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	191	R	2,394.76	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	224	R	76.49	AF-Q6	1.05	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	12	R	1,552.85	AF-Q7	0.06	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,703.20	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	235	R	-	AF-Q9	1.14	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	207	R	7.19									
AF1.11	Formwork to bases	m2	270	R	207.51	AF-Q10	1.41	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	164	R	245.30	AF-Q11	13.67	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	14	R	291.68	AF-Q12	4.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	3.03	R	16,024.09	AF-Q13	0.25	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	12.04	R	7,217.79	AF-Q14	19.52	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	323	R	43.84	AF-Q15	0.59	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	25	R	248.34	AF-Q16	0.48	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	6,854.40	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	94	R	747.58									
	Base excavation / backfill					AF-R1					0.83	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.44	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					35.12	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					31.31	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					22.77	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.71	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					333.07	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.09	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.16	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.17	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.22	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					54.63	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					6.25	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.20	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	250	R	65.78	AG-Q1	1.75	AG1.1	/	AG1.4				
AG1.2	Working space	m2	1,042	R	45.23	AG-Q2	0.24	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	47	R	139.61	AG-Q3	5.32	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	143	R	1,566.79	AG-Q4	0.63	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	99	R	2,316.86	AG-Q5	1.44	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	220	R	-									
AG1.7	Wood float	m2	154	R	9.45	AG-Q6	0.64	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	228	R	108.71	AG-Q7	0.63	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	332	R	212.09	AG-Q8	0.43	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	100	R	135.94	AG-Q9	0.99	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	19.86	R	10,314.92	AG-Q10	11.08	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	3,089	R	61.00	AG-Q11	0.07	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,931	R	51.76	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.18	R	9,019.59	AG-Q13	45.41	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.69	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					2.12	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.14	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.06	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.58	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.76	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	392	R	104.21	AH-Q1	7.84	AH1.1	/	AH1.4				
AH1.2	Working space	m2	67	R	45.64	AH-Q2	5.85	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	281	R	131.08	AH-Q3	1.40	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	50	R	1,323.58	AH-Q4	0.71	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	32	R	1,538.73	AH-Q5	1.56	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	68	R	2,193.88	AH-Q6	0.74	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	1,566.79	AH-Q7	3.85	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	2,316.86	AH-Q8	12.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	180	R	-									
AH1.10	Blinding	m2	70	R	76.49	AH-Q9	2.57	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,067	R	13.43	AH-Q10	0.17	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	127	R	212.09	AH-Q11	0.39	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	29	R	135.94	AH-Q12	0.45	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	23	R	230.86	AH-Q13	0.17	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	226	R	279.60	AH-Q14	0.14	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	22	R	208.29	AH-Q15	3.09	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	52	R	73.37	AH-Q16	1.31	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.70	R	10,238.34	AH-Q17	0.17	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	9.89	R	15,239.36	AH-Q18	18.20	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	635	R	119.79	AH-Q19	0.11	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,197	R	63.82	AH-Q20	0.15	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,953	R	52.33	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.02	R	12,327.64	AH-Q22	176.47	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	313	R	68.37	AH-Q23	0.22	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	346	R	147.44	AH-Q24	0.20	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.08	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.28	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.80	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					17.30	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					98.55	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.86	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.60	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.84	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.57	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					6.24	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					11.53	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					10.04	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.50	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					10.53	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					29.90	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.67	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					127.22	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					238.79	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					291.22	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.11	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					32.09	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					14.88	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	248	R	112.39	AI-Q1	3.31	AI1.1	/	AI1.5				
AI1.2	Working space	m2	846	R	48.32	AI-Q2	0.29	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	112	R	98.88	AI-Q3	2.21	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	308	R	119.35	AI-Q4	0.24	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	75	R	2,345.97	AI-Q5	5.36	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	14	R	1,558.48	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	102	R	-									
AI1.8	Wood float	m2	213	R	10.00									
AI1.9	Formwork bases	m2	184	R	204.53	AI-Q7	0.41	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	142	R	308.24	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	10.62	R	7,894.18	AI-Q9	9.60	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	5,139	R	81.93	AI-Q10	0.01	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.90	R	9,630.93	AI-Q11	83.33	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.33	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.14	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					19.66	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.51	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					234.60	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.47	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.06	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					96.35	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.24	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	485	R	95.32	AJ-Q1	4.49	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	734	R	50.74	AJ-Q2	0.66	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	141	R	118.68	AJ-Q3	3.44	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	277	R	92.67	AJ-Q4	0.39	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	108	R	2,145.78	AJ-Q5	2.84	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	23	R	1,578.18	AJ-Q6	4.70	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	38	R	1,609.22									
AJ1.8	Total concrete	m3	219	R	-									
AJ1.9	Wood float	m2	245	R	10.29	AJ-Q7	0.89	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	270	R	307.19	AJ-Q8	0.40	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	330	R	246.44	AJ-Q9	0.07	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	11.35	R	10,985.82	AJ-Q10	19.30	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,232	R	62.17	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,745	R	52.33	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.60	R	12,842.19	AJ-Q13	67.50	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.88	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.80	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					23.16	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					208.53	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					6.99	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.40	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					176.71	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					209.93	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	390	R	104.87	AK-Q1	1.31	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,211	R	48.52	AK-Q2	0.32	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	285	R	113.48	AK-Q3	1.37	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	345	R	85.04	AK-Q4	0.86	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	297	R	2,144.96	AK-Q5	42.43	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	1,526.73									
AK1.7	Concrete plinth	m3	44	R	2,324.81	AK-Q6	6.75	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	385	R	-									
AK1.9	Wood float	m2	527	R	15.21	AK-Q7	0.56	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	412	R	206.76	AK-Q8	0.72	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	216	R	263.62	AK-Q9	0.20	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	28	R	230.28	AK-Q10	0.25	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	42.30	R	15,214.69	AK-Q11	9.10	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	9,621	R	63.93	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.36	R	10,331.90	AK-Q13	163.14	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.16	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.92	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					25.22	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					141.02	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					10.37	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					8.82	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.63	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					237.99	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.21	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	340	R	78.43	AL-Q1	1.66	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,396	R	47.30	AL-Q2	0.24	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	279	R	130.57	AL-Q3	1.22	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	218	R	119.76	AL-Q4	0.94	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	205	R	2,394.76	AL-Q5	1.81	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	113	R	2,390.88	AL-Q6	1.53	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	74	R	1,918.05	AL-Q7	2.77	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	292	R	-									
AL1.9	Wood float	m2	386	R	9.88	AL-Q8	0.53	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	432	R	279.86	AL-Q9	0.47	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	851	R	256.21	AL-Q10	0.13	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	206	R	345.93	AL-Q11	0.36	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	113	R	493.90	AL-Q12	0.65	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	12	R	521.36	AL-Q13	9.42	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	52.23	R	7,548.41	AL-Q14	5.59	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	8,850	R	45.85	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	231	R	50.04	AL-Q16	1.26	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.61	R	9,684.12	AL-Q17	478.69	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.03	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.66	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.60	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					20.00	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					242.38	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.00	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.00	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.56	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.54	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					9.33	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					3.88	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.54	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					3.68	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					164.63	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					150.85	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.25	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	960	R	125.14	AM-Q1	4.73	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,657	R	50.74	AM-Q2	0.58	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	883	R	118.68	AM-Q3	1.09	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	754	R	120.63	AM-Q4	0.27	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	203	R	1,297.34									
AM1.6	Concrete column	m3	106	R	1,608.88	AM-Q5	1.92	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	278	R	2,399.08	AM-Q6	0.38	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	122	R	1,240.51	AM-Q7	1.66	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	51	R	1,648.30	AM-Q8	2.08	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	148	R	1,650.73	AM-Q9	0.72	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	869	R	-									
AM1.12	Wood float	m2	1,505	R	11.87	AM-Q10	0.58	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	1,086	R	300.87	AM-Q11	0.19	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	771	R	223.66	AM-Q12	0.14	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	529	R	246.13	AM-Q13	0.53	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	261	R	425.51	AM-Q14	1.07	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	751	R	438.31	AM-Q15	0.16	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	449.95	AM-Q16	21.20	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	598	R	281.37	AM-Q17	0.09	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	90.16	R	14,545.39	AM-Q18	9.64	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,281	R	39.47	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,950	R	53.51	AM-Q20	0.29	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	60	R	1,375.70	AM-Q21	1.50	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.90	R	10,331.90	AM-Q22	965.56	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.10	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.47	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.05	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					10.75	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.81	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.54	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.05	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.79	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.79	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					109.30	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					4.31	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					9.75	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.64	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.19	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					5.33	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.77	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					5.86	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					368.52	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					271.83	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.57	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.13	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,885	R	78.12	AN-Q1	1.17	AN1.1	/	AN1.5				
AN1.2	Working space	m2	386	R	74.02	AN-Q2	7.47	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	410	R	72.18	AN-Q3	7.04	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,383	R	77.64	AN-Q4	1.79	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,474	R	2,518.07	AN-Q5								
AN1.6	Concrete column	m3	43	R	1,134.22	AN-Q6	57.53	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	36	R	1,507.07	AN-Q7	1.19	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	148	R	2,193.88	AN-Q8	16.72	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	1,648.30	AN-Q9	8.60	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,893	R	-				/					
AN1.11	Wood float	m2	2,509	R	16.02	AN-Q10	0.99	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	165	R	202.55	AN-Q11	14.99	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	351	R	245.87	AN-Q12	0.12	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	270	R	266.75	AN-Q13	0.13	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	43	R	315.97	AN-Q14	0.84	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	30	R	462.65	AN-Q15	0.17	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	320.61	AN-Q16	824.67	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,116	R	216.12	AN-Q17	0.13	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	367.48	R	10,460.81	AN-Q18	5.15	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	14,357	R	45.20	AN-Q19	0.13	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	11,325	R	85.70	AN-Q20	0.17	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	103	R	1,594.08	AN-Q21	18.38	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.59	R	6,788.16	AN-Q22	955.21	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.03	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.06	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					1.08	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					32.43	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					157.18	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					12.43	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.65	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					4.77	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.61	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					4.70	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					3.56	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					10.15	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					231.43	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					122.06	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.37	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.56	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	230	R	115.14	AO-Q1	0.97	AO1.1	/	AO1.5				
AO1.2	Working space	m2	451	R	46.20	AO-Q2	0.51	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	115	R	109.86	AO-Q3	2.00	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	32	R	77.64	AO-Q4	7.44	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	238	R	2,193.88									
AO1.6	Concrete column	m3	18	R	1,566.79	AO-Q5	13.22	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	2,316.86	AO-Q6	1.64	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	1,605.18	AO-Q7	47.60	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	2,373.63	AO-Q8	18.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	32	R	-									
AO1.11	Wood float	m2	33	R	10.72	AO-Q9	7.21	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	102	R	233.89	AO-Q10	2.33	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	260	R	325.54	AO-Q11	0.07	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	38	R	218.73	AO-Q12	0.29	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	16	R	287.43	AO-Q13	0.69	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	6	R	383.81	AO-Q14	0.17	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	52	R	470.56	AO-Q15	4.58	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	15	R	274.64	AO-Q16	0.33	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	7.21	R	10,985.82	AO-Q17	4.44	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,172	R	45.73	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,001	R	83.94	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	1,202.97	AO-Q20	2.91	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.36	R	9,019.59	AO-Q21	70.83	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.49	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.05	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					28.26	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					204.65	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					9.38	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					10.59	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					8.06	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.81	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.92	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					6.18	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.84	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					240.23	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					130.88	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.24	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					9.13	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,760	R	125.14	AP-Q1	2.53	AP1.1	/	AP1.5				
AP1.2	Working space	m2	543	R	33.34	AP-Q2	3.24	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	994	R	95.90	AP-Q3	1.77	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	243	R	113.02	AP-Q4	2.87	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	697	R	1,552.85	AP-Q5	0.35	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,016	R	218.46									
AP1.7	Rough formwork	m2	292	R	221.81	AP-Q6	2.39	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,285	R	223.87	AP-Q7	0.54	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,114	R	22.89	AP-Q8	0.22	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	278	R	58.43	AP-Q9	2.51	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	39	R	95.90	AP-Q10	17.87	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	328	R	63.82	AP-Q11	2.13	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.55	R	9,864.83	AP-Q12	449.68	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,323	R	281.03	AP-Q13	0.53	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,085	R	-	AP-Q14	4.43	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,199	R	138.54	AP-Q15	1.40	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,571	R	264.77	AP-Q16	1.96	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,031	R	102.79	AP-Q17	0.77	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	2,344.81	AP-Q18	385.63	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,650	R	362.33	AP-Q19	0.85	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,746	R	257.16	AP-Q20	0.65	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	112.43	R	16,761.43	AP-Q21	6.20	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	50,112.01									
AP1.24	Structural steel	Item	1	R	129,759.94									
AP1.25	Plumbing and drainage	Item	1	R	82,623.20									
AP1.26	Small power and lighting	Item	1	R	703,891.67									
AP1.27	External works	Item	1	R	304,161.14									
	Excavations / concrete					AP-R1					0.08	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					3.75	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.30	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					13.74	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					76.73	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.00	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					6.94	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					67.84	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					26.58	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					16.19	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					262.64	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.16	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.21	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					63.31	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.73	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.12	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.78	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.09	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					2.99	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					7.74	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					4.93	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					41.99	AP1.26	/	AP1.22
	External works / concrete					AP-R23					195.87	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	60	R	2,316.86	AQ-Q1	3.03	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	182	R	210.59									
AQ1.3	Reinforcement	t	7.77	R	10,985.82	AQ-Q2	7.72	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	720	R	268.09	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	285	R	170.06	AQ-Q4	0.21	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	130	R	269.45	AQ-Q5	8.64	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	837	R	223.38	AQ-Q6	1.34	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	42.36	R	30,815.52	AQ-Q7	26.51	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	679	R	147.52	AQ-Q8	1.65	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	16,450.18	AQ-Q9	374.33	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	38	R	1,602.98	AQ-Q10	29.55	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	961	R	115.76	AQ-Q11	1.17	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,123	R	-									
	Concrete / reinforcement					AQ-R1					0.21	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.00	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					8.64	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					13.62	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					8.60	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					137.95	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.66	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.53	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.18	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.93	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	160	R	143.75	AR-Q1	2.05	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	78	R	1,615.06	AR-Q2	16.53	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.72	R	17,172.08									
AR1.4	Mesh	m2	427	R	140.38	AR-Q3	0.18	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	129	R	197.70	AR-Q4	0.60	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	129	R	392.24	AR-Q5	3.34	AR1.15	/	AR1.6				
AR1.7	Screed	m2	370	R	41.78	AR-Q6	1.16	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	33.19	R	39,543.26	AR-Q7	12.99	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	16	R	3,926.70	AR-Q8	2.07	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	46	R	1,372.45	AR-Q9	0.72	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	44	R	668.93	AR-Q10	0.75	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	810	R	214.86	AR-Q11	0.53	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	75	R	155.07	AR-Q12	5.75	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	31	R	2,275.04	AR-Q13	1.07	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	431	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.09	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					11.50	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.17	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.12	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					38.66	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					10.07	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					28.81	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.05	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					184.04	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.72	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					17.38	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	269	R	336.44	AS-Q1	4.14	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	130	R	135.69	AS-Q2	0.50	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	65	R	1,609.22	AS-Q3	5.00	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	13	R	13,056.90									
AS1.5	Mesh	m2	125	R	171.48	AS-Q4	0.52	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	200	R	201.96	AS-Q5	0.33	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	142	R	16.35	AS-Q6	0.46	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	31	R	95.65	AS-Q7	2.10	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	748	R	44.81	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.99	R	13,632.86	AS-Q9	65.66	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	52	R	375.06	AS-Q10	0.15	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	3,059.57	AS-Q11	4.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	46	R	927.87	AS-Q12	3.91	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	564	R	52.35	AS-Q13	0.12	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.51	R	43,785.04	AS-Q14	3.19	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.90	R	39,234.49	AS-Q15	200.00	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	180	R	-									
AS1.18	Total control room area	m2	8	R	-									
	Concrete / earthworks					AS-R1					4.78	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					11.86	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					76.14	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.97	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					98.42	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					16.82	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					291.38	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					1.73	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.12	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.30	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.33	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.12	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	212	R	199.79	AU-Q1	0.55	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	230	R	79.36	AU-Q2	1.68	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	386	R	2,277.90									
AU1.4	Reinforcement	t	46.34	R	13,349.56	AU-Q3	8.33	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,314	R	206.24	AU-Q4	0.29	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	220	R	152.67	AU-Q5	1.75	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,685	R	36.09	AU-Q6	0.23	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	999	R	54.94	AU-Q7	0.39	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	33	R	222.92	AU-Q8	11.70	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.69	R	40,195.74	AU-Q9	143.49	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	11	R	6,561.63	AU-Q10	35.09	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	24	R	265.47	AU-Q11	8.08	AU1.12	/	AU1.13				
AU1.13	Total area	m2	194	R	-									
	Concrete / earthworks					AU-R1					11.40	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					28.70	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					11.04	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.17	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					14.92	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					369.90	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.33	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					242.98	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					59.88	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.35	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					8.58	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,113	R	200.89	AW-Q1	7.13	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	102	R	94.12	AW-Q2	1.53	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	156	R	2,527.71	AW-Q3	14.12	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	11.05	R	6,732.83									
AW1.5	Mesh	m2	78	R	171.92	AW-Q4	2.00	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	490	R	201.31	AW-Q5	0.32	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,866	R	71.26	AW-Q6	0.04	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.70	R	39,385.05	AW-Q7	24.07	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	65	R	-									
	Concrete / earthworks					AW-R1					12.58	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					26.86	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					39.16	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					12.56	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					94.48	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.17	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	26	R	-									
BA1.2	Steel	t	2.82	R	30,720.26	BA-Q1	9.22	BA1.1	/	BA1.2				
BA1.3	Handrail	m	26	R	1,517.05	BA-Q2	1.00	BA1.1	/	BA1.3				
BA1.4	Grating	m2	15	R	2,178.32	BA-Q3	1.73	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	476.61	BA-Q4	1.86	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	493.16	BA-Q5	4.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.25	BA1.2	/	BA1.3
	Steel / grating					BA-R2					14.10	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					64.46	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					62.29	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,293	R	-									
BB1.2	Steel	t	48.04	R	48,624.18	BB-Q1	26.92	BB1.1	/	BB1.2				
BB1.3	Handrail	m	101	R	1,285.14	BB-Q2	12.80	BB1.1	/	BB1.3				
BB1.4	Grating	m2	161	R	3,488.39	BB-Q3	8.03	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	106	R	359.79	BB-Q4	12.20	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	22	R	3,917.52	BB-Q5	58.77	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					37.84	BB1.2	/	BB1.3
	Steel / grating					BB-R2					13.94	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					135.15	BB1.2	/	BB1.5

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Year of construction 2006

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					12.41	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,281	R	-									
BC1.2	Steel	t	296.36	R	21,443.75	BC-Q1	44.81	BC1.1	/	BC1.2				
BC1.3	Handrail	m	732	R	1,213.98	BC-Q2	18.14	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,571	R	2,599.09	BC-Q3	3.72	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	609	R	441.18	BC-Q4	21.81	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	77	R	392.76	BC-Q5	172.48	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	70	R	6,005.17	BC-Q6	189.73	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					17.66	BC1.2	/	BC1.3
	Steel / grating					BC-R2					8.25	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					48.61	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					54.60	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					3.57	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	779	R	-									
BD1.2	Steel	t	14.30	R	42,770.78	BD-Q1	54.48	BD1.1	/	BD1.2				
BD1.3	Handrail	m	10	R	1,245.55	BD-Q2	77.90	BD1.1	/	BD1.3				
BD1.4	Grating	m2	14	R	1,753.92	BD-Q3	55.64	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	8	R	411.16	BD-Q4	97.38	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	25	R	5,509.35	BD-Q5	31.16	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					34.34	BD1.1	/	BD1.2
	Steel / grating					BD-R2					24.39	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					104.02	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.76	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	40	R	-									
BE1.2	Steel	t	3.14	R	23,941.02	BE-Q1	12.74	BE1.1	/	BE1.2				
BE1.3	Handrail	m	67	R	1,189.49	BE-Q2	0.60	BE1.1	/	BE1.3				
BE1.4	Grating	m2	15	R	2,954.79	BE-Q3	2.67	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	55	R	706.51	BE-Q4	0.73	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	8	R	339.14	BE-Q5	5.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					20.13	BE1.2	/	BE1.3
	Steel / grating					BE-R2					8.10	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					33.89	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					70.59	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	279	R	-									
BF1.2	Steel	t	39.43	R	37,895.48	BF-Q1	7.08	BF1.1	/	BF1.2				
BF1.3	Handrail	m	10	R	1,357.35	BF-Q2	27.90	BF1.1	/	BF1.3				
BF1.4	Grating	m2	41	R	2,549.82	BF-Q3	6.80	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	13	R	659.28	BF-Q4	21.46	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	23	R	2,979.92	BF-Q5	12.13	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					27.92	BF1.1	/	BF1.2
	Steel / grating					BF-R2					14.86	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					57.48	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					12.72	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	20,645	R	-	C-Q1	0.31	C1.1	/	C1.2				
C1.2	Total work units	WU	65,719	R	471.22									
C1.3	Pipe supports	kg	9,130	R	-	C-Q2	2.26	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,803	R	-	C-Q3	0.16	C1.4	/	C1.2				
C1.5	Number of welds	No	14,330	R	-	C-Q4	0.69	C1.5	/	C1.1				
C1.6	Total fittings	No	7,155	R	-	C-Q5	0.35	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,538	R	-	C-Q6	0.35	C1.7	/	C1.6				
C1.8	Support number	No	2,478	R	-	C-Q7	0.27	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	65,719	R	471.22	DA-Q1	62.35	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,054	R	85.96									
	Average cost per examination / WU					DA-R1					5.48	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	65,719	R	471.22	DB-Q1	185.12	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	355	R	145.06									
	Average cost per examination / WU					DB-R1					3.25	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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Year of construction 2006

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	65,719	R	471.22	DC-Q1	302.85	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	217	R	227.75									
	Average cost per examination / WU					DC-R1					2.07	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	65,719	R	471.22	DD-Q1	39.14	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,679	R	61.88									
	Average cost per examination / WU					DD-R1					7.62	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	65,719	R	471.22	DE-Q1	118.84	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	553	R	185.08									
	Average cost per examination / WU					DE-R1					2.55	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	65,719	R	471.22	E-Q1	236.32	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	278.09	R	584.80	E-Q2	197.71	E1.1	/	E1.3				
E1.3	Structural steel	t	332.40	R	36,634.52									
	WU cost / install mechanical weight - receive					E-R1					0.81	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					62.64	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	65,719	R	471.22									
F1.2	Painting to piping	m2	3,364	R	253.56	F-Q1	19.54	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,549	R	549.94	F-Q2	42.43	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	382.34	R	611.59									
F1.5	Painting to mechanical equipment	m2	925	R	178.48	F-Q3	0.41	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	392	R	548.17	F-Q4	0.98	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.46	F1.2	/	F1.3
	Work unit / paint					F-R2					1.86	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.86	F1.1	/	F1.3
	Install plant / paint					F-R4					3.43	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.12	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	47,181	R	113.69									
G1.2	Electrical cable terminations	No	1,978	R	129.23	G-Q1	23.85	G1.1	/	G1.2				
G1.3	Electrical equipment	No	127	R	678.62	G-Q2	371.50	G1.1	/	G1.3				
G1.4	DB's	No	16	R	2,261.95	G-Q3	7.94	G1.3	/	G1.4				
G1.5	Rack	m	5,404	R	232.65	G-Q4	8.73	G1.1	/	G1.5				
G1.6	Support steel	kg	9,762	R	49.15	G-Q5	0.55	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	24,560	R	27.15	G-Q6	1.92	G1.1	/	G1.7				
G1.8	Instruments	No	1,072	R	231.54	G-Q7	22.91	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,416	R	287.34	G-Q8	0.44	G1.8	/	G1.9				
G1.10	Light fittings	No	377	R	347.21	G-Q9	2.97	G1.10	/	G1.3				
G1.11	Conduit	m	3,197	R	42.04	G-Q10	14.76	G1.1	/	G1.11				
G1.12	Instrument stands	No	306	R	1,579.06	G-Q11	3.50	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.88	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.17	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.30	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.70	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.31	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.49	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.33	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.09	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.12	G1.7	/	G1.8

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Year of construction 2009

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	5,392	R	80.51	AB-Q1	2.03	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,651	R	17.76									
AB1.3	Back fill and compact	m3	4,713	R	90.65	AB-Q2	1.14	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,469	R	6.76	AB-Q3	1.55	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,413	R	9.84	AB-Q4	1.58	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.53	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.89	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.91	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.18	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	462,644.56									
AC1.2	EO for raking equipment	Item	1	R	62,471.53									
AC1.3	Number of piles	No	187	R	-									
AC1.4	Move rig to new position	No	157	R	461.46	AC-Q1	1.19	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	12	R	-	AC-Q2	15.58	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	18	R	903.42	AC-Q3	0.67	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	50	R	179.53	AC-Q4	0.24	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,189	R	299.88	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	418	R	519.95	AC-Q6	0.45	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	128	R	1,261.53	AC-Q7	1.46	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	95	R	666.13	AC-Q8	1.97	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	492	R	1,083.53	AC-Q9	0.38	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	69	R	1,360.72	AC-Q10	0.17	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	13.67	R	14,576.69	AC-Q11	13.68	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	161.43	R	21,554.97	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,406	R	2,404.78	AC-Q13	0.13	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	164	R	2,435.36	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	329,483.27		1.00		/					
AC1.19	Load test to pile	No	2	R	51,293.93	AC-Q15	93.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	122,679.85	AC-Q16	187.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	157	R	584.95	AC-Q17	1.19	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.98	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.38	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.52	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.28	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.45	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					137.01	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					21.33	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.01	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	77	R	120.16	AD-Q1	0.10	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	747	R	159.66									
AD1.3	Kerbing	m	186	R	177.76	AD-Q2	0.10	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,916	R	-									
AD1.5	Remove top soil	m3	767	R	81.64	AD-Q3	0.72	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,071	R	149.93	AD-Q4	0.38	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,034	R	10.10									
AD1.8	Reduce levels	m3	1,116	R	59.85	AD-Q5	0.55	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	884	R	149.87	AD-Q6	1.26	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	198	R	246.84	AD-Q7	4.46	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	260	R	306.12	AD-Q8	4.29	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,083	R	40.50	AD-Q9	5.47	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	221	R	20.82	AD-Q10	0.99	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	295	R	8.81	AD-Q11	1.19	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	197	R	989.52	AD-Q12	1.59	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	30	R	488.08	AD-Q13	1.06	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	319.77	AD-Q14	0.16	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	8	R	728.15	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	300	R	6.38	AD-Q16	1.61	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.75	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					8.08	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					5.93	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.61	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.00	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.16	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.70	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.72	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.12	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.05	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					5.57	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.75	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.80	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					4.10	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	141	R	2,198.24	AE-Q1	4.41	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	32	R	3,250.60	AE-Q2	0.10	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	321	R	-									
AE1.4	Rip and compact	m2	1,382	R	10.34									
AE1.5	Formwork to plinth	m2	271	R	379.78	AE-Q3	8.47	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	161	R	272.97	AE-Q4	1.14	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.43	R	13,822.31	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,461	R	372.00	AE-Q6	717.49	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	481	R	73.86	AE-Q7	3.41	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	426	R	143.13	AE-Q8	3.02	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.68	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.60	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.12	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.12	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					37.16	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	2,503	R	-	AF-Q1	9.85	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	254	R	93.05	AF-Q2	2.13	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	119	R	96.08	AF-Q3	0.58	AF1.2	/	AF1.4				
AF1.4	Working space	m2	435	R	67.99	AF-Q4	0.61	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	154	R	2,992.44	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	168	R	114.15	AF-Q6	1.10	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	14	R	3,261.74	AF-Q7	0.09	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	2,243.05	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	185	R	-	AF-Q9	1.22	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	152	R	10.30									
AF1.11	Formwork to bases	m2	213	R	276.32	AF-Q10	1.38	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	120	R	267.41	AF-Q11	8.57	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	11	R	314.66	AF-Q12	5.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.23	R	15,410.91	AF-Q13	0.25	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	8.85	R	22,788.55	AF-Q14	20.90	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	254	R	53.63	AF-Q15	0.61	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	28	R	363.07	AF-Q16	0.50	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	9,352.93	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	82	R	996.88									
	Base excavation / backfill					AF-R1					0.97	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.37	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					32.16	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					26.21	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					35.05	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.75	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					290.53	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.09	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.08	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.14	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					55.80	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.98	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.00	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	166	R	162.10	AG-Q1	1.47	AG1.1	/	AG1.4				
AG1.2	Working space	m2	499	R	56.91	AG-Q2	0.33	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	66	R	142.61	AG-Q3	2.52	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	113	R	2,992.44	AG-Q4	0.74	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	72	R	2,215.94	AG-Q5	1.57	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	186	R	-									
AG1.7	Wood float	m2	115	R	20.76	AG-Q6	0.63	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	152	R	99.74	AG-Q7	0.74	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	293	R	287.93	AG-Q8	0.39	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	104	R	279.93	AG-Q9	0.69	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	23.07	R	21,111.63	AG-Q10	8.06	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,270	R	99.41	AG-Q11	0.08	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,308	R	70.63	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.71	R	11,033.66	AG-Q13	42.11	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.35	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.88	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.03	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.10	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					7.05	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					3.69	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	288	R	169.83	AH-Q1	8.73	AH1.1	/	AH1.4				
AH1.2	Working space	m2	53	R	62.28	AH-Q2	5.43	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	222	R	191.63	AH-Q3	1.30	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	33	R	3,261.74	AH-Q4	0.63	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	15	R	1,936.13	AH-Q5	2.20	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	97	R	2,241.00	AH-Q6	0.34	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	10	R	2,992.44	AH-Q7	3.30	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	2,215.94	AH-Q8	11.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	153	R	-									
AH1.10	Blinding	m2	52	R	168.03	AH-Q9	2.94	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	712	R	12.32	AH-Q10	0.21	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	112	R	287.93	AH-Q11	0.29	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	30	R	279.93	AH-Q12	0.33	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	27	R	472.50	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	166	R	455.65	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	17	R	395.56	AH-Q15	5.71	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	38	R	92.04	AH-Q16	2.55	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.33	R	14,719.58	AH-Q17	0.15	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.69	R	19,042.78	AH-Q18	17.61	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	536	R	332.04	AH-Q19	0.18	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	914	R	99.41	AH-Q20	0.17	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,907	R	70.63	AH-Q21	0.08	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.65	R	13,381.19	AH-Q22	235.38	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	241	R	99.95	AH-Q23	0.40	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	208	R	215.55	AH-Q24	0.47	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.73	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.89	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.41	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					264.75	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.68	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.46	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.09	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.47	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.33	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					10.69	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.69	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					4.25	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					5.67	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					24.35	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.77	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					57.35	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					191.56	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					269.61	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.24	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					22.42	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					10.40	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	239	R	164.31	AI-Q1	3.79	AI1.1	/	AI1.5				
AI1.2	Working space	m2	534	R	65.93	AI-Q2	0.45	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	97	R	144.55	AI-Q3	2.46	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	145	R	120.46	AI-Q4	0.43	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	63	R	3,347.74	AI-Q5	5.73	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	11	R	2,223.98	AI-Q6	0.40	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	41	R	-									
AI1.8	Wood float	m2	157	R	14.27									
AI1.9	Formwork bases	m2	131	R	291.86	AI-Q7	0.48	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	145	R	439.87	AI-Q8	0.08	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.89	R	11,265.14	AI-Q9	4.61	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,201	R	116.91	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.00	R	13,743.51	AI-Q11	63.00	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.49	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.14	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					27.79	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.51	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					234.60	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.47	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.06	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					96.36	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.24	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	228	R	136.02	AJ-Q1	2.40	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	704	R	65.96	AJ-Q2	0.32	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	168	R	223.20	AJ-Q3	1.36	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	202	R	118.30	AJ-Q4	0.47	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	95	R	2,927.95	AJ-Q5	3.06	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	17	R	2,307.27	AJ-Q6	5.59	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	31	R	2,243.05									
AJ1.8	Total concrete	m3	113	R	-									
AJ1.9	Wood float	m2	277	R	19.49	AJ-Q7	0.41	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	133	R	289.36	AJ-Q8	0.71	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	241	R	399.36	AJ-Q9	0.07	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	12.65	R	17,801.42	AJ-Q10	8.93	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,360	R	116.07	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,558	R	97.39	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	0.90	R	13,310.18	AJ-Q13	105.56	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.06	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.61	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					24.75	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					150.23	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.12	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.78	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					153.37	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					182.78	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.22	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	491	R	145.51	AK-Q1	2.32	AK1.1	/	AK1.5				
AK1.2	Working space	m2	557	R	67.82	AK-Q2	0.88	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	174	R	138.14	AK-Q3	2.82	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	306	R	174.49	AK-Q4	0.69	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	212	R	2,144.80	AK-Q5	35.33	AK1.5		AK1.6				
AK1.6	Concrete column	m3	6	R	2,172.08									
AK1.7	Concrete plinth	m3	46	R	2,939.39	AK-Q6	4.61	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	242	R	-									
AK1.9	Wood float	m2	415	R	14.99	AK-Q7	0.51	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	460	R	393.28	AK-Q8	0.46	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	142	R	376.20	AK-Q9	0.32	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	23	R	328.61	AK-Q10	0.26	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	32.40	R	21,711.65	AK-Q11	7.47	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	4,530	R	91.24	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.27	R	13,429.74	AK-Q13	106.61	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.15	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.05	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					12.29	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					143.08	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.45	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.81	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.61	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					237.96	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.16	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	250	R	114.66	AL-Q1	2.25	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,130	R	65.93	AL-Q2	0.22	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	145	R	163.36	AL-Q3	1.72	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	205	R	110.49	AL-Q4	0.54	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	111	R	2,939.39	AL-Q5	1.00	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	111	R	3,945.11	AL-Q6	2.58	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	43	R	2,235.84	AL-Q7	2.58	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	235	R	-									
AL1.9	Wood float	m2	345	R	14.28	AL-Q8	0.32	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	340	R	386.92	AL-Q9	0.33	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	621	R	335.50	AL-Q10	0.18	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	181	R	379.75	AL-Q11	0.24	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	55	R	420.22	AL-Q12	0.78	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	12	R	724.89	AL-Q13	9.25	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	26.36	R	13,483.80	AL-Q14	8.92	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	13,154	R	65.43	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	134	R	53.95	AL-Q16	1.75	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.51	R	12,871.13	AL-Q17	460.78	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.04	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.74	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.70	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					26.60	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					205.84	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.60	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.89	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					11.76	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.32	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.89	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					3.08	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					206.08	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					249.93	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.23	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,036	R	146.08	AM-Q1	3.66	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,337	R	72.41	AM-Q2	0.77	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	760	R	169.36	AM-Q3	1.36	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	363	R	132.24	AM-Q4	0.78	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	283	R	3,062.07									
AM1.6	Concrete column	m3	79	R	2,252.10	AM-Q5	3.58	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	170	R	3,495.55	AM-Q6	0.46	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	131	R	2,083.24	AM-Q7	2.16	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	53	R	3,398.82	AM-Q8	1.49	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	108	R	3,501.09	AM-Q9	0.73	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	688	R	-									
AM1.12	Wood float	m2	1,142	R	13.99	AM-Q10	0.60	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	523	R	402.25	AM-Q11	0.54	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	908	R	537.27	AM-Q12	0.09	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	397	R	379.75	AM-Q13	0.43	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	131	R	456.28	AM-Q14	1.30	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	424	R	639.79	AM-Q15	0.31	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	631.29	AM-Q16	19.75	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	334	R	433.41	AM-Q17	0.16	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	125.31	R	17,417.83	AM-Q18	5.49	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,187	R	65.28	AM-Q19	0.22	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,338	R	118.51	AM-Q20	0.29	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	31	R	1,309.73	AM-Q21	4.04	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.80	R	12,734.72	AM-Q22	860.00	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.02	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.86	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					23.16	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.36	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.88	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.47	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.90	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.87	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					218.88	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.61	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					9.20	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					7.66	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.19	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					5.54	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.47	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.84	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					266.82	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					146.97	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					13.30	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.24	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	178	R	155.59	AO-Q1	1.59	AO1.1	/	AO1.5				
AO1.2	Working space	m2	739	R	110.88	AO-Q2	0.24	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	81	R	149.90	AO-Q3	2.20	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	23	R	128.42	AO-Q4	4.87	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	112	R	3,495.55									
AO1.6	Concrete column	m3	21	R	2,083.24	AO-Q5	5.33	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	9	R	3,250.60	AO-Q6	2.33	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	2,737.09	AO-Q7	22.40	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	2,243.96	AO-Q8	21.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	24	R	-									
AO1.11	Wood float	m2	32	R	14.26	AO-Q9	3.50	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	80	R	272.24	AO-Q10	1.40	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	188	R	428.90	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	38	R	379.75	AO-Q12	0.24	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	13	R	465.77	AO-Q13	0.69	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	690.45	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	30	R	478.48	AO-Q15	3.73	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	12	R	301.03	AO-Q16	0.42	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	3.97	R	14,990.31	AO-Q17	6.05	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,412	R	89.04	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,344	R	72.62	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	8	R	2,612.83	AO-Q20	3.00	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.80	R	15,927.77	AO-Q21	40.00	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.40	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.04	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					27.22	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					245.13	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					12.84	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.56	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.98	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.86	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					6.79	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.25	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					9.09	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					168.35	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					206.42	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.22	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.74	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	800	R	80.10	AP-Q1	1.24	AP1.1	/	AP1.5				
AP1.2	Working space	m2	429	R	67.74	AP-Q2	1.86	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,165	R	178.01	AP-Q3	0.69	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	158	R	121.17	AP-Q4	4.09	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	646	R	1,685.64	AP-Q5	0.33	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,948	R	238.59									
AP1.7	Rough formwork	m2	141	R	419.08	AP-Q6	4.58	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,031	R	319.46	AP-Q7	0.63	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,697	R	32.67	AP-Q8	0.17	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	98	R	83.38	AP-Q9	6.59	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	44	R	136.86	AP-Q10	14.68	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	258	R	91.08	AP-Q11	2.50	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.79	R	13,381.19	AP-Q12	817.72	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,208	R	440.45	AP-Q13	0.53	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,453	R	-	AP-Q14	3.80	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,263	R	190.08	AP-Q15	1.94	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,743	R	559.91	AP-Q16	1.41	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,533	R	157.39	AP-Q17	0.97	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	6	R	2,577.09	AP-Q18	408.83	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,697	R	920.53	AP-Q19	0.66	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	1,906	R	192.42	AP-Q20	1.29	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	67.49	R	15,025.70	AP-Q21	9.57	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	71,510.77									
AP1.24	Structural steel	Item	1	R	185,169.84									
AP1.25	Plumbing and drainage	Item	1	R	117,904.84									
AP1.26	Small power and lighting	Item	1	R	1,004,466.47									
AP1.27	External works	Item	1	R	434,043.58									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.18	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.45	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					13.91	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					62.98	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					4.02	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.28	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					51.60	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					20.22	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					12.32	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					164.97	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.13	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					8.87	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					26.84	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.80	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.17	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.48	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.29	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.76	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.32	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.85	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					66.85	AP1.26	/	AP1.22
	External works / concrete					AP-R23					257.49	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	46	R	3,306.21	AQ-Q1	3.04	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	140	R	285.48									
AQ1.3	Reinforcement	t	9.24	R	22,866.67	AQ-Q2	4.98	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	565	R	171.67	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	156	R	302.66	AQ-Q4	0.29	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	100	R	454.98	AQ-Q5	6.08	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,064	R	225.62	AQ-Q6	0.57	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	23.97	R	42,298.11	AQ-Q7	25.37	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	358	R	206.50	AQ-Q8	1.70	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	28,672.26	AQ-Q9	304.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	27	R	3,165.94	AQ-Q10	22.52	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	871	R	172.29	AQ-Q11	0.70	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	608	R	-									
	Concrete / reinforcement					AQ-R1					0.14	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.58	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					19.26	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					10.92	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.27	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					187.48	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.92	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.68	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.03	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.31	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	118	R	431.10	AR-Q1	2.23	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	53	R	2,144.80	AR-Q2	12.18	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.35	R	13,822.31									
AR1.4	Mesh	m2	346	R	372.00	AR-Q3	0.15	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	147	R	217.49	AR-Q4	0.36	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	62	R	402.12	AR-Q5	8.44	AR1.15	/	AR1.6				
AR1.7	Screed	m2	299	R	57.19	AR-Q6	1.75	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	24.89	R	62,983.14	AR-Q7	21.01	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	13	R	5,122.56	AR-Q8	1.91	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	34	R	1,691.12	AR-Q9	0.73	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	45	R	640.17	AR-Q10	0.55	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	667	R	238.08	AR-Q11	0.78	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	58	R	303.16	AR-Q12	9.02	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	22	R	2,992.66	AR-Q13	1.13	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	523	R	-									
	Earthworks / concrete					AR-R1					0.20	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.16	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					5.77	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					9.86	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.33	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					37.50	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					12.30	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					37.24	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.64	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					264.55	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.27	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					21.05	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	292	R	331.82	AS-Q1	3.84	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	103	R	185.82	AS-Q2	0.74	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	76	R	3,306.21	AS-Q3	12.24	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	6.21	R	14,263.89									
AS1.5	Mesh	m2	162	R	244.71	AS-Q4	0.47	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	136	R	207.96	AS-Q5	0.56	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	157	R	19.55	AS-Q6	0.48	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	24	R	199.23	AS-Q7	3.17	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	561	R	65.19	AS-Q8	0.14	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.08	R	17,909.28	AS-Q9	70.37	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	19	R	396.18	AS-Q10	0.47	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	4,122.71	AS-Q11	4.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	33	R	927.38	AS-Q12	3.21	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	442	R	69.65	AS-Q13	0.17	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.96	R	76,604.42	AS-Q14	4.59	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.62	R	47,188.27	AS-Q15	170.97	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	106	R	-									
AS1.18	Total control room area	m2	9	R	-									
	Concrete / earthworks					AS-R1					9.96	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					17.79	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					58.29	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					15.90	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					169.12	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					16.59	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					218.80	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.57	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.18	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.19	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.30	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.10	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	115	R	275.28	AT-Q1	7.67	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	17	R	147.80	AT-Q2	0.88	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	15	R	2,404.61	AT-Q3	7.11	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.11	R	19,922.68									
AT1.5	Formwork	m2	102	R	287.27	AT-Q4	0.15	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	30	R	30.06	AT-Q5	0.50	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	23	R	148.80	AT-Q6	0.65	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.52	R	93.88	AT-Q7	28.85	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.29	R	14,039.21	AT-Q8	51.72	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.07	R	99.79	AT-Q9	214.29	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.68	R	47,828.21	AT-Q10	51.47	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.83	R	55,859.53	AT-Q11	42.17	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	51	R	383.46	AT-Q12	0.69	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	12	R	192.31	AT-Q13	2.92	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	35	R	-									
	Concrete / earthworks					AT-R1					8.74	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					16.27	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					8.37	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					79.99	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					16.16	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					212.21	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.94	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.42	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.36	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.27	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.99	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	254	R	300.51	AU-Q1	0.68	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	173	R	126.91	AU-Q2	2.14	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	371	R	3,607.09									
AU1.4	Reinforcement	t	23.97	R	19,922.68	AU-Q3	15.48	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	916	R	402.25	AU-Q4	0.41	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	132	R	142.28	AU-Q5	2.81	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,470	R	70.71	AU-Q6	0.25	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	747	R	128.36	AU-Q7	0.50	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	42	R	228.58	AU-Q8	8.83	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.12	R	57,580.17	AU-Q9	175.00	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	9	R	8,053.92	AU-Q10	41.22	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	19	R	401.03	AU-Q11	10.53	AU1.12	/	AU1.13				
AU1.13	Total area	m2	200	R	-									
	Concrete / earthworks					AU-R1					12.00	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					28.42	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					8.97	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.18	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					25.35	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					281.75	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.35	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					155.21	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					87.16	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.45	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					8.99	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,144	R	295.05	AV-Q1	0.96	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,443	R	180.58	AV-Q2	1.23	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,577	R	172.53	AV-Q3	0.84	AV1.10	/	AV1.3				
AV1.4	Pipework	m	35	R	1,252.35	AV-Q4	86.20	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	6,495.32	AV-Q5	11.67	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	21	R	2,567.06	AV-Q6	1.67	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	185	R	275.57	AV-Q7	0.11	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	27	R	171.67	AV-Q8	0.78	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	2.57	R	13,685.76	AV-Q9	8.17	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,017	R	-									
	Earthworks / lining					AV-R1					1.63	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.71	AV1.1	/	AV1.3
	Lining / paving					AV-R3					1.05	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.24	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.19	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.07	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					9.32	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					14.95	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.19	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	653	R	294.39	AW-Q1	8.06	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	59	R	154.16	AW-Q2	1.37	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	81	R	3,130.71	AW-Q3	4.31	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	18.78	R	14,228.10									
AW1.5	Mesh	m2	51	R	350.66	AW-Q4	1.59	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	337	R	207.96	AW-Q5	0.24	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,841	R	102.03	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.07	R	50,587.20	AW-Q7	20.29	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	42	R	-									
	Concrete / earthworks					AW-R1					10.63	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					20.31	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					40.58	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					15.05	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					139.45	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.28	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	19	R	-									
BA1.2	Steel	t	2.07	R	43,257.41	BA-Q1	9.18	BA1.1	/	BA1.2				
BA1.3	Handrail	m	20	R	2,627.40	BA-Q2	0.95	BA1.1	/	BA1.3				
BA1.4	Grating	m2	11	R	4,327.71	BA-Q3	1.73	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	11	R	894.73	BA-Q4	1.73	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	457.16	BA-Q5	3.80	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					16.46	BA1.2	/	BA1.3
	Steel / grating					BA-R2					10.00	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					48.35	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					94.62	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,018	R	-									
BB1.2	Steel	t	53.34	R	46,533.13	BB-Q1	19.09	BB1.1	/	BB1.2				
BB1.3	Handrail	m	80	R	2,362.26	BB-Q2	12.73	BB1.1	/	BB1.3				
BB1.4	Grating	m2	127	R	2,890.34	BB-Q3	8.02	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	69	R	896.34	BB-Q4	14.75	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	11	R	5,893.09	BB-Q5	92.55	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					19.70	BB1.2	/	BB1.3
	Steel / grating					BB-R2					16.10	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					51.91	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.90	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	11,922	R	-									
BC1.2	Steel	t	146.53	R	47,673.19	BC-Q1	81.36	BC1.1	/	BC1.2				
BC1.3	Handrail	m	370	R	1,692.48	BC-Q2	32.22	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,012	R	4,645.20	BC-Q3	2.97	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	443	R	423.77	BC-Q4	26.91	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	51	R	508.24	BC-Q5	233.76	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	72	R	6,685.83	BC-Q6	165.58	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					28.17	BC1.2	/	BC1.3
	Steel / grating					BC-R2					10.26	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					112.50	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					93.80	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.13	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	383	R	-									
BD1.2	Steel	t	23.20	R	68,651.56	BD-Q1	16.51	BD1.1	/	BD1.2				
BD1.3	Handrail	m	8	R	1,814.39	BD-Q2	47.88	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	3,358.12	BD-Q3	47.88	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	8	R	853.98	BD-Q4	47.88	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	29	R	6,188.86	BD-Q5	13.21	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					37.84	BD1.1	/	BD1.2
	Steel / grating					BD-R2					20.44	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					80.39	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					11.09	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	22	R	-									
BE1.2	Steel	t	1.99	R	30,600.63	BE-Q1	11.06	BE1.1	/	BE1.2				
BE1.3	Handrail	m	44	R	1,745.32	BE-Q2	0.50	BE1.1	/	BE1.3				
BE1.4	Grating	m2	17	R	3,868.40	BE-Q3	1.29	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	28	R	652.70	BE-Q4	0.79	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	5	R	754.19	BE-Q5	4.40	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					17.53	BE1.2	/	BE1.3
	Steel / grating					BE-R2					7.91	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					46.88	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					40.57	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	214	R	-									
BF1.2	Steel	t	26.65	R	72,056.69	BF-Q1	8.03	BF1.1	/	BF1.2				
BF1.3	Handrail	m	10	R	1,479.69	BF-Q2	21.40	BF1.1	/	BF1.3				
BF1.4	Grating	m2	36	R	2,750.70	BF-Q3	5.94	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	17	R	634.05	BF-Q4	12.59	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	8	R	9,408.42	BF-Q5	26.75	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					48.70	BF1.1	/	BF1.2
	Steel / grating					BF-R2					26.20	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					113.65	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.66	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	14,430	R	-	C-Q1	0.26	C1.1	/	C1.2				
C1.2	Total work units	WU	54,565	R	573.96									
C1.3	Pipe supports	kg	10,401	R	-	C-Q2	1.39	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	5,916	R	-	C-Q3	0.11	C1.4	/	C1.2				
C1.5	Number of welds	No	9,064	R	-	C-Q4	0.63	C1.5	/	C1.1				
C1.6	Total fittings	No	5,634	R	-	C-Q5	0.39	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,999	R	-	C-Q6	0.35	C1.7	/	C1.6				
C1.8	Support number	No	1,951	R	-	C-Q7	0.19	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	54,565	R	573.96	DA-Q1	60.09	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	908	R	172.97									
	Average cost per examination / WU					DA-R1					3.32	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	54,565	R	54,565.25	DB-Q1	126.60	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	431	R	430.58									
	Average cost per examination / WU					DB-R1					126.72	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	54,565	R	573.96	DC-Q1	212.32	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	257	R	237.39									
	Average cost per examination / WU					DC-R1					2.42	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	54,565	R	573.96	DD-Q1	73.74	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	740	R	148.25									
	Average cost per examination / WU					DD-R1					3.87	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	54,565	R	573.96	DE-Q1	122.89	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	444	R	240.48									
	Average cost per examination / WU					DE-R1					2.39	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	54,565	R	573.96	E-Q1	263.42	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	207.14	R	1,317.93	E-Q2	213.59	E1.1	/	E1.3				
E1.3	Structural steel	t	255.47	R	52,278.13									
	WU cost / install mechanical weight - receive					E-R1					0.44	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					39.67	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	54,565	R	573.96									
F1.2	Painting to piping	m2	3,980	R	337.64	F-Q1	13.71	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,354	R	741.33	F-Q2	40.30	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	170.25	R	1,286.42									
F1.5	Painting to mechanical equipment	m2	1,283	R	211.77	F-Q3	0.13	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	243	R	717.53	F-Q4	0.70	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.46	F1.2	/	F1.3
	Work unit / paint					F-R2					1.70	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.77	F1.1	/	F1.3
	Install plant / paint					F-R4					6.07	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.79	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	18,424	R	132.72									
G1.2	Electrical cable terminations	No	1,001	R	241.42	G-Q1	18.41	G1.1	/	G1.2				
G1.3	Electrical equipment	No	93	R	1,012.77	G-Q2	198.11	G1.1	/	G1.3				
G1.4	DB's	No	12	R	3,375.69	G-Q3	7.75	G1.3	/	G1.4				
G1.5	Rack	m	4,255	R	508.34	G-Q4	4.33	G1.1	/	G1.5				
G1.6	Support steel	kg	7,686	R	37.55	G-Q5	0.55	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	19,339	R	40.63	G-Q6	0.95	G1.1	/	G1.7				
G1.8	Instruments	No	844	R	326.26	G-Q7	22.91	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,902	R	392.00	G-Q8	0.44	G1.8	/	G1.9				
G1.10	Light fittings	No	277	R	475.76	G-Q9	2.98	G1.10	/	G1.3				
G1.11	Conduit	m	2,518	R	57.35	G-Q10	7.32	G1.1	/	G1.11				
G1.12	Instrument stands	No	269	R	2,356.57	G-Q11	3.14	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.55	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.13	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.30	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.31	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					3.53	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.26	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.28	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.12	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,780	R	70.34	AB-Q1	2.03	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,333	R	14.48									
AB1.3	Back fill and compact	m3	6,350	R	73.92	AB-Q2	1.07	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,362	R	5.51	AB-Q3	1.55	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,291	R	8.60	AB-Q4	1.58	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.86	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.95	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					12.77	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.18	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	368,654.49									
AC1.2	EO for raking equipment	Item	1	R	53,700.61									
AC1.3	Number of piles	No	252	R	-									
AC1.4	Move rig to new position	No	197	R	470.97	AC-Q1	1.28	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	16.80	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	23	R	789.25	AC-Q3	0.65	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	67	R	146.39	AC-Q4	0.22	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,267	R	244.52	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	526	R	530.67	AC-Q6	0.48	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	143	R	1,028.63	AC-Q7	1.76	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	181	R	581.95	AC-Q8	1.39	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	929	R	883.50	AC-Q9	0.27	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	104	R	1,084.28	AC-Q10	0.14	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.19	R	12,530.14	AC-Q11	14.66	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	217.48	R	14,478.65	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,768	R	2,454.35	AC-Q13	0.14	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	206	R	2,691.12	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	287,845.39		1.00		/					
AC1.19	Load test to pile	No	2	R	41,824.30	AC-Q15	126.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	100,031.30	AC-Q16	252.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	197	R	597.00	AC-Q17	1.28	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					150.20	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.32	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.42	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.24	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.36	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.44	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.87	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					5.90	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.10	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					117.28	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					17.04	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					40.76	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	97	R	97.98	AD-Q1	0.10	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,006	R	130.19									
AD1.3	Kerbing	m	234	R	145.55	AD-Q2	0.09	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,581	R	-									
AD1.5	Remove top soil	m3	1,152	R	72.81	AD-Q3	0.86	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,346	R	124.79	AD-Q4	0.42	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,740	R	13.18									
AD1.8	Reduce levels	m3	1,503	R	52.29	AD-Q5	0.55	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,191	R	130.93	AD-Q6	1.26	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	249	R	201.27	AD-Q7	4.78	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	351	R	267.44	AD-Q8	4.28	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,868	R	27.17	AD-Q9	7.50	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	320	R	19.73	AD-Q10	0.72	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	346	R	7.44	AD-Q11	1.37	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	253	R	1,130.21	AD-Q12	1.48	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	52	R	306.83	AD-Q13	1.08	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	480.42	AD-Q14	0.22	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	11	R	525.94	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	377	R	12.03	AD-Q16	1.61	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.75	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					5.52	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.97	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.65	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.95	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.13	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.59	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.72	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.14	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.05	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					7.77	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.11	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					3.30	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					3.61	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.08	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	268	R	1,920.44	AE-Q1	4.39	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	61	R	2,650.49	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	483	R	-									
AE1.4	Rip and compact	m2	1,738	R	8.89									
AE1.5	Formwork to plinth	m2	365	R	255.10	AE-Q3	5.98	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	203	R	278.60	AE-Q4	0.76	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.32	R	15,273.95	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,095	R	324.99	AE-Q6	716.44	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	648	R	60.23	AE-Q7	2.42	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	536	R	116.70	AE-Q8	2.00	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.72	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					216.02	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					47.00	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.06	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,362	R	-	AF-Q1	12.94	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	337	R	93.53	AF-Q2	1.49	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	226	R	117.37	AF-Q3	0.39	AF1.2	/	AF1.4				
AF1.4	Working space	m2	858	R	71.91	AF-Q4	0.45	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	151	R	2,050.49	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	219	R	114.11	AF-Q6	0.71	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	2,781.40	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	1,651.00	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	156	R	-	AF-Q9	0.44	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	353	R	16.24									
AF1.11	Formwork to bases	m2	266	R	242.79	AF-Q10	1.76	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	151	R	233.62	AF-Q11	7.95	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	14	R	274.90	AF-Q12	7.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.82	R	11,339.37	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	24.54	R	19,908.69	AF-Q14	6.36	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	292	R	46.85	AF-Q15	0.52	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	35	R	317.18	AF-Q16	0.54	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	8,754.61	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	111	R	831.76									
	Base excavation / backfill					AF-R1					0.80	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.30	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.92	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					17.97	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					29.74	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.81	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					126.26	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.08	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.17	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.57	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					43.77	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.77	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.47	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.10	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	424	R	90.89	AG-Q1	2.10	AG1.1	/	AG1.4				
AG1.2	Working space	m2	494	R	54.44	AG-Q2	0.86	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	66	R	190.33	AG-Q3	6.42	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	202	R	1,443.42	AG-Q4	1.76	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	73	R	1,917.91	AG-Q5	2.77	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	337	R	-									
AG1.7	Wood float	m2	256	R	11.67	AG-Q6	0.29	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	115	R	137.53	AG-Q7	1.76	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	351	R	374.42	AG-Q8	0.58	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	121	R	232.15	AG-Q9	0.60	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	20.91	R	16,341.35	AG-Q10	16.12	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,984	R	55.77	AG-Q11	0.11	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,935	R	97.31	AG-Q12	0.11	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.91	R	9,034.38	AG-Q13	25.09	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.06	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.60	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					2.09	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.10	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.26	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.12	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					11.32	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.07	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.26	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	239	R	93.91	AH-Q1	4.69	AH1.1	/	AH1.4				
AH1.2	Working space	m2	67	R	73.68	AH-Q2	3.57	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	269	R	133.68	AH-Q3	0.89	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	51	R	1,578.69	AH-Q4	0.88	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	30	R	1,957.80	AH-Q5	1.70	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	96	R	2,914.10	AH-Q6	0.53	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	18	R	1,806.84	AH-Q7	2.83	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	1,828.95	AH-Q8	17.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	240	R	-									
AH1.10	Blinding	m2	58	R	132.29	AH-Q9	4.14	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	699	R	12.78	AH-Q10	0.34	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	188	R	212.13	AH-Q11	0.27	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	40	R	245.53	AH-Q12	0.45	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	36	R	363.43	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	164	R	251.95	AH-Q14	0.18	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	21	R	236.88	AH-Q15	4.57	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	64	R	87.51	AH-Q16	1.50	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.91	R	8,192.97	AH-Q17	0.35	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	5.51	R	12,551.89	AH-Q18	43.56	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	856	R	270.64	AH-Q19	0.11	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,257	R	77.66	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,873	R	63.55	AH-Q21	0.13	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.90	R	11,690.17	AH-Q22	266.67	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	303	R	124.57	AH-Q23	0.32	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	280	R	120.68	AH-Q24	0.34	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.06	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.27	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.70	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					11.93	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					123.53	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.81	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.54	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.87	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.86	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.44	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.36	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.03	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.77	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					12.30	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					33.30	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.65	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					46.38	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					161.63	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					197.51	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.14	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					23.39	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					24.15	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	322	R	94.93	AI-Q1	2.95	AI1.1	/	AI1.5				
AI1.2	Working space	m2	720	R	79.80	AI-Q2	0.45	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	131	R	109.88	AI-Q3	2.46	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	273	R	102.95	AI-Q4	0.40	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	109	R	3,053.80	AI-Q5	10.90	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	10	R	1,819.98	AI-Q6	0.48	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	80	R	-									
AI1.8	Wood float	m2	225	R	15.27									
AI1.9	Formwork bases	m2	171	R	250.97	AI-Q7	0.64	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	232	R	371.11	AI-Q8	0.04	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.79	R	11,638.75	AI-Q9	10.27	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	4,584	R	47.91	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.36	R	11,480.81	AI-Q11	80.15	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.19	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.86	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					29.66	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.68	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					199.99	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.17	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.90	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					242.93	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.27	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	318	R	152.28	AJ-Q1	2.36	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	948	R	40.57	AJ-Q2	0.34	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	132	R	116.70	AJ-Q3	2.41	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	303	R	169.16	AJ-Q4	0.45	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	135	R	1,374.44	AJ-Q5	3.46	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	17	R	1,965.31	AJ-Q6	7.94	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	39	R	2,506.52									
AJ1.8	Total concrete	m3	186	R	-									
AJ1.9	Wood float	m2	293	R	10.90	AJ-Q7	0.63	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	214	R	238.84	AJ-Q8	0.63	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	287	R	228.95	AJ-Q9	0.06	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	14.66	R	19,908.69	AJ-Q10	12.69	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,959	R	53.69	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,905	R	54.47	AJ-Q12	0.07	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.64	R	17,064.65	AJ-Q13	82.32	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.11	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					3.75	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.30	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					8.13	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					126.10	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					5.75	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					8.58	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					370.81	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					365.50	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.08	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	455	R	97.42	AK-Q1	1.97	AK1.1	/	AK1.5				
AK1.2	Working space	m2	788	R	56.37	AK-Q2	0.58	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	259	R	128.74	AK-Q3	1.76	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	369	R	165.11	AK-Q4	0.63	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	231	R	1,437.40	AK-Q5	33.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	1,918.31									
AK1.7	Concrete plinth	m3	61	R	1,720.39	AK-Q6	3.79	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	318	R	-									
AK1.9	Wood float	m2	334	R	12.20	AK-Q7	0.69	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	648	R	327.86	AK-Q8	0.36	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	209	R	242.79	AK-Q9	0.29	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	356.99	AK-Q10	0.23	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	41.58	R	10,249.38	AK-Q11	7.65	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,229	R	62.41	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.30	R	15,977.53	AK-Q13	138.26	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.73	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.76	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					8.71	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					117.82	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					4.38	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.09	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					5.37	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					164.23	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.09	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	552	R	97.78	AL-Q1	4.15	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,314	R	40.57	AL-Q2	0.42	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	274	R	116.70	AL-Q3	2.01	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	270	R	137.53	AL-Q4	0.49	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	133	R	1,906.58	AL-Q5	0.69	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	192	R	2,008.72	AL-Q6	3.84	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	50	R	2,610.14	AL-Q7	2.66	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	455	R	-									
AL1.9	Wood float	m2	295	R	18.00	AL-Q8	0.45	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	435	R	374.42	AL-Q9	0.31	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	819	R	257.34	AL-Q10	0.23	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	175	R	394.42	AL-Q11	0.29	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	73	R	361.02	AL-Q12	0.68	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	17	R	541.28	AL-Q13	11.29	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	34.47	R	12,024.79	AL-Q14	13.20	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,407	R	53.35	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	150	R	62.48	AL-Q16	3.03	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.66	R	16,589.40	AL-Q17	689.39	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.41	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.84	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					13.86	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					105.92	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.95	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.95	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					5.09	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.62	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.81	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					7.23	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.62	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.82	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					225.39	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					192.46	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.11	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,002	R	145.08	AM-Q1	2.36	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,194	R	44.37	AM-Q2	0.46	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,549	R	190.33	AM-Q3	0.65	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	454	R	100.88	AM-Q4	0.94	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	425	R	2,496.77									
AM1.6	Concrete column	m3	99	R	1,967.49	AM-Q5	4.29	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	214	R	3,053.80	AM-Q6	0.46	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	176	R	1,819.98	AM-Q7	2.41	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	76	R	2,969.30	AM-Q8	1.30	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	139	R	2,854.73	AM-Q9	0.71	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	879	R	-									
AM1.12	Wood float	m2	2,406	R	18.13	AM-Q10	0.37	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	655	R	202.84	AM-Q11	0.65	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,137	R	271.54	AM-Q12	0.09	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	394	R	413.98	AM-Q13	0.54	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	175	R	367.66	AM-Q14	1.22	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	957	R	302.18	AM-Q15	0.18	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	3	R	579.08	AM-Q16	33.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	403	R	340.23	AM-Q17	0.19	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	110.86	R	12,024.79	AM-Q18	7.93	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,674	R	72.92	AM-Q19	0.15	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,931	R	62.48	AM-Q20	0.22	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	28	R	1,384.23	AM-Q21	3.96	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.96	R	19,652.34	AM-Q22	915.63	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					3.27	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.76	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					24.75	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.27	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.82	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.37	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.84	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.87	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					137.71	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					12.31	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					7.38	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					8.31	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.25	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					5.27	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					9.45	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.73	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					164.90	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					192.46	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.69	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.13	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,449	R	132.67	AN-Q1	1.50	AN1.1	/	AN1.5				
AN1.2	Working space	m2	386	R	56.04	AN-Q2	6.34	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	513	R	179.41	AN-Q3	4.77	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,905	R	157.85	AN-Q4	0.86	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,633	R	1,380.20	AN-Q5								
AN1.6	Concrete column	m3	80	R	1,833.91	AN-Q6	20.41	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	35	R	1,912.72	AN-Q7	2.29	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	227	R	1,937.05	AN-Q8	7.19	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	3	R	2,919.36	AN-Q9	26.67	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,968	R	-				/					
AN1.11	Wood float	m2	1,905	R	12.76	AN-Q10	0.86	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	175	R	245.76	AN-Q11	9.33	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	588	R	436.41	AN-Q12	0.14	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	126	R	222.51	AN-Q13	0.28	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	56	R	335.66	AN-Q14	0.63	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	29	R	488.63	AN-Q15	0.10	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	577.75	AN-Q16	408.25	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,142	R	254.80	AN-Q17	0.20	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	569.74	R	16,238.44	AN-Q18	3.45	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	11,913	R	54.97	AN-Q19	0.17	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	8,539	R	61.48	AN-Q20	0.23	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	97	R	2,145.61	AN-Q21	20.29	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.75	R	10,664.41	AN-Q22	593.82	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.10	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.37	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.74	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					8.74	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					108.17	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.62	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					8.60	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.70	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.20	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.31	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.97	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.60	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					295.41	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					264.13	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.13	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					7.57	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	222	R	132.67	AO-Q1	2.06	AO1.1	/	AO1.5				
AO1.2	Working space	m2	590	R	56.04	AO-Q2	0.38	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	168	R	121.61	AO-Q3	1.32	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	30	R	116.91	AO-Q4	3.60	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	108	R	1,844.42									
AO1.6	Concrete column	m3	24	R	2,446.57	AO-Q5	4.50	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	2,050.49	AO-Q6	1.60	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	1,889.61	AO-Q7	21.60	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,889.61	AO-Q8	24.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	30	R	-									
AO1.11	Wood float	m2	50	R	18.38	AO-Q9	2.16	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	106	R	266.29	AO-Q10	1.02	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	195	R	273.05	AO-Q11	0.12	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	60	R	470.64	AO-Q12	0.25	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	22	R	276.29	AO-Q13	0.68	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	7	R	367.12	AO-Q14	0.14	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	38	R	577.75	AO-Q15	2.84	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	15	R	220.13	AO-Q16	0.33	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.25	R	12,160.78	AO-Q17	4.80	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,033	R	54.05	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,158	R	60.96	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	1,924.44	AO-Q20	3.00	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.53	R	12,021.88	AO-Q21	30.59	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.37	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.09	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					15.78	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					100.35	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.93	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					4.36	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					7.42	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					8.96	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.55	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.15	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.58	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					224.99	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					199.49	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.15	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.32	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,073	R	65.31	AP-Q1	1.53	AP1.1	/	AP1.5				
AP1.2	Working space	m2	539	R	59.18	AP-Q2	1.99	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,404	R	133.68	AP-Q3	0.76	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	149	R	158.45	AP-Q4	4.70	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	701	R	1,287.47	AP-Q5	0.32	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,223	R	209.20									
AP1.7	Rough formwork	m2	288	R	327.86	AP-Q6	2.43	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,314	R	299.20	AP-Q7	0.53	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,103	R	23.21	AP-Q8	0.14	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	118	R	131.45	AP-Q9	5.94	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	52	R	114.98	AP-Q10	13.48	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	451	R	54.97	AP-Q11	1.55	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.90	R	9,448.21	AP-Q12	778.89	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,518	R	326.57	AP-Q13	0.46	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,084	R	-	AP-Q14	4.40	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,587	R	164.45	AP-Q15	1.94	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,347	R	556.09	AP-Q16	1.31	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,185	R	-	AP-Q17	0.97	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	2,131.91	AP-Q18	385.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,981	R	483.60	AP-Q19	0.62	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,397	R	409.96	AP-Q20	1.29	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	84.86	R	12,171.87	AP-Q21	8.26	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	60,979.72									
AP1.24	Structural steel	Item	1	R	157,900.75									
AP1.25	Plumbing and drainage	Item	1	R	100,541.55									
AP1.26	Small power and lighting	Item	1	R	856,543.43									
AP1.27	External works	Item	1	R	370,124.03									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.10	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.49	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					8.13	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					58.18	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					3.93	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					4.30	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					55.47	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					9.79	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					11.20	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					221.43	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.14	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					7.83	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					21.89	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					#DIV/0!	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.68	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					0.80	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.01	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.97	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.26	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					70.37	AP1.26	/	AP1.22
	External works / concrete					AP-R23					287.48	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	70	R	2,888.39	AQ-Q1	2.60	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	182	R	232.77									
AQ1.3	Reinforcement	t	11.93	R	8,783.10	AQ-Q2	5.87	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	800	R	194.51	AQ-Q3	0.09	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	192	R	343.01	AQ-Q4	0.36	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	190	R	340.87	AQ-Q5	5.14	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	876	R	196.03	AQ-Q6	1.12	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	32	R	25,321.74	AQ-Q7	30.53	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	471	R	185.29	AQ-Q8	2.07	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	22,508.02	AQ-Q9	325.67	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	55	R	2,823.37	AQ-Q10	17.76	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	825	R	109.77	AQ-Q11	1.18	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	977	R	-									
	Concrete / reinforcement					AQ-R1					0.33	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					12.41	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					14.85	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					8.42	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					8.47	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					129.17	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.95	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.89	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.40	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.79	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	217	R	289.57	AR-Q1	4.09	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	53	R	2,189.02	AR-Q2	8.56	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.19	R	15,273.95									
AR1.4	Mesh	m2	765	R	324.99	AR-Q3	0.07	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	85	R	177.34	AR-Q4	0.62	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	82	R	327.88	AR-Q5	3.99	AR1.15	/	AR1.6				
AR1.7	Screed	m2	478	R	58.37	AR-Q6	0.68	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	44.71	R	51,355.50	AR-Q7	7.31	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	12	R	4,475.21	AR-Q8	3.73	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	50	R	1,378.91	AR-Q9	0.89	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	54	R	521.99	AR-Q10	0.83	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	505	R	194.12	AR-Q11	0.65	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	129	R	264.85	AR-Q12	2.53	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	33	R	2,440.17	AR-Q13	1.35	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	327	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.14	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					6.74	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					12.34	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					6.68	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					37.50	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.48	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					37.24	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.64	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					264.56	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.36	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					21.05	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	207	R	233.41	AS-Q1	2.80	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	137	R	137.53	AS-Q2	0.54	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	74	R	2,914.10	AS-Q3	6.73	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	11.00	R	11,498.10									
AS1.5	Mesh	m2	183	R	265.84	AS-Q4	0.40	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	203	R	269.91	AS-Q5	0.36	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	155	R	20.63	AS-Q6	0.48	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	27	R	139.30	AS-Q7	2.74	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	941	R	55.79	AS-Q8	0.08	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.00	R	10,945.96	AS-Q9	74.00	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	33	R	488.22	AS-Q10	0.39	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	3,572.94	AS-Q11	3.25	AS1.18	/	AS1.12				
AS1.13	Pipework	m	33	R	747.70	AS-Q12	4.15	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	558	R	64.57	AS-Q13	0.13	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.54	R	41,632.96	AS-Q14	5.12	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.95	R	68,752.39	AS-Q15	144.21	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	137	R	-									
AS1.18	Total control room area	m2	13	R	-									
	Concrete / earthworks					AS-R1					12.48	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					21.19	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					43.25	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					10.80	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					141.26	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					20.92	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					206.10	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.90	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.27	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.28	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.17	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.14	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	157	R	282.95	AT-Q1	10.47	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	19	R	158.45	AT-Q2	0.79	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	15	R	1,287.47	AT-Q3	8.24	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.82	R	13,368.29									
AT1.5	Formwork	m2	144	R	291.59	AT-Q4	0.10	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	38	R	15.01	AT-Q5	0.39	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	43	R	181.33	AT-Q6	0.35	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.34	R	45.93	AT-Q7	44.12	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.46	R	11,717.13	AT-Q8	32.61	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.14	R	88.99	AT-Q9	107.14	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.60	R	39,809.44	AT-Q10	48.33	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.08	R	72,936.22	AT-Q11	26.85	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	46	R	341.97	AT-Q12	0.63	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	14	R	146.35	AT-Q13	2.07	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	29	R	-									
	Concrete / earthworks					AT-R1					4.55	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					8.13	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					4.42	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					85.77	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					7.10	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					291.06	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.52	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.11	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.34	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.18	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					3.76	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.34	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	5,359	R	335.49	AV-Q1	0.55	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,841	R	103.59	AV-Q2	1.03	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,326	R	205.61	AV-Q3	0.68	AV1.10	/	AV1.3				
AV1.4	Pipework	m	104	R	903.56	AV-Q4	28.22	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	5,701.81	AV-Q5	34.67	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	27	R	2,506.52	AV-Q6	3.85	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	260	R	242.79	AV-Q7	0.10	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	22	R	265.84	AV-Q8	1.23	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	4.66	R	13,368.29	AV-Q9	5.79	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,935	R	-									
	Earthworks / lining					AV-R1					3.24	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.63	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.50	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.37	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.16	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					10.32	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					9.43	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.19	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	706	R	192.12	AW-Q1	4.18	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	84	R	103.33	AW-Q2	2.01	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	169	R	2,849.55	AW-Q3	12.97	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	13.03	R	13,368.29									
AW1.5	Mesh	m2	80	R	191.64	AW-Q4	2.11	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	603	R	248.88	AW-Q5	0.28	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,853	R	58.00	AW-Q6	0.06	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.30	R	50,111.28	AW-Q7	16.96	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	39	R	-									
	Concrete / earthworks					AW-R1					14.83	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					27.58	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					69.76	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					11.45	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					230.49	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.27	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	31	R	-									
BA1.2	Steel	t	2.63	R	38,298.38	BA-Q1	11.79	BA1.1	/	BA1.2				
BA1.3	Handrail	m	23	R	1,891.28	BA-Q2	1.35	BA1.1	/	BA1.3				
BA1.4	Grating	m2	16	R	2,715.67	BA-Q3	1.94	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	20	R	500.79	BA-Q4	1.55	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	417.93	BA-Q5	7.75	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.25	BA1.2	/	BA1.3
	Steel / grating					BA-R2					14.10	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					76.48	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					91.64	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,371	R	-									
BB1.2	Steel	t	64.37	R	59,062.69	BB-Q1	21.30	BB1.1	/	BB1.2				
BB1.3	Handrail	m	107	R	1,363.35	BB-Q2	12.81	BB1.1	/	BB1.3				
BB1.4	Grating	m2	109	R	2,442.75	BB-Q3	12.58	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	100	R	525.92	BB-Q4	13.71	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	12	R	4,337.63	BB-Q5	114.25	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					43.32	BB1.2	/	BB1.3
	Steel / grating					BB-R2					24.18	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					112.30	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					13.62	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	20,792	R	-									
BC1.2	Steel	t	203.09	R	37,992.45	BC-Q1	102.38	BC1.1	/	BC1.2				
BC1.3	Handrail	m	545	R	2,091.52	BC-Q2	38.15	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,854	R	3,299.99	BC-Q3	3.55	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	610	R	668.10	BC-Q4	34.09	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	91	R	608.29	BC-Q5	228.48	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	62	R	5,025.24	BC-Q6	335.35	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					18.16	BC1.2	/	BC1.3
	Steel / grating					BC-R2					11.51	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					56.87	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					62.46	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.56	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	505	R	-									
BD1.2	Steel	t	26.24	R	40,712.49	BD-Q1	19.25	BD1.1	/	BD1.2				
BD1.3	Handrail	m	11	R	1,585.10	BD-Q2	45.91	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	2,933.75	BD-Q3	63.13	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	18	R	746.06	BD-Q4	28.06	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	28	R	5,020.66	BD-Q5	18.04	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					25.68	BD1.1	/	BD1.2
	Steel / grating					BD-R2					13.88	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					54.57	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					8.11	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	40	R	-									
BE1.2	Steel	t	4.02	R	59,062.69	BE-Q1	9.95	BE1.1	/	BE1.2				
BE1.3	Handrail	m	42	R	1,363.35	BE-Q2	0.95	BE1.1	/	BE1.3				
BE1.4	Grating	m2	25	R	3,162.75	BE-Q3	1.60	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	37	R	594.18	BE-Q4	1.08	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	5	R	397.95	BE-Q5	8.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					43.32	BE1.2	/	BE1.3
	Steel / grating					BE-R2					18.67	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					99.40	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					148.42	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	293	R	-									
BF1.2	Steel	t	17.15	R	66,553.28	BF-Q1	17.08	BF1.1	/	BF1.2				
BF1.3	Handrail	m	14	R	1,037.08	BF-Q2	20.93	BF1.1	/	BF1.3				
BF1.4	Grating	m2	55	R	2,540.61	BF-Q3	5.33	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	19	R	859.73	BF-Q4	15.42	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	16	R	4,231.53	BF-Q5	18.31	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					64.17	BF1.1	/	BF1.2
	Steel / grating					BF-R2					26.20	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					77.41	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					15.73	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	21,032	R	-	C-Q1	0.21	C1.1	/	C1.2				
C1.2	Total work units	WU	101,702	R	541.83									
C1.3	Pipe supports	kg	11,308	R	-	C-Q2	1.86	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,890	R	-	C-Q3	0.12	C1.4	/	C1.2				
C1.5	Number of welds	No	12,845	R	-	C-Q4	0.61	C1.5	/	C1.1				
C1.6	Total fittings	No	11,344	R	-	C-Q5	0.54	C1.6	/	C1.1				
C1.7	Stud bolts	No	4,064	R	-	C-Q6	0.36	C1.7	/	C1.6				
C1.8	Support number	No	1,123	R	-	C-Q7	0.10	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	101,702	R	541.83	DA-Q1	83.16	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,223	R	96.99									
	Average cost per examination / WU					DA-R1					5.59	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	101,702	R	541.83	DB-Q1	258.13	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	394	R	247.76									
	Average cost per examination / WU					DB-R1					2.19	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	101,702	R	541.83	DC-Q1	440.27	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	231	R	280.28									
	Average cost per examination / WU					DC-R1					1.93	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	101,702	R	541.83	DD-Q1	74.78	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,360	R	94.52									
	Average cost per examination / WU					DD-R1					5.73	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	101,702	R	541.83	DE-Q1	114.02	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	892	R	214.46									
	Average cost per examination / WU					DE-R1					2.53	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	101,702	R	541.83	E-Q1	392.47	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	259.13	R	746.40	E-Q2	302.75	E1.1	/	E1.3				
E1.3	Structural steel	t	335.93	R	44,579.38									
	WU cost / install mechanical weight - receive					E-R1					0.73	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					59.73	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	101,702	R	541.83									
F1.2	Painting to piping	m2	5,305	R	281.03	F-Q1	19.17	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,250	R	604.47	F-Q2	81.36	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	362.01	R	817.38									
F1.5	Painting to mechanical equipment	m2	977	R	311.85	F-Q3	0.37	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	406	R	966.30	F-Q4	0.89	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.46	F1.2	/	F1.3
	Work unit / paint					F-R2					1.93	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.90	F1.1	/	F1.3
	Install plant / paint					F-R4					2.62	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.85	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	27,827	R	145.24									
G1.2	Electrical cable terminations	No	1,296	R	316.91	G-Q1	21.47	G1.1	/	G1.2				
G1.3	Electrical equipment	No	128	R	651.73	G-Q2	217.40	G1.1	/	G1.3				
G1.4	DB's	No	16	R	2,850.13	G-Q3	8.00	G1.3	/	G1.4				
G1.5	Rack	m	9,961	R	271.57	G-Q4	2.79	G1.1	/	G1.5				
G1.6	Support steel	kg	5,299	R	57.92	G-Q5	1.88	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	24,373	R	32.38	G-Q6	1.14	G1.1	/	G1.7				
G1.8	Instruments	No	1,027	R	403.19	G-Q7	23.73	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,700	R	278.48	G-Q8	0.38	G1.8	/	G1.9				
G1.10	Light fittings	No	297	R	574.15	G-Q9	2.32	G1.10	/	G1.3				
G1.11	Conduit	m	3,335	R	77.02	G-Q10	8.34	G1.1	/	G1.11				
G1.12	Instrument stands	No	310	R	1,376.70	G-Q11	3.31	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.46	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.22	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.89	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.51	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.53	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.25	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.12	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,412	R	15.62	AB-Q1	1.90	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,904	R	3.45									
AB1.3	Back fill and compact	m3	7,438	R	16.42	AB-Q2	1.00	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,109	R	1.31	AB-Q3	1.45	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	5,027	R	2.05	AB-Q4	1.47	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.53	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.95	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.92	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					7.62	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	83,778.60									
AC1.2	EO for raking equipment	Item	1	R	12,120.79									
AC1.3	Number of piles	No	295	R	-									
AC1.4	Move rig to new position	No	215	R	83.56	AC-Q1	1.37	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	18	R	-	AC-Q2	16.39	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	25	R	123.54	AC-Q3	0.72	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	74	R	75.22	AC-Q4	0.24	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,170	R	48.68	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	570	R	110.26	AC-Q6	0.52	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	186	R	228.45	AC-Q7	1.59	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	198	R	138.48	AC-Q8	1.49	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	1,088	R	225.24	AC-Q9	0.27	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	122	R	246.41	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	20.14	R	2,828.18	AC-Q11	14.65	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	254.76	R	4,480.84	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,933	R	435.47	AC-Q13	0.15	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	242	R	472.51	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	45,056.63		1.00		/					
AC1.19	Load test to pile	No	2	R	21,492.43	AC-Q15	147.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	19,916.51	AC-Q16	295.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	295	R	124.04	AC-Q17	1.00	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					27.83	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.28	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.55	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.25	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.52	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.32	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.52	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.63	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					10.29	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.09	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					103.47	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					49.35	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					45.74	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.28	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	114	R	30.16	AD-Q1	0.10	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,100	R	30.54									
AD1.3	Kerbing	m	218	R	48.84	AD-Q2	0.07	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,973	R	-									
AD1.5	Remove top soil	m3	1,154	R	12.67	AD-Q3	0.72	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,610	R	28.74	AD-Q4	0.25	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,612	R	3.28									
AD1.8	Reduce levels	m3	1,586	R	10.20	AD-Q5	0.34	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,270	R	19.50	AD-Q6	1.25	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	286	R	82.67	AD-Q7	4.44	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	374	R	59.04	AD-Q8	4.24	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,274	R	8.86	AD-Q9	7.95	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	332	R	4.04	AD-Q10	0.71	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	491	R	1.77	AD-Q11	1.52	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	347	R	208.82	AD-Q12	2.25	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	68	R	93.36	AD-Q13	1.59	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	80.25	AD-Q14	0.31	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	8	R	83.04	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	908	R	1.32	AD-Q16	4.17	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.99	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.86	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.11	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.52	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.24	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.17	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.47	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.24	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.59	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.91	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.64	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.70	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	293	R	456.97	AE-Q1	4.13	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	71	R	675.73	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	565	R	-									
AE1.4	Rip and compact	m2	2,036	R	2.01									
AE1.5	Formwork to plinth	m2	428	R	78.95	AE-Q3	6.03	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	222	R	49.43	AE-Q4	0.76	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.06	R	2,681.82	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,384	R	50.87	AE-Q6	668.77	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	708	R	30.95	AE-Q7	2.42	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	628	R	23.24	AE-Q8	2.14	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.68	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					227.35	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.12	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.11	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					52.72	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.05	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,769	R	-	AF-Q1	12.92	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	369	R	20.77	AF-Q2	1.49	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	247	R	27.93	AF-Q3	0.37	AF1.2	/	AF1.4				
AF1.4	Working space	m2	1,005	R	17.11	AF-Q4	0.45	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	165	R	487.92	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	257	R	27.15	AF-Q6	0.71	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	23	R	661.84	AF-Q7	0.14	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	366.67	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	183	R	-	AF-Q9	0.47	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	386	R	4.31									
AF1.11	Formwork to bases	m2	311	R	53.92	AF-Q10	1.88	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	179	R	62.02	AF-Q11	7.78	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	15	R	77.95	AF-Q12	7.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	3.18	R	4,972.25	AF-Q13	0.20	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	15.60	R	1,942.47	AF-Q14	11.73	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	388	R	13.60	AF-Q15	0.43	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	41	R	75.47	AF-Q16	0.56	AF1.7	/	AF1.17				
AF1.18	Manhole	No	10	R	2,083.16	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	121	R	220.62									
	Base excavation / backfill					AF-R1					0.74	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.21	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					23.49	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					17.97	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					31.87	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.75	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					113.21	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.11	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.21	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.56	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					35.88	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.77	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.21	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	304	R	25.27	AG-Q1	2.49	AG1.1	/	AG1.4				
AG1.2	Working space	m2	852	R	16.39	AG-Q2	0.36	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	126	R	45.29	AG-Q3	2.41	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	122	R	320.57	AG-Q4	0.52	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	83	R	425.94	AG-Q5	1.47	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	172	R	-									
AG1.7	Wood float	m2	180	R	4.10	AG-Q6	0.46	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	233	R	30.54	AG-Q7	0.52	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	559	R	76.15	AG-Q8	0.22	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	160	R	56.39	AG-Q9	0.52	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	35.28	R	3,704.67	AG-Q10	4.88	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,558	R	10.88	AG-Q11	0.07	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	5,443	R	14.50	AG-Q12	0.03	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.80	R	3,710.94	AG-Q13	46.11	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.08	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.65	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.79	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.10	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.24	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					11.56	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.05	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					11.58	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	332	R	20.86	AH-Q1	7.90	AH1.1	/	AH1.4				
AH1.2	Working space	m2	118	R	17.53	AH-Q2	2.81	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	211	R	29.69	AH-Q3	1.57	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	42	R	299.03	AH-Q4	0.36	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	22	R	458.12	AH-Q5	1.91	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	152	R	592.67	AH-Q6	0.28	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	16	R	438.88	AH-Q7	2.63	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	504.01	AH-Q8	14.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	208	R	-									
AH1.10	Blinding	m2	117	R	29.99	AH-Q9	1.78	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	817	R	3.10	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	116	R	47.11	AH-Q11	0.36	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	46	R	58.42	AH-Q12	0.35	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	37	R	96.40	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	191	R	55.95	AH-Q14	0.12	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	26	R	55.34	AH-Q15	5.85	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	52	R	14.57	AH-Q16	2.92	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.04	R	2,710.55	AH-Q17	0.15	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	13.57	R	3,945.81	AH-Q18	15.33	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	979	R	71.78	AH-Q19	0.16	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,374	R	12.21	AH-Q20	0.15	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,123	R	19.88	AH-Q21	0.10	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.79	R	1,871.61	AH-Q22	263.29	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	480	R	19.36	AH-Q23	0.32	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	243	R	26.71	AH-Q24	0.63	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.07	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.19	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.70	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					9.97	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					96.46	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.65	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.50	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.68	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.59	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					6.35	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.51	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.23	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.19	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					10.71	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					40.68	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.69	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					54.97	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					323.16	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					198.48	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					30.61	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					22.19	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	439	R	37.13	AI-Q1	4.35	AI1.1	/	AI1.5				
AI1.2	Working space	m2	565	R	9.19	AI-Q2	0.78	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	126	R	28.46	AI-Q3	3.48	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	224	R	24.03	AI-Q4	0.45	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	101	R	606.23	AI-Q5	6.31	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	16	R	431.50	AI-Q6	0.43	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	87	R	-									
AI1.8	Wood float	m2	237	R	3.35									
AI1.9	Formwork bases	m2	195	R	55.04	AI-Q7	0.52	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	240	R	73.01	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.79	R	3,030.67	AI-Q9	8.89	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,787	R	10.64	AI-Q10	0.04	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.07	R	2,731.86	AI-Q11	94.39	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.06	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					4.04	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.30	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					25.23	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.40	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					180.96	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.01	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.91	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					284.84	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.22	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	577	R	22.14	AJ-Q1	8.01	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	544	R	18.99	AJ-Q2	1.06	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	148	R	28.27	AJ-Q3	3.90	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	465	R	36.66	AJ-Q4	0.15	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	72	R	320.57	AJ-Q5	1.57	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	28	R	425.94	AJ-Q6	2.57	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	46	R	620.06									
AJ1.8	Total concrete	m3	184	R	-									
AJ1.9	Wood float	m2	305	R	3.10	AJ-Q7	0.60	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	209	R	67.72	AJ-Q8	0.34	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	255	R	55.04	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	17.97	R	3,616.08	AJ-Q10	10.24	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,508	R	15.87	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,898	R	14.97	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	2.21	R	3,866.26	AJ-Q13	32.58	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.17	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.78	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					8.74	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					103.41	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					4.73	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					7.74	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					227.86	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					241.56	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.08	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	472	R	21.81	AK-Q1	2.46	AK1.1	/	AK1.5				
AK1.2	Working space	m2	907	R	19.93	AK-Q2	0.52	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	216	R	30.63	AK-Q3	2.19	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	598	R	39.29	AK-Q4	0.32	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	192	R	319.23	AK-Q5	21.33	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	456.46									
AK1.7	Concrete plinth	m3	42	R	382.08	AK-Q6	4.57	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	284	R	-									
AK1.9	Wood float	m2	446	R	2.90	AK-Q7	0.43	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	451	R	58.42	AK-Q8	0.43	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	215	R	86.96	AK-Q9	0.20	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	34	R	59.77	AK-Q10	0.26	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	49.23	R	2,834.71	AK-Q11	5.77	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,621	R	10.69	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.73	R	2,549.20	AK-Q13	104.03	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.09	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.71	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					8.12	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					110.08	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.46	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					4.39	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.64	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					265.17	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.13	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	543	R	28.93	AL-Q1	2.62	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,699	R	14.34	AL-Q2	0.32	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	235	R	33.54	AL-Q3	2.31	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	266	R	26.19	AL-Q4	0.78	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	207	R	606.46	AL-Q5	1.52	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	136	R	446.04	AL-Q6	1.77	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	77	R	692.31	AL-Q7	2.69	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	350	R	-									
AL1.9	Wood float	m2	472	R	4.28	AL-Q8	0.44	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	420	R	89.09	AL-Q9	0.49	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	964	R	61.23	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	229	R	108.15	AL-Q11	0.34	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	96	R	77.75	AL-Q12	0.80	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	16	R	91.25	AL-Q13	8.50	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	53.09	R	3,704.67	AL-Q14	6.59	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	13,609	R	14.19	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	250	R	19.41	AL-Q16	1.40	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	1.02	R	2,920.10	AL-Q17	343.14	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.02	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.86	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					23.16	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					141.70	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.36	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.36	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.81	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.40	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.28	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.90	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.40	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					7.59	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					261.08	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					190.86	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.21	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,548	R	20.86	AM-Q1	5.06	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,892	R	12.49	AM-Q2	0.82	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,320	R	26.71	AM-Q3	1.17	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	438	R	30.72	AM-Q4	0.70	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	306	R	466.54									
AM1.6	Concrete column	m3	170	R	383.46	AM-Q5	1.80	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	187	R	443.84	AM-Q6	0.91	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	288	R	592.67	AM-Q7	1.06	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	57	R	438.88	AM-Q8	2.98	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	123	R	442.82	AM-Q9	1.38	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,348	R	-									
AM1.12	Wood float	m2	1,803	R	1.90	AM-Q10	0.75	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	504	R	58.86	AM-Q11	0.61	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,083	R	84.41	AM-Q12	0.16	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	871	R	99.96	AM-Q13	0.21	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	207	R	81.05	AM-Q14	0.90	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	643	R	83.04	AM-Q15	0.45	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	200.92	AM-Q16	34.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	615	R	58.73	AM-Q17	0.09	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	126.77	R	3,983.69	AM-Q18	10.63	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,617	R	12.41	AM-Q19	0.24	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,525	R	16.46	AM-Q20	0.53	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	61	R	296.32	AM-Q21	2.08	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.14	R	3,773.80	AM-Q22	1182.46	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.67	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.78	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					15.19	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.22	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.05	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.79	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.06	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.05	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					245.55	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.93	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.44	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.48	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.54	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.21	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.33	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.47	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					321.01	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					242.02	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					13.44	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.12	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	1,930	R	21.01	AN-Q1	0.65	AN1.1	/	AN1.5				
AN1.2	Working space	m2	315	R	14.94	AN-Q2	6.13	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	631	R	35.48	AN-Q3	3.06	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,631	R	23.37	AN-Q4	1.83	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,990	R	670.86	AN-Q5								
AN1.6	Concrete column	m3	59	R	424.79	AN-Q6	50.68	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	61	R	333.85	AN-Q7	0.97	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	242	R	445.55	AN-Q8	12.36	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	592.90	AN-Q9	11.80	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	3,158	R	-				/					
AN1.11	Wood float	m2	1,920	R	3.55	AN-Q10	1.56	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	202	R	91.44	AN-Q11	14.80	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	563	R	45.66	AN-Q12	0.10	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	210	R	68.67	AN-Q13	0.29	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	76	R	139.59	AN-Q14	0.80	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	58	R	58.43	AN-Q15	0.09	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	138.32	AN-Q16	996.67	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,371	R	77.62	AN-Q17	0.18	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	589.08	R	3,104.92	AN-Q18	5.36	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	14,246	R	11.58	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	10,423	R	14.39	AN-Q20	0.30	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	154	R	438.95	AN-Q21	20.51	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.79	R	4,348.75	AN-Q22	1071.68	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.03	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.41	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.59	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					28.71	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					188.97	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					7.34	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					4.86	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					2.39	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					9.30	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.41	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					10.15	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.74	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					268.13	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					215.77	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.15	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					7.07	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	318	R	23.27	AO-Q1	1.85	AO1.1	/	AO1.5				
AO1.2	Working space	m2	680	R	20.35	AO-Q2	0.47	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	166	R	39.40	AO-Q3	1.92	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	40	R	23.46	AO-Q4	4.30	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	172	R	445.45									
AO1.6	Concrete column	m3	38	R	469.86	AO-Q5	4.53	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	13	R	744.43	AO-Q6	2.92	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	6	R	333.85	AO-Q7	28.67	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	445.55	AO-Q8	38.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	65	R	-									
AO1.11	Wood float	m2	45	R	2.94	AO-Q9	3.82	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	112	R	57.21	AO-Q10	1.54	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	291	R	84.41	AO-Q11	0.13	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	90	R	70.75	AO-Q12	0.14	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	106.55	AO-Q13	0.65	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	8	R	68.47	AO-Q14	0.13	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	60	R	131.79	AO-Q15	2.87	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	18	R	82.67	AO-Q16	0.33	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	9.53	R	2,817.96	AO-Q17	6.82	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,849	R	19.05	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,585	R	14.80	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	19	R	484.66	AO-Q20	3.42	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.87	R	1,918.54	AO-Q21	44.44	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.14	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.59	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					18.99	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					151.51	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					7.79	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					10.52	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.99	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					5.57	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					5.65	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					6.51	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					4.04	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					147.92	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					190.40	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.23	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.81	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	2,278	R	23.19	AP-Q1	1.85	AP1.1	/	AP1.5				
AP1.2	Working space	m2	645	R	17.82	AP-Q2	3.53	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,716	R	27.46	AP-Q3	1.33	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	234	R	33.85	AP-Q4	5.26	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	1,232	R	676.83	AP-Q5	0.68	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,821	R	44.51									
AP1.7	Rough formwork	m2	360	R	73.01	AP-Q6	3.42	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	2,097	R	84.41	AP-Q7	0.59	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,549	R	5.64	AP-Q8	0.22	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	177	R	22.81	AP-Q9	6.96	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	62	R	27.93	AP-Q10	19.87	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	377	R	12.21	AP-Q11	3.27	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.54	R	3,853.05	AP-Q12	800.00	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,438	R	83.41	AP-Q13	0.51	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,825	R	-	AP-Q14	3.10	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,024	R	39.04	AP-Q15	1.89	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,821	R	82.90	AP-Q16	2.10	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,825	R	28.16	AP-Q17	1.00	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	14	R	776.76	AP-Q18	273.21	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,483	R	78.22	AP-Q19	1.10	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,445	R	55.61	AP-Q20	1.11	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	94.84	R	2,703.21	AP-Q21	12.99	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	14,163.14									
AP1.24	Structural steel	Item	1	R	36,674.01									
AP1.25	Plumbing and drainage	Item	1	R	23,351.77									
AP1.26	Small power and lighting	Item	1	R	198,940.67									
AP1.27	External works	Item	1	R	85,964.96									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.30	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.84	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.99	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					60.73	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					9.27	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					8.02	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					120.01	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					29.67	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					24.23	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					221.39	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.18	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					17.34	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					32.61	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.96	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.11	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					1.07	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.50	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.24	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					13.57	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.64	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					73.59	AP1.26	/	AP1.22
	External works / concrete					AP-R23					127.01	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	62	R	568.24	AQ-Q1	3.50	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	217	R	60.61									
AQ1.3	Reinforcement	t	10.41	R	3,104.92	AQ-Q2	5.96	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	852	R	45.18	AQ-Q3	0.07	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	341	R	79.67	AQ-Q4	0.18	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	142	R	79.17	AQ-Q5	7.82	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,341	R	66.67	AQ-Q6	0.83	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	49.34	R	8,922.76	AQ-Q7	22.52	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	828	R	58.25	AQ-Q8	1.34	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	3,905.96	AQ-Q9	555.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	31	R	692.52	AQ-Q10	35.84	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,002	R	25.58	AQ-Q11	1.11	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,111	R	-									
	Concrete / reinforcement					AQ-R1					0.18	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					9.38	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					12.58	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.13	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.18	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					133.83	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.87	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.44	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.39	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.61	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	186	R	56.54	AR-Q1	2.14	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	87	R	711.68	AR-Q2	17.40	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5	R	2,039.96									
AR1.4	Mesh	m2	546	R	45.18	AR-Q3	0.16	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	138	R	55.88	AR-Q4	0.63	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	81	R	90.11	AR-Q5	4.41	AR1.15	/	AR1.6				
AR1.7	Screed	m2	520	R	11.61	AR-Q6	0.69	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	36.39	R	12,662.20	AR-Q7	9.81	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	14	R	1,087.19	AR-Q8	2.60	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	49	R	372.25	AR-Q9	0.74	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	55	R	125.20	AR-Q10	0.66	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	657	R	43.25	AR-Q11	0.54	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	137	R	40.41	AR-Q12	2.61	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	62	R	886.22	AR-Q13	0.59	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	357	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.35	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					15.75	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					12.74	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					7.90	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					61.30	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.65	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					34.02	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.97	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					292.77	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.93	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					14.29	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	212	R	55.41	AS-Q1	2.02	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	161	R	33.17	AS-Q2	0.65	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	105	R	711.68	AS-Q3	11.67	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	9	R	2,039.96									
AS1.5	Mesh	m2	154	R	45.18	AS-Q4	0.68	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	289	R	55.88	AS-Q5	0.36	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	275	R	4.58	AS-Q6	0.38	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	29	R	27.71	AS-Q7	3.62	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	826	R	12.39	AS-Q8	0.13	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.09	R	3,042.82	AS-Q9	96.33	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	51	R	108.43	AS-Q10	0.14	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	850.18	AS-Q11	2.33	AS1.18	/	AS1.12				
AS1.13	Pipework	m	57	R	166.05	AS-Q12	2.93	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	790	R	14.34	AS-Q13	0.13	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.01	R	9,246.14	AS-Q14	3.48	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.33	R	16,359.65	AS-Q15	125.56	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	167	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					12.84	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					21.46	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					45.15	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					12.74	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					155.39	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					25.68	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					164.65	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					4.29	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.23	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.22	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.12	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.13	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	477	R	75.91	AU-Q1	1.15	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	286	R	24.03	AU-Q2	1.45	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	414	R	504.01									
AU1.4	Reinforcement	t	43.11	R	4,754.46	AU-Q3	9.60	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,295	R	83.00	AU-Q4	0.32	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	192	R	21.33	AU-Q5	2.16	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,677	R	12.96	AU-Q6	0.15	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	1,363	R	14.16	AU-Q7	0.30	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	32	R	89.95	AU-Q8	12.94	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.29	R	10,877.24	AU-Q9	125.84	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	10	R	1,764.01	AU-Q10	41.40	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	42	R	106.00	AU-Q11	4.17	AU1.12	/	AU1.13				
AU1.13	Total area	m2	175	R	-									
	Concrete / earthworks					AU-R1					6.64	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					20.97	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					6.07	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.11	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					23.63	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					366.86	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.44	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					335.77	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					52.86	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.29	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.75	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,127	R	42.49	AW-Q1	5.84	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	89	R	22.95	AW-Q2	2.17	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	193	R	762.67	AW-Q3	11.41	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	16.92	R	2,031.45									
AW1.5	Mesh	m2	94	R	48.41	AW-Q4	2.05	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	501	R	74.80	AW-Q5	0.39	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	5,484	R	12.92	AW-Q6	0.04	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	4.49	R	14,196.73	AW-Q7	10.91	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	49	R	-									
	Concrete / earthworks					AW-R1					17.95	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					33.23	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					41.96	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					10.20	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					157.23	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.14	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	30	R	-									
BA1.2	Steel	t	3.63	R	6,766.44	BA-Q1	8.26	BA1.1	/	BA1.2				
BA1.3	Handrail	m	33	R	336.19	BA-Q2	0.91	BA1.1	/	BA1.3				
BA1.4	Grating	m2	11	R	835.11	BA-Q3	2.73	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	18	R	122.15	BA-Q4	1.67	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	108.74	BA-Q5	6.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.13	BA1.2	/	BA1.3
	Steel / grating					BA-R2					8.10	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					55.39	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					62.23	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,534	R	-									
BB1.2	Steel	t	76.98	R	9,889.02	BB-Q1	19.93	BB1.1	/	BB1.2				
BB1.3	Handrail	m	119	R	321.39	BB-Q2	12.89	BB1.1	/	BB1.3				
BB1.4	Grating	m2	191	R	801.56	BB-Q3	8.03	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	120	R	115.94	BB-Q4	12.78	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	1,720.38	BB-Q5	118.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					30.77	BB1.2	/	BB1.3
	Steel / grating					BB-R2					12.34	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					85.29	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					5.75	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	24,356	R	-									
BC1.2	Steel	t	239.04	R	11,799.21	BC-Q1	101.89	BC1.1	/	BC1.2				
BC1.3	Handrail	m	974	R	368.15	BC-Q2	25.01	BC1.1	/	BC1.3				
BC1.4	Grating	m2	2,991	R	681.39	BC-Q3	8.14	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	754	R	100.40	BC-Q4	32.30	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	72	R	94.69	BC-Q5	338.28	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	74	R	1,281.89	BC-Q6	329.14	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					32.05	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.32	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					117.52	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					124.61	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					9.20	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	539	R	-									
BD1.2	Steel	t	30.54	R	9,889.02	BD-Q1	17.65	BD1.1	/	BD1.2				
BD1.3	Handrail	m	12	R	539.05	BD-Q2	44.92	BD1.1	/	BD1.3				
BD1.4	Grating	m2	14	R	386.56	BD-Q3	38.50	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	14	R	119.94	BD-Q4	38.50	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	24	R	1,557.11	BD-Q5	22.46	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.35	BD1.1	/	BD1.2
	Steel / grating					BD-R2					25.58	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					82.45	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					6.35	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	63	R	-									
BE1.2	Steel	t	3.89	R	14,053.98	BE-Q1	16.20	BE1.1	/	BE1.2				
BE1.3	Handrail	m	49	R	324.41	BE-Q2	1.29	BE1.1	/	BE1.3				
BE1.4	Grating	m2	33	R	867.24	BE-Q3	1.91	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	43	R	204.57	BE-Q4	1.47	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	11	R	65.86	BE-Q5	5.73	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					43.32	BE1.2	/	BE1.3
	Steel / grating					BE-R2					16.21	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					68.70	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					213.39	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	491	R	-									
BF1.2	Steel	t	44.47	R	6,794.80	BF-Q1	11.04	BF1.1	/	BF1.2				
BF1.3	Handrail	m	12	R	336.12	BF-Q2	40.92	BF1.1	/	BF1.3				
BF1.4	Grating	m2	49	R	548.43	BF-Q3	10.02	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	23	R	199.68	BF-Q4	21.35	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	21	R	1,116.04	BF-Q5	23.38	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.22	BF1.1	/	BF1.2
	Steel / grating					BF-R2					12.39	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					34.03	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					6.09	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	22,398	R	-	C-Q1	0.24	C1.1	/	C1.2				
C1.2	Total work units	WU	92,248	R	122.77									
C1.3	Pipe supports	kg	9,338	R	-	C-Q2	2.40	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	14,687	R	-	C-Q3	0.16	C1.4	/	C1.2				
C1.5	Number of welds	No	21,772	R	-	C-Q4	0.97	C1.5	/	C1.1				
C1.6	Total fittings	No	11,216	R	-	C-Q5	0.50	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,394	R	-	C-Q6	0.21	C1.7	/	C1.6				
C1.8	Support number	No	1,707	R	-	C-Q7	0.18	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	92,248	R	122.77	DA-Q1	45.22	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	2,040	R	24.74									
	Average cost per examination / WU					DA-R1					4.96	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	92,248	R	122.77	DB-Q1	189.81	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	486	R	38.91									
	Average cost per examination / WU					DB-R1					3.16	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	92,248	R	122.77	DC-Q1	482.97	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	191	R	73.92									
	Average cost per examination / WU					DC-R1					1.66	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	92,248	R	122.77	DD-Q1	44.63	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	2,067	R	20.74									
	Average cost per examination / WU					DD-R1					5.92	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	92,248	R	122.77	DE-Q1	91.43	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	1,009	R	47.76									
	Average cost per examination / WU					DE-R1					2.57	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	92,248	R	122.77	E-Q1	213.91	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	431.25	R	121.68	E-Q2	240.16	E1.1	/	E1.3				
E1.3	Structural steel	t	384.11	R	10,354.00									
	WU cost / install mechanical weight - receive					E-R1					1.01	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					85.09	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	92,248	R	122.77									
F1.2	Painting to piping	m2	5,490	R	66.48	F-Q1	16.80	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,383	R	151.77	F-Q2	66.70	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	388.63	R	261.02									
F1.5	Painting to mechanical equipment	m2	2,169	R	42.99	F-Q3	0.18	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	594	R	146.83	F-Q4	0.65	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.44	F1.2	/	F1.3
	Work unit / paint					F-R2					1.85	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.81	F1.1	/	F1.3
	Install plant / paint					F-R4					6.07	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.78	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	61,995	R	18.95									
G1.2	Electrical cable terminations	No	2,514	R	67.96	G-Q1	24.66	G1.1	/	G1.2				
G1.3	Electrical equipment	No	136	R	192.32	G-Q2	455.85	G1.1	/	G1.3				
G1.4	DB's	No	24	R	921.44	G-Q3	5.67	G1.3	/	G1.4				
G1.5	Rack	m	6,117	R	65.75	G-Q4	10.13	G1.1	/	G1.5				
G1.6	Support steel	kg	8,712	R	14.38	G-Q5	0.70	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	28,687	R	7.69	G-Q6	2.16	G1.1	/	G1.7				
G1.8	Instruments	No	1,836	R	98.63	G-Q7	15.62	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,380	R	38.25	G-Q8	1.33	G1.8	/	G1.9				
G1.10	Light fittings	No	519	R	136.93	G-Q9	3.82	G1.10	/	G1.3				
G1.11	Conduit	m	4,846	R	12.44	G-Q10	12.79	G1.1	/	G1.11				
G1.12	Instrument stands	No	291	R	379.38	G-Q11	6.31	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.28	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.21	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.52	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.32	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.29	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.14	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.20	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,467	R	25.29	AB-Q1	2.27	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,293	R	5.98									
AB1.3	Back fill and compact	m3	6,722	R	30.51	AB-Q2	1.11	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,310	R	2.12	AB-Q3	1.73	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,240	R	3.31	AB-Q4	1.76	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.23	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.83	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.93	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					7.64	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	161,982.17									
AC1.2	EO for raking equipment	Item	1	R	21,023.79									
AC1.3	Number of piles	No	266	R	-									
AC1.4	Move rig to new position	No	182	R	144.94	AC-Q1	1.46	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	17.73	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	14	R	180.48	AC-Q3	1.07	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	137	R	130.48	AC-Q4	0.11	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,764	R	84.44	AC-Q5	0.06	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	527	R	178.49	AC-Q6	0.50	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	169	R	441.69	AC-Q7	1.57	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	179	R	240.19	AC-Q8	1.49	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	983	R	390.69	AC-Q9	0.27	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	103	R	476.42	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.20	R	4,905.55	AC-Q11	14.62	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	230.23	R	7,253.98	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,631	R	755.34	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	204	R	819.58	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	65,822.36		1.00		/					
AC1.19	Load test to pile	No	4	R	37,279.11	AC-Q15	66.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	34,545.63	AC-Q16	266.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	198	R	200.81	AC-Q17	1.34	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					214.45	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					27.83	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.55	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.58	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.32	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.52	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.63	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					9.60	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.09	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.14	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					49.35	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					45.74	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.27	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	156	R	48.82	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,144	R	49.44									
AD1.3	Kerbing	m	275	R	79.06	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,253	R	-									
AD1.5	Remove top soil	m3	818	R	20.51	AD-Q3	0.49	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,665	R	49.86	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,068	R	5.69									
AD1.8	Reduce levels	m3	1,207	R	15.42	AD-Q5	0.30	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	699	R	33.83	AD-Q6	1.73	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	467	R	133.84	AD-Q7	1.50	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	340	R	102.41	AD-Q8	3.55	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,884	R	15.36	AD-Q9	4.03	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	323	R	6.54	AD-Q10	0.88	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	348	R	2.87	AD-Q11	1.17	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	255	R	338.05	AD-Q12	1.27	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	53	R	161.93	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	129.91	AD-Q14	0.19	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	144.03	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	397	R	2.14	AD-Q16	1.44	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.99	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.60	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					2.71	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.46	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.25	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.15	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.47	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.25	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.59	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.05	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.64	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.82	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	265	R	792.62	AE-Q1	4.14	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	64	R	1,172.08	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	477	R	-									
AE1.4	Rip and compact	m2	1,840	R	3.48									
AE1.5	Formwork to plinth	m2	387	R	127.81	AE-Q3	6.05	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	187	R	85.74	AE-Q4	0.71	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.26	R	4,651.68	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,854	R	74.32	AE-Q6	435.21	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,317	R	53.68	AE-Q7	4.97	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	485	R	40.30	AE-Q8	1.83	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.68	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					227.76	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.11	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.11	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					62.59	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.05	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,399	R	-	AF-Q1	12.94	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	340	R	36.78	AF-Q2	1.02	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	333	R	84.18	AF-Q3	0.72	AF1.2	/	AF1.4				
AF1.4	Working space	m2	474	R	15.19	AF-Q4	0.45	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	153	R	791.75	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	224	R	42.55	AF-Q6	0.69	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	1,209.52	AF-Q7	0.12	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	506.27	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	154	R	-	AF-Q9	0.43	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	356	R	6.39									
AF1.11	Formwork to bases	m2	268	R	95.47	AF-Q10	1.75	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	166	R	100.40	AF-Q11	8.74	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	126.19	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.87	R	8,049.51	AF-Q13	0.22	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	13.16	R	3,369.26	AF-Q14	11.70	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	328	R	22.02	AF-Q15	0.47	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	38	R	106.01	AF-Q16	0.50	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	2,146.98	AF-Q17	0.05	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	115	R	289.38									
	Base excavation / backfill					AF-R1					0.44	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.42	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.53	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					18.61	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.89	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.64	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					123.90	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.08	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.25	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.39	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					35.96	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					11.41	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.74	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	256	R	32.68	AG-Q1	2.49	AG1.1	/	AG1.4				
AG1.2	Working space	m2	770	R	20.97	AG-Q2	0.33	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	106	R	51.68	AG-Q3	2.42	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	103	R	1,200.79	AG-Q4	0.44	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	75	R	618.19	AG-Q5	1.37	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	218	R	-									
AG1.7	Wood float	m2	228	R	6.63	AG-Q6	0.33	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	235	R	48.32	AG-Q7	0.44	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	472	R	147.23	AG-Q8	0.22	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	144	R	91.29	AG-Q9	0.52	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	31.88	R	6,425.84	AG-Q10	6.84	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,947	R	31.82	AG-Q11	0.11	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,994	R	21.64	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.94	R	4,497.29	AG-Q13	25.51	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.03	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.64	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.58	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.12	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.15	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					5.35	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					3.75	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	283	R	54.35	AH-Q1	5.66	AH1.1	/	AH1.4				
AH1.2	Working space	m2	90	R	19.08	AH-Q2	3.14	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	214	R	47.82	AH-Q3	1.32	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	50	R	730.55	AH-Q4	0.48	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	29	R	1,112.43	AH-Q5	1.72	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	129	R	1,145.90	AH-Q6	0.39	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	14	R	710.50	AH-Q7	3.57	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	736.29	AH-Q8	16.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	188	R	-									
AH1.10	Blinding	m2	105	R	38.62	AH-Q9	1.79	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	689	R	7.05	AH-Q10	0.27	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	98	R	96.64	AH-Q11	0.51	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	39	R	91.29	AH-Q12	0.36	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	35	R	143.82	AH-Q13	0.09	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	165	R	105.32	AH-Q14	0.18	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	23	R	62.90	AH-Q15	5.61	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	32	R	50.39	AH-Q16	4.03	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.89	R	4,786.30	AH-Q17	0.17	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	11.02	R	4,797.45	AH-Q18	17.06	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	903	R	121.75	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	906	R	17.27	AH-Q20	0.21	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,794	R	26.29	AH-Q21	0.07	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.66	R	4,727.32	AH-Q22	284.85	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	505	R	28.33	AH-Q23	0.26	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	216	R	47.82	AH-Q24	0.60	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.07	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.85	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					1.14	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					18.92	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					103.62	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.66	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.64	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.03	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.99	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.56	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.78	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.12	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					10.56	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					18.22	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					22.74	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.00	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					39.40	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					277.79	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					182.48	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.15	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					40.45	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					23.96	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	397	R	29.50	AI-Q1	4.67	AI1.1	/	AI1.5				
AI1.2	Working space	m2	477	R	23.18	AI-Q2	0.83	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	106	R	47.80	AI-Q3	3.75	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	236	R	55.00	AI-Q4	0.36	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	85	R	678.96	AI-Q5	5.67	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	15	R	785.87	AI-Q6	0.43	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	74	R	-									
AI1.8	Wood float	m2	200	R	5.43									
AI1.9	Formwork bases	m2	165	R	95.47	AI-Q7	0.52	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	216	R	126.64	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.26	R	5,256.76	AI-Q9	8.96	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,508	R	21.64	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.90	R	4,497.29	AI-Q11	94.44	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.27	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.62	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					12.34	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.86	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					125.04	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.11	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.21	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					242.92	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.15	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	442	R	55.10	AJ-Q1	7.62	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	747	R	23.27	AJ-Q2	0.59	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	127	R	52.57	AJ-Q3	3.48	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	431	R	62.31	AJ-Q4	0.13	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	58	R	506.27	AJ-Q5	1.07	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	23	R	775.61	AJ-Q6	2.52	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	54	R	1,003.42									
AJ1.8	Total concrete	m3	141	R	-									
AJ1.9	Wood float	m2	257	R	5.03	AJ-Q7	0.55	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	176	R	109.64	AJ-Q8	0.33	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	215	R	95.47	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	16.24	R	6,272.17	AJ-Q10	8.68	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,802	R	27.54	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,715	R	25.96	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	2.00	R	6,706.12	AJ-Q13	29.00	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.11	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.37	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.05	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					8.13	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					100.65	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					4.62	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					8.12	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					227.75	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					241.61	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.08	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	426	R	35.31	AK-Q1	2.63	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,156	R	22.70	AK-Q2	0.37	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	195	R	74.84	AK-Q3	2.18	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	541	R	29.24	AK-Q4	0.30	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	162	R	754.17	AK-Q5	20.25	AK1.5		AK1.6				
AK1.6	Concrete column	m3	8	R	718.26									
AK1.7	Concrete plinth	m3	38	R	751.16	AK-Q6	4.26	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	257	R	-									
AK1.9	Wood float	m2	376	R	4.32	AK-Q7	0.43	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	404	R	99.65	AK-Q8	0.40	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	197	R	128.92	AK-Q9	0.19	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	105.83	AK-Q10	0.27	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	28.64	R	4,589.07	AK-Q11	8.97	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	4,229	R	24.57	AK-Q12	0.06	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.37	R	6,523.38	AK-Q13	108.44	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.56	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.47	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					25.79	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					174.58	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.57	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.83	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.79	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					186.78	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.12	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	353	R	57.05	AL-Q1	1.69	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,870	R	17.45	AL-Q2	0.19	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	321	R	74.84	AL-Q3	1.10	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	222	R	39.67	AL-Q4	0.94	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	209	R	981.79	AL-Q5	1.82	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	115	R	773.67	AL-Q6	1.77	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	65	R	1,200.84	AL-Q7	3.22	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	316	R	-									
AL1.9	Wood float	m2	457	R	7.43	AL-Q8	0.46	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	363	R	144.23	AL-Q9	0.58	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	826	R	106.21	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	207	R	178.72	AL-Q11	0.31	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	81	R	137.66	AL-Q12	0.80	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	14	R	161.57	AL-Q13	8.21	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	34.46	R	7,305.25	AL-Q14	9.17	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	14,979	R	17.27	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	340	R	33.66	AL-Q16	0.93	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.61	R	4,727.32	AL-Q17	518.03	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.06	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					3.27	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.76	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					24.75	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					132.14	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.27	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.27	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.81	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.72	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.28	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.72	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.72	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					7.43	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					423.00	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					217.03	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.21	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,020	R	36.93	AM-Q1	3.71	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,855	R	25.08	AM-Q2	0.55	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	886	R	47.28	AM-Q3	1.15	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	676	R	50.77	AM-Q4	0.41	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	275	R	826.06									
AM1.6	Concrete column	m3	81	R	620.78	AM-Q5	3.40	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	166	R	769.86	AM-Q6	0.49	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	230	R	1,145.90	AM-Q7	1.20	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	52	R	710.50	AM-Q8	1.56	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	113	R	754.17	AM-Q9	0.72	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	849	R	-									
AM1.12	Wood float	m2	1,484	R	4.59	AM-Q10	0.57	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	958	R	134.88	AM-Q11	0.29	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	956	R	163.20	AM-Q12	0.08	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	735	R	114.54	AM-Q13	0.23	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	181	R	184.82	AM-Q14	0.92	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	433	R	96.91	AM-Q15	0.53	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	227.62	AM-Q16	13.50	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	412	R	94.73	AM-Q17	0.13	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	160.79	R	6,425.84	AM-Q18	5.28	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,176	R	22.98	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,183	R	28.44	AM-Q20	0.39	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	65	R	844.82	AM-Q21	2.47	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.69	R	3,168.71	AM-Q22	1230.43	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.47	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.78	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					16.27	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.33	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.07	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.72	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.16	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.10	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					179.97	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.12	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.72	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.17	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					3.80	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.38	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					7.78	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.50	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					279.63	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					225.94	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					7.61	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.26	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	189	R	32.26	AO-Q1	1.24	AO1.1	/	AO1.5				
AO1.2	Working space	m2	571	R	22.09	AO-Q2	0.33	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	156	R	63.85	AO-Q3	1.21	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	32	R	38.28	AO-Q4	4.75	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	152	R	1,147.97									
AO1.6	Concrete column	m3	24	R	814.99	AO-Q5	6.33	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	16	R	1,291.23	AO-Q6	1.50	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	540.47	AO-Q7	38.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	772.81	AO-Q8	24.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	35	R	-									
AO1.11	Wood float	m2	31	R	5.10	AO-Q9	4.90	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	115	R	99.24	AO-Q10	1.32	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	156	R	109.65	AO-Q11	0.15	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	71	R	184.73	AO-Q12	0.23	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	17	R	130.04	AO-Q13	0.94	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	7	R	138.04	AO-Q14	0.14	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	42	R	164.46	AO-Q15	3.62	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	16	R	96.15	AO-Q16	0.25	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.78	R	6,680.42	AO-Q17	6.06	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,542	R	33.34	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	4,259	R	23.68	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	15	R	1,045.36	AO-Q20	2.33	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.86	R	4,943.86	AO-Q21	39.38	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.46	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.51	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					29.99	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					225.09	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					11.57	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.99	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					9.93	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.43	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					7.85	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.60	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.62	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					200.37	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					282.11	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.23	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.39	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,248	R	37.53	AP-Q1	1.36	AP1.1	/	AP1.5				
AP1.2	Working space	m2	758	R	34.45	AP-Q2	1.65	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,018	R	44.45	AP-Q3	1.23	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	289	R	58.71	AP-Q4	3.18	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	919	R	1,173.98	AP-Q5	0.56	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,654	R	77.20									
AP1.7	Rough formwork	m2	363	R	145.93	AP-Q6	2.53	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,768	R	142.97	AP-Q7	0.52	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,484	R	9.12	AP-Q8	0.20	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	165	R	38.28	AP-Q9	5.57	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	56	R	36.12	AP-Q10	16.41	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	486	R	28.67	AP-Q11	1.89	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.58	R	4,270.17	AP-Q12	581.65	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,602	R	131.79	AP-Q13	0.57	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,111	R	-	AP-Q14	3.39	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,574	R	72.59	AP-Q15	1.98	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,003	R	229.10	AP-Q16	1.55	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,307	R	47.64	AP-Q17	0.94	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	1,156.78	AP-Q18	345.67	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,677	R	176.23	AP-Q19	0.85	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,020	R	109.14	AP-Q20	0.77	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	136.75	R	7,696.94	AP-Q21	6.72	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	23,978.81									
AP1.24	Structural steel	Item	1	R	62,090.68									
AP1.25	Plumbing and drainage	Item	1	R	39,535.55									
AP1.26	Small power and lighting	Item	1	R	336,815.14									
AP1.27	External works	Item	1	R	145,542.39									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.09	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.84	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					20.00	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					99.70	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					8.04	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					8.21	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					128.73	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					30.67	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					32.50	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					268.47	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.27	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					16.17	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					33.60	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.77	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.11	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.75	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.21	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.12	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.07	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.14	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					43.76	AP1.26	/	AP1.22
	External works / concrete					AP-R23					123.97	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	90	R	791.75	AQ-Q1	3.00	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	270	R	105.14									
AQ1.3	Reinforcement	t	8.78	R	5,026.51	AQ-Q2	10.25	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	1,082	R	104.54	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	197	R	106.14	AQ-Q4	0.46	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	134	R	159.55	AQ-Q5	7.18	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,155	R	66.10	AQ-Q6	0.83	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	41.62	R	14,614.09	AQ-Q7	23.11	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	544	R	74.20	AQ-Q8	1.77	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	7,526.71	AQ-Q9	481.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	32	R	1,337.75	AQ-Q10	30.06	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	871	R	62.97	AQ-Q11	1.10	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	962	R	-									
	Concrete / reinforcement					AQ-R1					0.16	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.53	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.57	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.46	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.96	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					221.09	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.12	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.52	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					20.24	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.05	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	247	R	128.52	AR-Q1	5.15	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	48	R	789.88	AR-Q2	9.20	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.22	R	5,319.52									
AR1.4	Mesh	m2	482	R	79.77	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	178	R	101.49	AR-Q4	0.27	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	82	R	226.15	AR-Q5	6.40	AR1.15	/	AR1.6				
AR1.7	Screed	m2	497	R	19.18	AR-Q6	1.06	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	56.73	R	14,032.98	AR-Q7	9.25	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	13	R	1,717.69	AR-Q8	4.36	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	44	R	643.34	AR-Q9	1.29	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	45	R	232.80	AR-Q10	1.26	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	658	R	119.53	AR-Q11	0.80	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	105	R	68.38	AR-Q12	5.00	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	37	R	1,319.79	AR-Q13	1.53	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	525	R	-									
	Earthworks / concrete					AR-R1					0.16	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.15	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.90	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.78	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.49	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					41.18	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.17	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					21.81	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.76	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					117.40	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.57	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					10.63	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	266	R	98.71	AS-Q1	4.22	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	158	R	38.62	AS-Q2	0.40	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	63	R	789.88	AS-Q3	7.88	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	8	R	5,319.52									
AS1.5	Mesh	m2	145	R	79.77	AS-Q4	0.43	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	283	R	101.49	AS-Q5	0.22	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	137	R	11.50	AS-Q6	0.46	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	28	R	45.77	AS-Q7	2.25	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	625	R	22.16	AS-Q8	0.10	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.92	R	6,870.41	AS-Q9	68.48	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	32	R	203.76	AS-Q10	0.19	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,429.01	AS-Q11	2.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	44	R	458.19	AS-Q12	5.50	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	617	R	23.28	AS-Q13	0.10	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.02	R	23,796.60	AS-Q14	2.97	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.09	R	22,929.81	AS-Q15	222.02	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	242	R	-									
AS1.18	Total control room area	m2	6	R	-									
	Concrete / earthworks					AS-R1					8.00	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					20.45	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					66.69	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.78	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					68.69	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					17.26	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					240.05	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					1.72	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.11	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.22	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.23	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.14	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	108	R	141.10	AT-Q1	6.00	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	15	R	38.75	AT-Q2	1.20	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	18	R	860.78	AT-Q3	6.77	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.66	R	8,216.91									
AT1.5	Formwork	m2	191	R	69.44	AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	30	R	7.03	AT-Q5	0.60	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	39	R	62.72	AT-Q6	0.46	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.49	R	21.88	AT-Q7	36.73	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.53	R	4,558.65	AT-Q8	33.96	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.13	R	42.01	AT-Q9	138.46	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.67	R	17,248.18	AT-Q10	43.28	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.74	R	18,415.64	AT-Q11	39.19	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	45	R	194.88	AT-Q12	0.64	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	22	R	102.21	AT-Q13	1.32	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	29	R	-									
	Concrete / earthworks					AT-R1					6.10	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					22.21	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					12.40	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					122.44	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					13.72	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					375.54	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.52	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.19	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.48	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.45	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					4.42	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.91	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	431	R	125.44	AU-Q1	1.23	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	241	R	64.93	AU-Q2	1.45	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	349	R	565.22									
AU1.4	Reinforcement	t	74.10	R	4,521.35	AU-Q3	4.71	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,938	R	129.74	AU-Q4	0.18	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	158	R	45.89	AU-Q5	2.21	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	3,032	R	30.54	AU-Q6	0.12	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	646	R	24.99	AU-Q7	0.54	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	41	R	162.80	AU-Q8	8.51	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.98	R	18,834.78	AU-Q9	117.11	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	14	R	3,145.43	AU-Q10	24.93	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	16	R	106.13	AU-Q11	14.75	AU1.12	/	AU1.13				
AU1.13	Total area	m2	236	R	-									
	Concrete / earthworks					AU-R1					4.51	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					8.71	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					4.36	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.13	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					12.32	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					148.05	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.24	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					180.93	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					27.77	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.18	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.33	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	6,323	R	144.06	AV-Q1	0.70	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,807	R	42.75	AV-Q2	1.58	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,580	R	90.92	AV-Q3	0.97	AV1.10	/	AV1.3				
AV1.4	Pipework	m	103	R	397.02	AV-Q4	42.94	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	2,232.26	AV-Q5	25.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	31	R	826.06	AV-Q6	3.32	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	263	R	132.92	AV-Q7	0.12	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	26	R	80.11	AV-Q8	1.19	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	4.61	R	5,563.19	AV-Q9	6.72	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	4,423	R	-									
	Earthworks / lining					AV-R1					3.37	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.58	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.47	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.36	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.18	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					6.21	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					10.31	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.15	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	19	R	-									
BA1.2	Steel	t	2.64	R	10,260.93	BA-Q1	7.20	BA1.1	/	BA1.2				
BA1.3	Handrail	m	26	R	585.24	BA-Q2	0.73	BA1.1	/	BA1.3				
BA1.4	Grating	m2	15	R	1,297.14	BA-Q3	1.27	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	15	R	285.38	BA-Q4	1.27	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	216.58	BA-Q5	3.17	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					17.53	BA1.2	/	BA1.3
	Steel / grating					BA-R2					7.91	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					35.96	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					47.38	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,325	R	-									
BB1.2	Steel	t	46.52	R	22,167.37	BB-Q1	28.48	BB1.1	/	BB1.2				
BB1.3	Handrail	m	156	R	596.00	BB-Q2	8.49	BB1.1	/	BB1.3				
BB1.4	Grating	m2	110	R	654.46	BB-Q3	12.05	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	107	R	203.07	BB-Q4	12.38	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	19	R	2,636.25	BB-Q5	69.74	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					37.19	BB1.2	/	BB1.3
	Steel / grating					BB-R2					33.87	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					109.16	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					8.41	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	21,484	R	-									
BC1.2	Steel	t	261.25	R	20,466.00	BC-Q1	82.24	BC1.1	/	BC1.2				
BC1.3	Handrail	m	525	R	596.00	BC-Q2	40.92	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,165	R	1,103.10	BC-Q3	5.16	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	741	R	331.18	BC-Q4	28.99	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	96	R	271.93	BC-Q5	223.79	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	47	R	2,022.62	BC-Q6	457.11	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					34.34	BC1.2	/	BC1.3
	Steel / grating					BC-R2					18.55	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					61.80	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					75.26	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					10.12	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	486	R	-									
BD1.2	Steel	t	29.26	R	26,170.48	BD-Q1	16.61	BD1.1	/	BD1.2				
BD1.3	Handrail	m	15	R	407.81	BD-Q2	32.40	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	999.03	BD-Q3	60.75	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	17	R	258.06	BD-Q4	28.59	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	25	R	2,170.29	BD-Q5	19.44	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					64.17	BD1.1	/	BD1.2
	Steel / grating					BD-R2					26.20	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					101.41	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					12.06	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	61	R	-									
BE1.2	Steel	t	3.36	R	22,751.82	BE-Q1	18.15	BE1.1	/	BE1.2				
BE1.3	Handrail	m	42	R	562.69	BE-Q2	1.45	BE1.1	/	BE1.3				
BE1.4	Grating	m2	30	R	1,433.16	BE-Q3	2.03	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	60	R	234.24	BE-Q4	1.02	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	185.72	BE-Q5	10.17	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					40.43	BE1.2	/	BE1.3
	Steel / grating					BE-R2					15.88	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					97.13	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					122.51	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	297	R	-									
BF1.2	Steel	t	43.07	R	22,710.47	BF-Q1	6.90	BF1.1	/	BF1.2				
BF1.3	Handrail	m	10	R	468.41	BF-Q2	29.70	BF1.1	/	BF1.3				
BF1.4	Grating	m2	41	R	995.22	BF-Q3	7.24	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	24	R	300.56	BF-Q4	12.38	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	12	R	1,559.53	BF-Q5	24.75	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					48.48	BF1.1	/	BF1.2
	Steel / grating					BF-R2					22.82	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					75.56	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					14.56	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	20,868	R	-	C-Q1	0.20	C1.1	/	C1.2				
C1.2	Total work units	WU	102,206	R	296.09									
C1.3	Pipe supports	kg	8,614	R	-	C-Q2	2.42	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,191	R	-	C-Q3	0.11	C1.4	/	C1.2				
C1.5	Number of welds	No	16,549	R	-	C-Q4	0.79	C1.5	/	C1.1				
C1.6	Total fittings	No	9,080	R	-	C-Q5	0.44	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,498	R	-	C-Q6	0.28	C1.7	/	C1.6				
C1.8	Support number	No	2,276	R	-	C-Q7	0.26	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	102,206	R	296.09	DA-Q1	91.01	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,123	R	43.81									
	Average cost per examination / WU					DA-R1					6.76	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	102,206	R	296.09	DB-Q1	181.54	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	563	R	105.89									
	Average cost per examination / WU					DB-R1					2.80	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	102,206	R	296.09	DC-Q1	438.65	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	233	R	110.31									
	Average cost per examination / WU					DC-R1					2.68	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	102,206	R	296.09	DD-Q1	81.63	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,252	R	34.74									
	Average cost per examination / WU					DD-R1					8.52	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	102,206	R	296.09	DE-Q1	168.10	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	608	R	137.93									
	Average cost per examination / WU					DE-R1					2.15	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	102,206	R	296.09	E-Q1	541.46	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	188.76	R	294.57	E-Q2	301.65	E1.1	/	E1.3				
E1.3	Structural steel	t	338.82	R	17,529.77									
	WU cost / install mechanical weight - receive					E-R1					1.01	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					59.51	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	102,206	R	296.09									
F1.2	Painting to piping	m2	5,531	R	79.66	F-Q1	18.48	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,166	R	337.82	F-Q2	87.66	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	351.20	R	293.33									
F1.5	Painting to mechanical equipment	m2	1,660	R	84.33	F-Q3	0.21	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	567	R	257.55	F-Q4	0.62	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.24	F1.2	/	F1.3
	Work unit / paint					F-R2					3.72	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.88	F1.1	/	F1.3
	Install plant / paint					F-R4					3.48	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.14	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	32,411	R	33.55									
G1.2	Electrical cable terminations	No	1,951	R	112.30	G-Q1	16.61	G1.1	/	G1.2				
G1.3	Electrical equipment	No	121	R	488.59	G-Q2	267.86	G1.1	/	G1.3				
G1.4	DB's	No	18	R	1,168.91	G-Q3	6.72	G1.3	/	G1.4				
G1.5	Rack	m	5,643	R	110.40	G-Q4	5.74	G1.1	/	G1.5				
G1.6	Support steel	kg	11,312	R	26.10	G-Q5	0.50	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	23,353	R	10.94	G-Q6	1.39	G1.1	/	G1.7				
G1.8	Instruments	No	1,512	R	107.10	G-Q7	15.45	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,222	R	114.52	G-Q8	1.24	G1.8	/	G1.9				
G1.10	Light fittings	No	427	R	220.37	G-Q9	3.53	G1.10	/	G1.3				
G1.11	Conduit	m	4,553	R	29.56	G-Q10	7.12	G1.1	/	G1.11				
G1.12	Instrument stands	No	233	R	566.15	G-Q11	6.49	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.30	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.42	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.13	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.29	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.30	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.10	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,157	R	12.26	AB-Q1	2.27	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,156	R	2.60									
AB1.3	Back fill and compact	m3	6,443	R	13.27	AB-Q2	1.11	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,855	R	0.92	AB-Q3	1.86	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,064	R	1.44	AB-Q4	1.76	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.72	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.92	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					13.33	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.51	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	70,452.25									
AC1.2	EO for raking equipment	Item	1	R	8,534.45									
AC1.3	Number of piles	No	255	R	-									
AC1.4	Move rig to new position	No	162	R	58.84	AC-Q1	1.57	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	18.21	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	86.99	AC-Q3	1.17	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	131	R	56.75	AC-Q4	0.11	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,262	R	31.99	AC-Q5	0.06	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	472	R	77.63	AC-Q6	0.54	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	136	R	199.37	AC-Q7	1.88	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	177	R	84.59	AC-Q8	1.44	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	689	R	100.97	AC-Q9	0.37	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	104	R	156.70	AC-Q10	0.13	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	11.56	R	3,244.06	AC-Q11	22.06	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	157.63	R	1,670.10	AC-Q12	1.62	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,584	R	366.53	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	174	R	424.78	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	52,756.85		1.00		/					
AC1.19	Load test to pile	No	2	R	6,648.43	AC-Q15	127.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	18,334.10	AC-Q16	255.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	177	R	95.64	AC-Q17	1.44	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.21	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					23.28	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.16	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.77	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.54	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.28	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.43	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					1.94	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					4.56	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					143.94	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.14	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.02	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	140	R	21.67	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,023	R	21.95									
AD1.3	Kerbing	m	264	R	51.39	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,118	R	-									
AD1.5	Remove top soil	m3	784	R	9.13	AD-Q3	0.49	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,596	R	20.90	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,899	R	2.31									
AD1.8	Reduce levels	m3	1,080	R	6.28	AD-Q5	0.28	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	670	R	13.73	AD-Q6	1.61	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	498	R	59.42	AD-Q7	1.35	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	304	R	42.44	AD-Q8	3.55	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,805	R	6.37	AD-Q9	3.62	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	289	R	2.90	AD-Q10	0.88	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	312	R	1.27	AD-Q11	1.09	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	244	R	219.75	AD-Q12	1.18	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	51	R	36.81	AD-Q13	0.92	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	57.84	AD-Q14	0.19	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	8	R	60.38	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	554	R	1.32	AD-Q16	2.10	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.99	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.95	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					2.72	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.46	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.23	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.15	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.52	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.28	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.86	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.06	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.02	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.72	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.13	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.17	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	261	R	279.16	AE-Q1	5.80	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	45	R	302.91	AE-Q2	0.22	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	481	R	-									
AE1.4	Rip and compact	m2	1,169	R	2.30									
AE1.5	Formwork to plinth	m2	265	R	29.43	AE-Q3	5.89	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	181	R	41.61	AE-Q4	0.69	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.64	R	2,410.90	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,650	R	59.56	AE-Q6	728.02	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	685	R	9.57	AE-Q7	2.62	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	527	R	21.39	AE-Q8	2.02	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.92	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					121.37	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.48	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,936	R	-	AF-Q1	12.95	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	304	R	14.93	AF-Q2	0.95	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	320	R	34.17	AF-Q3	0.72	AF1.2	/	AF1.4				
AF1.4	Working space	m2	424	R	6.61	AF-Q4	0.45	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	137	R	321.40	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	200	R	17.27	AF-Q6	1.09	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	16	R	435.73	AF-Q7	0.12	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	310.14	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	218	R	-	AF-Q9	0.68	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	319	R	3.10									
AF1.11	Formwork to bases	m2	257	R	38.76	AF-Q10	1.88	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	148	R	43.67	AF-Q11	9.25	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	15	R	54.88	AF-Q12	5.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.75	R	3,267.64	AF-Q13	0.23	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	11.77	R	1,367.73	AF-Q14	18.52	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	293	R	9.58	AF-Q15	0.47	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	34	R	46.11	AF-Q16	0.47	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	933.80	AF-Q17	0.09	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	67	R	106.01									
	Base excavation / backfill					AF-R1					0.44	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.26	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.53	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					18.61	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					29.18	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.96	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					103.68	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.18	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.39	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					33.55	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					9.45	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.03	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	229	R	15.92	AG-Q1	1.13	AG1.1	/	AG1.4				
AG1.2	Working space	m2	689	R	9.00	AG-Q2	0.33	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	62	R	23.25	AG-Q3	3.69	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	202	R	435.90	AG-Q4	0.90	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	61	R	320.60	AG-Q5	3.31	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	195	R	-									
AG1.7	Wood float	m2	219	R	2.53	AG-Q6	0.28	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	225	R	16.25	AG-Q7	0.90	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	441	R	53.76	AG-Q8	0.46	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	131	R	45.06	AG-Q9	0.47	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	25.88	R	2,954.79	AG-Q10	7.53	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	3,537	R	9.49	AG-Q11	0.06	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,107	R	15.69	AG-Q12	0.09	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.07	R	2,213.17	AG-Q13	29.47	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.57	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.46	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.12	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.14	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.78	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.08	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	449	R	15.21	AH-Q1	10.69	AH1.1	/	AH1.4				
AH1.2	Working space	m2	48	R	13.10	AH-Q2	9.35	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	183	R	20.25	AH-Q3	2.45	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	42	R	470.65	AH-Q4	0.65	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	19	R	319.31	AH-Q5	2.21	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	120	R	511.53	AH-Q6	0.35	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	230.41	AH-Q7	3.23	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	335.33	AH-Q8	10.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	149	R	-									
AH1.10	Blinding	m2	65	R	16.12	AH-Q9	2.29	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	655	R	2.94	AH-Q10	0.23	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	188	R	54.75	AH-Q11	0.22	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	58	R	41.90	AH-Q12	0.22	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	23	R	68.67	AH-Q13	0.17	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	167	R	45.64	AH-Q14	0.11	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	37	R	51.99	AH-Q15	3.24	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	32	R	15.94	AH-Q16	3.75	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.76	R	1,677.10	AH-Q17	0.17	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	10.13	R	2,079.85	AH-Q18	14.71	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	605	R	44.38	AH-Q19	0.20	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,114	R	12.17	AH-Q20	0.13	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,579	R	8.96	AH-Q21	0.06	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.74	R	1,870.76	AH-Q22	201.35	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	227	R	11.50	AH-Q23	0.53	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	197	R	20.80	AH-Q24	0.61	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.16	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.75	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					29.20	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					160.09	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.47	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.92	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					2.04	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.40	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					8.60	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					5.50	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.88	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.00	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					9.84	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					32.09	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.81	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					46.86	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					170.90	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					232.13	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.25	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					44.48	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					24.59	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	159	R	11.98	AI-Q1	3.24	AI1.1	/	AI1.5				
AI1.2	Working space	m2	651	R	9.41	AI-Q2	0.24	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	97	R	19.40	AI-Q3	1.64	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	316	R	23.92	AI-Q4	0.16	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	49	R	275.62	AI-Q5	3.77	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	319.02	AI-Q6	0.25	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	72	R	-									
AI1.8	Wood float	m2	196	R	2.41									
AI1.9	Formwork bases	m2	236	R	72.16	AI-Q7	0.21	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	108	R	28.19	AI-Q8	0.12	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.10	R	2,138.98	AI-Q9	8.89	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,094	R	8.78	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.86	R	1,956.05	AI-Q11	56.98	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.27	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.62	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					11.52	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.86	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					114.37	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					3.82	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					11.32	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					243.62	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.14	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	388	R	23.96	AJ-Q1	5.04	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	653	R	10.17	AJ-Q2	0.59	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	172	R	34.88	AJ-Q3	2.26	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	336	R	11.82	AJ-Q4	0.23	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	77	R	328.09	AJ-Q5	2.26	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	34	R	418.44	AJ-Q6	2.26	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	34	R	350.69									
AJ1.8	Total concrete	m3	127	R	-									
AJ1.9	Wood float	m2	338	R	3.00	AJ-Q7	0.38	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	179	R	41.03	AJ-Q8	0.43	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	174	R	30.83	AJ-Q9	0.20	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.30	R	2,037.90	AJ-Q10	12.33	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,745	R	14.21	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,565	R	9.49	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.11	R	1,887.92	AJ-Q13	69.37	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.36	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.69	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					27.76	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					109.36	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.00	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					13.57	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					143.41	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					214.74	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	521	R	21.18	AK-Q1	2.71	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,038	R	12.52	AK-Q2	0.50	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	181	R	20.07	AK-Q3	2.88	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	489	R	21.56	AK-Q4	0.39	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	192	R	268.87	AK-Q5	17.45	AK1.5		AK1.6				
AK1.6	Concrete column	m3	11	R	312.58									
AK1.7	Concrete plinth	m3	30	R	445.67	AK-Q6	6.40	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	231	R	-									
AK1.9	Wood float	m2	463	R	3.00	AK-Q7	0.41	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	571	R	60.68	AK-Q8	0.34	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	176	R	62.51	AK-Q9	0.17	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	29	R	42.96	AK-Q10	0.38	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.45	R	1,670.10	AK-Q11	8.42	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,709	R	10.69	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.18	R	2,648.12	AK-Q13	72.64	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.08	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.69	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.06	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					12.47	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					89.62	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					4.43	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.13	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.28	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					156.23	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.10	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	230	R	19.79	AL-Q1	1.15	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,406	R	9.66	AL-Q2	0.16	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	188	R	26.63	AL-Q3	1.22	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	218	R	18.07	AL-Q4	0.92	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	200	R	378.86	AL-Q5	1.82	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	110	R	428.69	AL-Q6	1.59	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	69	R	522.27	AL-Q7	2.90	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	303	R	-									
AL1.9	Wood float	m2	438	R	1.99	AL-Q8	0.46	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	388	R	57.26	AL-Q9	0.52	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	792	R	45.33	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	158	R	70.27	AL-Q11	0.44	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	86	R	58.68	AL-Q12	0.80	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	20	R	93.86	AL-Q13	5.50	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	22.42	R	2,534.12	AL-Q14	13.51	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,257	R	9.56	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	276	R	9.19	AL-Q16	1.10	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.66	R	1,909.27	AL-Q17	459.09	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.05	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.74	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					20.97	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					190.38	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.88	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.88	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.62	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					7.43	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					9.46	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.90	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					7.43	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					5.56	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					265.08	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					275.75	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.20	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	978	R	14.99	AM-Q1	3.98	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,575	R	9.19	AM-Q2	0.62	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	849	R	28.36	AM-Q3	1.15	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	648	R	16.40	AM-Q4	0.38	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	246	R	470.65									
AM1.6	Concrete column	m3	73	R	319.31	AM-Q5	3.37	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	148	R	301.63	AM-Q6	0.49	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	225	R	428.69	AM-Q7	1.09	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	47	R	335.33	AM-Q8	1.55	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	108	R	214.93	AM-Q9	0.68	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	558	R	-									
AM1.12	Wood float	m2	1,461	R	2.03	AM-Q10	0.38	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	825	R	41.12	AM-Q11	0.30	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	935	R	69.41	AM-Q12	0.08	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	514	R	40.63	AM-Q13	0.29	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	253	R	61.29	AM-Q14	0.58	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	387	R	61.38	AM-Q15	0.58	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	7	R	83.52	AM-Q16	10.43	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	389	R	42.54	AM-Q17	0.12	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	118.49	R	3,555.43	AM-Q18	4.71	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,676	R	9.31	AM-Q19	0.12	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,647	R	16.25	AM-Q20	0.21	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	62	R	168.31	AM-Q21	1.91	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.62	R	2,003.97	AM-Q22	900.00	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.03	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.63	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.53	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					28.70	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.47	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.56	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.10	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.40	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					2.19	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					231.85	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					11.45	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					7.42	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.92	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.60	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.61	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.50	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.88	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					381.89	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					218.80	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					21.12	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.23	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,328	R	16.58	AN-Q1	1.02	AN1.1	/	AN1.5				
AN1.2	Working space	m2	236	R	9.86	AN-Q2	9.86	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	459	R	23.05	AN-Q3	5.07	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,284	R	16.25	AN-Q4	1.77	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,278	R	418.44	AN-Q5								
AN1.6	Concrete column	m3	52	R	350.69	AN-Q6	43.81	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	27	R	275.62	AN-Q7	1.93	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	131	R	319.02	AN-Q8	17.39	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	425.99	AN-Q9	8.67	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,276	R	-				/					
AN1.11	Wood float	m2	1,519	R	2.03	AN-Q10	1.50	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	230	R	60.47	AN-Q11	9.90	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	363	R	47.87	AN-Q12	0.14	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	165	R	56.54	AN-Q13	0.16	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	88	R	93.98	AN-Q14	0.31	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	20	R	39.34	AN-Q15	0.30	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	99.78	AN-Q16	759.33	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,534	R	56.80	AN-Q17	0.09	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	366.49	R	2,075.06	AN-Q18	3.48	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	10,235	R	9.76	AN-Q19	0.12	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,020	R	12.08	AN-Q20	0.18	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	94	R	334.57	AN-Q21	13.57	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.53	R	2,504.27	AN-Q22	900.40	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.68	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.72	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					25.75	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					206.13	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					6.92	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					4.87	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					2.93	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					7.33	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.76	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					10.83	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.62	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					212.61	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					171.78	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.17	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.20	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	158	R	13.10	AO-Q1	0.77	AO1.1	/	AO1.5				
AO1.2	Working space	m2	547	R	9.61	AO-Q2	0.29	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	140	R	30.96	AO-Q3	1.13	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	31	R	15.54	AO-Q4	6.65	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	206	R	327.89									
AO1.6	Concrete column	m3	23	R	499.30	AO-Q5	8.96	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	16	R	240.96	AO-Q6	1.44	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	3	R	320.17	AO-Q7	68.67	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	304.93	AO-Q8	23.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	33	R	-									
AO1.11	Wood float	m2	30	R	2.88	AO-Q9	6.87	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	103	R	37.03	AO-Q10	2.00	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	148	R	46.90	AO-Q11	0.16	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	70	R	68.67	AO-Q12	0.23	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	16	R	57.74	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	56.03	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	34	R	94.83	AO-Q15	6.06	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	15	R	61.70	AO-Q16	0.20	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.87	R	2,711.87	AO-Q17	4.80	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,926	R	12.39	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,958	R	10.51	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	516.89	AO-Q20	3.30	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.50	R	1,508.19	AO-Q21	45.78	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.36	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.42	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					21.10	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					113.85	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					8.85	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					3.51	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.17	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					10.65	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.54	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.44	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.19	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					218.88	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					258.03	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.22	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.25	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,117	R	16.32	AP-Q1	1.33	AP1.1	/	AP1.5				
AP1.2	Working space	m2	678	R	14.99	AP-Q2	1.65	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	976	R	19.33	AP-Q3	1.14	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	297	R	25.54	AP-Q4	2.83	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	841	R	476.57	AP-Q5	0.56	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,503	R	33.58									
AP1.7	Rough formwork	m2	348	R	60.47	AP-Q6	2.42	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,889	R	63.47	AP-Q7	0.45	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,839	R	2.89	AP-Q8	0.30	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	208	R	24.25	AP-Q9	4.04	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	36	R	14.66	AP-Q10	23.36	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	304	R	14.52	AP-Q11	2.77	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.95	R	1,832.27	AP-Q12	885.26	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,335	R	96.01	AP-Q13	0.36	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,791	R	-	AP-Q14	3.32	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,178	R	28.24	AP-Q15	1.28	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,834	R	65.44	AP-Q16	1.52	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,007	R	27.39	AP-Q17	0.93	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	11	R	627.98	AP-Q18	253.73	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,628	R	51.19	AP-Q19	1.06	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,843	R	41.96	AP-Q20	0.98	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	86.22	R	2,231.69	AP-Q21	9.75	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	10,179.90									
AP1.24	Structural steel	Item	1	R	26,359.80									
AP1.25	Plumbing and drainage	Item	1	R	16,784.31									
AP1.26	Small power and lighting	Item	1	R	142,990.55									
AP1.27	External works	Item	1	R	61,788.15									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.09	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.84	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					18.66	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					66.46	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.88	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.51	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					164.90	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					19.65	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					32.51	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					153.70	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.26	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					16.88	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					34.10	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					3.51	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					1.88	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.29	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.56	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					11.81	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.52	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					64.07	AP1.26	/	AP1.22
	External works / concrete					AP-R23					129.65	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	77	R	319.31	AQ-Q1	2.16	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	166	R	65.10									
AQ1.3	Reinforcement	t	12.97	R	1,466.24	AQ-Q2	5.94	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	922	R	35.57	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	194	R	46.55	AQ-Q4	0.40	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	140	R	57.09	AQ-Q5	3.69	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,386	R	52.08	AQ-Q6	0.37	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	59.94	R	4,531.67	AQ-Q7	8.61	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	487	R	28.76	AQ-Q8	1.06	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	2,757.17	AQ-Q9	258.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	58	R	383.12	AQ-Q10	8.90	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,381	R	18.02	AQ-Q11	0.37	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	516	R	-									
	Concrete / reinforcement					AQ-R1					0.22	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					4.90	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					8.98	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.86	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.59	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					87.01	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.55	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.61	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.36	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.89	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	225	R	61.37	AR-Q1	4.79	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	47	R	305.32	AR-Q2	9.42	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.99	R	1,967.67									
AR1.4	Mesh	m2	421	R	44.38	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	159	R	40.89	AR-Q4	0.30	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	130	R	58.30	AR-Q5	2.88	AR1.15	/	AR1.6				
AR1.7	Screed	m2	451	R	12.86	AR-Q6	0.83	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	34.36	R	6,005.05	AR-Q7	10.91	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	19	R	536.92	AR-Q8	1.81	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	40	R	230.82	AR-Q9	0.86	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	62	R	125.60	AR-Q10	0.55	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	603	R	32.41	AR-Q11	0.62	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	95	R	30.19	AR-Q12	3.95	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	46	R	274.20	AR-Q13	0.75	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	375	R	-									
	Earthworks / concrete					AR-R1					0.20	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.16	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					6.88	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.47	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.24	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					23.74	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.18	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					26.02	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.84	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					185.28	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.93	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					21.90	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	0	R	-	AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-	AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-	AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0	R	-									
AS1.5	Mesh	m2	0	R	-	AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-	AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-	AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-	AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-	AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0	R	-	AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-	AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-	AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-	AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-	AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0	R	-	AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0	R	-	AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-									
AS1.18	Total control room area	m2	0	R	-									
	Concrete / earthworks					AS-R1						AS1.3	/	AS1.1
	Concrete / blinding					AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3						AS1.4	/	AS1.5
	Concrete / formwork					AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7						AS1.4	/	AS1.9
	Concrete / pipework					AS-R8						AS1.3	/	AS1.13
	Concrete / grout					AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	229	R	50.68	AT-Q1	14.31	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	13	R	16.93	AT-Q2	1.23	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	16	R	418.44	AT-Q3	6.11	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.62	R	3,255.18									
AT1.5	Formwork	m2	106	R	29.60	AT-Q4	0.15	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	29	R	2.78	AT-Q5	0.55	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	25	R	27.11	AT-Q6	0.64	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.47	R	9.18	AT-Q7	34.04	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.51	R	2,778.91	AT-Q8	31.37	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.13	R	11.69	AT-Q9	123.08	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.60	R	5,502.81	AT-Q10	43.33	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.00	R	8,165.48	AT-Q11	26.00	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	61	R	86.98	AT-Q12	0.43	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	24	R	30.71	AT-Q13	1.08	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	26	R	-									
	Concrete / earthworks					AT-R1					8.26	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					24.72	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					14.14	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					150.52	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					15.43	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					354.59	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.79	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.15	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.59	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.40	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					4.81	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.83	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	259	R	61.92	AU-Q1	1.09	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	320	R	15.54	AU-Q2	0.74	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	237	R	428.69									
AU1.4	Reinforcement	t	41.09	R	2,007.41	AU-Q3	5.77	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,595	R	53.76	AU-Q4	0.15	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	149	R	29.23	AU-Q5	1.59	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,484	R	9.71	AU-Q6	0.10	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	632	R	10.52	AU-Q7	0.38	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	56	R	74.07	AU-Q8	4.23	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.58	R	6,717.47	AU-Q9	91.86	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	12	R	856.48	AU-Q10	19.75	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	15	R	79.68	AU-Q11	13.73	AU1.12	/	AU1.13				
AU1.13	Total area	m2	206	R	-									
	Concrete / earthworks					AU-R1					6.92	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					27.59	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.97	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.21	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					14.67	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					206.74	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.30	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					190.82	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					27.10	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.50	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.38	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	2,608	R	62.62	AV-Q1	1.07	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,778	R	13.59	AV-Q2	1.00	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,899	R	34.57	AV-Q3	0.96	AV1.10	/	AV1.3				
AV1.4	Pipework	m	84	R	120.56	AV-Q4	33.20	AV1.10	/	AV1.4				
AV1.5	Manholes	No	5	R	930.71	AV-Q5	16.80	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	19	R	214.93	AV-Q6	4.42	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	328	R	44.45	AV-Q7	0.06	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	19	R	58.14	AV-Q8	1.00	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.26	R	1,460.12	AV-Q9	5.83	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,789	R	-									
	Earthworks / lining					AV-R1					4.61	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.81	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.39	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.52	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.13	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.06	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					4.84	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					3.70	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.15	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	624	R	41.60	AW-Q1	6.86	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	80	R	25.06	AW-Q2	1.14	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	91	R	301.63	AW-Q3	4.47	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	20.38	R	2,037.47									
AW1.5	Mesh	m2	77	R	24.44	AW-Q4	1.18	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	601	R	39.34	AW-Q5	0.15	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,843	R	12.96	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3.14	R	11,134.48	AW-Q7	12.42	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	39	R	-									
	Concrete / earthworks					AW-R1					7.25	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					12.04	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					83.37	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					7.67	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					157.21	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.18	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	25	R	-									
BA1.2	Steel	t	3.80	R	9,859.87	BA-Q1	6.58	BA1.1	/	BA1.2				
BA1.3	Handrail	m	17	R	227.60	BA-Q2	1.47	BA1.1	/	BA1.3				
BA1.4	Grating	m2	16	R	527.99	BA-Q3	1.56	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	24	R	127.60	BA-Q4	1.04	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	2	R	54.37	BA-Q5	12.50	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					43.32	BA1.2	/	BA1.3
	Steel / grating					BA-R2					18.67	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					77.27	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					181.35	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,252	R	-									
BB1.2	Steel	t	76.27	R	9,641.44	BB-Q1	16.42	BB1.1	/	BB1.2				
BB1.3	Handrail	m	108	R	240.71	BB-Q2	11.59	BB1.1	/	BB1.3				
BB1.4	Grating	m2	101	R	400.93	BB-Q3	12.40	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	143	R	123.65	BB-Q4	8.76	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	18	R	1,278.11	BB-Q5	69.56	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					40.05	BB1.2	/	BB1.3
	Steel / grating					BB-R2					24.05	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					77.97	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.54	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,150	R	-									
BC1.2	Steel	t	238.57	R	5,586.17	BC-Q1	55.12	BC1.1	/	BC1.2				
BC1.3	Handrail	m	784	R	358.94	BC-Q2	16.77	BC1.1	/	BC1.3				
BC1.4	Grating	m2	2,581	R	340.69	BC-Q3	5.09	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	389	R	83.33	BC-Q4	33.80	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	83	R	101.55	BC-Q5	158.43	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	56	R	865.10	BC-Q6	234.82	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					15.56	BC1.2	/	BC1.3
	Steel / grating					BC-R2					16.40	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					67.04	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					55.01	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					6.46	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	465	R	-									
BD1.2	Steel	t	28.84	R	10,367.59	BD-Q1	16.12	BD1.1	/	BD1.2				
BD1.3	Handrail	m	8	R	173.85	BD-Q2	58.13	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	395.77	BD-Q3	58.13	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	11	R	116.68	BD-Q4	42.27	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	27	R	836.22	BD-Q5	17.22	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					59.64	BD1.1	/	BD1.2
	Steel / grating					BD-R2					26.20	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					88.85	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					12.40	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	59	R	-									
BE1.2	Steel	t	3.59	R	8,480.80	BE-Q1	16.43	BE1.1	/	BE1.2				
BE1.3	Handrail	m	40	R	343.97	BE-Q2	1.48	BE1.1	/	BE1.3				
BE1.4	Grating	m2	23	R	404.53	BE-Q3	2.57	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	50	R	132.51	BE-Q4	1.18	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	60.23	BE-Q5	8.43	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					24.66	BE1.2	/	BE1.3
	Steel / grating					BE-R2					20.96	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					64.00	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					140.81	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	275	R	-									
BF1.2	Steel	t	38.52	R	10,407.27	BF-Q1	7.14	BF1.1	/	BF1.2				
BF1.3	Handrail	m	9	R	162.17	BF-Q2	30.56	BF1.1	/	BF1.3				
BF1.4	Grating	m2	37	R	425.67	BF-Q3	7.43	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	21	R	81.84	BF-Q4	13.10	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	11	R	1,170.90	BF-Q5	25.00	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					64.18	BF1.1	/	BF1.2
	Steel / grating					BF-R2					24.45	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					127.17	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.89	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	19,279	R	-	C-Q1	0.21	C1.1	/	C1.2				
C1.2	Total work units	WU	91,415	R	135.68									
C1.3	Pipe supports	kg	7,359	R	-	C-Q2	2.62	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	9,222	R	-	C-Q3	0.10	C1.4	/	C1.2				
C1.5	Number of welds	No	10,674	R	-	C-Q4	0.55	C1.5	/	C1.1				
C1.6	Total fittings	No	8,492	R	-	C-Q5	0.44	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,261	R	-	C-Q6	0.27	C1.7	/	C1.6				
C1.8	Support number	No	1,848	R	-	C-Q7	0.25	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	91,415	R	135.68	DA-Q1	90.96	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,005	R	17.78									
	Average cost per examination / WU					DA-R1					7.63	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	91,415	R	135.68	DB-Q1	160.66	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	569	R	37.45									
	Average cost per examination / WU					DB-R1					3.62	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	91,415	R	135.68	DC-Q1	415.52	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	220	R	46.79									
	Average cost per examination / WU					DC-R1					2.90	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	91,415	R	135.68	DD-Q1	63.04	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,450	R	14.10									
	Average cost per examination / WU					DD-R1					9.62	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	91,415	R	135.68	DE-Q1	113.98	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	802	R	59.99									
	Average cost per examination / WU					DE-R1					2.26	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	91,415	R	135.68	E-Q1	244.72	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	373.55	R	180.66	E-Q2	288.38	E1.1	/	E1.3				
E1.3	Structural steel	t	316.99	R	7,442.04									
	WU cost / install mechanical weight - receive					E-R1					0.75	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					41.19	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	91,415	R	135.68									
F1.2	Painting to piping	m2	3,385	R	35.37	F-Q1	27.01	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,702	R	139.99	F-Q2	53.71	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	244.74	R	104.62									
F1.5	Painting to mechanical equipment	m2	1,173	R	34.23	F-Q3	0.21	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	350	R	157.46	F-Q4	0.70	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.25	F1.2	/	F1.3
	Work unit / paint					F-R2					3.84	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.97	F1.1	/	F1.3
	Install plant / paint					F-R4					3.06	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.66	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	31,066	R	13.62									
G1.2	Electrical cable terminations	No	1,870	R	48.84	G-Q1	16.61	G1.1	/	G1.2				
G1.3	Electrical equipment	No	141	R	212.51	G-Q2	220.33	G1.1	/	G1.3				
G1.4	DB's	No	14	R	474.51	G-Q3	10.07	G1.3	/	G1.4				
G1.5	Rack	m	6,189	R	48.02	G-Q4	5.02	G1.1	/	G1.5				
G1.6	Support steel	kg	10,583	R	11.35	G-Q5	0.58	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	18,859	R	4.14	G-Q6	1.65	G1.1	/	G1.7				
G1.8	Instruments	No	882	R	46.58	G-Q7	21.38	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,114	R	46.49	G-Q8	0.42	G1.8	/	G1.9				
G1.10	Light fittings	No	411	R	95.85	G-Q9	2.91	G1.10	/	G1.3				
G1.11	Conduit	m	3,999	R	12.86	G-Q10	7.77	G1.1	/	G1.11				
G1.12	Instrument stands	No	241	R	229.82	G-Q11	3.66	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.28	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.06	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.45	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.06	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.20	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.28	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.14	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.09	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.09	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,608	R	16.13	AB-Q1	2.12	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,122	R	3.42									
AB1.3	Back fill and compact	m3	5,949	R	17.45	AB-Q2	1.11	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,814	R	1.13	AB-Q3	1.73	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,752	R	1.90	AB-Q4	1.76	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.72	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.92	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					14.27	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.49	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	86,491.98									
AC1.2	EO for raking equipment	Item	1	R	11,225.86									
AC1.3	Number of piles	No	253	R	-									
AC1.4	Move rig to new position	No	161	R	77.39	AC-Q1	1.57	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	18.07	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	114.42	AC-Q3	1.17	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	130	R	74.65	AC-Q4	0.11	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	3,935	R	39.28	AC-Q5	0.06	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	467	R	102.12	AC-Q6	0.54	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	134	R	244.76	AC-Q7	1.89	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	163	R	111.27	AC-Q8	1.55	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	636	R	132.81	AC-Q9	0.40	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	62	R	173.60	AC-Q10	0.23	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	23.54	R	4,267.10	AC-Q11	10.75	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	133.23	R	2,196.79	AC-Q12	1.90	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,603	R	449.97	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	161	R	521.49	AC-Q14	0.09	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	64,767.90		1.00		/					
AC1.19	Load test to pile	No	2	R	8,745.08	AC-Q15	126.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	22,508.20	AC-Q16	253.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	163	R	117.42	AC-Q17	1.55	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.22	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.95	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.17	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.25	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.90	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.54	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.30	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.39	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					1.94	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					4.88	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					143.94	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					19.43	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.02	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	141	R	26.61	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,033	R	26.95									
AD1.3	Kerbing	m	454	R	67.60	AD-Q2	0.29	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,579	R	-									
AD1.5	Remove top soil	m3	725	R	11.21	AD-Q3	0.51	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,426	R	25.66	AD-Q4	0.18	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,064	R	2.64									
AD1.8	Reduce levels	m3	851	R	10.96	AD-Q5	0.21	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	652	R	26.64	AD-Q6	1.31	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	421	R	72.95	AD-Q7	1.55	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	307	R	55.82	AD-Q8	2.77	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,702	R	8.37	AD-Q9	4.04	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	291	R	3.56	AD-Q10	0.84	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	315	R	1.56	AD-Q11	0.64	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	420	R	289.05	AD-Q12	0.69	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	26	R	45.19	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	71.00	AD-Q14	0.06	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	74.12	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	511	R	2.24	AD-Q16	1.13	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.99	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.25	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.15	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.41	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.37	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.96	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.07	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.93	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.02	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.67	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.05	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.10	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	241	R	367.20	AE-Q1	5.88	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	41	R	398.43	AE-Q2	0.10	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	288	R	-									
AE1.4	Rip and compact	m2	2,380	R	3.03									
AE1.5	Formwork to plinth	m2	224	R	38.71	AE-Q3	5.46	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	184	R	51.08	AE-Q4	0.76	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.36	R	2,959.78	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,622	R	73.13	AE-Q6	780.36	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	633	R	12.59	AE-Q7	2.63	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	486	R	26.26	AE-Q8	2.02	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.92	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					121.19	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.47	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,548	R	-	AF-Q1	11.94	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	381	R	19.64	AF-Q2	1.21	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	316	R	41.95	AF-Q3	0.97	AF1.2	/	AF1.4				
AF1.4	Working space	m2	392	R	8.11	AF-Q4	0.33	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	126	R	422.76	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	232	R	21.05	AF-Q6	0.87	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	15	R	638.88	AF-Q7	0.12	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	380.75	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	201	R	-	AF-Q9	0.70	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	287	R	4.07									
AF1.11	Formwork to bases	m2	250	R	50.98	AF-Q10	1.98	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	147	R	57.44	AF-Q11	9.80	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	11	R	60.55	AF-Q12	5.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.79	R	3,702.94	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	25.15	R	2,355.02	AF-Q14	7.99	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	243	R	12.46	AF-Q15	0.52	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	31	R	56.60	AF-Q16	0.48	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	1,228.29	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	62	R	154.52									
	Base excavation / backfill					AF-R1					0.47	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.42	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.53	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.08	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.53	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.90	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					103.87	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.16	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.57	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					33.93	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					11.29	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.74	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	236	R	20.93	AG-Q1	1.10	AG1.1	/	AG1.4				
AG1.2	Working space	m2	617	R	9.90	AG-Q2	0.38	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	60	R	26.71	AG-Q3	3.93	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	215	R	535.14	AG-Q4	0.88	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	61	R	421.70	AG-Q5	3.52	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	308	R	-									
AG1.7	Wood float	m2	217	R	3.18	AG-Q6	0.28	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	245	R	33.02	AG-Q7	0.88	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	219	R	39.75	AG-Q8	0.98	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	134	R	52.82	AG-Q9	0.46	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	20.95	R	2,494.57	AG-Q10	14.70	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,925	R	11.93	AG-Q11	0.16	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,742	R	13.84	AG-Q12	0.11	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.07	R	4,111.43	AG-Q13	29.47	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.47	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.28	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.06	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.07	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.66	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					7.68	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	267	R	29.53	AH-Q1	4.38	AH1.1	/	AH1.4				
AH1.2	Working space	m2	83	R	16.08	AH-Q2	3.22	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	174	R	26.64	AH-Q3	1.53	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	61	R	619.08	AH-Q4	0.90	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	15	R	353.87	AH-Q5	4.07	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	85	R	409.59	AH-Q6	0.72	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	17	R	546.93	AH-Q7	3.59	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	604.27	AH-Q8	20.33	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	166	R	-									
AH1.10	Blinding	m2	68	R	21.17	AH-Q9	2.44	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,117	R	3.98	AH-Q10	0.15	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	88	R	41.57	AH-Q11	0.69	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	37	R	55.24	AH-Q12	0.46	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	29	R	61.32	AH-Q13	0.10	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	149	R	60.03	AH-Q14	0.10	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	31	R	50.77	AH-Q15	2.74	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	41	R	27.47	AH-Q16	2.07	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.20	R	2,608.84	AH-Q17	0.17	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.16	R	2,464.43	AH-Q18	23.18	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	578	R	42.96	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	775	R	11.89	AH-Q20	0.21	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,299	R	20.14	AH-Q21	0.07	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.87	R	2,453.55	AH-Q22	190.80	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	210	R	14.12	AH-Q23	0.40	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	195	R	27.36	AH-Q24	0.44	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.84	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					1.11	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					29.24	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					155.55	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.75	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.51	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.13	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.02	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					14.89	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					9.90	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					9.85	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.89	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.07	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					14.91	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.06	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					57.37	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					207.27	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					122.36	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.25	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					29.01	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					14.97	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	221	R	20.81	AI-Q1	5.26	AI1.1	/	AI1.5				
AI1.2	Working space	m2	576	R	12.01	AI-Q2	0.38	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	106	R	25.52	AI-Q3	2.08	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	313	R	31.46	AI-Q4	0.13	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	42	R	338.37	AI-Q5	3.23	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	419.62	AI-Q6	0.23	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	67	R	-									
AI1.8	Wood float	m2	181	R	2.96									
AI1.9	Formwork bases	m2	233	R	88.59	AI-Q7	0.18	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	100	R	37.08	AI-Q8	0.13	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.48	R	2,625.96	AI-Q9	8.96	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	1,942	R	9.20	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.80	R	2,530.16	AI-Q11	52.50	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.06	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.73	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.82	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					10.76	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.81	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					114.31	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					3.82	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					11.32	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					285.43	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.13	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	384	R	30.03	AJ-Q1	4.99	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	645	R	12.05	AJ-Q2	0.60	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	175	R	41.79	AJ-Q3	2.19	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	192	R	15.24	AJ-Q4	0.40	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	77	R	393.07	AJ-Q5	1.93	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	23	R	572.20	AJ-Q6	3.35	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	40	R	408.64									
AJ1.8	Total concrete	m3	128	R	-									
AJ1.9	Wood float	m2	318	R	3.94	AJ-Q7	0.40	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	180	R	50.37	AJ-Q8	0.43	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	161	R	38.01	AJ-Q9	0.14	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.18	R	2,501.34	AJ-Q10	12.57	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	5,233	R	19.07	AJ-Q11	0.01	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,445	R	11.89	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.08	R	2,469.65	AJ-Q13	71.30	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.08	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.49	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.72	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					25.79	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					99.76	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.80	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					15.05	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					131.17	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					210.37	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.16	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	575	R	28.44	AK-Q1	2.03	AK1.1	/	AK1.5				
AK1.2	Working space	m2	678	R	12.01	AK-Q2	0.85	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	236	R	38.45	AK-Q3	2.44	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	321	R	21.12	AK-Q4	0.88	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	283	R	656.75	AK-Q5	56.60	AK1.5		AK1.6				
AK1.6	Concrete column	m3	5	R	295.82									
AK1.7	Concrete plinth	m3	42	R	393.07	AK-Q6	6.74	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	244	R	-									
AK1.9	Wood float	m2	363	R	2.60	AK-Q7	0.78	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	376	R	53.79	AK-Q8	0.75	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	167	R	79.54	AK-Q9	0.25	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	55.83	AK-Q10	0.17	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	21.22	R	1,882.51	AK-Q11	11.50	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,809	R	13.10	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.16	R	3,424.52	AK-Q13	77.22	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.37	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.74	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					31.10	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					252.60	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					12.21	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					4.94	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					5.30	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					143.70	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.19	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	503	R	24.86	AL-Q1	4.30	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,248	R	12.06	AL-Q2	0.40	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	249	R	35.02	AL-Q3	2.02	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	193	R	22.18	AL-Q4	0.61	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	117	R	465.11	AL-Q5	0.80	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	147	R	405.01	AL-Q6	2.26	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	65	R	686.97	AL-Q7	1.80	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	240	R	-									
AL1.9	Wood float	m2	271	R	2.62	AL-Q8	0.43	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	358	R	70.30	AL-Q9	0.33	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	737	R	59.63	AL-Q10	0.20	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	217	R	86.27	AL-Q11	0.30	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	65	R	77.18	AL-Q12	1.00	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	16	R	132.27	AL-Q13	9.19	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	49.18	R	3,183.45	AL-Q14	4.88	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	9,993	R	11.93	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	153	R	13.65	AL-Q16	1.57	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.58	R	2,911.11	AL-Q17	413.79	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.06	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.71	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					20.97	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					177.52	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.15	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.15	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.62	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					7.96	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.79	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.90	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					7.96	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					5.19	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					266.84	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					233.22	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.16	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	913	R	20.13	AM-Q1	3.77	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,219	R	11.90	AM-Q2	0.41	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	693	R	44.79	AM-Q3	1.32	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	414	R	15.18	AM-Q4	0.58	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	242	R	421.23									
AM1.6	Concrete column	m3	143	R	703.80	AM-Q5	1.69	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	227	R	345.21	AM-Q6	0.63	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	155	R	401.33	AM-Q7	1.56	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	49	R	572.20	AM-Q8	2.92	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	178	R	408.64	AM-Q9	0.80	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	575	R	-									
AM1.12	Wood float	m2	1,406	R	2.80	AM-Q10	0.41	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	782	R	61.00	AM-Q11	0.31	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	647	R	88.17	AM-Q12	0.22	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	652	R	88.73	AM-Q13	0.35	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	241	R	78.80	AM-Q14	0.94	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	447	R	85.13	AM-Q15	0.35	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	3	R	208.93	AM-Q16	47.67	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	366	R	79.49	AM-Q17	0.13	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	151.04	R	2,739.77	AM-Q18	3.81	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,380	R	13.53	AM-Q19	0.13	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,582	R	11.80	AM-Q20	0.16	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	26	R	274.60	AM-Q21	5.81	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.87	R	2,401.88	AM-Q22	660.92	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.69	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.45	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					27.75	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.60	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.22	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.05	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.74	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.03	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					150.44	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.91	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					3.89	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.38	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.98	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					1.65	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					4.80	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.20	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					202.50	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					232.18	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.98	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.18	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,192	R	21.84	AN-Q1	1.86	AN1.1	/	AN1.5				
AN1.2	Working space	m2	239	R	13.96	AN-Q2	9.17	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	464	R	39.40	AN-Q3	4.72	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,898	R	28.35	AN-Q4	0.62	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,178	R	430.54	AN-Q5								
AN1.6	Concrete column	m3	52	R	465.11	AN-Q6	22.65	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	24	R	689.46	AN-Q7	2.17	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	130	R	596.15	AN-Q8	9.06	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	430.54	AN-Q9	8.67	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,278	R	-				/					
AN1.11	Wood float	m2	1,511	R	4.39	AN-Q10	0.78	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	209	R	88.27	AN-Q11	5.64	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	327	R	43.88	AN-Q12	0.16	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	231	R	66.28	AN-Q13	0.10	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	71	R	64.77	AN-Q14	0.34	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	28	R	74.97	AN-Q15	0.21	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	5	R	183.11	AN-Q16	235.60	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,015	R	54.66	AN-Q17	0.13	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	338.38	R	2,526.30	AN-Q18	6.73	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	13,876	R	11.69	AN-Q19	0.16	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,351	R	19.07	AN-Q20	0.31	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	79	R	731.25	AN-Q21	28.84	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.66	R	2,576.69	AN-Q22	709.64	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.56	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.55	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					15.19	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					98.07	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					4.88	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					10.40	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					10.64	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					10.60	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.77	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.74	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					10.91	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					216.11	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					132.48	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.17	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					3.45	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	204	R	29.53	AO-Q1	1.07	AO1.1	/	AO1.5				
AO1.2	Working space	m2	354	R	14.70	AO-Q2	0.58	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	104	R	25.77	AO-Q3	1.96	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	39	R	27.68	AO-Q4	4.90	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	191	R	450.26									
AO1.6	Concrete column	m3	22	R	401.77	AO-Q5	8.68	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	594.11	AO-Q6	1.47	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	547.14	AO-Q7	47.75	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	409.67	AO-Q8	22.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	27	R	-									
AO1.11	Wood float	m2	28	R	2.50	AO-Q9	6.82	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	131	R	73.52	AO-Q10	1.46	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	216	R	64.13	AO-Q11	0.10	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	64	R	88.20	AO-Q12	0.23	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	16	R	100.10	AO-Q13	0.94	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	70.88	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	47	R	122.73	AO-Q15	4.06	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	21	R	71.63	AO-Q16	0.19	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	7.58	R	2,865.27	AO-Q17	3.56	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,701	R	14.15	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,926	R	13.18	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	7	R	556.16	AO-Q20	3.86	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.49	R	2,630.28	AO-Q21	54.73	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.01	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.15	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					16.27	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					180.10	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.12	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.74	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.94	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					6.26	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.84	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.78	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.64	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					202.49	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					217.40	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.15	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,105	R	20.81	AP-Q1	1.19	AP1.1	/	AP1.5				
AP1.2	Working space	m2	748	R	8.48	AP-Q2	1.48	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	966	R	26.26	AP-Q3	1.14	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	293	R	22.18	AP-Q4	3.17	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	928	R	537.23	AP-Q5	0.62	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,487	R	62.08									
AP1.7	Rough formwork	m2	275	R	51.62	AP-Q6	3.37	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	900	R	86.06	AP-Q7	1.03	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,911	R	3.73	AP-Q8	0.32	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	199	R	33.83	AP-Q9	4.66	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	51	R	18.83	AP-Q10	18.20	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	445	R	12.52	AP-Q11	2.09	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.87	R	3,215.24	AP-Q12	1066.67	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,249	R	128.91	AP-Q13	0.74	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,899	R	-	AP-Q14	3.12	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,936	R	56.14	AP-Q15	1.50	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,434	R	74.30	AP-Q16	2.02	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,803	R	28.18	AP-Q17	0.76	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	481.42	AP-Q18	414.14	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,145	R	130.54	AP-Q19	0.92	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,968	R	49.71	AP-Q20	0.58	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	55.41	R	3,858.57	AP-Q21	16.75	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	13,070.00									
AP1.24	Structural steel	Item	1	R	33,843.43									
AP1.25	Plumbing and drainage	Item	1	R	21,549.43									
AP1.26	Small power and lighting	Item	1	R	183,586.00									
AP1.27	External works	Item	1	R	79,330.00									
	Excavations / concrete					AP-R1					0.04	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.45	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.79	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					24.22	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					62.15	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					10.41	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					6.24	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					144.03	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					15.88	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					28.53	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					308.19	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.17	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					9.57	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					51.93	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					4.57	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.27	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.99	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.59	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.39	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.77	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.58	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					47.58	AP1.26	/	AP1.22
	External works / concrete					AP-R23					147.66	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	74	R	380.75	AQ-Q1	2.30	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	170	R	61.91									
AQ1.3	Reinforcement	t	12.66	R	2,985.69	AQ-Q2	5.85	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	524	R	59.36	AQ-Q3	0.14	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	187	R	52.89	AQ-Q4	0.40	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	119	R	101.57	AQ-Q5	7.44	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,275	R	52.06	AQ-Q6	0.69	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	29	R	12,517.05	AQ-Q7	30.52	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	429	R	55.81	AQ-Q8	2.06	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	4,826.07	AQ-Q9	442.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	33	R	442.76	AQ-Q10	26.82	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	795	R	35.64	AQ-Q11	1.11	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	885	R	-									
	Concrete / reinforcement					AQ-R1					0.13	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					6.15	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					6.41	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.20	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					3.75	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					240.44	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.07	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.39	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					8.50	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.46	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	137	R	81.31	AR-Q1	1.83	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	75	R	380.75	AR-Q2	18.75	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4	R	2,739.77									
AR1.4	Mesh	m2	398	R	45.66	AR-Q3	0.19	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	154	R	64.28	AR-Q4	0.49	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	74	R	80.50	AR-Q5	4.03	AR1.15	/	AR1.6				
AR1.7	Screed	m2	414	R	12.97	AR-Q6	0.72	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	35.42	R	9,227.77	AR-Q7	8.41	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	967.48	AR-Q8	3.22	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	53	R	471.75	AR-Q9	0.67	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	44	R	175.07	AR-Q10	0.81	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	471	R	41.61	AR-Q11	0.63	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	91	R	60.02	AR-Q12	3.27	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	48	R	494.06	AR-Q13	0.74	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	298	R	-									
	Earthworks / concrete					AR-R1					0.21	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.14	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					8.34	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.92	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.73	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					29.36	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					9.54	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					19.56	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.69	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					221.77	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.44	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					18.68	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	245	R	54.71	AS-Q1	4.08	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	174	R	22.18	AS-Q2	0.34	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	60	R	465.11	AS-Q3	6.28	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	9.55	R	3,502.50									
AS1.5	Mesh	m2	133	R	58.37	AS-Q4	0.45	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	230	R	79.54	AS-Q5	0.26	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	137	R	3.56	AS-Q6	0.44	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	19	R	18.83	AS-Q7	3.16	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	670	R	11.43	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.26	R	3,424.52	AS-Q9	47.51	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	28	R	73.06	AS-Q10	0.29	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	858.22	AS-Q11	4.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	39	R	159.74	AS-Q12	4.08	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	712	R	20.14	AS-Q13	0.08	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.74	R	8,559.98	AS-Q14	4.60	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.72	R	7,697.04	AS-Q15	220.83	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	159	R	-									
AS1.18	Total control room area	m2	8	R	-									
	Concrete / earthworks					AS-R1					8.50	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					20.97	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					60.01	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					5.85	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					130.65	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					24.70	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					306.43	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.91	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.14	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.41	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.46	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	152	R	37.65	AT-Q1	12.67	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	10	R	20.25	AT-Q2	1.20	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	572.20	AT-Q3	4.98	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.41	R	2,735.74									
AT1.5	Formwork	m2	129	R	52.67	AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	43	R	5.97	AT-Q5	0.28	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	17	R	18.83	AT-Q6	0.71	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.40	R	11.43	AT-Q7	30.00	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.58	R	3,424.52	AT-Q8	20.69	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.08	R	13.50	AT-Q9	150.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.64	R	8,185.05	AT-Q10	43.75	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.18	R	9,918.25	AT-Q11	23.73	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	38	R	73.06	AT-Q12	0.74	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	19	R	61.53	AT-Q13	1.47	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	28	R	-									
	Concrete / earthworks					AT-R1					15.20	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					28.26	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					10.86	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					95.85	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					30.39	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					239.35	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.85	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.33	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.28	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					7.83	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.19	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,430	R	38.01	AV-Q1	1.10	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,612	R	21.20	AV-Q2	1.44	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,862	R	44.39	AV-Q3	0.98	AV1.10	/	AV1.3				
AV1.4	Pipework	m	83	R	236.59	AV-Q4	45.37	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	1,121.43	AV-Q5	20.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	19	R	550.39	AV-Q6	4.37	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	151	R	37.08	AV-Q7	0.13	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	27	R	43.42	AV-Q8	0.70	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.39	R	2,464.43	AV-Q9	5.60	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,766	R	-									
	Earthworks / lining					AV-R1					1.79	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					0.86	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.48	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.16	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.21	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					14.84	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					12.68	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.22	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	33	R	-									
BA1.2	Steel	t	3.10	R	12,969.27	BA-Q1	10.65	BA1.1	/	BA1.2				
BA1.3	Handrail	m	17	R	299.37	BA-Q2	1.94	BA1.1	/	BA1.3				
BA1.4	Grating	m2	17	R	800.30	BA-Q3	1.94	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	21	R	172.61	BA-Q4	1.57	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	2	R	59.54	BA-Q5	16.50	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					43.32	BA1.2	/	BA1.3
	Steel / grating					BA-R2					16.21	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					75.14	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					217.82	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,736	R	-									
BB1.2	Steel	t	48.27	R	7,945.10	BB-Q1	35.96	BB1.1	/	BB1.2				
BB1.3	Handrail	m	79	R	223.21	BB-Q2	21.97	BB1.1	/	BB1.3				
BB1.4	Grating	m2	102	R	508.13	BB-Q3	17.02	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	145	R	149.81	BB-Q4	11.97	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	1,073.62	BB-Q5	133.54	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					35.59	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.64	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					53.03	BB1.2	/	BB1.5

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Year of construction 1995

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.40	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,155	R	-									
BC1.2	Steel	t	267.82	R	11,597.25	BC-Q1	49.12	BC1.1	/	BC1.2				
BC1.3	Handrail	m	427	R	308.34	BC-Q2	30.81	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,453	R	781.16	BC-Q3	2.95	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	393	R	109.61	BC-Q4	33.47	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	78	R	133.57	BC-Q5	168.65	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	81	R	1,377.70	BC-Q6	162.41	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					37.61	BC1.2	/	BC1.3
	Steel / grating					BC-R2					14.85	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					105.80	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					86.83	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.42	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	377	R	-									
BD1.2	Steel	t	17.86	R	8,301.46	BD-Q1	21.11	BD1.1	/	BD1.2				
BD1.3	Handrail	m	14	R	412.68	BD-Q2	26.93	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	523.56	BD-Q3	53.86	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	15	R	140.66	BD-Q4	25.13	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	23	R	1,182.95	BD-Q5	16.39	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					20.12	BD1.1	/	BD1.2
	Steel / grating					BD-R2					15.86	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					59.02	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.02	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	51	R	-									
BE1.2	Steel	t	2.48	R	8,208.63	BE-Q1	20.56	BE1.1	/	BE1.2				
BE1.3	Handrail	m	38	R	296.59	BE-Q2	1.34	BE1.1	/	BE1.3				
BE1.4	Grating	m2	13	R	519.38	BE-Q3	3.92	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	38	R	107.59	BE-Q4	1.34	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	11	R	135.00	BE-Q5	4.64	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					27.68	BE1.2	/	BE1.3
	Steel / grating					BE-R2					15.80	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					76.30	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					60.80	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	283	R	-									
BF1.2	Steel	t	23.84	R	8,820.00	BF-Q1	11.87	BF1.1	/	BF1.2				
BF1.3	Handrail	m	13	R	296.59	BF-Q2	21.77	BF1.1	/	BF1.3				
BF1.4	Grating	m2	57	R	739.70	BF-Q3	4.96	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	12	R	106.99	BF-Q4	23.58	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	15	R	1,084.14	BF-Q5	18.87	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					29.74	BF1.1	/	BF1.2
	Steel / grating					BF-R2					11.92	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					82.44	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.14	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	28,361	R	-	C-Q1	0.54	C1.1	/	C1.2				
C1.2	Total work units	WU	52,049	R	107.98									
C1.3	Pipe supports	kg	9,285	R	-	C-Q2	3.05	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,330	R	-	C-Q3	0.22	C1.4	/	C1.2				
C1.5	Number of welds	No	12,240	R	-	C-Q4	0.43	C1.5	/	C1.1				
C1.6	Total fittings	No	7,034	R	-	C-Q5	0.25	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,017	R	-	C-Q6	0.43	C1.7	/	C1.6				
C1.8	Support number	No	1,367	R	-	C-Q7	0.15	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	52,049	R	107.98	DA-Q1	53.00	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	982	R	21.75									
	Average cost per examination / WU					DA-R1					4.96	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	52,049	R	107.98	DB-Q1	201.74	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	258	R	35.59									
	Average cost per examination / WU					DB-R1					3.03	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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Year of construction 1995

	Trade / Item description	Unit	Quantity	Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	52,049	R 107.98	DC-Q1	272.51	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	191	R 50.63									
	Average cost per examination / WU				DC-R1					2.13	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**												
DD1.1	Total work units	WU	52,049	R 107.98	DD-Q1	27.63	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,884	R 22.18									
	Average cost per examination / WU				DD-R1					4.87	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**												
DE1.1	Total work units	WU	52,049	R 107.98	DE-Q1	103.48	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	503	R 45.82									
	Average cost per examination / WU				DE-R1					2.36	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**												
E1.1	Total work units	WU	52,049	R 107.98	E-Q1	215.19	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	241.88	R 212.89	E-Q2	170.06	E1.1	/	E1.3				
E1.3	Structural steel	t	306.07	R 9,554.86									
	WU cost / install mechanical weight - receive				E-R1					0.51	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive				E-R2					44.88	E1.3	/	E1.2
F	**PAINTING & INSULATION**												
F1.1	Total work units	WU	52,049	R 107.98									
F1.2	Painting to piping	m2	3,349	R 43.42	F-Q1	15.54	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,684	R 184.13	F-Q2	30.91	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	203.98	R 231.96									
F1.5	Painting to mechanical equipment	m2	1,083	R 69.41	F-Q3	0.19	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	462	R 184.13	F-Q4	0.44	F1.4	/	F1.6				
	Paint / insulation				F-R1					0.24	F1.2	/	F1.3
	Work unit / paint				F-R2					2.49	F1.1	/	F1.2
	Work unit / insulation				F-R3					0.59	F1.1	/	F1.3
	Install plant / paint				F-R4					3.34	F1.4	/	F1.5
	Install plant / insulation				F-R5					1.26	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**												
G1.1	Electrical cable	m	29,019	R 26.92									
G1.2	Electrical cable terminations	No	1,567	R 40.32	G-Q1	18.52	G1.1	/	G1.2				
G1.3	Electrical equipment	No	139	R 146.09	G-Q2	208.77	G1.1	/	G1.3				
G1.4	DB's	No	14	R 638.86	G-Q3	9.93	G1.3	/	G1.4				
G1.5	Rack	m	6,122	R 60.87	G-Q4	4.74	G1.1	/	G1.5				
G1.6	Support steel	kg	10,469	R 13.93	G-Q5	0.58	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	17,412	R 5.11	G-Q6	1.67	G1.1	/	G1.7				
G1.8	Instruments	No	872	R 57.17	G-Q7	19.97	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,331	R 62.42	G-Q8	0.37	G1.8	/	G1.9				
G1.10	Light fittings	No	380	R 120.12	G-Q9	2.73	G1.10	/	G1.3				
G1.11	Conduit	m	3,956	R 16.11	G-Q10	7.34	G1.1	/	G1.11				
G1.12	Instrument stands	No	222	R 308.59	G-Q11	3.93	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations				G-R1					0.67	G1.1	/	G1.2
	Electrical cable / electrical equipment				G-R2					0.18	G1.1	/	G1.3
	Electrical equipment / DB's				G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit				G-R4					1.67	G1.1	/	G1.11
	Electrical cable / support steel				G-R5					1.93	G1.1	/	G1.6
	Electrical cable / rack				G-R6					0.44	G1.1	/	G1.5
	Electrical cable / light fittings				G-R7					0.22	G1.1	/	G1.10
	Instrumentation cable / hook-ups				G-R8					0.08	G1.7	/	G1.9
	Instrument cable / instrument stands				G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments				G-R10					0.09	G1.7	/	G1.8

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Year of construction 1998

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,796	R	20.61	AB-Q1	1.98	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,947	R	3.53									
AB1.3	Back fill and compact	m3	7,018	R	21.36	AB-Q2	1.11	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,821	R	1.39	AB-Q3	1.62	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,743	R	2.16	AB-Q4	1.64	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					5.84	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.96	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					14.83	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.54	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	98,801.90									
AC1.2	EO for raking equipment	Item	1	R	13,739.54									
AC1.3	Number of piles	No	319	R	-									
AC1.4	Move rig to new position	No	190	R	88.41	AC-Q1	1.68	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	16	R	-	AC-Q2	19.94	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	15	R	140.04	AC-Q3	1.07	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	164	R	91.36	AC-Q4	0.10	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,643	R	44.87	AC-Q5	0.07	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	590	R	124.98	AC-Q6	0.54	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	170	R	279.60	AC-Q7	1.88	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	193	R	127.11	AC-Q8	1.65	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	750	R	162.55	AC-Q9	0.43	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	73	R	235.45	AC-Q10	0.22	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	29.75	R	5,222.58	AC-Q11	10.72	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	157.19	R	2,342.15	AC-Q12	2.03	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,891	R	550.73	AC-Q13	0.17	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	257	R	638.26	AC-Q14	0.06	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	73,985.95		1.00		/					
AC1.19	Load test to pile	No	2	R	9,989.71	AC-Q15	159.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	27,548.21	AC-Q16	319.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	241	R	133.14	AC-Q17	1.32	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					179.40	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.95	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.16	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.25	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					2.04	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.51	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.30	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.43	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					2.23	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					4.25	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.14	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.02	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	167	R	38.05	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,219	R	41.72									
AD1.3	Kerbing	m	535	R	82.74	AD-Q2	0.27	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,996	R	-									
AD1.5	Remove top soil	m3	856	R	12.81	AD-Q3	0.51	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,683	R	36.69	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,255	R	3.02									
AD1.8	Reduce levels	m3	1,514	R	13.41	AD-Q5	0.36	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,153	R	30.44	AD-Q6	1.31	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	594	R	81.44	AD-Q7	1.94	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	362	R	67.22	AD-Q8	4.18	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,151	R	7.88	AD-Q9	3.62	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	344	R	5.10	AD-Q10	0.78	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	371	R	2.42	AD-Q11	0.64	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	496	R	353.78	AD-Q12	0.69	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	32	R	51.62	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	81.11	AD-Q14	0.06	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	105.99	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	953	R	2.93	AD-Q16	1.78	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.91	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.24	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.44	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.44	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.37	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.21	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.66	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.02	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.06	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.62	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.98	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.28	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	285	R	419.46	AE-Q1	5.82	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	49	R	487.65	AE-Q2	0.09	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	340	R	-									
AE1.4	Rip and compact	m2	3,008	R	3.71									
AE1.5	Formwork to plinth	m2	264	R	41.27	AE-Q3	5.39	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	217	R	62.52	AE-Q4	0.76	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.37	R	3,622.53	AE-Q5	0.02	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,314	R	83.53	AE-Q6	617.13	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	746	R	14.39	AE-Q7	2.62	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	574	R	32.14	AE-Q8	2.01	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					113.06	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.08	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					43.37	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,287	R	-	AF-Q1	12.08	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	355	R	22.43	AF-Q2	1.35	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	263	R	31.13	AF-Q3	0.33	AF1.2	/	AF1.4				
AF1.4	Working space	m2	1,070	R	20.43	AF-Q4	0.38	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	134	R	442.11	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	256	R	26.36	AF-Q6	1.06	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	781.94	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	466.01	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	272	R	-	AF-Q9	0.78	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	347	R	4.65									
AF1.11	Formwork to bases	m2	300	R	62.39	AF-Q10	2.24	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	186	R	70.30	AF-Q11	10.94	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	13	R	69.16	AF-Q12	4.33	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	3.35	R	4,532.10	AF-Q13	0.20	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	16.37	R	2,690.20	AF-Q14	16.62	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	357	R	14.23	AF-Q15	0.38	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	39	R	69.28	AF-Q16	0.44	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	1,503.32	AF-Q17	0.09	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	78	R	189.12									
	Base excavation / backfill					AF-R1					0.72	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.10	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					19.71	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					16.77	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					34.86	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.05	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					95.08	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.14	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					31.07	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					11.29	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.34	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	298	R	25.62	AG-Q1	1.10	AG1.1	/	AG1.4				
AG1.2	Working space	m2	667	R	12.12	AG-Q2	0.45	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	77	R	30.51	AG-Q3	3.87	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	271	R	730.09	AG-Q4	1.33	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	77	R	516.13	AG-Q5	3.52	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	389	R	-									
AG1.7	Wood float	m2	257	R	4.34	AG-Q6	0.30	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	204	R	34.70	AG-Q7	1.33	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	451	R	63.19	AG-Q8	0.60	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	198	R	73.14	AG-Q9	0.39	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	37.70	R	5,011.95	AG-Q10	10.32	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,762	R	14.94	AG-Q11	0.14	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,963	R	16.33	AG-Q12	0.10	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.66	R	4,695.65	AG-Q13	21.04	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.47	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.19	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.09	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.14	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.86	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.43	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	472	R	24.32	AH-Q1	6.13	AH1.1	/	AH1.4				
AH1.2	Working space	m2	117	R	19.21	AH-Q2	4.03	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	205	R	30.79	AH-Q3	2.30	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	77	R	641.80	AH-Q4	0.99	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	33	R	820.69	AH-Q5	2.33	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	93	R	368.05	AH-Q6	0.83	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	16	R	462.65	AH-Q7	4.81	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	739.58	AH-Q8	19.25	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	226	R	-									
AH1.10	Blinding	m2	78	R	21.25	AH-Q9	2.90	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,287	R	3.05	AH-Q10	0.18	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	109	R	87.83	AH-Q11	0.71	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	43	R	62.72	AH-Q12	0.37	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	39	R	102.82	AH-Q13	0.10	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	193	R	68.74	AH-Q14	0.17	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	26	R	59.63	AH-Q15	3.58	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	52	R	32.26	AH-Q16	1.79	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	3.03	R	4,159.50	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	14.03	R	3,182.76	AH-Q18	16.11	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	690	R	57.05	AH-Q19	0.13	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,001	R	14.55	AH-Q20	0.23	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,769	R	24.65	AH-Q21	0.08	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.12	R	2,802.75	AH-Q22	201.79	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	618	R	32.62	AH-Q23	0.15	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	168	R	24.60	AH-Q24	0.55	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.27	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.79	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					30.20	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					210.43	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.78	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.74	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.39	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.87	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.31	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.38	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.19	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					11.94	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.17	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					11.41	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.31	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					55.79	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					218.75	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					129.12	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.23	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					11.28	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					14.96	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	275	R	24.05	AI-Q1	2.35	AI1.1	/	AI1.5				
AI1.2	Working space	m2	1,086	R	18.87	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	124	R	34.23	AI-Q3	2.22	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	233	R	29.94	AI-Q4	0.50	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	117	R	729.64	AI-Q5	9.75	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	12	R	404.23	AI-Q6	0.38	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	86	R	-									
AI1.8	Wood float	m2	307	R	4.75									
AI1.9	Formwork bases	m2	188	R	59.44	AI-Q7	0.62	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	238	R	64.62	AI-Q8	0.05	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.23	R	4,873.44	AI-Q9	9.32	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	5,067	R	12.32	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.81	R	2,939.09	AI-Q11	144.44	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.27	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.70	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					24.37	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.81	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					153.61	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.28	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.26	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					395.57	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.25	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	375	R	21.97	AJ-Q1	2.86	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	796	R	14.74	AJ-Q2	0.47	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	188	R	47.48	AJ-Q3	1.99	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	306	R	23.83	AJ-Q4	0.43	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	131	R	502.93	AJ-Q5	2.57	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	29	R	781.94	AJ-Q6	4.52	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	51	R	466.01									
AJ1.8	Total concrete	m3	238	R	-									
AJ1.9	Wood float	m2	247	R	4.65	AJ-Q7	0.96	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	207	R	62.39	AJ-Q8	0.63	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	366	R	88.67	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	16.48	R	3,707.31	AJ-Q10	14.44	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,450	R	18.68	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,142	R	17.88	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	2.24	R	4,695.65	AJ-Q13	58.48	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.49	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.46	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					21.10	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					108.16	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.06	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					8.82	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					198.46	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					207.34	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.11	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	488	R	23.34	AK-Q1	2.23	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,385	R	24.21	AK-Q2	0.35	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	164	R	21.94	AK-Q3	2.98	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	396	R	25.40	AK-Q4	0.55	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	219	R	514.34	AK-Q5	18.25	AK1.5		AK1.6				
AK1.6	Concrete column	m3	12	R	641.80									
AK1.7	Concrete plinth	m3	49	R	537.90	AK-Q6	4.47	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	290	R	-									
AK1.9	Wood float	m2	518	R	2.69	AK-Q7	0.42	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	444	R	62.17	AK-Q8	0.49	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	173	R	66.08	AK-Q9	0.28	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	40	R	79.14	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.38	R	5,241.53	AK-Q11	10.59	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,918	R	23.74	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.35	R	2,530.06	AK-Q13	86.57	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					0.96	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.06	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					20.25	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					191.20	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					8.27	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					8.14	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.11	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					220.79	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.20	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	601	R	32.68	AL-Q1	2.77	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,521	R	15.12	AL-Q2	0.40	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	193	R	34.64	AL-Q3	3.11	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	261	R	25.23	AL-Q4	0.83	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	217	R	514.34	AL-Q5	1.57	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	138	R	823.67	AL-Q6	2.30	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	60	R	468.31	AL-Q7	3.62	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	588	R	-									
AL1.9	Wood float	m2	493	R	3.54	AL-Q8	0.44	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	490	R	62.17	AL-Q9	0.44	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,403	R	91.41	AL-Q10	0.10	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	162	R	86.72	AL-Q11	0.37	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	71	R	73.99	AL-Q12	0.85	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	13	R	106.34	AL-Q13	10.62	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	53.87	R	4,748.33	AL-Q14	10.92	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	15,889	R	14.83	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	382	R	16.36	AL-Q16	1.54	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.68	R	3,910.42	AL-Q17	864.71	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.06	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.16	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.94	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					20.39	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					145.29	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.62	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.62	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.27	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.40	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					9.01	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					6.33	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.40	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.40	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					320.18	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					290.24	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.13	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,253	R	23.27	AM-Q1	4.14	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,234	R	13.94	AM-Q2	0.56	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,330	R	40.84	AM-Q3	0.94	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	580	R	25.15	AM-Q4	0.52	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	303	R	500.15									
AM1.6	Concrete column	m3	157	R	739.58	AM-Q5	1.93	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	202	R	468.31	AM-Q6	0.78	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	159	R	353.41	AM-Q7	1.91	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	58	R	469.58	AM-Q8	2.71	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	195	R	683.58	AM-Q9	0.81	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	933	R	-									
AM1.12	Wood float	m2	1,693	R	3.14	AM-Q10	0.55	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	532	R	42.36	AM-Q11	0.57	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	765	R	71.93	AM-Q12	0.21	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	857	R	105.33	AM-Q13	0.24	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	312	R	125.12	AM-Q14	0.65	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	604	R	89.35	AM-Q15	0.26	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	7	R	218.76	AM-Q16	22.43	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	317	R	47.12	AM-Q17	0.18	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	118.53	R	4,873.44	AM-Q18	7.87	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,598	R	14.67	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,373	R	19.42	AM-Q20	0.28	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	46	R	359.25	AM-Q21	2.58	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.56	R	4,084.63	AM-Q22	598.08	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.67	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.57	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					19.89	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.68	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.07	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.42	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.07	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.73	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					159.28	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					11.81	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.45	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.74	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					10.28	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.14	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					7.65	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					9.97	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					332.20	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					250.95	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					13.57	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.12	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,085	R	24.06	AN-Q1	0.80	AN1.1	/	AN1.5				
AN1.2	Working space	m2	295	R	23.55	AN-Q2	7.07	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	539	R	26.24	AN-Q3	3.87	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,533	R	24.70	AN-Q4	1.71	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,614	R	683.58	AN-Q5								
AN1.6	Concrete column	m3	55	R	776.27	AN-Q6	47.53	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	40	R	428.18	AN-Q7	1.38	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	243	R	464.60	AN-Q8	10.76	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	528.77	AN-Q9	11.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,163	R	-				/					
AN1.11	Wood float	m2	3,014	R	3.42	AN-Q10	0.87	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	187	R	101.19	AN-Q11	13.98	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	640	R	46.95	AN-Q12	0.09	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	293	R	80.82	AN-Q13	0.14	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	65	R	114.66	AN-Q14	0.62	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	48	R	96.10	AN-Q15	0.10	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	5	R	171.88	AN-Q16	522.80	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,499	R	94.96	AN-Q17	0.16	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	554.62	R	2,690.20	AN-Q18	3.90	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	20,430	R	21.23	AN-Q19	0.11	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	8,637	R	13.47	AN-Q20	0.25	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	180	R	517.77	AN-Q21	12.02	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.48	R	3,935.20	AN-Q22	1766.22	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.02	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.92	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					27.68	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					199.88	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					6.76	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.30	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					3.73	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					16.53	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.49	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.50	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					4.89	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					126.72	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					199.72	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.17	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					5.20	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	252	R	32.47	AO-Q1	1.49	AO1.1	/	AO1.5				
AO1.2	Working space	m2	682	R	14.22	AO-Q2	0.37	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	182	R	26.24	AO-Q3	1.38	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	31	R	24.70	AO-Q4	5.45	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	169	R	683.58									
AO1.6	Concrete column	m3	27	R	488.19	AO-Q5	6.26	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	18	R	721.90	AO-Q6	1.50	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	8	R	489.76	AO-Q7	21.13	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	462.65	AO-Q8	27.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	42	R	-									
AO1.11	Wood float	m2	37	R	3.27	AO-Q9	4.57	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	154	R	42.36	AO-Q10	1.10	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	257	R	93.06	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	90	R	110.20	AO-Q12	0.20	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	18	R	89.35	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	88.56	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	61	R	140.20	AO-Q15	2.77	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	26	R	87.67	AO-Q16	0.31	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.87	R	3,273.07	AO-Q17	7.16	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,418	R	16.16	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,524	R	16.13	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	18	R	680.70	AO-Q20	2.33	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.09	R	3,219.25	AO-Q21	41.32	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.28	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.24	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					27.68	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					209.05	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					16.14	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.55	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					8.08	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					5.25	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					5.15	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.22	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.59	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					202.54	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					202.92	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.21	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					4.81	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,420	R	16.72	AP-Q1	1.13	AP1.1	/	AP1.5				
AP1.2	Working space	m2	912	R	15.15	AP-Q2	1.56	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,131	R	34.23	AP-Q3	1.26	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	235	R	26.36	AP-Q4	5.34	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	1,254	R	781.94	AP-Q5	0.89	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,413	R	49.43									
AP1.7	Rough formwork	m2	483	R	97.69	AP-Q6	2.60	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,275	R	117.31	AP-Q7	0.98	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,538	R	6.47	AP-Q8	0.35	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	241	R	21.78	AP-Q9	5.20	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	67	R	31.14	AP-Q10	18.72	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	356	R	13.84	AP-Q11	3.52	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.02	R	3,935.20	AP-Q12	1229.41	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,792	R	91.96	AP-Q13	0.45	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,666	R	-	AP-Q14	2.92	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,337	R	72.38	AP-Q15	1.57	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,842	R	67.28	AP-Q16	1.99	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,581	R	33.00	AP-Q17	1.02	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	717.65	AP-Q18	407.33	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,888	R	125.51	AP-Q19	0.75	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,585	R	72.55	AP-Q20	1.02	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	131.85	R	4,184.26	AP-Q21	9.51	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	15,614.08									
AP1.24	Structural steel	Item	1	R	40,431.05									
AP1.25	Plumbing and drainage	Item	1	R	25,744.02									
AP1.26	Small power and lighting	Item	1	R	219,321.01									
AP1.27	External works	Item	1	R	94,771.58									
	Excavations / concrete					AP-R1					0.02	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.10	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.49	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					29.66	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					84.65	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					8.00	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					6.67	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					120.86	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					35.90	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					25.11	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					302.33	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.20	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.80	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					62.19	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.79	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.13	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.73	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.27	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.73	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					9.66	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					6.15	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					52.42	AP1.26	/	AP1.22
	External works / concrete					AP-R23					121.20	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	94	R	489.96	AQ-Q1	2.13	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	200	R	83.69									
AQ1.3	Reinforcement	t	15.45	R	3,273.07	AQ-Q2	6.08	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	783	R	58.93	AQ-Q3	0.12	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	213	R	62.17	AQ-Q4	0.44	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	193	R	121.34	AQ-Q5	5.18	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,453	R	62.19	AQ-Q6	0.69	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	51.57	R	9,165.47	AQ-Q7	19.37	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	754	R	71.42	AQ-Q8	1.32	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	6,447.55	AQ-Q9	333.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	42	R	513.56	AQ-Q10	23.79	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,494	R	41.56	AQ-Q11	0.67	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	999	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.85	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					8.31	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.88	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.04	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					147.38	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.15	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.70	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					8.26	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.50	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	238	R	62.13	AR-Q1	4.10	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	58	R	763.24	AR-Q2	9.45	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.14	R	2,894.61									
AR1.4	Mesh	m2	585	R	78.71	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	130	R	76.79	AR-Q4	0.45	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	121	R	87.60	AR-Q5	6.44	AR1.15	/	AR1.6				
AR1.7	Screed	m2	900	R	20.42	AR-Q6	0.87	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	36.71	R	9,861.59	AR-Q7	21.22	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	17	R	1,703.37	AR-Q8	2.16	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	51	R	366.11	AR-Q9	0.72	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	69	R	203.44	AR-Q10	0.53	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	618	R	49.87	AR-Q11	1.26	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	119	R	52.65	AR-Q12	6.55	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	36	R	599.07	AR-Q13	1.02	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	779	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.26	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate		Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh						AR-R3					9.70	AR1.2	/	AR1.4
	Concrete / formwork						AR-R4					9.94	AR1.2	/	AR1.5
	Concrete / brickwork						AR-R5					8.71	AR1.2	/	AR1.6
	Concrete / screed						AR-R6					37.38	AR1.2	/	AR1.7
	Structural steel / cat ladders						AR-R7					5.79	AR1.8	/	AR1.9
	Structural steel / hand rail						AR-R8					26.94	AR1.8	/	AR1.10
	Hand rail / kick plates						AR-R9					1.80	AR1.10	/	AR1.11
	Structural steel / roof covering						AR-R10					197.75	AR1.8	/	AR1.12
	Side cladding / roof covering						AR-R11					1.06	AR1.13	/	AR1.12
	Structural steel / floor grating						AR-R12					16.46	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**														
AS1.1	Earthworks	m3	0	R	-		AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-		AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-		AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0	R	-										
AS1.5	Mesh	m2	0	R	-		AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-		AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-		AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-		AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-		AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0	R	-		AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-		AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-		AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-		AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-		AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0	R	-		AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0	R	-		AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-										
AS1.18	Total control room area	m2	0	R	-										
	Concrete / earthworks						AS-R1						AS1.3	/	AS1.1
	Concrete / blinding						AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement						AS-R3						AS1.4	/	AS1.5
	Concrete / formwork						AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete						AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints						AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel						AS-R7						AS1.4	/	AS1.9
	Concrete / pipework						AS-R8						AS1.3	/	AS1.13
	Concrete / grout						AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork						AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork						AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows						AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**														
AT1.1	Earthworks	m3	0	R	-		AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-		AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-		AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-										
AT1.5	Formwork	m2	0	R	-		AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-		AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-		AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-		AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-		AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-		AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-		AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-		AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-		AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-		AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-										
	Concrete / earthworks						AT-R1						AT1.3	/	AT1.1
	Concrete / blinding						AT-R2						AT1.3	/	AT1.2
	Concrete / formwork						AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete						AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints						AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel						AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts						AT-R7						AT1.8	/	AT1.10
	Concrete / grout						AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork						AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork						AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork						AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering						AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**														
AU1.1	Earthworks	m3	358	R	61.09		AU-Q1	0.95	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	248	R	28.62		AU-Q2	1.52	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	376	R	537.90										
AU1.4	Reinforcement	t	48.13	R	4,864.67		AU-Q3	7.81	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,868	R	60.90		AU-Q4	0.20	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	229	R	42.87		AU-Q5	1.64	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,265	R	14.31		AU-Q6	0.17	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	760	R	18.98		AU-Q7	0.49	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	47	R	111.69	AU-Q8	8.00	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	4.63	R	8,236.12	AU-Q9	81.21	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	9	R	1,383.84	AU-Q10	41.78	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	18	R	87.56	AU-Q11	13.61	AU1.12	/	AU1.13				
AU1.13	Total area	m2	245	R	-									
	Concrete / earthworks					AU-R1					8.81	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					18.79	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					8.83	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.11	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					12.55	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					339.95	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.59	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					256.31	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					43.56	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.39	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					6.14	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	797	R	62.13	AW-Q1	6.33	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	88	R	21.78	AW-Q2	1.43	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	126	R	489.31	AW-Q3	5.31	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	23.74	R	3,027.20									
AW1.5	Mesh	m2	92	R	49.67	AW-Q4	1.37	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	465	R	59.69	AW-Q5	0.27	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,116	R	14.96	AW-Q6	0.04	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3.06	R	12,526.94	AW-Q7	23.53	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	72	R	-									
	Concrete / earthworks					AW-R1					7.88	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					22.47	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					60.95	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					8.20	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					202.35	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.24	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	45	R	-									
BA1.2	Steel	t	3.75	R	14,815.11	BA-Q1	12.00	BA1.1	/	BA1.2				
BA1.3	Handrail	m	20	R	366.40	BA-Q2	2.25	BA1.1	/	BA1.3				
BA1.4	Grating	m2	22	R	933.22	BA-Q3	2.05	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	22	R	195.36	BA-Q4	2.05	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	99.82	BA-Q5	11.25	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					40.43	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.88	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					75.83	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					148.42	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,413	R	-									
BB1.2	Steel	t	75.68	R	13,242.74	BB-Q1	18.67	BB1.1	/	BB1.2				
BB1.3	Handrail	m	117	R	365.08	BB-Q2	12.08	BB1.1	/	BB1.3				
BB1.4	Grating	m2	181	R	829.68	BB-Q3	7.81	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	118	R	107.97	BB-Q4	11.97	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	26	R	1,259.63	BB-Q5	54.35	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					36.27	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.96	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					122.65	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					10.51	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	15,807	R	-									
BC1.2	Steel	t	277.43	R	13,007.97	BC-Q1	56.98	BC1.1	/	BC1.2				
BC1.3	Handrail	m	598	R	405.87	BC-Q2	26.43	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,739	R	751.20	BC-Q3	3.34	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	742	R	172.15	BC-Q4	21.30	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	99	R	141.87	BC-Q5	159.67	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	73	R	1,351.31	BC-Q6	216.53	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					32.05	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.32	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					75.56	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					91.69	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					9.63	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	552	R	-									
BD1.2	Steel	t	22.44	R	15,962.83	BD-Q1	24.60	BD1.1	/	BD1.2				
BD1.3	Handrail	m	13	R	248.74	BD-Q2	42.46	BD1.1	/	BD1.3				
BD1.4	Grating	m2	16	R	607.04	BD-Q3	34.50	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	9	R	125.53	BD-Q4	61.33	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	29	R	1,459.82	BD-Q5	19.03	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					64.17	BD1.1	/	BD1.2
	Steel / grating					BD-R2					26.30	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					127.16	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					10.93	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	60	R	-									
BE1.2	Steel	t	3.13	R	13,242.74	BE-Q1	19.17	BE1.1	/	BE1.2				
BE1.3	Handrail	m	49	R	349.09	BE-Q2	1.22	BE1.1	/	BE1.3				
BE1.4	Grating	m2	24	R	625.47	BE-Q3	2.50	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	67	R	127.82	BE-Q4	0.90	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	155.75	BE-Q5	10.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					37.94	BE1.2	/	BE1.3
	Steel / grating					BE-R2					21.17	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					103.60	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					85.03	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	465	R	-									
BF1.2	Steel	t	25.86	R	13,854.65	BF-Q1	17.98	BF1.1	/	BF1.2				
BF1.3	Handrail	m	16	R	535.54	BF-Q2	29.06	BF1.1	/	BF1.3				
BF1.4	Grating	m2	61	R	844.97	BF-Q3	7.62	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	15	R	130.95	BF-Q4	31.00	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	18	R	1,326.91	BF-Q5	25.83	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					25.87	BF1.1	/	BF1.2
	Steel / grating					BF-R2					16.40	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					105.80	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					10.44	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	30,642	R	-	C-Q1	0.46	C1.1	/	C1.2				
C1.2	Total work units	WU	67,163	R	132.16									
C1.3	Pipe supports	kg	13,343	R	-	C-Q2	2.30	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,045	R	-	C-Q3	0.15	C1.4	/	C1.2				
C1.5	Number of welds	No	19,903	R	-	C-Q4	0.65	C1.5	/	C1.1				
C1.6	Total fittings	No	7,764	R	-	C-Q5	0.25	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,559	R	-	C-Q6	0.46	C1.7	/	C1.6				
C1.8	Support number	No	1,728	R	-	C-Q7	0.13	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	67,163	R	132.16	DA-Q1	54.08	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,242	R	26.62									
	Average cost per examination / WU					DA-R1					4.96	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	67,163	R	132.16	DB-Q1	159.15	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	422	R	61.45									
	Average cost per examination / WU					DB-R1					2.15	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	67,163	R	132.16	DC-Q1	245.12	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	274	R	103.35									
	Average cost per examination / WU					DC-R1					1.28	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	67,163	R	132.16	DD-Q1	33.05	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	2,032	R	22.43									
	Average cost per examination / WU					DD-R1					5.89	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	67,163	R	132.16	DE-Q1	101.00	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	665	R	65.15									
	Average cost per examination / WU					DE-R1					2.03	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	67,163	R	132.16	E-Q1	151.19	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	444.24	R	265.97	E-Q2	177.84	E1.1	/	E1.3				
E1.3	Structural steel	t	377.66	R	11,414.71									
	WU cost / install mechanical weight - receive					E-R1					0.50	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					42.92	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	67,163	R	132.16									
F1.2	Painting to piping	m2	3,997	R	79.85	F-Q1	16.80	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,803	R	141.43	F-Q2	37.25	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	488.61	R	283.89									
F1.5	Painting to mechanical equipment	m2	1,709	R	71.96	F-Q3	0.29	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	584	R	242.34	F-Q4	0.84	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.56	F1.2	/	F1.3
	Work unit / paint					F-R2					1.66	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.93	F1.1	/	F1.3
	Install plant / paint					F-R4					3.95	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.17	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	60,733	R	32.94									
G1.2	Electrical cable terminations	No	1,109	R	46.06	G-Q1	54.76	G1.1	/	G1.2				
G1.3	Electrical equipment	No	90	R	166.88	G-Q2	674.81	G1.1	/	G1.3				
G1.4	DB's	No	16	R	729.79	G-Q3	5.63	G1.3	/	G1.4				
G1.5	Rack	m	6,993	R	69.54	G-Q4	8.68	G1.1	/	G1.5				
G1.6	Support steel	kg	13,944	R	14.83	G-Q5	0.50	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	17,521	R	8.29	G-Q6	3.47	G1.1	/	G1.7				
G1.8	Instruments	No	1,085	R	103.24	G-Q7	16.15	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,518	R	71.31	G-Q8	0.43	G1.8	/	G1.9				
G1.10	Light fittings	No	490	R	147.01	G-Q9	5.44	G1.10	/	G1.3				
G1.11	Conduit	m	4,765	R	19.72	G-Q10	12.75	G1.1	/	G1.11				
G1.12	Instrument stands	No	287	R	352.51	G-Q11	3.78	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.72	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.20	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.67	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.22	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.47	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.22	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.12	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,064	R	18.87	AB-Q1	2.36	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,995	R	4.00									
AB1.3	Back fill and compact	m3	5,705	R	21.88	AB-Q2	1.24	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,658	R	1.24	AB-Q3	1.93	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,599	R	2.22	AB-Q4	1.96	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.72	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.86	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					15.22	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.50	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	112,782.18									
AC1.2	EO for raking equipment	Item	1	R	14,069.98									
AC1.3	Number of piles	No	260	R	-									
AC1.4	Move rig to new position	No	144	R	90.53	AC-Q1	1.81	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	20.00	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	13	R	133.85	AC-Q3	1.00	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	133	R	87.32	AC-Q4	0.10	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	3,522	R	45.95	AC-Q5	0.07	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	448	R	119.46	AC-Q6	0.58	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	138	R	267.24	AC-Q7	1.88	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	157	R	130.17	AC-Q8	1.66	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	610	R	166.46	AC-Q9	0.43	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	60	R	241.12	AC-Q10	0.22	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	24.19	R	5,348.19	AC-Q11	10.75	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	119.26	R	2,238.58	AC-Q12	2.18	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,537	R	563.97	AC-Q13	0.17	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	154	R	548.17	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	65,273.88		1.00		/					
AC1.19	Load test to pile	No	4	R	13,391.37	AC-Q15	65.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	27,900.10	AC-Q16	260.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	171	R	189.50	AC-Q17	1.52	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.98	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.95	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.16	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.90	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.47	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.30	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.43	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					2.39	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					3.97	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					0.97	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					115.74	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					23.74	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					49.47	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.34	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	126	R	29.05	AD-Q1	0.13	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	991	R	31.52									
AD1.3	Kerbing	m	406	R	55.74	AD-Q2	0.27	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,514	R	-									
AD1.5	Remove top soil	m3	696	R	10.97	AD-Q3	0.55	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,267	R	32.80	AD-Q4	0.18	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,856	R	2.89									
AD1.8	Reduce levels	m3	1,149	R	13.73	AD-Q5	0.30	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	937	R	33.40	AD-Q6	1.23	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	483	R	79.65	AD-Q7	1.94	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	295	R	65.30	AD-Q8	3.89	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,749	R	10.50	AD-Q9	3.62	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	261	R	3.89	AD-Q10	0.72	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	302	R	1.83	AD-Q11	0.64	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	376	R	238.32	AD-Q12	0.74	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	25	R	114.16	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	69.50	AD-Q14	0.06	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	94.77	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	775	R	3.01	AD-Q16	1.91	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.92	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.80	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.75	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.41	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.42	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.98	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.13	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.12	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.70	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.07	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.05	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.25	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.70	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.05	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	231	R	429.55	AE-Q1	5.78	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	40	R	499.37	AE-Q2	0.09	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	276	R	-									
AE1.4	Rip and compact	m2	2,445	R	3.79									
AE1.5	Formwork to plinth	m2	200	R	39.44	AE-Q3	5.00	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	176	R	64.02	AE-Q4	0.76	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.22	R	3,111.25	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,772	R	73.70	AE-Q6	550.31	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,310	R	19.28	AE-Q7	5.67	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	390	R	32.55	AE-Q8	1.69	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					113.34	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.08	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					42.22	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,485	R	-	AF-Q1	12.06	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	289	R	20.43	AF-Q2	1.61	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	180	R	32.48	AF-Q3	0.33	AF1.2	/	AF1.4				
AF1.4	Working space	m2	870	R	20.70	AF-Q4	0.38	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	109	R	511.97	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	194	R	24.93	AF-Q6	1.14	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	16	R	800.71	AF-Q7	0.15	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	412.22	AF-Q8	0.03	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	221	R	-	AF-Q9	0.70	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	314	R	4.35									
AF1.11	Formwork to bases	m2	244	R	62.70	AF-Q10	2.24	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	141	R	67.19	AF-Q11	8.81	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	70.83	AF-Q12	4.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.72	R	4,641.10	AF-Q13	0.23	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	11.59	R	2,571.23	AF-Q14	19.07	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	290	R	14.58	AF-Q15	0.38	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	30	R	66.22	AF-Q16	0.53	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	1,436.84	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	63	R	193.67									
	Base excavation / backfill					AF-R1					0.63	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.99	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.06	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.54	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					39.19	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.81	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					117.69	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.08	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.17	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.81	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					35.11	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					12.09	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.64	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	226	R	24.49	AG-Q1	1.03	AG1.1	/	AG1.4				
AG1.2	Working space	m2	613	R	15.43	AG-Q2	0.37	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	58	R	36.08	AG-Q3	3.90	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	220	R	711.87	AG-Q4	1.02	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	54	R	422.56	AG-Q5	4.07	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	195	R	-									
AG1.7	Wood float	m2	190	R	4.16	AG-Q6	0.28	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	216	R	35.54	AG-Q7	1.02	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	273	R	60.40	AG-Q8	0.81	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	119	R	69.91	AG-Q9	0.45	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	20.16	R	3,111.25	AG-Q10	9.67	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,100	R	13.96	AG-Q11	0.09	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,911	R	23.65	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.13	R	3,910.19	AG-Q13	17.25	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.03	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.63	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.47	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.08	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.17	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.37	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.49	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	272	R	25.51	AH-Q1	6.97	AH1.1	/	AH1.4				
AH1.2	Working space	m2	71	R	14.39	AH-Q2	3.83	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	250	R	31.89	AH-Q3	1.09	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	39	R	745.84	AH-Q4	0.74	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	27	R	462.45	AH-Q5	1.44	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	70	R	657.24	AH-Q6	0.56	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	12	R	483.63	AH-Q7	3.25	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	721.58	AH-Q8	13.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	171	R	-									
AH1.10	Blinding	m2	53	R	18.95	AH-Q9	3.23	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	637	R	3.12	AH-Q10	0.27	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	160	R	83.95	AH-Q11	0.24	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	35	R	64.23	AH-Q12	0.34	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	29	R	105.29	AH-Q13	0.10	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	143	R	70.73	AH-Q14	0.19	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	22	R	60.96	AH-Q15	3.18	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	72	R	33.96	AH-Q16	0.97	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.17	R	2,458.61	AH-Q17	0.16	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.51	R	3,266.82	AH-Q18	22.77	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	649	R	51.75	AH-Q19	0.11	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,122	R	12.29	AH-Q20	0.15	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,671	R	16.30	AH-Q21	0.10	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.20	R	2,845.76	AH-Q22	142.50	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	458	R	20.43	AH-Q23	0.15	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	134	R	29.55	AH-Q24	0.52	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.77	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.80	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					39.36	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					239.05	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.61	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.13	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.54	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.03	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					8.88	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.53	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.85	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					6.54	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					10.78	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					19.35	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.75	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					63.13	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					265.81	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					200.42	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.26	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					32.17	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					22.24	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	335	R	42.79	AI-Q1	3.81	AI1.1	/	AI1.5				
AI1.2	Working space	m2	461	R	9.89	AI-Q2	0.73	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	103	R	32.79	AI-Q3	3.25	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	183	R	27.70	AI-Q4	0.48	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	88	R	787.25	AI-Q5	9.78	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	9	R	329.52	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	65	R	-									
AI1.8	Wood float	m2	255	R	4.16									
AI1.9	Formwork bases	m2	146	R	62.14	AI-Q7	0.60	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	130	R	64.23	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.75	R	3,105.28	AI-Q9	6.67	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,602	R	15.97	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.78	R	4,364.84	AI-Q11	112.82	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					4.33	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.30	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					28.42	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					2.39	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					189.24	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.67	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.13	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					194.44	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.18	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	236	R	23.80	AJ-Q1	3.32	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	604	R	21.44	AJ-Q2	0.39	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	156	R	25.71	AJ-Q3	1.51	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	237	R	25.81	AJ-Q4	0.30	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	71	R	555.40	AJ-Q5	2.15	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	25	R	483.63	AJ-Q6	2.84	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	33	R	641.52									
AJ1.8	Total concrete	m3	162	R	-									
AJ1.9	Wood float	m2	255	R	4.53	AJ-Q7	0.64	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	159	R	64.23	AJ-Q8	0.45	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	188	R	92.71	AJ-Q9	0.13	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	16.72	R	4,754.81	AJ-Q10	9.69	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	2,416	R	12.88	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,539	R	14.93	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.81	R	4,364.84	AJ-Q13	39.23	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.11	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.93	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					21.52	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					122.60	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.65	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.22	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					369.16	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					318.47	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.13	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	368	R	25.36	AK-Q1	1.34	AK1.1	/	AK1.5				
AK1.2	Working space	m2	899	R	13.80	AK-Q2	0.41	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	184	R	41.56	AK-Q3	2.00	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	363	R	26.48	AK-Q4	0.76	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	275	R	555.40	AK-Q5	30.56	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	823.31									
AK1.7	Concrete plinth	m3	41	R	711.87	AK-Q6	6.71	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	258	R	-									
AK1.9	Wood float	m2	527	R	3.11	AK-Q7	0.52	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	542	R	61.09	AK-Q8	0.51	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	131	R	93.03	AK-Q9	0.31	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	106.23	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	42.32	R	2,192.97	AK-Q11	6.10	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	9,311	R	16.43	AK-Q12	0.03	AK1.8	/	AK1.14				
AK1.15	Grout	m3	1.53	R	3,076.89	AK-Q13	168.63	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.84	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.61	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					20.97	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					178.59	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					9.09	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.65	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.75	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					133.47	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.18	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	465	R	27.60	AL-Q1	2.82	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,262	R	14.10	AL-Q2	0.37	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	156	R	35.34	AL-Q3	2.98	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	193	R	27.70	AL-Q4	0.85	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	165	R	721.58	AL-Q5	0.90	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	184	R	344.61	AL-Q6	4.00	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	46	R	489.54	AL-Q7	3.59	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	302	R	-									
AL1.9	Wood float	m2	265	R	4.08	AL-Q8	0.62	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	269	R	59.42	AL-Q9	0.61	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,103	R	76.58	AL-Q10	0.17	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	130	R	93.64	AL-Q11	0.35	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	49	R	77.34	AL-Q12	0.94	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	102.59	AL-Q13	18.40	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	43.06	R	4,082.40	AL-Q14	7.01	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	9,860	R	15.64	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	221	R	15.99	AL-Q16	1.37	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.54	R	4,245.91	AL-Q17	559.26	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.04	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.96	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.78	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					26.05	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					176.86	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					2.09	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					2.09	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					12.14	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.23	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					4.50	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					6.33	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.23	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.77	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					261.02	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					255.31	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.17	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	951	R	25.55	AM-Q1	2.44	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,695	R	20.92	AM-Q2	0.56	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	776	R	31.05	AM-Q3	1.23	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	406	R	25.29	AM-Q4	0.96	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	390	R	653.35									
AM1.6	Concrete column	m3	95	R	499.93	AM-Q5	4.11	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	126	R	739.26	AM-Q6	0.75	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	153	R	537.66	AM-Q7	2.55	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	45	R	580.84	AM-Q8	2.11	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	106	R	472.06	AM-Q9	0.90	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,127	R	-									
AM1.12	Wood float	m2	1,401	R	3.34	AM-Q10	0.80	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	578	R	72.84	AM-Q11	0.67	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,036	R	101.39	AM-Q12	0.09	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	410	R	68.12	AM-Q13	0.31	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	159	R	89.52	AM-Q14	0.79	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	708	R	119.54	AM-Q15	0.22	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	146.55	AM-Q16	23.75	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	360	R	99.62	AM-Q17	0.13	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	92.13	R	3,375.63	AM-Q18	12.23	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,754	R	24.45	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	1,646	R	11.73	AM-Q20	0.68	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	37	R	335.95	AM-Q21	2.49	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.68	R	2,519.81	AM-Q22	1657.35	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.22	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.82	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					25.83	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.31	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.88	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.22	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.12	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.38	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					195.61	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					8.97	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					10.85	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					8.26	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.93	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					5.04	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.95	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					5.83	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					138.06	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					287.78	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.05	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.26	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	293	R	33.96	AO-Q1	1.64	AO1.1	/	AO1.5				
AO1.2	Working space	m2	515	R	14.34	AO-Q2	0.57	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	74	R	45.92	AO-Q3	3.96	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	28	R	25.22	AO-Q4	6.39	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	179	R	784.24									
AO1.6	Concrete column	m3	22	R	353.25	AO-Q5	8.14	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	514.11	AO-Q6	1.47	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	555.40	AO-Q7	44.75	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	483.63	AO-Q8	22.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	37	R	-									
AO1.11	Wood float	m2	19	R	3.05	AO-Q9	9.42	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	95	R	91.15	AO-Q10	1.88	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	195	R	93.05	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	66	R	105.29	AO-Q12	0.23	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	15	R	88.52	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	67.62	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	70	R	194.40	AO-Q15	2.56	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	66.66	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.86	R	4,704.37	AO-Q17	5.39	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,903	R	13.62	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,118	R	15.80	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	811.88	AO-Q20	3.70	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.61	R	2,210.99	AO-Q21	38.83	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.37	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.74	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					31.10	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					257.13	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					8.60	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					4.88	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.81	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					3.80	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.64	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					7.15	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.33	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					345.40	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					297.74	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.35	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.79	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,081	R	23.84	AP-Q1	1.10	AP1.1	/	AP1.5				
AP1.2	Working space	m2	562	R	14.39	AP-Q2	1.92	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,126	R	31.55	AP-Q3	0.96	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	188	R	26.29	AP-Q4	5.23	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	984	R	704.32	AP-Q5	0.72	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,358	R	54.30									
AP1.7	Rough formwork	m2	184	R	51.91	AP-Q6	5.35	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,971	R	79.10	AP-Q7	0.50	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,761	R	4.36	AP-Q8	0.21	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	110	R	36.55	AP-Q9	8.95	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	49	R	32.72	AP-Q10	20.08	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	249	R	15.83	AP-Q11	3.95	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.59	R	1,972.10	AP-Q12	1667.80	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,358	R	90.26	AP-Q13	0.72	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,878	R	-	AP-Q14	4.96	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,021	R	33.95	AP-Q15	4.78	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,460	R	100.18	AP-Q16	3.34	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,723	R	33.65	AP-Q17	1.31	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	621.04	AP-Q18	696.86	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,545	R	114.23	AP-Q19	1.92	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,753	R	61.90	AP-Q20	1.77	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	70.33	R	3,247.52	AP-Q21	13.99	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	15,607.21									
AP1.24	Structural steel	Item	1	R	40,413.28									
AP1.25	Plumbing and drainage	Item	1	R	25,732.71									
AP1.26	Small power and lighting	Item	1	R	219,224.63									
AP1.27	External works	Item	1	R	94,729.94									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.66	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.76	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					26.79	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					59.81	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					13.57	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					8.90	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					161.54	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					19.27	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					21.53	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					205.15	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.36	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					20.75	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					32.42	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.68	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.79	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.46	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.81	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.44	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.92	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					67.51	AP1.26	/	AP1.22
	External works / concrete					AP-R23					134.50	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	72	R	492.76	AQ-Q1	2.40	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	173	R	60.96									
AQ1.3	Reinforcement	t	14	R	4,641.10	AQ-Q2	5.14	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	488	R	42.85	AQ-Q3	0.15	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	175	R	64.38	AQ-Q4	0.41	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	105	R	73.43	AQ-Q5	6.06	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	811	R	48.62	AQ-Q6	0.78	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	39.06	R	10,688.55	AQ-Q7	16.28	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	585	R	43.44	AQ-Q8	1.09	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	5,797.23	AQ-Q9	318.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	43	R	518.94	AQ-Q10	14.79	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	656	R	43.02	AQ-Q11	0.97	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	636	R	-									
	Concrete / reinforcement					AQ-R1					0.11	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					8.08	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					11.50	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.65	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					6.71	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					219.84	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.89	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.54	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.67	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.13	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	144	R	83.65	AR-Q1	3.13	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	46	R	657.24	AR-Q2	13.11	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	3.51	R	3,271.63									
AR1.4	Mesh	m2	389	R	58.91	AR-Q3	0.12	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	151	R	66.06	AR-Q4	0.30	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	73	R	119.44	AR-Q5	7.41	AR1.15	/	AR1.6				
AR1.7	Screed	m2	426	R	12.68	AR-Q6	1.27	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	39.88	R	13,143.98	AR-Q7	13.57	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	1,145.39	AR-Q8	3.63	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	60	R	511.45	AR-Q9	0.66	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	62	R	172.06	AR-Q10	0.64	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	441	R	51.31	AR-Q11	1.23	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	115	R	60.26	AR-Q12	4.70	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	28	R	685.93	AR-Q13	1.42	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	541	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.20	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					11.16	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					9.95	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.50	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					51.83	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.48	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					25.70	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.97	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					256.17	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.17	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					19.16	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	355	R	86.96	AS-Q1	4.55	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	163	R	25.14	AS-Q2	0.48	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	78	R	721.58	AS-Q3	10.80	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	7.22	R	3,115.28									
AS1.5	Mesh	m2	186	R	69.27	AS-Q4	0.42	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	136	R	62.14	AS-Q5	0.57	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	190	R	5.83	AS-Q6	0.41	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	23	R	26.23	AS-Q7	3.39	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	836	R	13.94	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.84	R	4,089.31	AS-Q9	92.86	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	47	R	87.24	AS-Q10	0.15	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	1,375.37	AS-Q11	3.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	63	R	191.37	AS-Q12	2.70	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	775	R	15.41	AS-Q13	0.10	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.61	R	13,723.12	AS-Q14	4.35	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.78	R	13,875.86	AS-Q15	217.95	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	170	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					8.30	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					28.70	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					44.97	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					11.61	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					123.77	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					27.51	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					223.48	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.77	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.18	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.23	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.22	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	210	R	86.34	AT-Q1	17.50	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	20	R	31.45	AT-Q2	0.60	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	503.95	AT-Q3	5.77	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.08	R	4,082.40									
AT1.5	Formwork	m2	169	R	83.91	AT-Q4	0.07	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	36	R	6.21	AT-Q5	0.33	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	23	R	31.05	AT-Q6	0.52	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.40	R	14.54	AT-Q7	30.00	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.38	R	4,372.79	AT-Q8	31.58	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.12	R	28.01	AT-Q9	100.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.60	R	10,221.69	AT-Q10	41.67	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.08	R	11,843.63	AT-Q11	23.15	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	39	R	85.78	AT-Q12	0.64	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	14	R	62.16	AT-Q13	1.79	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	25	R	-									
	Concrete / earthworks					AT-R1					5.84	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					16.02	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					6.01	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					81.15	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					16.23	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					280.77	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.52	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.12	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.40	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.34	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					5.87	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.38	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	272	R	99.81	AU-Q1	1.02	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	290	R	18.20	AU-Q2	0.92	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	267	R	469.37									
AU1.4	Reinforcement	t	56.47	R	3,565.29	AU-Q3	4.73	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,365	R	85.87	AU-Q4	0.20	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	139	R	31.28	AU-Q5	1.92	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,933	R	16.16	AU-Q6	0.14	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	718	R	16.12	AU-Q7	0.37	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	35	R	90.98	AU-Q8	7.63	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.12	R	13,432.79	AU-Q9	85.58	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,950.54	AU-Q10	33.38	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	22	R	83.69	AU-Q11	8.86	AU1.12	/	AU1.13				
AU1.13	Total area	m2	195	R	-									
	Concrete / earthworks					AU-R1					4.70	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					25.79	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					5.47	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.13	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.01	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					220.62	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.27	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					221.17	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					39.19	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.24	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.61	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,577	R	59.42	AV-Q1	0.68	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,642	R	29.00	AV-Q2	0.67	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,601	R	45.06	AV-Q3	0.94	AV1.10	/	AV1.3				
AV1.4	Pipework	m	90	R	160.06	AV-Q4	27.13	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	1,400.47	AV-Q5	30.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	30	R	641.52	AV-Q6	3.00	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	141	R	69.08	AV-Q7	0.21	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	21	R	50.88	AV-Q8	1.43	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.68	R	4,514.64	AV-Q9	8.15	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,442	R	-									
	Earthworks / lining					AV-R1					2.05	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.32	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.64	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.37	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.11	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					9.29	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					12.61	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.14	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	858	R	90.60	AW-Q1	9.98	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	83	R	25.14	AW-Q2	1.04	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	86	R	530.46	AW-Q3	4.30	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	20.00	R	5,348.19									
AW1.5	Mesh	m2	77	R	51.92	AW-Q4	1.12	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	429	R	60.91	AW-Q5	0.20	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,553	R	13.96	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.54	R	11,394.08	AW-Q7	22.83	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	58	R	-									
	Concrete / earthworks					AW-R1					5.85	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					21.10	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					103.01	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					8.71	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					383.11	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.47	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	37	R	-									
BA1.2	Steel	t	3.39	R	13,002.26	BA-Q1	10.91	BA1.1	/	BA1.2				
BA1.3	Handrail	m	17	R	527.36	BA-Q2	2.18	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	620.21	BA-Q3	2.64	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	17	R	148.44	BA-Q4	2.18	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	153.59	BA-Q5	12.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					24.66	BA1.2	/	BA1.3
	Steel / grating					BA-R2					20.96	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					87.59	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					84.66	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,694	R	-									
BB1.2	Steel	t	57.42	R	15,116.57	BB-Q1	29.50	BB1.1	/	BB1.2				
BB1.3	Handrail	m	95	R	348.94	BB-Q2	17.83	BB1.1	/	BB1.3				
BB1.4	Grating	m2	147	R	849.63	BB-Q3	11.52	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	81	R	195.27	BB-Q4	20.91	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	1,214.97	BB-Q5	130.31	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					43.32	BB1.2	/	BB1.3
	Steel / grating					BB-R2					17.79	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					77.41	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					12.44	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,819	R	-									
BC1.2	Steel	t	259.88	R	13,320.81	BC-Q1	53.17	BC1.1	/	BC1.2				
BC1.3	Handrail	m	423	R	387.92	BC-Q2	32.67	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,144	R	717.98	BC-Q3	4.40	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	511	R	126.62	BC-Q4	27.04	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	86	R	146.36	BC-Q5	160.69	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	84	R	1,604.01	BC-Q6	164.51	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					34.34	BC1.2	/	BC1.3
	Steel / grating					BC-R2					18.55	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					105.20	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					91.01	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.30	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	421	R	-									
BD1.2	Steel	t	19.85	R	13,848.56	BD-Q1	21.21	BD1.1	/	BD1.2				
BD1.3	Handrail	m	10	R	387.35	BD-Q2	42.10	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	632.85	BD-Q3	52.63	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	14	R	134.60	BD-Q4	30.07	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	23	R	2,163.05	BD-Q5	18.30	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					35.75	BD1.1	/	BD1.2
	Steel / grating					BD-R2					21.88	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					102.89	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					6.40	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	54	R	-									
BE1.2	Steel	t	2.30	R	9,890.17	BE-Q1	23.48	BE1.1	/	BE1.2				
BE1.3	Handrail	m	37	R	364.92	BE-Q2	1.46	BE1.1	/	BE1.3				
BE1.4	Grating	m2	20	R	597.82	BE-Q3	2.70	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	33	R	124.49	BE-Q4	1.64	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	9	R	156.22	BE-Q5	6.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					27.10	BE1.2	/	BE1.3
	Steel / grating					BE-R2					16.54	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					79.45	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					63.31	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	249	R	-									
BF1.2	Steel	t	31.73	R	13,236.92	BF-Q1	7.85	BF1.1	/	BF1.2				
BF1.3	Handrail	m	13	R	515.56	BF-Q2	19.15	BF1.1	/	BF1.3				
BF1.4	Grating	m2	49	R	964.17	BF-Q3	5.08	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	16	R	121.08	BF-Q4	15.56	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	14	R	1,282.04	BF-Q5	17.79	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					25.67	BF1.1	/	BF1.2
	Steel / grating					BF-R2					13.73	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					109.32	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					10.32	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	21,623	R	-	C-Q1	0.42	C1.1	/	C1.2				
C1.2	Total work units	WU	52,017	R	128.94									
C1.3	Pipe supports	kg	8,873	R	-	C-Q2	2.44	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,827	R	-	C-Q3	0.21	C1.4	/	C1.2				
C1.5	Number of welds	No	11,696	R	-	C-Q4	0.54	C1.5	/	C1.1				
C1.6	Total fittings	No	5,605	R	-	C-Q5	0.26	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,887	R	-	C-Q6	0.52	C1.7	/	C1.6				
C1.8	Support number	No	1,361	R	-	C-Q7	0.15	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	52,017	R	128.94	DA-Q1	36.66	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,419	R	20.49									
	Average cost per examination / WU					DA-R1					6.29	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	52,017	R	128.94	DB-Q1	114.07	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	456	R	58.73									
	Average cost per examination / WU					DB-R1					2.20	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	52,017	R	128.94	DC-Q1	196.29	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	265	R	105.83									
	Average cost per examination / WU					DC-R1					1.22	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	52,017	R	128.94	DD-Q1	42.95	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,211	R	16.11									
	Average cost per examination / WU					DD-R1					8.00	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	52,017	R	128.94	DE-Q1	88.02	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	591	R	83.78									
	Average cost per examination / WU					DE-R1					1.54	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	52,017	R	128.94	E-Q1	204.71	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	254.10	R	182.13	E-Q2	173.59	E1.1	/	E1.3				
E1.3	Structural steel	t	299.65	R	11,409.69									
	WU cost / install mechanical weight - receive					E-R1					0.71	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					62.65	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	52,017	R	128.94									
F1.2	Painting to piping	m2	3,286	R	52.63	F-Q1	15.83	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,663	R	228.59	F-Q2	31.28	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	218.55	R	189.87									
F1.5	Painting to mechanical equipment	m2	1,109	R	54.84	F-Q3	0.20	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	338	R	159.07	F-Q4	0.65	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.23	F1.2	/	F1.3
	Work unit / paint					F-R2					2.45	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.56	F1.1	/	F1.3
	Install plant / paint					F-R4					3.46	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.19	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	43,426	R	29.68									
G1.2	Electrical cable terminations	No	1,010	R	81.11	G-Q1	43.00	G1.1	/	G1.2				
G1.3	Electrical equipment	No	73	R	282.73	G-Q2	594.88	G1.1	/	G1.3				
G1.4	DB's	No	12	R	779.89	G-Q3	6.08	G1.3	/	G1.4				
G1.5	Rack	m	5,305	R	84.18	G-Q4	8.19	G1.1	/	G1.5				
G1.6	Support steel	kg	9,388	R	15.10	G-Q5	0.57	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	20,061	R	7.30	G-Q6	2.16	G1.1	/	G1.7				
G1.8	Instruments	No	1,234	R	71.14	G-Q7	16.26	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,282	R	71.25	G-Q8	0.54	G1.8	/	G1.9				
G1.10	Light fittings	No	372	R	142.16	G-Q9	5.10	G1.10	/	G1.3				
G1.11	Conduit	m	3,873	R	17.11	G-Q10	11.21	G1.1	/	G1.11				
G1.12	Instrument stands	No	217	R	404.71	G-Q11	5.69	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.37	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.36	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.73	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.97	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.35	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.21	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.10	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,702	R	26.07	AB-Q1	2.36	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,841	R	5.53									
AB1.3	Back fill and compact	m3	5,412	R	30.23	AB-Q2	1.24	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,239	R	1.60	AB-Q3	2.07	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,414	R	3.06	AB-Q4	1.96	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.71	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.86	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					16.29	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.52	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	155,870.71									
AC1.2	EO for raking equipment	Item	1	R	19,445.42									
AC1.3	Number of piles	No	230	R	-									
AC1.4	Move rig to new position	No	136	R	116.78	AC-Q1	1.69	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	11	R	-	AC-Q2	20.91	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	19	R	254.49	AC-Q3	0.58	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	75	R	74.08	AC-Q4	0.15	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,285	R	147.55	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	357	R	120.31	AC-Q6	0.64	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	86	R	260.92	AC-Q7	2.67	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	139	R	167.90	AC-Q8	1.65	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	540	R	214.72	AC-Q9	0.43	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	57	R	333.24	AC-Q10	0.19	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	22.95	R	7,391.46	AC-Q11	10.02	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	105.60	R	2,887.57	AC-Q12	2.18	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,458	R	779.44	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	140	R	707.10	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	90,211.82		1.00		/					
AC1.19	Load test to pile	No	2	R	17,273.71	AC-Q15	115.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	35,988.73	AC-Q16	230.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	253	R	261.91	AC-Q17	0.91	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.98	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.95	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.15	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.33	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.50	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.15	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.33	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.22	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.28	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.43	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					2.56	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					3.70	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					0.91	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					115.74	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					22.16	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.17	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.34	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	112	R	40.15	AD-Q1	0.13	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	877	R	43.57									
AD1.3	Kerbing	m	233	R	64.88	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,956	R	-									
AD1.5	Remove top soil	m3	564	R	15.17	AD-Q3	0.46	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,230	R	42.32	AD-Q4	0.15	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,658	R	4.44									
AD1.8	Reduce levels	m3	1,090	R	18.98	AD-Q5	0.30	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	889	R	46.15	AD-Q6	1.23	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	427	R	122.70	AD-Q7	2.08	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	279	R	90.25	AD-Q8	3.91	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,659	R	13.54	AD-Q9	3.89	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	231	R	5.38	AD-Q10	0.74	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	267	R	2.53	AD-Q11	0.99	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	216	R	277.41	AD-Q12	1.15	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	48	R	157.77	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	96.05	AD-Q14	0.21	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	6	R	122.24	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	453	R	2.74	AD-Q16	1.94	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.92	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.42	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.27	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.41	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.38	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.92	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.13	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.53	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.43	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.48	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.88	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	205	R	554.08	AE-Q1	5.86	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	35	R	644.15	AE-Q2	0.09	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	262	R	-									
AE1.4	Rip and compact	m2	2,320	R	5.24									
AE1.5	Formwork to plinth	m2	177	R	50.88	AE-Q3	5.06	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	167	R	88.48	AE-Q4	0.81	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	2.93	R	4,013.25	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,486	R	101.85	AE-Q6	848.46	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	640	R	24.87	AE-Q7	3.12	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	430	R	41.99	AE-Q8	2.10	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					105.74	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.08	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					39.40	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,957	R	-	AF-Q1	12.14	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	326	R	26.36	AF-Q2	1.88	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	173	R	41.89	AF-Q3	0.52	AF1.2	/	AF1.4				
AF1.4	Working space	m2	630	R	28.61	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	128	R	660.40	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	212	R	34.45	AF-Q6	0.62	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	14	R	1,106.63	AF-Q7	0.11	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	496.28	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	131	R	-	AF-Q9	0.47	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	279	R	5.61									
AF1.11	Formwork to bases	m2	218	R	86.65	AF-Q10	1.70	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	198	R	130.95	AF-Q11	14.14	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	11	R	97.89	AF-Q12	5.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.58	R	6,414.24	AF-Q13	0.25	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	10.26	R	3,316.67	AF-Q14	12.77	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	275	R	20.15	AF-Q15	0.47	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	27	R	91.51	AF-Q16	0.52	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	1,985.79	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	60	R	249.81									
	Base excavation / backfill					AF-R1					0.63	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.92	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.05	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					19.17	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					41.98	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.75	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.02	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					117.72	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.12	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.20	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.93	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					32.77	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					12.09	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.64	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	319	R	47.72	AG-Q1	1.53	AG1.1	/	AG1.4				
AG1.2	Working space	m2	543	R	21.32	AG-Q2	0.59	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	55	R	49.86	AG-Q3	5.80	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	209	R	983.85	AG-Q4	1.09	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	45	R	545.07	AG-Q5	4.64	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	185	R	-									
AG1.7	Wood float	m2	169	R	6.40	AG-Q6	0.27	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	191	R	45.67	AG-Q7	1.09	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	277	R	89.11	AG-Q8	0.75	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	112	R	96.26	AG-Q9	0.40	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	27.03	R	7,067.72	AG-Q10	6.84	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,002	R	19.26	AG-Q11	0.09	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	4,213	R	33.60	AG-Q12	0.04	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.30	R	3,119.25	AG-Q13	34.62	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.45	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.04	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.09	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.18	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					7.18	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					3.17	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	247	R	32.91	AH-Q1	4.19	AH1.1	/	AH1.4				
AH1.2	Working space	m2	62	R	18.56	AH-Q2	3.98	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	153	R	61.94	AH-Q3	1.61	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	59	R	660.40	AH-Q4	0.70	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	16	R	668.79	AH-Q5	3.69	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	116	R	865.41	AH-Q6	0.51	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	12	R	623.84	AH-Q7	4.92	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	725.31	AH-Q8	19.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	151	R	-									
AH1.10	Blinding	m2	84	R	29.37	AH-Q9	1.80	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	590	R	4.15	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	178	R	111.19	AH-Q11	0.33	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	24	R	93.19	AH-Q12	0.50	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	21	R	92.18	AH-Q13	0.14	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	154	R	127.61	AH-Q14	0.10	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	19	R	123.90	AH-Q15	6.11	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	63	R	28.70	AH-Q16	1.84	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.08	R	3,986.64	AH-Q17	0.17	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	6.49	R	4,413.43	AH-Q18	23.27	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	519	R	101.85	AH-Q19	0.22	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	844	R	19.15	AH-Q20	0.18	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,521	R	23.85	AH-Q21	0.10	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.09	R	6,785.26	AH-Q22	138.53	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	278	R	28.82	AH-Q23	0.42	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	191	R	40.70	AH-Q24	0.61	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.77	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.53	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					22.49	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					159.13	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.99	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.76	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.06	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.91	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					5.94	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.69	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.87	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.24	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.98	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					30.15	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.90	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					43.33	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					230.47	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					185.05	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.10	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					30.03	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					21.26	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	317	R	39.04	AI-Q1	4.34	AI1.1	/	AI1.5				
AI1.2	Working space	m2	408	R	22.22	AI-Q2	0.78	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	91	R	52.74	AI-Q3	3.48	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	162	R	54.50	AI-Q4	0.45	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	73	R	476.53	AI-Q5	6.08	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	12	R	633.18	AI-Q6	0.32	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	92	R	-									
AI1.8	Wood float	m2	226	R	5.74									
AI1.9	Formwork bases	m2	138	R	85.19	AI-Q7	0.53	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	132	R	96.26	AI-Q8	0.09	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.03	R	4,151.73	AI-Q9	11.46	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,352	R	28.85	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.96	R	4,340.86	AI-Q11	76.04	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.08	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.76	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.74	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					8.74	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.75	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					83.02	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					5.59	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.58	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					143.91	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.11	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	281	R	32.90	AJ-Q1	3.60	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,001	R	29.63	AJ-Q2	0.28	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	75	R	33.17	AJ-Q3	3.75	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	226	R	35.68	AJ-Q4	0.35	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	78	R	639.50	AJ-Q5	3.55	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	34	R	1,032.65	AJ-Q6	2.29	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	22	R	498.36									
AJ1.8	Total concrete	m3	123	R	-									
AJ1.9	Wood float	m2	242	R	4.02	AJ-Q7	0.51	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	141	R	84.85	AJ-Q8	0.55	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	179	R	85.93	AJ-Q9	0.19	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	6.81	R	7,042.17	AJ-Q10	18.06	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,122	R	16.54	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,324	R	19.27	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.68	R	6,785.26	AJ-Q13	46.43	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.11	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.99	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					17.92	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					159.08	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.54	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					12.02	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					425.77	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					365.45	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.09	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	573	R	32.82	AK-Q1	3.00	AK1.1	/	AK1.5				
AK1.2	Working space	m2	671	R	19.66	AK-Q2	0.85	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	167	R	70.42	AK-Q3	3.43	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	305	R	37.36	AK-Q4	0.63	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	191	R	647.20	AK-Q5	19.10	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	957.04									
AK1.7	Concrete plinth	m3	60	R	881.37	AK-Q6	3.18	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	158	R	-									
AK1.9	Wood float	m2	291	R	6.35	AK-Q7	0.66	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	298	R	73.24	AK-Q8	0.64	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	116	R	84.77	AK-Q9	0.52	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	33	R	125.48	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	31.28	R	6,194.43	AK-Q11	5.05	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,404	R	22.01	AK-Q12	0.03	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.13	R	4,959.65	AK-Q13	74.18	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.67	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.47	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					17.32	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					101.92	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					8.84	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					10.40	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.63	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					281.44	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.13	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	291	R	48.89	AL-Q1	2.02	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,822	R	16.02	AL-Q2	0.16	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	139	R	43.02	AL-Q3	2.09	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	265	R	51.92	AL-Q4	0.54	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	144	R	521.19	AL-Q5	1.06	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	136	R	692.52	AL-Q6	3.40	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	40	R	693.54	AL-Q7	3.60	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	286	R	-									
AL1.9	Wood float	m2	212	R	4.99	AL-Q8	0.68	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	241	R	126.41	AL-Q9	0.60	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	710	R	93.97	AL-Q10	0.19	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	143	R	101.80	AL-Q11	0.28	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	106	R	87.22	AL-Q12	0.38	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	14	R	134.31	AL-Q13	9.71	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	24.66	R	5,865.62	AL-Q14	11.60	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	9,352	R	19.15	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	179	R	22.16	AL-Q16	1.60	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.78	R	2,660.37	AL-Q17	366.67	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.09	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					3.05	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.14	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					10.04	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					104.45	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					4.12	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.81	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.37	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					7.95	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.81	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					5.16	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					306.30	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					264.69	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.20	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	838	R	32.71	AM-Q1	2.78	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,453	R	28.61	AM-Q2	0.58	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,224	R	30.32	AM-Q3	0.68	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	376	R	53.20	AM-Q4	0.80	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	301	R	679.83									
AM1.6	Concrete column	m3	118	R	785.55	AM-Q5	2.55	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	142	R	755.79	AM-Q6	0.83	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	135	R	828.70	AM-Q7	2.23	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	40	R	1,057.95	AM-Q8	2.95	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	94	R	476.53	AM-Q9	1.26	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,069	R	-									
AM1.12	Wood float	m2	1,240	R	4.81	AM-Q10	0.86	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	548	R	115.83	AM-Q11	0.55	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	983	R	94.44	AM-Q12	0.12	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	339	R	101.80	AM-Q13	0.42	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	151	R	117.05	AM-Q14	0.94	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	627	R	120.48	AM-Q15	0.22	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	294.97	AM-Q16	29.50	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	481	R	88.05	AM-Q17	0.08	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	87.40	R	3,316.67	AM-Q18	12.23	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,459	R	20.15	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	1,457	R	34.42	AM-Q20	0.73	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	35	R	332.85	AM-Q21	2.50	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.65	R	3,963.09	AM-Q22	1644.62	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.14	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.08	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					12.78	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.87	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.90	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.82	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.64	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.43	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					141.34	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.87	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					7.42	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					6.46	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					8.32	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.56	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.96	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					12.02	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					164.60	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					96.36	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.96	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.17	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,709	R	33.24	AN-Q1	1.69	AN1.1	/	AN1.5				
AN1.2	Working space	m2	221	R	25.44	AN-Q2	12.26	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	603	R	39.70	AN-Q3	4.49	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,238	R	37.36	AN-Q4	1.30	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,605	R	783.55	AN-Q5								
AN1.6	Concrete column	m3	67	R	570.03	AN-Q6	23.96	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	24	R	652.42	AN-Q7	2.79	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	120	R	865.41	AN-Q8	13.38	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	725.31	AN-Q9	11.17	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,078	R	-				/					
AN1.11	Wood float	m2	1,456	R	6.09	AN-Q10	1.10	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	164	R	128.13	AN-Q11	9.79	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	509	R	89.94	AN-Q12	0.13	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	145	R	100.99	AN-Q13	0.17	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	73	R	126.94	AN-Q14	0.33	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	20	R	175.77	AN-Q15	0.30	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	199.48	AN-Q16	535.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,505	R	95.41	AN-Q17	0.08	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	245.06	R	7,214.70	AN-Q18	8.48	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	9,395	R	19.21	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	6,068	R	21.32	AN-Q20	0.34	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	122	R	769.27	AN-Q21	17.03	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.50	R	3,873.42	AN-Q22	1070.00	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.31	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.84	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					20.97	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					128.66	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					6.12	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.46	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.14	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.34	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.27	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.13	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					9.07	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					375.57	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					338.40	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.20	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					9.38	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	202	R	32.71	AO-Q1	1.24	AO1.1	/	AO1.5				
AO1.2	Working space	m2	566	R	19.82	AO-Q2	0.36	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	79	R	63.46	AO-Q3	2.56	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	26	R	32.53	AO-Q4	6.27	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	163	R	476.53									
AO1.6	Concrete column	m3	22	R	633.18	AO-Q5	7.41	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	9	R	921.74	AO-Q6	2.44	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	658.28	AO-Q7	32.60	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	664.73	AO-Q8	22.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	24	R	-									
AO1.11	Wood float	m2	25	R	4.33	AO-Q9	6.52	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	119	R	113.20	AO-Q10	1.37	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	206	R	131.28	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	41	R	106.12	AO-Q12	0.22	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	19	R	178.16	AO-Q13	0.47	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	3	R	87.22	AO-Q14	0.33	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	44	R	312.92	AO-Q15	3.70	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	12	R	90.64	AO-Q16	0.42	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.06	R	4,998.96	AO-Q17	3.96	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,927	R	21.99	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,947	R	27.62	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	15	R	1,122.06	AO-Q20	1.60	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.12	R	2,851.99	AO-Q21	76.89	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.65	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.52	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					14.65	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					110.05	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					4.21	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.69	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.17	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.82	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.95	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					7.62	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.26	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					227.33	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					180.99	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					4.46	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,022	R	32.95	AP-Q1	1.32	AP1.1	/	AP1.5				
AP1.2	Working space	m2	499	R	18.56	AP-Q2	2.05	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	986	R	40.70	AP-Q3	1.04	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	165	R	33.91	AP-Q4	4.68	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	772	R	973.41	AP-Q5	0.55	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,410	R	70.04									
AP1.7	Rough formwork	m2	163	R	71.45	AP-Q6	4.74	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,115	R	92.08	AP-Q7	0.69	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,281	R	8.38	AP-Q8	0.24	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	142	R	24.55	AP-Q9	5.44	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	34	R	40.29	AP-Q10	22.71	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	268	R	26.81	AP-Q11	2.88	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.09	R	4,144.62	AP-Q12	708.26	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,312	R	118.07	AP-Q13	0.59	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,215	R	-	AP-Q14	5.46	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	949	R	41.88	AP-Q15	4.44	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,261	R	123.57	AP-Q16	3.34	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,672	R	60.33	AP-Q17	1.15	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	6	R	729.52	AP-Q18	702.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,890	R	147.34	AP-Q19	1.46	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,113	R	79.84	AP-Q20	1.35	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	67.41	R	4,189.02	AP-Q21	11.45	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	21,054.14									
AP1.24	Structural steel	Item	1	R	54,517.53									
AP1.25	Plumbing and drainage	Item	1	R	34,713.44									
AP1.26	Small power and lighting	Item	1	R	295,734.10									
AP1.27	External works	Item	1	R	127,790.71									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.78	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.81	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					28.71	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					59.81	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					13.62	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					10.57	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					116.16	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					39.65	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					24.16	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					156.25	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.23	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					23.24	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					33.90	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.96	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.16	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.80	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.48	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.03	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					13.01	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.29	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					70.60	AP1.26	/	AP1.22
	External works / concrete					AP-R23					131.28	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	102	R	960.32	AQ-Q1	1.62	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	165	R	84.25									
AQ1.3	Reinforcement	t	13	R	6,414.24	AQ-Q2	7.85	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	432	R	55.28	AQ-Q3	0.24	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	166	R	88.98	AQ-Q4	0.61	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	93	R	101.49	AQ-Q5	4.67	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	770	R	67.19	AQ-Q6	0.56	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	37.05	R	13,787.32	AQ-Q7	11.71	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	415	R	59.48	AQ-Q8	1.05	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	8,130.31	AQ-Q9	217.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	28	R	696.18	AQ-Q10	15.50	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	724	R	38.27	AQ-Q11	0.60	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	434	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.40	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					17.37	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					10.79	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					9.46	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					205.20	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.89	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.59	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.36	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.76	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	126	R	83.78	AR-Q1	2.33	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	54	R	652.42	AR-Q2	10.91	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.95	R	5,507.16									
AR1.4	Mesh	m2	446	R	123.19	AR-Q3	0.12	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	114	R	84.58	AR-Q4	0.47	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	92	R	184.00	AR-Q5	3.96	AR1.15	/	AR1.6				
AR1.7	Screed	m2	377	R	16.36	AR-Q6	0.97	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	42	R	16,954.61	AR-Q7	8.67	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	10	R	1,582.99	AR-Q8	4.20	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	57	R	757.34	AR-Q9	0.74	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	59	R	227.10	AR-Q10	0.71	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	418	R	67.27	AR-Q11	0.87	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	126	R	83.29	AR-Q12	2.89	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	24	R	884.79	AR-Q13	1.75	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	364	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.12	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					5.30	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.71	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.55	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					39.88	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					10.71	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					22.39	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.33	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					252.04	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.24	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					19.16	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	249	R	80.37	AS-Q1	4.53	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	93	R	24.55	AS-Q2	0.59	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	55	R	633.18	AS-Q3	5.50	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	10	R	5,865.62									
AS1.5	Mesh	m2	107	R	69.82	AS-Q4	0.51	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	152	R	93.19	AS-Q5	0.36	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	107	R	5.98	AS-Q6	0.51	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	28	R	61.94	AS-Q7	1.96	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	623	R	19.21	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.65	R	2,970.18	AS-Q9	84.62	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	27	R	118.42	AS-Q10	0.33	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,679.94	AS-Q11	3.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	37	R	263.63	AS-Q12	3.49	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	480	R	21.75	AS-Q13	0.11	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.51	R	13,220.87	AS-Q14	5.96	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.89	R	29,018.89	AS-Q15	144.94	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	129	R	-									
AS1.18	Total control room area	m2	9	R	-									
	Concrete / earthworks					AS-R1					7.88	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					25.79	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					84.01	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					6.79	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					105.88	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					10.22	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					305.34	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.40	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.21	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.44	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.20	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.07	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	199	R	127.85	AT-Q1	18.09	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	19	R	41.51	AT-Q2	0.58	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	11	R	660.66	AT-Q3	4.85	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.27	R	5,642.09									
AT1.5	Formwork	m2	157	R	129.27	AT-Q4	0.07	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	32	R	5.67	AT-Q5	0.34	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	21	R	56.42	AT-Q6	0.52	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.28	R	13.52	AT-Q7	39.29	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.49	R	3,947.26	AT-Q8	22.45	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.07	R	24.47	AT-Q9	157.14	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.52	R	21,488.78	AT-Q10	44.23	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.02	R	15,323.64	AT-Q11	22.55	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	40	R	171.11	AT-Q12	0.58	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	21	R	82.05	AT-Q13	1.10	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	23	R	-									
	Concrete / earthworks					AT-R1					5.17	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					15.92	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					5.11	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					116.52	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					11.71	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					417.31	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.55	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.26	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.37	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					3.86	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.09	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,204	R	123.39	AV-Q1	0.95	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,537	R	37.41	AV-Q2	1.20	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,741	R	58.12	AV-Q3	1.11	AV1.10	/	AV1.3				
AV1.4	Pipework	m	95	R	420.70	AV-Q4	31.96	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	3,204.52	AV-Q5	23.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	15	R	496.28	AV-Q6	6.33	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	181	R	85.10	AV-Q7	0.08	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	18	R	60.46	AV-Q8	0.83	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	4.45	R	4,198.69	AV-Q9	3.37	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,036	R	-									
	Earthworks / lining					AV-R1					3.30	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					2.12	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.64	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.29	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.13	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.08	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.83	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					8.21	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.12	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	22	R	-									
BA1.2	Steel	t	2.96	R	11,553.35	BA-Q1	7.43	BA1.1	/	BA1.2				
BA1.3	Handrail	m	25	R	742.36	BA-Q2	0.88	BA1.1	/	BA1.3				
BA1.4	Grating	m2	9	R	704.62	BA-Q3	2.44	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	11	R	172.35	BA-Q4	2.00	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	191.29	BA-Q5	4.40	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					15.56	BA1.2	/	BA1.3
	Steel / grating					BA-R2					16.40	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					67.03	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					60.40	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,139	R	-									
BB1.2	Steel	t	43.76	R	19,397.14	BB-Q1	26.03	BB1.1	/	BB1.2				
BB1.3	Handrail	m	139	R	665.03	BB-Q2	8.19	BB1.1	/	BB1.3				
BB1.4	Grating	m2	61	R	871.82	BB-Q3	18.67	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	89	R	261.10	BB-Q4	12.80	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	12	R	1,733.46	BB-Q5	94.92	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					29.17	BB1.2	/	BB1.3
	Steel / grating					BB-R2					22.25	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					74.29	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.19	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	11,898	R	-									
BC1.2	Steel	t	240.65	R	14,056.58	BC-Q1	49.44	BC1.1	/	BC1.2				
BC1.3	Handrail	m	450	R	476.47	BC-Q2	26.44	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,568	R	826.70	BC-Q3	3.33	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	348	R	172.35	BC-Q4	34.19	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	69	R	210.02	BC-Q5	172.43	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	55	R	1,735.04	BC-Q6	216.33	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					29.50	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.00	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					81.56	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					66.93	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.10	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	406	R	-									
BD1.2	Steel	t	22.06	R	17,863.46	BD-Q1	18.40	BD1.1	/	BD1.2				
BD1.3	Handrail	m	9	R	508.87	BD-Q2	45.11	BD1.1	/	BD1.3				
BD1.4	Grating	m2	10	R	1,241.43	BD-Q3	40.60	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	254.86	BD-Q4	33.83	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	20	R	1,789.21	BD-Q5	20.30	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					35.10	BD1.1	/	BD1.2
	Steel / grating					BD-R2					14.39	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					70.09	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					9.98	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	46	R	-									
BE1.2	Steel	t	2.25	R	14,056.58	BE-Q1	20.44	BE1.1	/	BE1.2				
BE1.3	Handrail	m	35	R	652.99	BE-Q2	1.31	BE1.1	/	BE1.3				
BE1.4	Grating	m2	27	R	937.63	BE-Q3	1.70	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	23	R	205.15	BE-Q4	2.00	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	9	R	122.99	BE-Q5	5.11	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					21.53	BE1.2	/	BE1.3
	Steel / grating					BE-R2					14.99	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					68.52	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					114.29	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	253	R	-									
BF1.2	Steel	t	14.17	R	13,802.71	BF-Q1	17.85	BF1.1	/	BF1.2				
BF1.3	Handrail	m	15	R	664.78	BF-Q2	16.87	BF1.1	/	BF1.3				
BF1.4	Grating	m2	47	R	1,191.56	BF-Q3	5.38	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	11	R	172.35	BF-Q4	23.00	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	13	R	1,771.84	BF-Q5	19.46	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.76	BF1.1	/	BF1.2
	Steel / grating					BF-R2					11.58	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					80.09	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.79	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	19,146	R	-	C-Q1	0.39	C1.1	/	C1.2				
C1.2	Total work units	WU	49,346	R	193.95									
C1.3	Pipe supports	kg	8,417	R	-	C-Q2	2.27	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,271	R	-	C-Q3	0.21	C1.4	/	C1.2				
C1.5	Number of welds	No	11,096	R	-	C-Q4	0.58	C1.5	/	C1.1				
C1.6	Total fittings	No	7,433	R	-	C-Q5	0.39	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,523	R	-	C-Q6	0.47	C1.7	/	C1.6				
C1.8	Support number	No	848	R	-	C-Q7	0.10	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	49,346	R	193.95	DA-Q1	56.40	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	875	R	33.49									
	Average cost per examination / WU					DA-R1					5.79	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	49,346	R	193.95	DB-Q1	163.94	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	301	R	87.94									
	Average cost per examination / WU					DB-R1					2.21	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	49,346	R	193.95	DC-Q1	217.38	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	227	R	118.19									
	Average cost per examination / WU					DC-R1					1.64	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	49,346	R	193.95	DD-Q1	28.69	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,720	R	29.86									
	Average cost per examination / WU					DD-R1					6.50	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	49,346	R	193.95	DE-Q1	76.62	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	644	R	53.21									
	Average cost per examination / WU					DE-R1					3.64	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	49,346	R	193.95	E-Q1	158.40	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	311.53	R	430.58	E-Q2	177.84	E1.1	/	E1.3				
E1.3	Structural steel	t	277.47	R	15,391.68									
	WU cost / install mechanical weight - receive					E-R1					0.45	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					35.75	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	49,346	R	193.95									
F1.2	Painting to piping	m2	3,443	R	55.88	F-Q1	14.33	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,470	R	221.53	F-Q2	33.57	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	213.55	R	245.70									
F1.5	Painting to mechanical equipment	m2	1,567	R	71.70	F-Q3	0.14	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	276	R	345.47	F-Q4	0.77	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.25	F1.2	/	F1.3
	Work unit / paint					F-R2					3.47	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.88	F1.1	/	F1.3
	Install plant / paint					F-R4					3.43	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.71	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	34,895	R	29.72									
G1.2	Electrical cable terminations	No	1,816	R	110.91	G-Q1	19.22	G1.1	/	G1.2				
G1.3	Electrical equipment	No	126	R	450.28	G-Q2	276.94	G1.1	/	G1.3				
G1.4	DB's	No	12	R	938.40	G-Q3	10.50	G1.3	/	G1.4				
G1.5	Rack	m	5,550	R	94.96	G-Q4	6.29	G1.1	/	G1.5				
G1.6	Support steel	kg	6,143	R	13.96	G-Q5	0.90	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	24,462	R	16.81	G-Q6	1.43	G1.1	/	G1.7				
G1.8	Instruments	No	828	R	96.06	G-Q7	29.54	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,606	R	72.96	G-Q8	0.52	G1.8	/	G1.9				
G1.10	Light fittings	No	530	R	325.28	G-Q9	4.21	G1.10	/	G1.3				
G1.11	Conduit	m	2,306	R	13.23	G-Q10	15.13	G1.1	/	G1.11				
G1.12	Instrument stands	No	192	R	498.55	G-Q11	4.31	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.27	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.48	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.25	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.13	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.31	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.09	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.23	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.17	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,160	R	53.90	AB-Q1	2.36	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,035	R	11.43									
AB1.3	Back fill and compact	m3	5,783	R	62.50	AB-Q2	1.24	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,230	R	3.08	AB-Q3	2.22	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,648	R	6.33	AB-Q4	1.96	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.72	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.86	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					17.50	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.52	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	336,373.50									
AC1.2	EO for raking equipment	Item	1	R	33,855.22									
AC1.3	Number of piles	No	229	R	-									
AC1.4	Move rig to new position	No	146	R	241.41	AC-Q1	1.57	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	12	R	-	AC-Q2	19.08	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	20	R	526.07	AC-Q3	0.60	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	81	R	153.14	AC-Q4	0.15	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,716	R	305.01	AC-Q5	0.03	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	356	R	232.12	AC-Q6	0.64	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	92	R	539.35	AC-Q7	2.49	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	138	R	347.08	AC-Q8	1.66	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	577	R	443.85	AC-Q9	0.40	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	60	R	642.93	AC-Q10	0.20	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	24.52	R	14,260.70	AC-Q11	9.34	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	105.31	R	5,969.06	AC-Q12	2.17	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,454	R	1,503.81	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	166	R	1,461.68	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	186,482.04		1.00		/					
AC1.19	Load test to pile	No	2	R	33,326.99	AC-Q15	114.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	74,394.38	AC-Q16	229.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	271	R	541.40	AC-Q17	0.85	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					223.68	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					22.51	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.16	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.35	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.50	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.15	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.36	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.30	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.43	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					2.39	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					3.97	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					0.97	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					124.01	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					22.16	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					49.47	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.36	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	122	R	99.34	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	834	R	107.32									
AD1.3	Kerbing	m	254	R	135.50	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,125	R	-									
AD1.5	Remove top soil	m3	681	R	38.96	AD-Q3	0.56	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,214	R	101.01	AD-Q4	0.17	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,908	R	8.75									
AD1.8	Reduce levels	m3	1,006	R	31.37	AD-Q5	0.26	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	585	R	59.71	AD-Q6	1.72	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	417	R	237.02	AD-Q7	1.40	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	293	R	175.52	AD-Q8	3.43	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,810	R	23.62	AD-Q9	4.34	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	251	R	13.30	AD-Q10	0.67	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	254	R	6.23	AD-Q11	0.99	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	235	R	579.38	AD-Q12	1.00	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	51	R	248.95	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	246.74	AD-Q14	0.20	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	6	R	291.80	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	406	R	4.53	AD-Q16	1.60	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.45	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.59	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.53	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.25	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.18	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.69	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.28	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.57	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.05	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.84	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.82	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.15	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	204	R	1,145.37	AE-Q1	5.37	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	38	R	1,331.56	AE-Q2	0.08	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	280	R	-									
AE1.4	Rip and compact	m2	2,479	R	10.12									
AE1.5	Formwork to plinth	m2	177	R	105.17	AE-Q3	4.66	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	167	R	170.70	AE-Q4	0.82	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.47	R	8,296.02	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,656	R	210.54	AE-Q6	765.42	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	596	R	47.99	AE-Q7	2.92	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	460	R	86.79	AE-Q8	2.25	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					113.18	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.08	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					39.40	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,946	R	-	AF-Q1	12.10	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	326	R	55.61	AF-Q2	1.77	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	184	R	129.42	AF-Q3	0.48	AF1.2	/	AF1.4				
AF1.4	Working space	m2	673	R	30.91	AF-Q4	0.42	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	137	R	1,397.31	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	227	R	68.64	AF-Q6	0.62	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	15	R	2,134.64	AF-Q7	0.11	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	961.52	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	140	R	-	AF-Q9	0.42	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	332	R	11.84									
AF1.11	Formwork to bases	m2	217	R	170.66	AF-Q10	1.58	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	139	R	181.54	AF-Q11	9.27	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	17	R	262.88	AF-Q12	8.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.18	R	8,377.05	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	14.94	R	8,176.72	AF-Q14	9.37	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	267	R	41.00	AF-Q15	0.51	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	32	R	200.12	AF-Q16	0.47	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	6,558.22	AF-Q17	0.13	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	55	R	399.85									
	Base excavation / backfill					AF-R1					0.43	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.80	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.13	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.36	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					38.39	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.69	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					118.02	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.27	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.02	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					34.08	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					10.67	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.49	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.06	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	224	R	66.16	AG-Q1	1.11	AG1.1	/	AG1.4				
AG1.2	Working space	m2	904	R	46.47	AG-Q2	0.25	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	54	R	81.77	AG-Q3	4.15	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	202	R	1,704.40	AG-Q4	1.29	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	92	R	1,428.47	AG-Q5	2.20	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	190	R	-									
AG1.7	Wood float	m2	186	R	8.38	AG-Q6	0.49	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	157	R	117.84	AG-Q7	1.29	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	345	R	123.02	AG-Q8	0.59	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	151	R	175.91	AG-Q9	0.61	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	28.89	R	14,557.28	AG-Q10	6.58	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,927	R	32.64	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	4,100	R	43.48	AG-Q12	0.05	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.36	R	11,130.72	AG-Q13	67.65	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.70	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.24	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.00	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.07	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.12	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					8.54	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.53	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	246	R	76.69	AH-Q1	5.13	AH1.1	/	AH1.4				
AH1.2	Working space	m2	62	R	59.15	AH-Q2	3.97	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	218	R	113.84	AH-Q3	1.13	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	48	R	1,399.37	AH-Q4	0.48	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	20	R	1,511.74	AH-Q5	2.40	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	71	R	2,240.97	AH-Q6	0.68	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	12	R	1,937.66	AH-Q7	4.00	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	1,399.37	AH-Q8	24.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	179	R	-									
AH1.10	Blinding	m2	100	R	115.44	AH-Q9	1.79	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	895	R	14.21	AH-Q10	0.20	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	100	R	128.66	AH-Q11	0.48	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	34	R	171.71	AH-Q12	0.35	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	21	R	163.81	AH-Q13	0.10	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	209	R	177.50	AH-Q14	0.10	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	26	R	244.02	AH-Q15	2.73	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	43	R	60.57	AH-Q16	1.65	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.74	R	8,211.23	AH-Q17	0.25	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.06	R	8,310.13	AH-Q18	25.35	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	580	R	197.25	AH-Q19	0.12	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,305	R	65.19	AH-Q20	0.14	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,548	R	46.65	AH-Q21	0.12	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.74	R	8,863.23	AH-Q22	241.89	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	270	R	90.61	AH-Q23	0.26	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	204	R	78.75	AH-Q24	0.35	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.30	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.67	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					12.12	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					98.48	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.93	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.62	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.72	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.00	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					10.88	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					11.28	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					8.54	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.52	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					9.18	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					37.00	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.99	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					42.13	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					127.48	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					178.14	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					24.73	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					28.46	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	291	R	104.96	AI-Q1	8.08	AI1.1	/	AI1.5				
AI1.2	Working space	m2	567	R	34.24	AI-Q2	0.51	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	110	R	80.44	AI-Q3	2.65	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	284	R	74.11	AI-Q4	0.13	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	36	R	2,127.35	AI-Q5	2.77	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	1,095.20	AI-Q6	0.13	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	66	R	-									
AI1.8	Wood float	m2	275	R	11.07									
AI1.9	Formwork bases	m2	131	R	176.11	AI-Q7	0.27	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	149	R	165.79	AI-Q8	0.09	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	12.41	R	13,259.24	AI-Q9	5.32	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	1,748	R	33.52	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.83	R	7,996.42	AI-Q11	43.37	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					3.07	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.30	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					28.71	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.94	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					192.17	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.08	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.61	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					395.56	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.27	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	423	R	88.35	AJ-Q1	5.96	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	459	R	38.69	AJ-Q2	0.92	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	108	R	81.77	AJ-Q3	3.92	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	219	R	72.60	AJ-Q4	0.32	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	71	R	1,289.57	AJ-Q5	1.87	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	24	R	1,832.77	AJ-Q6	2.96	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	38	R	1,338.08									
AJ1.8	Total concrete	m3	153	R	-									
AJ1.9	Wood float	m2	368	R	13.64	AJ-Q7	0.42	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	170	R	179.53	AJ-Q8	0.42	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	219	R	171.21	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	14.02	R	13,584.09	AJ-Q10	10.91	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	2,680	R	32.05	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,480	R	37.17	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.56	R	12,775.51	AJ-Q13	45.51	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.28	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.08	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					17.76	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					94.54	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.18	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					10.70	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					423.84	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					365.46	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.10	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	392	R	69.44	AK-Q1	2.29	AK1.1	/	AK1.5				
AK1.2	Working space	m2	806	R	39.17	AK-Q2	0.49	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	248	R	135.84	AK-Q3	1.58	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	302	R	68.84	AK-Q4	0.57	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	171	R	1,150.17	AK-Q5	19.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	1,331.28									
AK1.7	Concrete plinth	m3	57	R	1,777.68	AK-Q6	3.00	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	207	R	-									
AK1.9	Wood float	m2	406	R	11.11	AK-Q7	0.42	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	523	R	286.89	AK-Q8	0.33	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	104	R	128.66	AK-Q9	0.55	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	26	R	179.27	AK-Q10	0.35	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	31.85	R	12,804.87	AK-Q11	6.50	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,894	R	42.47	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.28	R	7,565.14	AK-Q13	90.79	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.77	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.51	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					16.71	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					103.53	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					4.01	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					13.82	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.43	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					301.50	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.15	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	489	R	106.49	AL-Q1	5.89	AL1.1	/	AL1.5				
AL1.2	Working space	m2	880	R	26.36	AL-Q2	0.56	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	150	R	87.44	AL-Q3	3.26	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	305	R	67.20	AL-Q4	0.27	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	83	R	1,859.82	AL-Q5	0.82	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	101	R	1,328.22	AL-Q6	1.71	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	59	R	1,964.07	AL-Q7	1.41	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	275	R	-									
AL1.9	Wood float	m2	256	R	9.31	AL-Q8	0.32	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	407	R	275.32	AL-Q9	0.20	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	708	R	194.25	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	194	R	154.36	AL-Q11	0.30	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	66	R	250.59	AL-Q12	0.89	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	243.09	AL-Q13	10.10	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	40.00	R	9,044.10	AL-Q14	6.88	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	10,253	R	39.81	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	129	R	44.38	AL-Q16	2.13	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.81	R	10,639.12	AL-Q17	339.51	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.06	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					4.04	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.22	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					27.68	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					199.77	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.40	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.40	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.76	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					12.72	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.84	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					7.84	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					12.72	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					8.08	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					227.18	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					203.79	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.17	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	690	R	67.06	AM-Q1	2.94	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,513	R	65.63	AM-Q2	0.46	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	797	R	63.72	AM-Q3	0.87	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	338	R	68.84	AM-Q4	0.70	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	235	R	1,778.36									
AM1.6	Concrete column	m3	160	R	2,012.19	AM-Q5	1.47	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	141	R	1,274.13	AM-Q6	1.13	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	225	R	1,290.34	AM-Q7	1.04	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	34	R	2,083.59	AM-Q8	4.71	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	103	R	1,443.85	AM-Q9	1.55	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	756	R	-									
AM1.12	Wood float	m2	1,836	R	6.09	AM-Q10	0.41	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	510	R	175.91	AM-Q11	0.46	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	639	R	333.79	AM-Q12	0.25	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	494	R	147.60	AM-Q13	0.29	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	178	R	256.73	AM-Q14	0.79	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	484	R	267.86	AM-Q15	0.46	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	387.15	AM-Q16	32.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	379	R	247.98	AM-Q17	0.09	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	65.62	R	8,452.29	AM-Q18	11.52	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,576	R	57.14	AM-Q19	0.21	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,238	R	45.36	AM-Q20	0.23	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	25	R	1,242.13	AM-Q21	2.62	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.79	R	7,949.18	AM-Q22	956.96	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.02	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.05	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					25.83	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.88	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.40	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.38	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.85	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.23	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					292.01	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					10.11	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					8.63	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.96	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.03	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.29	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.39	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.40	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					147.92	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					186.34	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					6.80	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.22	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,511	R	47.78	AN-Q1	1.57	AN1.1	/	AN1.5				
AN1.2	Working space	m2	195	R	41.13	AN-Q2	12.88	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	428	R	96.20	AN-Q3	5.87	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,235	R	68.64	AN-Q4	1.30	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,601	R	2,134.64	AN-Q5								
AN1.6	Concrete column	m3	79	R	961.52	AN-Q6	20.27	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	43	R	1,277.59	AN-Q7	1.84	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	106	R	1,304.43	AN-Q8	15.10	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	1,511.74	AN-Q9	19.75	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,568	R	-				/					
AN1.11	Wood float	m2	2,139	R	12.29	AN-Q10	0.75	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	202	R	179.80	AN-Q11	7.93	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	332	R	210.92	AN-Q12	0.24	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	167	R	214.81	AN-Q13	0.26	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	50	R	233.20	AN-Q14	0.86	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	27	R	236.17	AN-Q15	0.15	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	5	R	631.39	AN-Q16	320.20	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	960	R	134.07	AN-Q17	0.11	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	321.27	R	8,502.52	AN-Q18	4.88	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	9,577	R	37.07	AN-Q19	0.16	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,508	R	63.41	AN-Q20	0.21	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	95	R	1,385.02	AN-Q21	16.51	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.45	R	11,556.98	AN-Q22	653.47	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.02	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.16	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.50	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					31.10	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					173.69	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					11.87	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.95	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.48	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.56	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.02	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					6.40	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					9.73	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					229.36	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					134.09	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.18	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.14	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	223	R	78.57	AO-Q1	1.73	AO1.1	/	AO1.5				
AO1.2	Working space	m2	801	R	37.77	AO-Q2	0.28	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	64	R	108.46	AO-Q3	3.48	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	28	R	73.59	AO-Q4	4.61	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	129	R	1,463.47									
AO1.6	Concrete column	m3	22	R	1,277.59	AO-Q5	5.86	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	14	R	1,859.82	AO-Q6	1.57	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	1,328.22	AO-Q7	32.25	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,964.07	AO-Q8	22.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	35	R	-									
AO1.11	Wood float	m2	40	R	11.84	AO-Q9	3.23	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	89	R	170.66	AO-Q10	1.45	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	106	R	279.73	AO-Q11	0.21	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	46	R	214.81	AO-Q12	0.30	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	390.70	AO-Q13	0.70	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	175.99	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	69	R	424.05	AO-Q15	1.87	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	201.57	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.71	R	8,479.52	AO-Q17	7.43	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,921	R	62.10	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,138	R	32.05	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	1,355.02	AO-Q20	3.50	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.13	R	7,806.82	AO-Q21	41.21	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.08	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.72	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					19.89	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					123.60	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					8.58	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.66	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.76	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.57	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.39	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					11.16	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					6.59	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					136.55	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					264.57	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.19	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.26	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,049	R	69.54	AP-Q1	1.40	AP1.1	/	AP1.5				
AP1.2	Working space	m2	450	R	43.53	AP-Q2	2.33	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	910	R	84.80	AP-Q3	1.15	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	195	R	65.64	AP-Q4	3.83	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	747	R	1,290.34	AP-Q5	0.31	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,413	R	220.99									
AP1.7	Rough formwork	m2	163	R	129.20	AP-Q6	4.58	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,192	R	190.29	AP-Q7	0.63	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,014	R	11.58	AP-Q8	0.25	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	227	R	98.00	AP-Q9	3.29	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	32	R	83.10	AP-Q10	23.34	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	287	R	56.18	AP-Q11	2.60	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.05	R	10,643.19	AP-Q12	711.43	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,351	R	243.29	AP-Q13	0.55	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,802	R	-	AP-Q14	3.75	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,368	R	138.94	AP-Q15	2.05	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,342	R	250.75	AP-Q16	2.09	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,088	R	111.56	AP-Q17	0.69	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	5	R	1,597.29	AP-Q18	560.40	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,620	R	328.84	AP-Q19	1.07	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,979	R	278.77	AP-Q20	0.70	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	68.87	R	8,659.37	AP-Q21	10.85	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	42,481.42									
AP1.24	Structural steel	Item	1	R	110,001.30									
AP1.25	Plumbing and drainage	Item	1	R	70,042.11									
AP1.26	Small power and lighting	Item	1	R	596,709.58									
AP1.27	External works	Item	1	R	257,846.30									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.60	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.82	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.66	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					39.18	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					9.99	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					6.78	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					111.43	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					13.17	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					15.53	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					154.14	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.12	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					9.29	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					34.53	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.18	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.74	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					0.87	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.91	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.70	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.09	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					68.91	AP1.26	/	AP1.22
	External works / concrete					AP-R23					199.83	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	77	R	1,274.13	AQ-Q1	1.97	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	152	R	249.97									
AQ1.3	Reinforcement	t	10.94	R	8,479.52	AQ-Q2	7.04	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	625	R	143.12	AQ-Q3	0.12	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	248	R	224.36	AQ-Q4	0.31	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	115	R	225.05	AQ-Q5	5.73	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,050	R	149.01	AQ-Q6	0.63	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	37.51	R	31,094.73	AQ-Q7	17.57	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	624	R	108.05	AQ-Q8	1.06	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	11,611.39	AQ-Q9	329.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	50	R	1,846.70	AQ-Q10	13.18	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	543	R	84.26	AQ-Q11	1.21	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	659	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.10	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					8.90	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.68	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.66	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					208.68	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.73	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.37	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					12.39	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.77	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	101	R	160.88	AR-Q1	2.46	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	41	R	1,399.37	AR-Q2	8.91	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.60	R	12,330.56									
AR1.4	Mesh	m2	445	R	140.87	AR-Q3	0.09	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	102	R	185.51	AR-Q4	0.40	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	102	R	408.99	AR-Q5	3.68	AR1.15	/	AR1.6				
AR1.7	Screed	m2	412	R	35.53	AR-Q6	0.91	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	31	R	25,378.18	AR-Q7	12.10	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	3,043.09	AR-Q8	2.82	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	37	R	1,252.89	AR-Q9	0.84	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	38	R	386.57	AR-Q10	0.82	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	705	R	161.38	AR-Q11	0.53	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	66	R	143.26	AR-Q12	5.68	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	27	R	2,133.18	AR-Q13	1.15	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	375	R	-									
	Earthworks / concrete					AR-R1					0.11	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.11	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.93	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.54	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.42	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					39.39	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.34	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					20.26	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.24	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					157.26	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.89	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					11.90	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	310	R	170.05	AS-Q1	5.54	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	129	R	65.64	AS-Q2	0.43	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	56	R	1,902.37	AS-Q3	4.96	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	11.30	R	8,310.13									
AS1.5	Mesh	m2	85	R	141.33	AS-Q4	0.66	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	159	R	173.38	AS-Q5	0.35	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	164	R	12.63	AS-Q6	0.34	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	23	R	122.00	AS-Q7	2.43	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	619	R	40.54	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.26	R	6,582.08	AS-Q9	44.44	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	20	R	243.85	AS-Q10	0.35	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	3,869.50	AS-Q11	3.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	55	R	523.07	AS-Q12	2.15	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	496	R	51.63	AS-Q13	0.11	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.05	R	44,741.93	AS-Q14	3.41	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.86	R	22,408.11	AS-Q15	137.21	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	118	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					11.19	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					28.98	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					58.80	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					10.97	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					150.62	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					15.59	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					204.99	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.64	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.29	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.19	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.37	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	301	R	121.86	AU-Q1	0.82	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	188	R	70.53	AU-Q2	1.95	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	367	R	1,511.74									
AU1.4	Reinforcement	t	37.51	R	11,835.19	AU-Q3	9.78	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,456	R	170.66	AU-Q4	0.25	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	134	R	124.99	AU-Q5	2.74	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,372	R	62.10	AU-Q6	0.15	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	582	R	32.05	AU-Q7	0.63	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	52	R	181.19	AU-Q8	7.06	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.35	R	33,290.58	AU-Q9	156.17	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	11	R	3,697.47	AU-Q10	33.36	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	14	R	363.61	AU-Q11	14.71	AU1.12	/	AU1.13				
AU1.13	Total area	m2	206	R	-									
	Concrete / earthworks					AU-R1					12.41	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					21.43	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					8.86	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.13	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					12.09	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					190.58	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.36	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					369.27	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					65.32	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.41	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.16	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	844	R	236.70	AW-Q1	6.59	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	72	R	68.42	AW-Q2	1.78	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	128	R	1,331.28	AW-Q3	10.05	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	12.74	R	10,060.85									
AW1.5	Mesh	m2	51	R	136.28	AW-Q4	2.51	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	357	R	218.99	AW-Q5	0.36	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,441	R	41.56	AW-Q6	0.04	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.22	R	33,183.70	AW-Q7	20.72	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	46	R	-									
	Concrete / earthworks					AW-R1					5.62	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					19.46	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					73.82	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					6.08	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					242.08	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.30	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	31	R	-									
BA1.2	Steel	t	2.36	R	25,082.80	BA-Q1	13.14	BA1.1	/	BA1.2				
BA1.3	Handrail	m	24	R	1,312.43	BA-Q2	1.29	BA1.1	/	BA1.3				
BA1.4	Grating	m2	12	R	1,771.88	BA-Q3	2.58	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	19	R	530.66	BA-Q4	1.63	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	350.82	BA-Q5	6.20	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					19.11	BA1.2	/	BA1.3
	Steel / grating					BA-R2					14.16	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					47.27	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					71.50	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,159	R	-									
BB1.2	Steel	t	64.97	R	36,029.71	BB-Q1	17.84	BB1.1	/	BB1.2				
BB1.3	Handrail	m	68	R	993.28	BB-Q2	17.04	BB1.1	/	BB1.3				
BB1.4	Grating	m2	94	R	1,661.04	BB-Q3	12.33	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	86	R	368.99	BB-Q4	13.48	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	3,261.39	BB-Q5	89.15	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					36.27	BB1.2	/	BB1.3
	Steel / grating					BB-R2					21.69	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					97.64	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.05	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	18,513	R	-									
BC1.2	Steel	t	157.00	R	26,920.15	BC-Q1	117.92	BC1.1	/	BC1.2				
BC1.3	Handrail	m	439	R	1,004.51	BC-Q2	42.17	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,007	R	2,043.79	BC-Q3	3.70	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	358	R	336.41	BC-Q4	51.71	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	88	R	367.74	BC-Q5	210.38	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	80	R	3,752.99	BC-Q6	231.41	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					26.80	BC1.2	/	BC1.3
	Steel / grating					BC-R2					13.17	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					80.02	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					73.20	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.17	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	502	R	-									
BD1.2	Steel	t	25.69	R	38,855.64	BD-Q1	19.54	BD1.1	/	BD1.2				
BD1.3	Handrail	m	8	R	1,051.48	BD-Q2	62.75	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	2,298.93	BD-Q3	71.71	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	526.83	BD-Q4	41.83	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	32	R	4,477.93	BD-Q5	15.69	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					36.95	BD1.1	/	BD1.2
	Steel / grating					BD-R2					16.90	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					73.75	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					8.68	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	50	R	-									
BE1.2	Steel	t	3.55	R	36,258.04	BE-Q1	14.08	BE1.1	/	BE1.2				
BE1.3	Handrail	m	48	R	1,349.84	BE-Q2	1.04	BE1.1	/	BE1.3				
BE1.4	Grating	m2	20	R	1,809.01	BE-Q3	2.50	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	37	R	395.80	BE-Q4	1.35	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	11	R	483.51	BE-Q5	4.55	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					26.86	BE1.2	/	BE1.3
	Steel / grating					BE-R2					20.04	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					91.61	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					74.99	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	285	R	-									
BF1.2	Steel	t	36.92	R	25,511.89	BF-Q1	7.72	BF1.1	/	BF1.2				
BF1.3	Handrail	m	20	R	1,349.84	BF-Q2	14.25	BF1.1	/	BF1.3				
BF1.4	Grating	m2	36	R	1,651.57	BF-Q3	7.92	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	18	R	486.93	BF-Q4	15.83	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	13	R	3,489.59	BF-Q5	21.92	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					18.90	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.45	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					52.39	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.31	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	12,647	R	-	C-Q1	0.24	C1.1	/	C1.2				
C1.2	Total work units	WU	53,526	R	369.23									
C1.3	Pipe supports	kg	8,779	R	-	C-Q2	1.44	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,295	R	-	C-Q3	0.21	C1.4	/	C1.2				
C1.5	Number of welds	No	14,183	R	-	C-Q4	1.12	C1.5	/	C1.1				
C1.6	Total fittings	No	6,102	R	-	C-Q5	0.48	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,406	R	-	C-Q6	0.23	C1.7	/	C1.6				
C1.8	Support number	No	1,327	R	-	C-Q7	0.15	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	53,526	R	369.23	DA-Q1	58.31	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	918	R	67.03									
	Average cost per examination / WU					DA-R1					5.51	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	53,526	R	369.23	DB-Q1	112.45	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	476	R	132.85									
	Average cost per examination / WU					DB-R1					2.78	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	53,526	R	369.23	DC-Q1	191.85	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	279	R	205.24									
	Average cost per examination / WU					DC-R1					1.80	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	53,526	R	369.23	DD-Q1	32.44	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,650	R	84.21									
	Average cost per examination / WU					DD-R1					4.38	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	53,526	R	369.23	DE-Q1	134.83	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	397	R	107.81									
	Average cost per examination / WU					DE-R1					3.42	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	53,526	R	369.23	E-Q1	160.81	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	332.86	R	569.42	E-Q2	184.97	E1.1	/	E1.3				
E1.3	Structural steel	t	289.38	R	31,056.15									
	WU cost / install mechanical weight - receive					E-R1					0.65	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					54.54	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	53,526	R	369.23									
F1.2	Painting to piping	m2	3,679	R	148.92	F-Q1	14.55	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	910	R	694.70	F-Q2	58.82	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	220.73	R	481.53									
F1.5	Painting to mechanical equipment	m2	1,278	R	177.26	F-Q3	0.17	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	366	R	784.05	F-Q4	0.60	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.21	F1.2	/	F1.3
	Work unit / paint					F-R2					2.48	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.53	F1.1	/	F1.3
	Install plant / paint					F-R4					2.72	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.61	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	28,361	R	65.19									
G1.2	Electrical cable terminations	No	1,707	R	260.64	G-Q1	16.61	G1.1	/	G1.2				
G1.3	Electrical equipment	No	135	R	660.78	G-Q2	210.08	G1.1	/	G1.3				
G1.4	DB's	No	12	R	2,349.45	G-Q3	11.25	G1.3	/	G1.4				
G1.5	Rack	m	5,535	R	190.79	G-Q4	5.12	G1.1	/	G1.5				
G1.6	Support steel	kg	6,564	R	36.15	G-Q5	0.84	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	26,137	R	24.67	G-Q6	1.09	G1.1	/	G1.7				
G1.8	Instruments	No	885	R	303.07	G-Q7	29.53	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,716	R	109.70	G-Q8	0.52	G1.8	/	G1.9				
G1.10	Light fittings	No	566	R	392.74	G-Q9	4.19	G1.10	/	G1.3				
G1.11	Conduit	m	2,300	R	33.98	G-Q10	12.33	G1.1	/	G1.11				
G1.12	Instrument stands	No	205	R	1,514.63	G-Q11	4.32	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.25	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.28	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.92	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.80	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.34	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.17	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.22	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,781	R	71.94	AB-Q1	2.20	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,534	R	14.67									
AB1.3	Back fill and compact	m3	6,733	R	80.19	AB-Q2	1.16	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,510	R	4.23	AB-Q3	2.22	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,964	R	8.13	AB-Q4	1.96	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.90	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.90	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					17.01	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.85	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	413,413.17									
AC1.2	EO for raking equipment	Item	1	R	51,574.76									
AC1.3	Number of piles	No	267	R	-									
AC1.4	Move rig to new position	No	158	R	289.09	AC-Q1	1.69	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	20.54	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	23	R	723.20	AC-Q3	0.57	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	94	R	210.52	AC-Q4	0.14	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	7,819	R	419.30	AC-Q5	0.03	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	387	R	297.83	AC-Q6	0.69	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	107	R	741.45	AC-Q7	2.50	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	182	R	504.76	AC-Q8	1.47	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	873	R	974.83	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	60	R	684.35	AC-Q10	0.22	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.62	R	11,138.42	AC-Q11	14.34	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	236.26	R	12,631.00	AC-Q12	1.13	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,516	R	2,915.16	AC-Q13	0.11	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	193	R	2,009.38	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	256,357.76		1.00		/					
AC1.19	Load test to pile	No	2	R	42,760.45	AC-Q15	133.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	102,270.31	AC-Q16	267.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	315	R	726.47	AC-Q17	0.85	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					141.81	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					17.69	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.10	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.25	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.50	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.10	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.25	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.17	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.33	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.23	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.88	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					4.33	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					0.69	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.94	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					14.67	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					35.08	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.25	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	132	R	127.46	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	906	R	137.69									
AD1.3	Kerbing	m	276	R	186.27	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,639	R	-									
AD1.5	Remove top soil	m3	740	R	53.56	AD-Q3	0.52	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,413	R	138.86	AD-Q4	0.16	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,550	R	12.03									
AD1.8	Reduce levels	m3	1,020	R	40.25	AD-Q5	0.22	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	681	R	82.08	AD-Q6	1.50	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	453	R	363.21	AD-Q7	1.50	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	341	R	225.20	AD-Q8	2.99	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,107	R	32.47	AD-Q9	4.65	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	273	R	17.07	AD-Q10	0.67	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	276	R	7.99	AD-Q11	0.99	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	256	R	796.48	AD-Q12	1.00	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	59	R	342.23	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	339.19	AD-Q14	0.21	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	401.14	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	412	R	5.81	AD-Q16	1.49	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.45	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.35	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.49	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.23	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.18	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.69	AD1.6	/	AD1.9

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	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.28	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.51	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.09	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.84	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.82	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.15	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	270	R	1,665.69	AE-Q1	4.74	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	57	R	2,924.48	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	280	R	-									
AE1.4	Rip and compact	m2	1,882	R	7.90									
AE1.5	Formwork to plinth	m2	397	R	222.55	AE-Q3	6.96	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	288	R	330.91	AE-Q4	1.07	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.04	R	11,404.58	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,093	R	289.44	AE-Q6	765.59	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	647	R	61.58	AE-Q7	2.40	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	536	R	119.32	AE-Q8	1.99	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.57	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					210.85	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.08	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.20	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					39.40	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,690	R	-	AF-Q1	12.12	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	387	R	71.36	AF-Q2	1.04	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	373	R	177.92	AF-Q3	0.97	AF1.2	/	AF1.4				
AF1.4	Working space	m2	401	R	39.66	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	149	R	1,792.83	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	239	R	88.07	AF-Q6	0.67	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	2,552.65	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	1,752.27	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	161	R	-	AF-Q9	0.49	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	330	R	15.19									
AF1.11	Formwork to bases	m2	258	R	234.60	AF-Q10	1.73	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	157	R	267.78	AF-Q11	8.26	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	313.71	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.74	R	10,971.77	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	25.22	R	14,553.75	AF-Q14	6.38	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	262	R	55.76	AF-Q15	0.57	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	35	R	304.86	AF-Q16	0.54	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	9,015.62	AF-Q17	0.12	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	68	R	690.42									
	Base excavation / backfill					AF-R1					0.40	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.80	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.12	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.36	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					35.77	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.98	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					118.03	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.18	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.75	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					32.15	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.37	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.60	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.08	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	281	R	105.43	AG-Q1	1.73	AG1.1	/	AG1.4				
AG1.2	Working space	m2	635	R	92.44	AG-Q2	0.44	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	84	R	78.18	AG-Q3	3.35	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	162	R	1,882.15	AG-Q4	0.71	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	102	R	1,963.73	AG-Q5	1.59	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	223	R	-									
AG1.7	Wood float	m2	221	R	11.52	AG-Q6	0.46	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	228	R	69.51	AG-Q7	0.71	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	271	R	230.35	AG-Q8	0.60	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	144	R	219.38	AG-Q9	0.71	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	30.53	R	19,533.39	AG-Q10	7.30	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,405	R	49.74	AG-Q11	0.09	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,748	R	59.60	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.17	R	10,836.89	AG-Q13	47.00	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.06	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.88	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.74	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.12	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.11	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					10.38	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.76	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	292	R	93.32	AH-Q1	4.00	AH1.1	/	AH1.4				
AH1.2	Working space	m2	76	R	59.63	AH-Q2	3.84	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	318	R	191.35	AH-Q3	0.92	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	73	R	2,996.13	AH-Q4	1.52	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	17	R	1,343.66	AH-Q5	4.29	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	93	R	1,793.21	AH-Q6	0.78	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	1,543.33	AH-Q7	5.62	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	1,786.35	AH-Q8	18.25	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	273	R	-									
AH1.10	Blinding	m2	48	R	123.66	AH-Q9	5.69	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	704	R	11.95	AH-Q10	0.39	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	138	R	260.63	AH-Q11	0.53	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	51	R	386.35	AH-Q12	0.25	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	26	R	341.88	AH-Q13	0.15	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	190	R	419.30	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	25	R	221.43	AH-Q15	3.72	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	45	R	126.65	AH-Q16	2.07	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.02	R	10,567.46	AH-Q17	0.23	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.81	R	16,488.98	AH-Q18	30.99	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	926	R	248.51	AH-Q19	0.10	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	621	R	69.83	AH-Q20	0.44	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,840	R	58.41	AH-Q21	0.15	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.86	R	12,140.28	AH-Q22	317.44	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	259	R	74.81	AH-Q23	0.36	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	209	R	158.81	AH-Q24	0.44	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.56	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.49	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					24.23	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					250.72	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					2.23	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.67	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.94	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.68	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.50	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					3.99	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.23	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					3.20	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.10	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					14.16	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.64	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					66.35	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					236.13	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					282.30	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.25	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					23.97	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					11.29	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	339	R	134.18	AI-Q1	3.94	AI1.1	/	AI1.5				
AI1.2	Working space	m2	616	R	50.25	AI-Q2	0.55	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	120	R	110.18	AI-Q3	2.83	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	200	R	144.03	AI-Q4	0.43	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	86	R	1,349.29	AI-Q5	6.62	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	1,792.83	AI-Q6	0.27	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	78	R	-									
AI1.8	Wood float	m2	320	R	16.24									
AI1.9	Formwork bases	m2	153	R	225.14	AI-Q7	0.56	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	147	R	222.33	AI-Q8	0.09	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.54	R	15,649.88	AI-Q9	8.18	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,309	R	59.85	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.12	R	12,437.72	AI-Q11	76.79	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.10	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.67	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.22	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					9.37	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.75	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					83.08	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					5.99	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					8.06	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					261.49	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.11	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	306	R	105.43	AJ-Q1	3.92	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	676	R	50.68	AJ-Q2	0.45	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	183	R	145.54	AJ-Q3	1.67	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	215	R	98.74	AJ-Q4	0.36	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	78	R	1,772.78	AJ-Q5	2.36	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	37	R	2,519.52	AJ-Q6	2.11	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	33	R	1,716.83									
AJ1.8	Total concrete	m3	132	R	-									
AJ1.9	Wood float	m2	282	R	11.36	AJ-Q7	0.47	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	186	R	225.14	AJ-Q8	0.42	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	230	R	332.92	AJ-Q9	0.16	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	17.19	R	15,185.24	AJ-Q10	7.68	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	2,484	R	60.86	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,695	R	78.55	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.13	R	10,691.05	AJ-Q13	69.03	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.06	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.08	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.72	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					17.95	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					156.05	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.87	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					7.57	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					249.51	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					193.32	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	427	R	87.08	AK-Q1	1.67	AK1.1	/	AK1.5				
AK1.2	Working space	m2	847	R	76.16	AK-Q2	0.50	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	304	R	151.85	AK-Q3	1.40	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	352	R	140.58	AK-Q4	0.72	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	255	R	1,411.09	AK-Q5	31.88	AK1.5		AK1.6				
AK1.6	Concrete column	m3	8	R	1,874.96									
AK1.7	Concrete plinth	m3	50	R	1,787.98	AK-Q6	5.10	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	363	R	-									
AK1.9	Wood float	m2	297	R	17.33	AK-Q7	0.86	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	609	R	217.01	AK-Q8	0.42	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	113	R	308.42	AK-Q9	0.44	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	29	R	251.57	AK-Q10	0.28	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	37.08	R	16,771.06	AK-Q11	9.79	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,404	R	59.60	AK-Q12	0.06	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.48	R	10,362.24	AK-Q13	146.37	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.57	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					10.04	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					81.42	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					6.50	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.80	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.45	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					281.39	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.14	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	463	R	63.85	AL-Q1	2.66	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,415	R	54.00	AL-Q2	0.33	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	268	R	149.10	AL-Q3	1.73	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	216	R	148.12	AL-Q4	0.81	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	174	R	1,203.50	AL-Q5	1.46	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	119	R	1,843.81	AL-Q6	1.89	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	63	R	1,869.88	AL-Q7	2.76	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	292	R	-									
AL1.9	Wood float	m2	422	R	18.61	AL-Q8	0.41	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	385	R	219.67	AL-Q9	0.45	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,224	R	183.75	AL-Q10	0.10	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	118	R	289.03	AL-Q11	0.53	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	78	R	312.52	AL-Q12	0.81	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	378.78	AL-Q13	11.90	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	33.83	R	16,149.84	AL-Q14	8.63	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,777	R	46.95	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	219	R	61.00	AL-Q16	1.33	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.83	R	16,303.06	AL-Q17	351.81	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.18	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.43	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					8.13	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					64.67	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.65	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.65	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					5.48	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.47	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					10.03	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.98	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.47	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.94	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					343.98	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					264.75	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.07	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,179	R	84.55	AM-Q1	2.90	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,442	R	81.59	AM-Q2	0.48	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	712	R	169.82	AM-Q3	1.66	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	456	R	91.33	AM-Q4	0.89	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	407	R	2,519.52									
AM1.6	Concrete column	m3	140	R	2,126.83	AM-Q5	2.91	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	168	R	2,046.26	AM-Q6	0.83	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	190	R	2,243.66	AM-Q7	2.14	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	82	R	2,864.33	AM-Q8	1.71	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	112	R	1,787.98	AM-Q9	1.25	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,312	R	-									
AM1.12	Wood float	m2	1,160	R	8.21	AM-Q10	1.13	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	673	R	220.26	AM-Q11	0.60	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,087	R	428.27	AM-Q12	0.13	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	403	R	202.91	AM-Q13	0.42	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	179	R	329.40	AM-Q14	0.94	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	532	R	343.68	AM-Q15	0.36	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	7	R	710.02	AM-Q16	20.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	392	R	261.83	AM-Q17	0.21	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	104.66	R	13,499.95	AM-Q18	12.54	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,555	R	44.90	AM-Q19	0.24	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,067	R	58.88	AM-Q20	0.63	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	44	R	1,254.09	AM-Q21	2.38	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.06	R	12,140.28	AM-Q22	1237.74	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.03	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.04	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.50	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					27.59	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.18	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.23	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.12	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.88	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.41	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					306.88	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					11.44	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					10.08	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					6.21	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.97	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.88	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.20	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					10.94	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					300.67	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					229.28	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.76	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.21	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,642	R	88.78	AN-Q1	1.72	AN1.1	/	AN1.5				
AN1.2	Working space	m2	251	R	51.05	AN-Q2	10.53	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	713	R	168.29	AN-Q3	3.71	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	2,018	R	123.66	AN-Q4	0.76	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,533	R	1,877.72	AN-Q5								
AN1.6	Concrete column	m3	51	R	1,987.18	AN-Q6	30.06	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	36	R	1,787.98	AN-Q7	1.42	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	202	R	1,877.72	AN-Q8	7.59	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	3,007.00	AN-Q9	12.75	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,988	R	-				/					
AN1.11	Wood float	m2	2,822	R	10.79	AN-Q10	0.54	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	171	R	225.14	AN-Q11	8.96	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	348	R	288.91	AN-Q12	0.15	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	168	R	316.58	AN-Q13	0.21	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	71	R	510.80	AN-Q14	0.51	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	30	R	316.71	AN-Q15	0.13	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	745.23	AN-Q16	383.25	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,305	R	239.40	AN-Q17	0.15	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	482.97	R	13,224.91	AN-Q18	4.12	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	17,791	R	83.64	AN-Q19	0.11	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	5,427	R	40.12	AN-Q20	0.37	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	94	R	1,955.55	AN-Q21	21.15	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.04	R	10,666.45	AN-Q22	751.47	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.74	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.53	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					15.18	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					174.02	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					8.34	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.65	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					3.50	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.88	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.40	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					9.49	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.84	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					158.12	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					329.63	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.18	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.76	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	216	R	156.28	AO-Q1	1.53	AO1.1	/	AO1.5				
AO1.2	Working space	m2	741	R	36.11	AO-Q2	0.29	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	119	R	119.77	AO-Q3	1.82	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	45	R	101.16	AO-Q4	3.13	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	141	R	1,877.72									
AO1.6	Concrete column	m3	35	R	2,343.05	AO-Q5	4.03	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	1,963.73	AO-Q6	3.18	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	2,121.42	AO-Q7	28.20	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,543.33	AO-Q8	35.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	38	R	-									
AO1.11	Wood float	m2	34	R	11.95	AO-Q9	4.15	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	119	R	260.63	AO-Q10	1.18	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	138	R	428.27	AO-Q11	0.25	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	51	R	419.15	AO-Q12	0.22	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	22	R	282.48	AO-Q13	0.50	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	326.96	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	51	R	526.26	AO-Q15	2.76	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	22	R	352.60	AO-Q16	0.23	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	8.07	R	15,275.62	AO-Q17	4.71	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,079	R	54.62	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,921	R	66.24	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	1,896.34	AO-Q20	3.45	AO1.10	/	AO1.22				
AO1.23	Grout	m3	5.18	R	11,237.86	AO-Q21	27.22	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.08	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					4.33	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.30	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					18.56	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					157.13	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					7.20	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					4.69	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.95	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					5.47	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.73	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					4.72	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					6.02	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					279.67	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					230.61	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					8.06	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,247	R	87.08	AP-Q1	1.69	AP1.1	/	AP1.5				
AP1.2	Working space	m2	522	R	59.63	AP-Q2	2.39	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	965	R	124.96	AP-Q3	1.29	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	252	R	143.77	AP-Q4	2.92	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	736	R	1,730.39	AP-Q5	0.40	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,855	R	260.83									
AP1.7	Rough formwork	m2	308	R	230.69	AP-Q6	2.39	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,614	R	295.99	AP-Q7	0.46	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,995	R	26.14	AP-Q8	0.15	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	116	R	62.00	AP-Q9	6.34	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	51	R	117.33	AP-Q10	14.43	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	362	R	51.85	AP-Q11	2.03	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.22	R	16,676.06	AP-Q12	603.28	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,561	R	296.90	AP-Q13	0.47	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,538	R	-	AP-Q14	4.81	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,540	R	276.36	AP-Q15	2.30	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,043	R	239.75	AP-Q16	1.73	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,425	R	123.20	AP-Q17	1.03	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	10	R	2,195.81	AP-Q18	353.80	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,051	R	452.06	AP-Q19	1.16	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,632	R	383.23	AP-Q20	0.76	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	83.20	R	12,496.46	AP-Q21	8.85	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	57,002.84									
AP1.24	Structural steel	Item	1	R	147,603.04									
AP1.25	Plumbing and drainage	Item	1	R	93,984.60									
AP1.26	Small power and lighting	Item	1	R	800,682.80									
AP1.27	External works	Item	1	R	345,985.90									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.46	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.70	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					12.04	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					47.91	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.50	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.85	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					66.20	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					27.91	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					14.75	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					241.01	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.10	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					6.26	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					52.12	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.41	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.14	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.66	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					0.77	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.56	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					11.81	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.52	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					64.07	AP1.26	/	AP1.22
	External works / concrete					AP-R23					199.95	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	83	R	2,700.02	AQ-Q1	2.84	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	236	R	305.51									
AQ1.3	Reinforcement	t	9.78	R	11,949.12	AQ-Q2	8.49	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	846	R	215.14	AQ-Q3	0.10	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	165	R	386.35	AQ-Q4	0.50	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	127	R	464.85	AQ-Q5	5.45	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	898	R	191.19	AQ-Q6	0.77	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	48.52	R	39,896.34	AQ-Q7	14.26	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	809	R	282.48	AQ-Q8	0.86	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	26,427.66	AQ-Q9	230.67	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	31	R	1,421.02	AQ-Q10	22.32	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	855	R	103.25	AQ-Q11	0.81	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	692	R	-									
	Concrete / reinforcement					AQ-R1					0.23	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					8.84	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					12.55	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.99	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.81	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					208.67	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.48	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.66	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.43	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.85	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	176	R	220.36	AR-Q1	3.59	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	49	R	1,752.27	AR-Q2	8.73	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.61	R	15,880.82									
AR1.4	Mesh	m2	749	R	318.92	AR-Q3	0.07	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	113	R	241.26	AR-Q4	0.43	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	76	R	355.28	AR-Q5	9.42	AR1.15	/	AR1.6				
AR1.7	Screed	m2	437	R	74.30	AR-Q6	1.64	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	36.39	R	32,660.50	AR-Q7	19.68	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	14	R	6,038.11	AR-Q8	2.60	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	70	R	1,644.94	AR-Q9	0.52	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	43	R	504.09	AR-Q10	0.85	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	705	R	288.55	AR-Q11	1.02	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	99	R	146.84	AR-Q12	7.23	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	35	R	2,163.86	AR-Q13	1.04	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	716	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.11	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					5.49	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.26	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.93	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					23.58	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					5.41	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					19.86	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.26	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					113.19	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.51	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					15.09	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	271	R	218.18	AS-Q1	3.08	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	140	R	105.41	AS-Q2	0.63	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	88	R	2,440.85	AS-Q3	11.30	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	7.79	R	11,423.98									
AS1.5	Mesh	m2	147	R	181.33	AS-Q4	0.60	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	224	R	222.46	AS-Q5	0.39	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	129	R	16.20	AS-Q6	0.68	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	32	R	167.71	AS-Q7	2.75	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	754	R	52.01	AS-Q8	0.12	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.64	R	9,010.66	AS-Q9	137.50	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	33	R	312.94	AS-Q10	0.27	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	4,756.68	AS-Q11	3.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	47	R	504.35	AS-Q12	2.98	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	428	R	57.14	AS-Q13	0.21	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.79	R	52,107.24	AS-Q14	5.03	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.30	R	46,843.21	AS-Q15	107.69	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	140	R	-									
AS1.18	Total control room area	m2	9	R	-									
	Concrete / earthworks					AS-R1					11.19	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					23.16	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					63.00	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					10.97	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					150.67	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					14.55	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					219.65	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					4.84	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.27	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.22	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.24	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.07	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	160	R	228.18	AT-Q1	12.31	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	16	R	88.07	AT-Q2	0.81	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	13	R	2,635.45	AT-Q3	7.43	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.75	R	17,791.64									
AT1.5	Formwork	m2	205	R	198.29	AT-Q4	0.06	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	29	R	16.06	AT-Q5	0.45	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	40	R	149.10	AT-Q6	0.33	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.32	R	57.13	AT-Q7	40.63	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.47	R	10,487.05	AT-Q8	27.66	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.12	R	59.62	AT-Q9	108.33	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	1.10	R	58,376.92	AT-Q10	27.27	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.07	R	45,732.54	AT-Q11	28.04	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	67	R	417.28	AT-Q12	0.45	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	15	R	187.26	AT-Q13	2.00	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	30	R	-									
	Concrete / earthworks					AT-R1					11.55	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					29.92	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					13.29	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					164.10	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					17.68	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					311.42	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.96	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.25	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.30	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.39	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.32	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.23	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	5,968	R	241.26	AV-Q1	0.70	AV1.10	/	AV1.1				
AV1.2	Lining	m2	4,150	R	131.61	AV-Q2	1.01	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,822	R	181.06	AV-Q3	1.09	AV1.10	/	AV1.3				
AV1.4	Pipework	m	68	R	696.66	AV-Q4	61.41	AV1.10	/	AV1.4				
AV1.5	Manholes	No	5	R	7,875.44	AV-Q5	13.60	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	20	R	2,181.79	AV-Q6	3.40	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	281	R	229.82	AV-Q7	0.07	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	39	R	296.53	AV-Q8	0.51	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.55	R	11,648.63	AV-Q9	5.63	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	4,176	R	-									
	Earthworks / lining					AV-R1					1.83	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.33	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.73	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.35	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.09	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.06	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					9.49	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					7.36	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.19	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,174	R	217.59	AW-Q1	10.30	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	88	R	120.70	AW-Q2	1.30	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	114	R	3,144.74	AW-Q3	6.58	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	17.33	R	11,341.54									
AW1.5	Mesh	m2	81	R	231.40	AW-Q4	1.41	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	646	R	229.82	AW-Q5	0.18	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	4,246	R	69.83	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.64	R	45,617.80	AW-Q7	23.11	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	61	R	-									
	Concrete / earthworks					AW-R1					14.45	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					26.05	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					49.01	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					13.68	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					162.42	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.25	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	34	R	-									
BA1.2	Steel	t	2.75	R	34,481.45	BA-Q1	12.36	BA1.1	/	BA1.2				
BA1.3	Handrail	m	28	R	2,011.13	BA-Q2	1.21	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	2,435.81	BA-Q3	2.43	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	22	R	729.50	BA-Q4	1.55	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	537.58	BA-Q5	6.80	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					17.15	BA1.2	/	BA1.3
	Steel / grating					BA-R2					14.16	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					47.27	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					64.14	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,681	R	-									
BB1.2	Steel	t	51.86	R	34,651.35	BB-Q1	32.41	BB1.1	/	BB1.2				
BB1.3	Handrail	m	102	R	1,926.09	BB-Q2	16.48	BB1.1	/	BB1.3				
BB1.4	Grating	m2	171	R	2,265.20	BB-Q3	9.83	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	74	R	468.13	BB-Q4	22.72	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	14	R	4,757.26	BB-Q5	120.07	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					17.99	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.30	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					74.02	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.28	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	22,122	R	-									
BC1.2	Steel	t	136.29	R	37,092.60	BC-Q1	162.32	BC1.1	/	BC1.2				
BC1.3	Handrail	m	466	R	2,055.42	BC-Q2	47.47	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,974	R	2,321.06	BC-Q3	4.45	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	422	R	544.11	BC-Q4	52.42	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	84	R	620.37	BC-Q5	263.36	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	67	R	3,161.93	BC-Q6	330.18	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					18.05	BC1.2	/	BC1.3
	Steel / grating					BC-R2					15.98	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					68.17	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					59.79	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					11.73	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	806	R	-									
BD1.2	Steel	t	14.73	R	29,909.96	BD-Q1	54.72	BD1.1	/	BD1.2				
BD1.3	Handrail	m	11	R	1,380.91	BD-Q2	73.27	BD1.1	/	BD1.3				
BD1.4	Grating	m2	12	R	3,226.07	BD-Q3	67.17	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	14	R	628.48	BD-Q4	57.57	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	26	R	4,933.28	BD-Q5	31.00	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					21.66	BD1.1	/	BD1.2
	Steel / grating					BD-R2					9.27	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					47.59	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					6.06	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	34	R	-									
BE1.2	Steel	t	2.64	R	52,696.66	BE-Q1	12.88	BE1.1	/	BE1.2				
BE1.3	Handrail	m	54	R	1,164.51	BE-Q2	0.63	BE1.1	/	BE1.3				
BE1.4	Grating	m2	36	R	3,443.45	BE-Q3	0.94	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	28	R	386.37	BE-Q4	1.21	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	384.53	BE-Q5	4.86	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					45.25	BE1.2	/	BE1.3
	Steel / grating					BE-R2					15.30	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					136.39	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					137.04	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	235	R	-									
BF1.2	Steel	t	24.87	R	35,800.70	BF-Q1	9.45	BF1.1	/	BF1.2				
BF1.3	Handrail	m	20	R	1,767.94	BF-Q2	11.75	BF1.1	/	BF1.3				
BF1.4	Grating	m2	41	R	3,325.45	BF-Q3	5.73	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	18	R	489.57	BF-Q4	13.06	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	16	R	4,643.49	BF-Q5	14.69	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.25	BF1.1	/	BF1.2
	Steel / grating					BF-R2					10.77	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					73.13	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.71	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	14,433	R	-	C-Q1	0.25	C1.1	/	C1.2				
C1.2	Total work units	WU	56,762	R	470.94									
C1.3	Pipe supports	kg	10,626	R	-	C-Q2	1.36	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	13,151	R	-	C-Q3	0.23	C1.4	/	C1.2				
C1.5	Number of welds	No	16,513	R	-	C-Q4	1.14	C1.5	/	C1.1				
C1.6	Total fittings	No	6,597	R	-	C-Q5	0.46	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,306	R	-	C-Q6	0.35	C1.7	/	C1.6				
C1.8	Support number	No	2,164	R	-	C-Q7	0.20	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	56,762	R	470.94	DA-Q1	33.41	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,699	R	97.53									
	Average cost per examination / WU					DA-R1					4.83	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	56,762	R	470.94	DB-Q1	101.54	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	559	R	219.31									
	Average cost per examination / WU					DB-R1					2.15	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	56,762	R	470.94	DC-Q1	218.32	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	260	R	261.40									
	Average cost per examination / WU					DC-R1					1.80	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	56,762	R	470.94	DD-Q1	29.55	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,921	R	124.03									
	Average cost per examination / WU					DD-R1					3.80	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	56,762	R	470.94	DE-Q1	147.43	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	385	R	204.72									
	Average cost per examination / WU					DE-R1					2.30	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	56,762	R	470.94	E-Q1	233.79	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	242.79	R	971.00	E-Q2	172.60	E1.1	/	E1.3				
E1.3	Structural steel	t	328.86	R	41,672.08									
	WU cost / install mechanical weight - receive					E-R1					0.49	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					42.92	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	56,762	R	470.94									
F1.2	Painting to piping	m2	3,607	R	144.66	F-Q1	15.74	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,564	R	935.33	F-Q2	36.29	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	261.18	R	716.16									
F1.5	Painting to mechanical equipment	m2	1,073	R	337.15	F-Q3	0.24	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	592	R	869.82	F-Q4	0.44	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.15	F1.2	/	F1.3
	Work unit / paint					F-R2					3.26	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.50	F1.1	/	F1.3
	Install plant / paint					F-R4					2.12	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.82	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	31,634	R	135.28									
G1.2	Electrical cable terminations	No	1,961	R	153.10	G-Q1	16.13	G1.1	/	G1.2				
G1.3	Electrical equipment	No	129	R	957.85	G-Q2	245.22	G1.1	/	G1.3				
G1.4	DB's	No	13	R	4,673.27	G-Q3	9.92	G1.3	/	G1.4				
G1.5	Rack	m	7,265	R	182.42	G-Q4	4.35	G1.1	/	G1.5				
G1.6	Support steel	kg	8,293	R	39.92	G-Q5	0.88	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	32,961	R	33.92	G-Q6	0.96	G1.1	/	G1.7				
G1.8	Instruments	No	913	R	251.84	G-Q7	36.10	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,423	R	191.16	G-Q8	0.38	G1.8	/	G1.9				
G1.10	Light fittings	No	432	R	733.54	G-Q9	3.35	G1.10	/	G1.3				
G1.11	Conduit	m	5,072	R	80.19	G-Q10	6.24	G1.1	/	G1.11				
G1.12	Instrument stands	No	164	R	1,413.41	G-Q11	5.57	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.88	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.14	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.20	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.69	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					3.39	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.74	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.18	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.18	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.13	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	8,907	R	25.35	AB-Q1	2.20	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	4,046	R	4.82									
AB1.3	Back fill and compact	m3	8,258	R	26.37	AB-Q2	1.08	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,017	R	1.39	AB-Q3	2.22	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,537	R	2.86	AB-Q4	1.96	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					5.26	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.96	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					18.24	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.86	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	145,668.82									
AC1.2	EO for raking equipment	Item	1	R	18,172.70									
AC1.3	Number of piles	No	327	R	-									
AC1.4	Move rig to new position	No	181	R	95.07	AC-Q1	1.81	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	16	R	-	AC-Q2	20.44	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	27	R	136.72	AC-Q3	0.59	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	115	R	65.16	AC-Q4	0.14	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	9,590	R	109.39	AC-Q5	0.03	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	443	R	147.28	AC-Q6	0.74	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	123	R	233.60	AC-Q7	2.66	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	209	R	197.09	AC-Q8	1.56	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	1,070	R	343.49	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	69	R	210.06	AC-Q10	0.23	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	21.31	R	3,924.70	AC-Q11	15.34	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	194.96	R	3,909.69	AC-Q12	1.68	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,026	R	688.85	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	334	R	919.83	AC-Q14	0.05	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	57,069.13		1.00		/					
AC1.19	Load test to pile	No	3	R	17,969.15	AC-Q15	109.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	35,476.23	AC-Q16	327.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	377	R	249.85	AC-Q17	0.87	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					211.47	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					26.38	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.14	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.20	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.34	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.29	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.50	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.30	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					1.00	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					5.68	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.34	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					82.85	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					26.09	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.50	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.36	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	165	R	45.84	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,134	R	49.53									
AD1.3	Kerbing	m	506	R	114.06	AD-Q2	0.22	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,333	R	-									
AD1.5	Remove top soil	m3	929	R	17.65	AD-Q3	0.56	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,670	R	44.21	AD-Q4	0.18	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	5,208	R	4.47									
AD1.8	Reduce levels	m3	1,173	R	11.29	AD-Q5	0.23	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	779	R	28.44	AD-Q6	1.51	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	567	R	109.39	AD-Q7	1.37	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	399	R	81.00	AD-Q8	2.94	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,462	R	10.90	AD-Q9	4.34	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	341	R	6.14	AD-Q10	0.68	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	346	R	2.87	AD-Q11	0.67	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	469	R	487.69	AD-Q12	0.68	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	38	R	61.71	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	111.81	AD-Q14	0.08	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	127.71	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	473	R	2.42	AD-Q16	0.93	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.95	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					2.53	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.26	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.14	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.55	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.06	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.04	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.54	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.98	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.12	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	309	R	650.40	AE-Q1	4.41	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	70	R	1,030.46	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	320	R	-									
AE1.4	Rip and compact	m2	2,155	R	2.78									
AE1.5	Formwork to plinth	m2	327	R	68.89	AE-Q3	4.67	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	232	R	78.19	AE-Q4	0.75	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	6.97	R	5,220.66	AE-Q5	0.02	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,627	R	64.43	AE-Q6	233.43	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,081	R	25.88	AE-Q7	3.50	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	596	R	41.39	AE-Q8	1.93	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.63	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					233.96	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.07	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.12	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					81.03	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.06	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	6,375	R	-	AF-Q1	15.86	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	402	R	24.53	AF-Q2	1.33	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	302	R	53.82	AF-Q3	0.50	AF1.2	/	AF1.4				
AF1.4	Working space	m2	800	R	18.15	AF-Q4	0.53	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	213	R	714.76	AF-Q5	0.02	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	417	R	50.94	AF-Q6	0.51	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	10	R	413.92	AF-Q7	0.05	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	634.14	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	214	R	-	AF-Q9	0.53	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	405	R	6.10									
AF1.11	Formwork to bases	m2	314	R	73.38	AF-Q10	1.47	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	209	R	99.49	AF-Q11	20.90	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	15	R	159.94	AF-Q12	5.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.80	R	2,688.82	AF-Q13	0.13	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	22.26	R	4,119.36	AF-Q14	9.61	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	552	R	19.65	AF-Q15	0.39	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	43	R	107.42	AF-Q16	0.23	AF1.7	/	AF1.17				
AF1.18	Manhole	No	10	R	3,176.71	AF-Q17	0.12	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	83	R	342.67									
	Base excavation / backfill					AF-R1					0.46	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.35	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					29.14	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					14.03	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					16.87	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.89	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.06	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					117.17	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.10	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.24	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.25	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.65	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					36.37	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					3.85	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.09	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	287	R	31.46	AG-Q1	1.61	AG1.1	/	AG1.4				
AG1.2	Working space	m2	1,204	R	21.50	AG-Q2	0.24	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	58	R	44.79	AG-Q3	4.95	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	178	R	771.66	AG-Q4	0.59	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	81	R	985.13	AG-Q5	2.20	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	261	R	-									
AG1.7	Wood float	m2	181	R	4.64	AG-Q6	0.45	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	300	R	47.19	AG-Q7	0.59	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	309	R	65.21	AG-Q8	0.58	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	165	R	80.87	AG-Q9	0.49	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	42.11	R	5,972.75	AG-Q10	6.20	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,884	R	14.12	AG-Q11	0.14	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,578	R	21.50	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.35	R	3,865.04	AG-Q13	24.18	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.68	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.42	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.06	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.08	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.08	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					7.74	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.01	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	365	R	30.53	AH-Q1	4.56	AH1.1	/	AH1.4				
AH1.2	Working space	m2	78	R	17.56	AH-Q2	4.68	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	328	R	57.88	AH-Q3	1.11	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	80	R	936.89	AH-Q4	0.67	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	24	R	580.90	AH-Q5	3.33	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	169	R	825.59	AH-Q6	0.47	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	14	R	894.22	AH-Q7	5.71	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	530.80	AH-Q8	26.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	286	R	-									
AH1.10	Blinding	m2	119	R	41.51	AH-Q9	2.40	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	837	R	4.30	AH-Q10	0.34	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	198	R	91.84	AH-Q11	0.40	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	75	R	127.06	AH-Q12	0.19	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	32	R	91.84	AH-Q13	0.09	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	228	R	81.99	AH-Q14	0.11	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	40	R	122.39	AH-Q15	4.23	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	46	R	20.17	AH-Q16	3.67	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.18	R	3,752.01	AH-Q17	0.15	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	14.65	R	6,269.00	AH-Q18	19.52	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	593	R	47.06	AH-Q19	0.28	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,107	R	17.15	AH-Q20	0.26	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,313	R	28.61	AH-Q21	0.12	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.17	R	3,859.35	AH-Q22	244.44	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	445	R	26.83	AH-Q23	0.38	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	364	R	62.69	AH-Q24	0.46	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.74	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.53	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					22.57	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					217.88	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.61	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.13	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.05	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.77	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					10.20	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.04	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.78	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.09	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.75	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					40.93	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.60	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					133.21	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					365.54	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					219.12	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.24	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					30.77	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					13.17	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	387	R	36.35	AI-Q1	7.59	AI1.1	/	AI1.5				
AI1.2	Working space	m2	806	R	20.69	AI-Q2	0.48	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	146	R	49.11	AI-Q3	2.65	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	404	R	50.75	AI-Q4	0.13	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	51	R	443.74	AI-Q5	3.00	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	17	R	589.60	AI-Q6	0.16	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	94	R	-									
AI1.8	Wood float	m2	327	R	5.34									
AI1.9	Formwork bases	m2	186	R	79.33	AI-Q7	0.27	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	171	R	78.34	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	15.21	R	5,514.34	AI-Q9	6.18	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,026	R	19.68	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.01	R	4,090.34	AI-Q11	50.50	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.08	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.76	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.74	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					8.74	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.75	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					83.10	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					5.59	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.53	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					280.20	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.11	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	364	R	53.75	AJ-Q1	3.79	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,085	R	12.42	AJ-Q2	0.34	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	162	R	41.19	AJ-Q3	2.25	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	454	R	34.79	AJ-Q4	0.21	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	96	R	580.90	AJ-Q5	2.23	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	42	R	825.59	AJ-Q6	2.29	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	43	R	645.80									
AJ1.8	Total concrete	m3	161	R	-									
AJ1.9	Wood float	m2	489	R	6.58	AJ-Q7	0.33	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	229	R	79.19	AJ-Q8	0.42	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	430	R	120.59	AJ-Q9	0.10	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	9.20	R	3,088.39	AJ-Q10	17.50	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,539	R	21.50	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,579	R	18.79	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	2.23	R	4,911.79	AJ-Q13	43.05	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.09	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					4.33	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.30	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					16.70	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					88.28	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.34	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.85	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					143.65	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					164.36	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.12	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	480	R	35.39	AK-Q1	2.10	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,511	R	26.28	AK-Q2	0.32	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	216	R	41.10	AK-Q3	2.22	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	297	R	21.32	AK-Q4	0.77	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	229	R	634.14	AK-Q5	19.08	AK1.5		AK1.6				
AK1.6	Concrete column	m3	12	R	820.39									
AK1.7	Concrete plinth	m3	51	R	607.51	AK-Q6	4.49	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	440	R	-									
AK1.9	Wood float	m2	412	R	3.30	AK-Q7	0.56	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	784	R	77.35	AK-Q8	0.29	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	119	R	110.28	AK-Q9	0.43	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	37	R	122.24	AK-Q10	0.32	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	37.51	R	3,900.70	AK-Q11	11.73	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	7,155	R	22.21	AK-Q12	0.06	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.03	R	4,618.28	AK-Q13	145.21	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.35	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.86	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					29.74	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					192.16	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					8.20	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.51	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.71	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					175.63	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.14	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	327	R	22.05	AL-Q1	2.06	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,739	R	17.33	AL-Q2	0.19	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	223	R	54.62	AL-Q3	1.47	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	346	R	22.76	AL-Q4	0.46	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	159	R	631.85	AL-Q5	0.73	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	217	R	805.85	AL-Q6	3.50	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	62	R	614.94	AL-Q7	2.56	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	414	R	-									
AL1.9	Wood float	m2	507	R	6.56	AL-Q8	0.31	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	363	R	86.78	AL-Q9	0.44	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	646	R	85.83	AL-Q10	0.34	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	173	R	151.04	AL-Q11	0.36	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	95	R	106.32	AL-Q12	0.65	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	13	R	166.85	AL-Q13	16.69	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	66.29	R	5,829.92	AL-Q14	6.25	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,184	R	14.77	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	251	R	20.98	AL-Q16	1.65	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	1.04	R	4,707.53	AL-Q17	398.08	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.03	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.27	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.40	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					27.76	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					96.32	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.78	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.78	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.28	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					4.07	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					9.39	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.78	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					4.07	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					3.69	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					394.71	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					277.88	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.13	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,147	R	46.56	AM-Q1	3.63	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,510	R	18.98	AM-Q2	0.46	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,107	R	44.40	AM-Q3	1.04	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	527	R	31.30	AM-Q4	0.60	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	316	R	805.85									
AM1.6	Concrete column	m3	214	R	675.39	AM-Q5	1.48	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	138	R	729.62	AM-Q6	1.55	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	206	R	916.13	AM-Q7	1.53	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	101	R	507.55	AM-Q8	2.12	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	112	R	629.43	AM-Q9	1.91	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,008	R	-									
AM1.12	Wood float	m2	2,456	R	3.70	AM-Q10	0.41	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	765	R	81.13	AM-Q11	0.41	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,064	R	136.95	AM-Q12	0.20	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	686	R	74.81	AM-Q13	0.20	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	247	R	112.86	AM-Q14	0.56	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	1,007	R	107.48	AM-Q15	0.20	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	7	R	186.10	AM-Q16	30.57	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	493	R	116.38	AM-Q17	0.20	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	140.37	R	3,532.53	AM-Q18	7.18	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	8,535	R	18.31	AM-Q19	0.12	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,809	R	31.23	AM-Q20	0.26	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	50	R	387.97	AM-Q21	2.81	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.21	R	3,779.28	AM-Q22	833.06	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.45	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.05	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					25.75	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.19	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.10	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.88	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.59	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.28	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					217.80	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					9.93	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					9.75	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					6.46	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.93	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.92	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.86	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					4.36	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					192.93	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					113.11	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.11	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.21	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,888	R	45.61	AN-Q1	1.50	AN1.1	/	AN1.5				
AN1.2	Working space	m2	265	R	17.92	AN-Q2	10.90	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	588	R	55.14	AN-Q3	4.91	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	2,358	R	37.68	AN-Q4	0.81	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,920	R	703.77	AN-Q5								
AN1.6	Concrete column	m3	62	R	771.66	AN-Q6	30.97	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	40	R	985.13	AN-Q7	1.55	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	232	R	614.94	AN-Q8	8.28	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	9	R	985.13	AN-Q9	6.89	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,306	R	-				/					
AN1.11	Wood float	m2	2,187	R	3.75	AN-Q10	0.88	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	319	R	132.88	AN-Q11	6.02	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	399	R	61.65	AN-Q12	0.16	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	297	R	99.79	AN-Q13	0.13	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	83	R	118.20	AN-Q14	0.48	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	35	R	147.49	AN-Q15	0.26	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	7	R	327.75	AN-Q16	274.29	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,194	R	56.34	AN-Q17	0.19	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	437.09	R	4,119.36	AN-Q18	5.28	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	14,354	R	19.65	AN-Q19	0.16	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	14,375	R	19.65	AN-Q20	0.16	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	96	R	910.32	AN-Q21	24.02	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.18	R	3,668.51	AN-Q22	880.73	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.06	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.55	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.83	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					18.68	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					187.67	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.30	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					9.87	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.33	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					12.52	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.01	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					6.68	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					10.91	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					209.64	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					209.64	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.19	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					4.53	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	409	R	30.46	AO-Q1	1.54	AO1.1	/	AO1.5				
AO1.2	Working space	m2	511	R	26.64	AO-Q2	0.80	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	130	R	39.13	AO-Q3	3.15	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	36	R	50.75	AO-Q4	7.39	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	266	R	443.74									
AO1.6	Concrete column	m3	39	R	645.80	AO-Q5	6.82	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	13	R	697.66	AO-Q6	3.00	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	6	R	614.94	AO-Q7	44.33	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	2	R	985.13	AO-Q8	19.50	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	70	R	-									
AO1.11	Wood float	m2	39	R	3.75	AO-Q9	6.82	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	137	R	77.35	AO-Q10	1.94	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	323	R	99.36	AO-Q11	0.12	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	104	R	97.16	AO-Q12	0.13	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	15	R	163.11	AO-Q13	0.87	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	118.20	AO-Q14	0.40	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	53	R	207.11	AO-Q15	5.02	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	18	R	79.35	AO-Q16	0.33	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	9.43	R	5,909.39	AO-Q17	7.42	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,604	R	17.11	AO-Q18	0.03	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,569	R	19.85	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	13	R	854.68	AO-Q20	5.38	AO1.10	/	AO1.22				
AO1.23	Grout	m3	5.95	R	3,668.51	AO-Q21	44.71	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.14	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.78	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					8.74	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					118.33	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.74	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					7.18	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.28	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					6.50	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.37	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					8.33	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.75	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					345.38	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					297.70	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.12	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.91	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	2,327	R	22.05	AP-Q1	2.72	AP1.1	/	AP1.5				
AP1.2	Working space	m2	599	R	17.33	AP-Q2	3.88	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,708	R	54.62	AP-Q3	1.36	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	295	R	31.58	AP-Q4	2.91	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	857	R	618.98	AP-Q5	0.29	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,958	R	43.90									
AP1.7	Rough formwork	m2	282	R	81.48	AP-Q6	3.04	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,461	R	116.84	AP-Q7	0.59	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,030	R	7.80	AP-Q8	0.21	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	307	R	31.58	AP-Q9	2.79	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	53	R	57.68	AP-Q10	16.17	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	388	R	12.91	AP-Q11	2.21	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.39	R	5,754.85	AP-Q12	616.55	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,914	R	113.18	AP-Q13	0.45	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,615	R	-	AP-Q14	4.22	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,919	R	78.58	AP-Q15	1.24	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,409	R	126.03	AP-Q16	2.57	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,743	R	45.67	AP-Q17	0.97	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	1,156.42	AP-Q18	451.88	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,742	R	240.44	AP-Q19	0.97	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	5,681	R	57.70	AP-Q20	0.64	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	112.54	R	4,643.04	AP-Q21	7.62	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	19,605.00									
AP1.24	Structural steel	Item	1	R	50,765.14									
AP1.25	Plumbing and drainage	Item	1	R	32,324.14									
AP1.26	Small power and lighting	Item	1	R	275,379.00									
AP1.27	External works	Item	1	R	118,995.00									
	Excavations / concrete					AP-R1					0.04	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.27	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.40	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.60	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					105.76	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.60	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.30	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					79.36	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					19.60	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					10.73	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					359.65	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.11	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					7.88	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					36.84	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.48	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.10	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.47	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.96	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.22	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					10.93	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					6.96	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					59.31	AP1.26	/	AP1.22
	External works / concrete					AP-R23					192.24	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	68	R	645.80	AQ-Q1	3.32	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	226	R	86.98									
AQ1.3	Reinforcement	t	12.10	R	6,098.40	AQ-Q2	5.62	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	853	R	60.57	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	367	R	114.50	AQ-Q4	0.19	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	111	R	109.59	AQ-Q5	8.54	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	982	R	92.29	AQ-Q6	0.97	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	50.12	R	12,094.59	AQ-Q7	18.91	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	653	R	54.57	AQ-Q8	1.45	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	7,282.20	AQ-Q9	474.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	62	R	682.99	AQ-Q10	15.29	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,075	R	23.83	AQ-Q11	0.88	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	948	R	-									
	Concrete / reinforcement					AQ-R1					0.11	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.42	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					10.66	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.64	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.89	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					131.05	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.59	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.60	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.40	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					3.87	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	184	R	61.77	AR-Q1	2.39	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	77	R	644.85	AR-Q2	12.07	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.38	R	4,109.66									
AR1.4	Mesh	m2	545	R	56.30	AR-Q3	0.14	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	214	R	78.94	AR-Q4	0.36	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	92	R	192.37	AR-Q5	8.09	AR1.15	/	AR1.6				
AR1.7	Screed	m2	385	R	16.44	AR-Q6	1.93	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	36.81	R	8,690.92	AR-Q7	20.21	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	21	R	1,472.40	AR-Q8	1.75	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	53	R	578.20	AR-Q9	0.69	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	54	R	181.73	AR-Q10	0.68	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	413	R	47.05	AR-Q11	1.80	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	122	R	57.94	AR-Q12	6.10	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	48	R	1,140.81	AR-Q13	0.77	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	744	R	-									
	Earthworks / concrete					AR-R1					0.10	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.16	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					11.45	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.17	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.35	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					39.22	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					5.90	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					15.03	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.18	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					184.72	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.23	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					7.62	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	278	R	79.26	AS-Q1	3.71	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	160	R	48.35	AS-Q2	0.47	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	75	R	931.80	AS-Q3	8.17	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	9.18	R	3,900.70									
AS1.5	Mesh	m2	152	R	101.64	AS-Q4	0.49	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	237	R	73.38	AS-Q5	0.32	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	176	R	8.47	AS-Q6	0.43	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	35	R	47.75	AS-Q7	2.14	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	1,480	R	17.90	AS-Q8	0.05	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.73	R	5,754.85	AS-Q9	102.74	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	40	R	112.56	AS-Q10	0.33	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	1,749.38	AS-Q11	3.25	AS1.18	/	AS1.12				
AS1.13	Pipework	m	86	R	238.34	AS-Q12	2.70	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	459	R	30.21	AS-Q13	0.16	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.20	R	12,839.97	AS-Q14	5.91	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.42	R	17,582.73	AS-Q15	163.38	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	232	R	-									
AS1.18	Total control room area	m2	13	R	-									
	Concrete / earthworks					AS-R1					11.76	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					19.27	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					38.38	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					12.70	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					110.01	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					19.51	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					217.92	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.91	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.16	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.30	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.22	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	216	R	79.26	AT-Q1	12.71	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	25	R	53.08	AT-Q2	0.68	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	17	R	675.39	AT-Q3	5.14	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	3.31	R	2,940.79									
AT1.5	Formwork	m2	280	R	132.88	AT-Q4	0.06	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	50	R	9.37	AT-Q5	0.34	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	26	R	29.41	AT-Q6	0.65	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.53	R	17.94	AT-Q7	32.08	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.52	R	3,176.74	AT-Q8	32.69	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.14	R	14.79	AT-Q9	121.43	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.78	R	12,310.89	AT-Q10	44.87	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.45	R	26,375.35	AT-Q11	24.14	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	86	R	79.00	AT-Q12	0.41	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	14	R	64.33	AT-Q13	2.50	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	35	R	-									
	Concrete / earthworks					AT-R1					8.52	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					12.72	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					5.08	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					72.08	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					22.96	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					163.92	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					1.21	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.21	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.24	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.11	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					8.55	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.23	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	501	R	72.91	AU-Q1	1.34	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	358	R	51.81	AU-Q2	1.05	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	375	R	517.81									
AU1.4	Reinforcement	t	58.08	R	3,830.84	AU-Q3	6.46	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,862	R	117.78	AU-Q4	0.20	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	223	R	41.24	AU-Q5	1.68	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,380	R	27.88	AU-Q6	0.16	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	1,041	R	28.56	AU-Q7	0.36	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	53	R	89.38	AU-Q8	7.08	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.20	R	15,405.14	AU-Q9	117.19	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	13	R	1,782.09	AU-Q10	28.85	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	28	R	184.23	AU-Q11	10.82	AU1.12	/	AU1.13				
AU1.13	Total area	m2	303	R	-									
	Concrete / earthworks					AU-R1					7.10	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					9.99	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					4.40	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.14	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					12.56	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					137.40	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.25	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					134.13	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					42.86	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.29	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					2.81	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,379	R	79.19	AV-Q1	0.73	AV1.10	/	AV1.1				
AV1.2	Lining	m2	5,322	R	44.25	AV-Q2	0.60	AV1.10	/	AV1.2				
AV1.3	Paving	m2	5,116	R	47.13	AV-Q3	0.63	AV1.10	/	AV1.3				
AV1.4	Pipework	m	79	R	305.24	AV-Q4	40.48	AV1.10	/	AV1.4				
AV1.5	Manholes	No	6	R	1,499.46	AV-Q5	13.17	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	25	R	601.99	AV-Q6	3.16	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	260	R	110.28	AV-Q7	0.10	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	41	R	65.01	AV-Q8	0.61	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	6.46	R	5,768.07	AV-Q9	3.87	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,198	R	-									
	Earthworks / lining					AV-R1					1.79	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.68	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.94	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.26	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.20	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.07	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.46	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					9.26	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.10	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,406	R	109.24	AW-Q1	7.81	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	96	R	31.58	AW-Q2	1.88	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	180	R	645.80	AW-Q3	9.70	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	18.56	R	5,340.11									
AW1.5	Mesh	m2	143	R	63.35	AW-Q4	1.26	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	502	R	116.86	AW-Q5	0.36	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	4,944	R	27.25	AW-Q6	0.04	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3.06	R	13,261.26	AW-Q7	11.44	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	35	R	-									
	Concrete / earthworks					AW-R1					5.91	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					20.45	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					84.30	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.53	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					195.97	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.40	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	31	R	-									
BA1.2	Steel	t	2.15	R	12,320.22	BA-Q1	14.42	BA1.1	/	BA1.2				
BA1.3	Handrail	m	22	R	758.93	BA-Q2	1.41	BA1.1	/	BA1.3				
BA1.4	Grating	m2	23	R	669.39	BA-Q3	1.35	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	24	R	157.61	BA-Q4	1.29	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	185.18	BA-Q5	7.75	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					16.23	BA1.2	/	BA1.3
	Steel / grating					BA-R2					18.41	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					78.17	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					66.53	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,581	R	-									
BB1.2	Steel	t	95.07	R	12,757.27	BB-Q1	16.63	BB1.1	/	BB1.2				
BB1.3	Handrail	m	178	R	706.92	BB-Q2	8.88	BB1.1	/	BB1.3				
BB1.4	Grating	m2	134	R	750.95	BB-Q3	11.80	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	139	R	165.33	BB-Q4	11.37	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	29	R	2,579.45	BB-Q5	54.52	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					18.05	BB1.2	/	BB1.3
	Steel / grating					BB-R2					16.99	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					77.16	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					4.95	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	14,270	R	-									
BC1.2	Steel	t	225.91	R	17,562.90	BC-Q1	63.17	BC1.1	/	BC1.2				
BC1.3	Handrail	m	857	R	551.94	BC-Q2	16.65	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,266	R	909.78	BC-Q3	3.35	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	496	R	202.04	BC-Q4	28.77	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	75	R	212.55	BC-Q5	190.27	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	101	R	1,615.62	BC-Q6	141.29	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					31.82	BC1.2	/	BC1.3
	Steel / grating					BC-R2					19.30	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					86.93	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					82.63	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					10.87	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	559	R	-									
BD1.2	Steel	t	34.71	R	18,988.68	BD-Q1	16.10	BD1.1	/	BD1.2				
BD1.3	Handrail	m	19	R	438.32	BD-Q2	29.42	BD1.1	/	BD1.3				
BD1.4	Grating	m2	9	R	1,067.26	BD-Q3	62.11	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	17	R	161.38	BD-Q4	32.88	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	43	R	1,615.62	BD-Q5	13.00	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					43.32	BD1.1	/	BD1.2
	Steel / grating					BD-R2					17.79	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					117.66	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					11.75	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	47	R	-									
BE1.2	Steel	t	3.28	R	11,949.98	BE-Q1	14.33	BE1.1	/	BE1.2				
BE1.3	Handrail	m	75	R	647.62	BE-Q2	0.63	BE1.1	/	BE1.3				
BE1.4	Grating	m2	24	R	792.40	BE-Q3	1.96	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	60	R	237.32	BE-Q4	0.78	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	8	R	135.49	BE-Q5	5.88	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					18.45	BE1.2	/	BE1.3
	Steel / grating					BE-R2					15.08	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					50.35	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					88.20	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	521	R	-									
BF1.2	Steel	t	23.57	R	8,993.57	BF-Q1	22.10	BF1.1	/	BF1.2				
BF1.3	Handrail	m	11	R	473.84	BF-Q2	47.36	BF1.1	/	BF1.3				
BF1.4	Grating	m2	49	R	1,200.45	BF-Q3	10.63	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	21	R	153.95	BF-Q4	24.81	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	21	R	1,694.21	BF-Q5	24.81	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					18.98	BF1.1	/	BF1.2
	Steel / grating					BF-R2					7.49	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					58.42	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					5.31	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	24,509	R	-	C-Q1	0.25	C1.1	/	C1.2				
C1.2	Total work units	WU	98,922	R	216.78									
C1.3	Pipe supports	kg	9,085	R	-	C-Q2	2.70	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	8,932	R	-	C-Q3	0.09	C1.4	/	C1.2				
C1.5	Number of welds	No	13,684	R	-	C-Q4	0.56	C1.5	/	C1.1				
C1.6	Total fittings	No	10,547	R	-	C-Q5	0.43	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,122	R	-	C-Q6	0.30	C1.7	/	C1.6				
C1.8	Support number	No	2,078	R	-	C-Q7	0.23	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	98,922	R	216.78	DA-Q1	56.43	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,753	R	42.73									
	Average cost per examination / WU					DA-R1					5.07	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	98,922	R	216.78	DB-Q1	168.81	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	586	R	72.12									
	Average cost per examination / WU					DB-R1					3.01	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	98,922	R	216.78	DC-Q1	355.83	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	278	R	94.24									
	Average cost per examination / WU					DC-R1					2.30	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	98,922	R	216.78	DD-Q1	41.99	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	2,356	R	43.70									
	Average cost per examination / WU					DD-R1					4.96	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	98,922	R	216.78	DE-Q1	152.89	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	647	R	68.11									
	Average cost per examination / WU					DE-R1					3.18	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	98,922	R	216.78	E-Q1	243.93	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	405.53	R	319.33	E-Q2	251.26	E1.1	/	E1.3				
E1.3	Structural steel	t	393.71	R	14,332.29									
	WU cost / install mechanical weight - receive					E-R1					0.68	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					44.88	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	98,922	R	216.78									
F1.2	Painting to piping	m2	5,888	R	69.82	F-Q1	16.80	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,430	R	214.46	F-Q2	69.18	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	388.82	R	229.41									
F1.5	Painting to mechanical equipment	m2	1,422	R	91.98	F-Q3	0.27	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	525	R	216.05	F-Q4	0.74	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.33	F1.2	/	F1.3
	Work unit / paint					F-R2					3.10	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.01	F1.1	/	F1.3
	Install plant / paint					F-R4					2.49	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.06	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	42,866	R	23.97									
G1.2	Electrical cable terminations	No	2,587	R	70.00	G-Q1	16.57	G1.1	/	G1.2				
G1.3	Electrical equipment	No	132	R	387.53	G-Q2	324.74	G1.1	/	G1.3				
G1.4	DB's	No	25	R	910.91	G-Q3	5.28	G1.3	/	G1.4				
G1.5	Rack	m	5,009	R	134.59	G-Q4	8.56	G1.1	/	G1.5				
G1.6	Support steel	kg	9,064	R	13.04	G-Q5	0.55	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	25,947	R	17.02	G-Q6	1.65	G1.1	/	G1.7				
G1.8	Instruments	No	824	R	93.94	G-Q7	31.49	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,974	R	87.91	G-Q8	0.42	G1.8	/	G1.9				
G1.10	Light fittings	No	447	R	198.52	G-Q9	3.39	G1.10	/	G1.3				
G1.11	Conduit	m	3,787	R	19.46	G-Q10	11.32	G1.1	/	G1.11				
G1.12	Instrument stands	No	401	R	525.15	G-Q11	2.05	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.34	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.06	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.43	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.23	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.84	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.18	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.12	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.19	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.18	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,399	R	24.45	AB-Q1	2.05	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,601	R	6.53									
AB1.3	Back fill and compact	m3	7,350	R	16.70	AB-Q2	1.01	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,576	R	2.34	AB-Q3	2.07	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,038	R	3.05	AB-Q4	1.83	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.74	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.46	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					10.45	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.02	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	162,917.82									
AC1.2	EO for raking equipment	Item	1	R	20,324.58									
AC1.3	Number of piles	No	291	R	-									
AC1.4	Move rig to new position	No	151	R	99.24	AC-Q1	1.93	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	19.40	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	10	R	142.72	AC-Q3	1.50	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	98	R	72.88	AC-Q4	0.15	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	7,111	R	136.37	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	520	R	153.73	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	106	R	261.26	AC-Q7	2.75	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	186	R	220.43	AC-Q8	1.56	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	952	R	384.16	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	57	R	219.27	AC-Q10	0.26	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.97	R	4,389.43	AC-Q11	15.34	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	220.12	R	5,598.19	AC-Q12	1.32	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,751	R	826.67	AC-Q13	0.17	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	185	R	893.05	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	60,810.61		1.00		/					
AC1.19	Load test to pile	No	4	R	26,020.53	AC-Q15	72.75	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	39,254.43	AC-Q16	291.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	328	R	279.44	AC-Q17	0.89	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					197.08	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.59	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.12	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.17	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.53	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.19	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.32	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.27	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.46	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.27	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.78	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					6.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					73.56	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					31.48	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					47.49	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.34	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	137	R	56.83	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	942	R	46.91									
AD1.3	Kerbing	m	451	R	84.21	AD-Q2	0.23	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,938	R	-									
AD1.5	Remove top soil	m3	772	R	22.97	AD-Q3	0.56	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,387	R	70.39	AD-Q4	0.19	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,032	R	2.19									
AD1.8	Reduce levels	m3	1,384	R	17.55	AD-Q5	0.34	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,023	R	34.46	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	471	R	122.19	AD-Q7	2.17	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	355	R	89.87	AD-Q8	3.90	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,191	R	12.58	AD-Q9	4.65	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	284	R	7.61	AD-Q10	0.63	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	287	R	2.72	AD-Q11	0.63	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	417	R	360.07	AD-Q12	0.64	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	31	R	112.22	AD-Q13	0.92	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	145.51	AD-Q14	0.07	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	203.35	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	572	R	1.91	AD-Q16	1.27	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.21	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					10.49	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.01	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.51	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.28	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					2.04	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.60	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.69	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.09	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.33	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.73	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.41	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	275	R	727.41	AE-Q1	4.44	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	62	R	1,152.48	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	266	R	-									
AE1.4	Rip and compact	m2	1,918	R	3.11									
AE1.5	Formwork to plinth	m2	370	R	98.63	AE-Q3	5.97	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	201	R	93.84	AE-Q4	0.73	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.86	R	5,068.65	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,833	R	68.66	AE-Q6	474.87	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,396	R	37.47	AE-Q7	5.08	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	447	R	45.80	AE-Q8	1.63	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.63	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					233.89	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.09	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.13	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					73.82	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.05	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.06	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,419	R	-	AF-Q1	15.99	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	339	R	27.43	AF-Q2	0.97	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	350	R	60.20	AF-Q3	0.64	AF1.2	/	AF1.4				
AF1.4	Working space	m2	531	R	18.95	AF-Q4	0.41	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	140	R	746.10	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	244	R	34.54	AF-Q6	0.68	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	952.85	AF-Q7	0.14	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	606.00	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	166	R	-	AF-Q9	0.49	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	336	R	6.82									
AF1.11	Formwork to bases	m2	279	R	82.07	AF-Q10	1.99	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	155	R	94.24	AF-Q11	8.16	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	20	R	118.09	AF-Q12	10.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.40	R	4,889.07	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	17.65	R	5,360.72	AF-Q14	9.41	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	315	R	31.29	AF-Q15	0.44	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	38	R	108.22	AF-Q16	0.50	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	3,236.07	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	96	R	238.46									
	Base excavation / backfill					AF-R1					0.46	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.45	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					27.20	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					21.60	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					34.74	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.81	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					109.40	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.11	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.19	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.91	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					23.84	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.80	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.13	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.07	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	249	R	33.38	AG-Q1	1.39	AG1.1	/	AG1.4				
AG1.2	Working space	m2	920	R	31.28	AG-Q2	0.27	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	67	R	37.35	AG-Q3	3.72	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	179	R	636.83	AG-Q4	0.72	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	118	R	724.78	AG-Q5	1.52	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	238	R	-									
AG1.7	Wood float	m2	156	R	4.69	AG-Q6	0.76	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	249	R	55.61	AG-Q7	0.72	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	257	R	58.06	AG-Q8	0.70	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	137	R	88.95	AG-Q9	0.86	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	34.14	R	4,182.00	AG-Q10	6.97	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,643	R	27.26	AG-Q11	0.14	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,901	R	22.31	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.10	R	5,922.00	AG-Q13	38.06	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.94	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.12	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.09	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.09	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.12	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.57	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					9.30	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	290	R	34.15	AH-Q1	4.20	AH1.1	/	AH1.4				
AH1.2	Working space	m2	60	R	25.24	AH-Q2	4.83	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	196	R	45.80	AH-Q3	1.48	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	69	R	777.45	AH-Q4	0.65	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	20	R	976.19	AH-Q5	3.45	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	127	R	579.45	AH-Q6	0.54	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	23	R	1,000.11	AH-Q7	3.00	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	554.07	AH-Q8	34.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	176	R	-									
AH1.10	Blinding	m2	106	R	46.43	AH-Q9	1.66	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	696	R	4.49	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	130	R	95.86	AH-Q11	0.53	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	44	R	86.14	AH-Q12	0.52	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	26	R	93.70	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	183	R	129.71	AH-Q14	0.11	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	37	R	111.31	AH-Q15	3.43	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	32	R	31.16	AH-Q16	3.97	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.91	R	6,451.09	AH-Q17	0.23	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.16	R	4,268.08	AH-Q18	21.57	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	912	R	94.99	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	914	R	19.29	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,820	R	29.32	AH-Q21	0.06	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.98	R	3,937.44	AH-Q22	179.59	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	358	R	42.45	AH-Q23	0.35	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	341	R	57.01	AH-Q24	0.37	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.35	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.75	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					16.74	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					173.15	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.80	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.34	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.78	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.40	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					8.11	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					11.61	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.91	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.53	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					5.21	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					18.60	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.51	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					44.93	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					221.26	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					145.57	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.20	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					13.65	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					10.16	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	438	R	52.39	AI-Q1	6.64	AI1.1	/	AI1.5				
AI1.2	Working space	m2	669	R	21.91	AI-Q2	0.65	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	171	R	75.14	AI-Q3	2.56	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	165	R	23.76	AI-Q4	0.40	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	66	R	706.67	AI-Q5	4.40	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	15	R	625.40	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	110	R	-									
AI1.8	Wood float	m2	188	R	3.60									
AI1.9	Formwork bases	m2	174	R	84.44	AI-Q7	0.38	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	151	R	81.48	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	12.59	R	5,735.34	AI-Q9	8.74	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,875	R	23.50	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.90	R	4,558.15	AI-Q11	73.33	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.07	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.39	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.70	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					29.74	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.13	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					196.30	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					8.37	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.68	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					244.06	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.16	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	500	R	39.68	AJ-Q1	5.95	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	543	R	22.58	AJ-Q2	0.92	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	128	R	53.61	AJ-Q3	3.91	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	260	R	55.40	AJ-Q4	0.32	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	84	R	727.41	AJ-Q5	1.87	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	29	R	1,152.48	AJ-Q6	2.90	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	45	R	482.39									
AJ1.8	Total concrete	m3	181	R	-									
AJ1.9	Wood float	m2	435	R	7.33	AJ-Q7	0.42	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	183	R	72.63	AJ-Q8	0.46	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	349	R	84.44	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	8.02	R	5,962.57	AJ-Q10	22.57	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,680	R	22.31	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,386	R	28.79	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	0.87	R	3,170.81	AJ-Q13	96.55	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.76	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.74	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					13.13	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					99.24	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.02	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					13.65	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					267.26	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					207.11	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.23	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	427	R	39.58	AK-Q1	1.42	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,345	R	29.40	AK-Q2	0.32	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	216	R	42.68	AK-Q3	1.98	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	351	R	33.59	AK-Q4	0.86	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	301	R	992.89	AK-Q5	30.10	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	1,022.77									
AK1.7	Concrete plinth	m3	45	R	634.15	AK-Q6	6.69	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	392	R	-									
AK1.9	Wood float	m2	309	R	6.21	AK-Q7	0.97	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	425	R	74.45	AK-Q8	0.71	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	190	R	88.08	AK-Q9	0.24	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	45	R	125.29	AK-Q10	0.22	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	28.72	R	4,691.89	AK-Q11	13.65	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,357	R	22.38	AK-Q12	0.06	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.38	R	4,213.13	AK-Q13	164.71	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.35	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.93	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					29.56	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					159.89	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					13.34	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.20	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.16	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					209.65	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.24	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	503	R	33.79	AL-Q1	3.54	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,436	R	20.57	AL-Q2	0.35	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	272	R	61.46	AL-Q3	1.85	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	178	R	24.95	AL-Q4	0.80	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	142	R	643.65	AL-Q5	1.08	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	131	R	936.97	AL-Q6	2.38	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	55	R	703.97	AL-Q7	2.58	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	368	R	-									
AL1.9	Wood float	m2	451	R	6.84	AL-Q8	0.31	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	300	R	86.51	AL-Q9	0.47	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	810	R	82.53	AL-Q10	0.16	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	139	R	108.22	AL-Q11	0.40	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	76	R	124.43	AL-Q12	0.72	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	148.44	AL-Q13	11.91	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	57.59	R	6,146.23	AL-Q14	6.39	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	9,716	R	20.42	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	222	R	22.12	AL-Q16	1.66	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.97	R	6,571.46	AL-Q17	379.38	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.64	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.55	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					25.80	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					94.10	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.69	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.69	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.44	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.50	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					11.35	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.66	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.50	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.74	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					300.99	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					277.86	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.10	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,059	R	33.26	AM-Q1	5.07	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,710	R	19.86	AM-Q2	0.62	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	949	R	41.80	AM-Q3	1.12	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	776	R	51.52	AM-Q4	0.27	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	209	R	554.07									
AM1.6	Concrete column	m3	109	R	687.13	AM-Q5	1.92	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	150	R	563.24	AM-Q6	0.73	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	181	R	654.80	AM-Q7	1.15	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	51	R	745.23	AM-Q8	2.14	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	180	R	657.17	AM-Q9	0.61	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,246	R	-									
AM1.12	Wood float	m2	1,567	R	4.26	AM-Q10	0.80	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	669	R	86.82	AM-Q11	0.31	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	756	R	102.50	AM-Q12	0.14	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	550	R	125.34	AM-Q13	0.27	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	303	R	178.67	AM-Q14	0.50	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	488	R	106.06	AM-Q15	0.37	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	203.24	AM-Q16	21.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	569	R	119.41	AM-Q17	0.09	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	170.36	R	6,019.82	AM-Q18	7.31	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,854	R	18.75	AM-Q19	0.32	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,159	R	24.87	AM-Q20	0.58	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	45	R	447.77	AM-Q21	3.79	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.98	R	3,937.44	AM-Q22	1271.43	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.67	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.80	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					10.75	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.81	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.98	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.85	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.74	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.84	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					130.06	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.38	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.49	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.15	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.70	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.77	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					6.20	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					6.24	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					321.06	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					242.05	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					13.44	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.14	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,561	R	50.92	AN-Q1	1.06	AN1.1	/	AN1.5				
AN1.2	Working space	m2	341	R	15.57	AN-Q2	7.51	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	548	R	44.80	AN-Q3	4.67	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,610	R	34.58	AN-Q4	1.51	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,425	R	687.13	AN-Q5								
AN1.6	Concrete column	m3	48	R	1,022.77	AN-Q6	50.52	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	52	R	634.15	AN-Q7	0.92	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	119	R	901.27	AN-Q8	20.38	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	663.20	AN-Q9	9.60	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,561	R	-				/					
AN1.11	Wood float	m2	1,795	R	4.27	AN-Q10	1.35	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	154	R	64.82	AN-Q11	15.75	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	373	R	95.89	AN-Q12	0.13	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	237	R	144.44	AN-Q13	0.22	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	59	R	125.48	AN-Q14	0.88	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	40	R	185.55	AN-Q15	0.13	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	220.43	AN-Q16	606.25	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,285	R	89.72	AN-Q17	0.09	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	687.18	R	6,520.25	AN-Q18	3.73	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	8,299	R	15.41	AN-Q19	0.31	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	8,037	R	23.47	AN-Q20	0.32	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	116	R	709.71	AN-Q21	22.08	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.59	R	3,467.95	AN-Q22	936.29	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.07	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					3.27	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					1.14	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					19.87	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					160.92	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					10.60	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					4.39	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.05	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					10.67	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.88	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					3.57	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					10.05	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					423.12	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					277.81	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.20	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					9.19	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	164	R	31.65	AO-Q1	0.70	AO1.1	/	AO1.5				
AO1.2	Working space	m2	564	R	20.72	AO-Q2	0.29	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	113	R	46.92	AO-Q3	1.45	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	33	R	41.03	AO-Q4	7.06	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	233	R	1,180.71									
AO1.6	Concrete column	m3	20	R	461.26	AO-Q5	11.65	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	12	R	706.67	AO-Q6	1.67	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	737.30	AO-Q7	46.60	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,079.55	AO-Q8	20.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	30	R	-									
AO1.11	Wood float	m2	31	R	4.41	AO-Q9	7.52	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	146	R	115.07	AO-Q10	1.60	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	166	R	94.46	AO-Q11	0.12	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	54	R	110.52	AO-Q12	0.22	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	23	R	122.48	AO-Q13	0.52	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	120.21	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	52	R	303.06	AO-Q15	4.48	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	73.88	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.18	R	4,079.58	AO-Q17	5.79	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,699	R	28.40	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,696	R	21.89	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	1,060.72	AO-Q20	2.73	AO1.10	/	AO1.22				
AO1.23	Grout	m3	5.17	R	3,316.05	AO-Q21	45.07	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.53	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.67	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					28.78	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					267.73	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					10.26	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.39	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.77	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.88	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.33	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					8.98	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					9.98	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					143.65	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					186.37	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.36	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					3.85	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,251	R	43.72	AP-Q1	1.70	AP1.1	/	AP1.5				
AP1.2	Working space	m2	717	R	21.67	AP-Q2	1.74	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,098	R	62.12	AP-Q3	1.14	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	208	R	35.32	AP-Q4	3.53	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	735	R	989.50	AP-Q5	0.26	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,784	R	108.67									
AP1.7	Rough formwork	m2	201	R	68.07	AP-Q6	3.66	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,375	R	100.26	AP-Q7	0.53	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,567	R	9.09	AP-Q8	0.13	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	140	R	37.98	AP-Q9	5.25	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	54	R	40.36	AP-Q10	13.61	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	459	R	19.78	AP-Q11	1.60	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.92	R	4,188.24	AP-Q12	798.91	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,068	R	115.08	AP-Q13	0.36	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,477	R	-	AP-Q14	4.73	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,878	R	61.95	AP-Q15	1.85	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,449	R	148.63	AP-Q16	1.42	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,354	R	73.90	AP-Q17	0.80	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	1,091.56	AP-Q18	434.63	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,679	R	135.21	AP-Q19	0.95	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	5,438	R	83.74	AP-Q20	0.64	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	83.44	R	5,962.57	AP-Q21	8.81	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	21,402.13									
AP1.24	Structural steel	Item	1	R	55,418.61									
AP1.25	Plumbing and drainage	Item	1	R	35,287.19									
AP1.26	Small power and lighting	Item	1	R	300,622.08									
AP1.27	External works	Item	1	R	129,902.88									
	Excavations / concrete					AP-R1					0.04	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.02	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.70	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					28.02	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					54.87	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					14.54	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					9.87	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					108.86	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					26.05	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					24.52	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					301.44	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.24	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					15.97	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					40.12	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.56	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.11	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.85	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.37	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.59	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					9.29	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.92	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					50.42	AP1.26	/	AP1.22
	External works / concrete					AP-R23					131.28	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	122	R	761.62	AQ-Q1	1.53	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	187	R	83.73									
AQ1.3	Reinforcement	t	8.97	R	4,846.65	AQ-Q2	13.60	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	726	R	78.20	AQ-Q3	0.17	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	278	R	127.14	AQ-Q4	0.44	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	133	R	86.25	AQ-Q5	4.01	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	864	R	70.23	AQ-Q6	0.62	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	65.78	R	22,666.80	AQ-Q7	8.10	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	762	R	53.10	AQ-Q8	0.70	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	5,796.65	AQ-Q9	266.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	40	R	990.92	AQ-Q10	13.33	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,527	R	38.53	AQ-Q11	0.35	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	533	R	-									
	Concrete / reinforcement					AQ-R1					0.16	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					9.10	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.74	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.99	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					8.83	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					322.75	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.76	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.26	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.11	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.82	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	216	R	114.71	AR-Q1	2.92	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	74	R	705.00	AR-Q2	15.42	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.80	R	4,846.65									
AR1.4	Mesh	m2	348	R	119.74	AR-Q3	0.21	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	124	R	125.43	AR-Q4	0.60	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	131	R	126.05	AR-Q5	3.53	AR1.15	/	AR1.6				
AR1.7	Screed	m2	514	R	20.31	AR-Q6	0.90	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	28.09	R	11,396.64	AR-Q7	16.48	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	13	R	1,562.93	AR-Q8	2.16	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	65	R	675.22	AR-Q9	0.43	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	33	R	264.06	AR-Q10	0.85	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	511	R	68.13	AR-Q11	0.91	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	144	R	92.95	AR-Q12	3.22	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	33	R	901.54	AR-Q13	0.85	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	463	R	-									
	Earthworks / concrete					AR-R1					0.16	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.15	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					5.89	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.62	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.59	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					34.71	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					7.29	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					16.88	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.56	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					167.28	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.36	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					12.64	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	0	R	-	AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-	AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-	AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0.00	R	-									
AS1.5	Mesh	m2	0	R	-	AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-	AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-	AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-	AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-	AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.00	R	-	AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-	AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-	AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-	AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-	AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0.00	R	-	AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.00	R	-	AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-									
AS1.18	Total control room area	m2	0	R	-									
	Concrete / earthworks					AS-R1						AS1.3	/	AS1.1
	Concrete / blinding					AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3						AS1.4	/	AS1.5
	Concrete / formwork					AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7						AS1.4	/	AS1.9
	Concrete / pipework					AS-R8						AS1.3	/	AS1.13
	Concrete / grout					AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	338	R	82.39	AU-Q1	1.04	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	333	R	44.23	AU-Q2	0.98	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	325	R	719.66									
AU1.4	Reinforcement	t	43.96	R	4,947.44	AU-Q3	7.39	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,910	R	125.43	AU-Q4	0.17	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	131	R	36.87	AU-Q5	2.48	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,967	R	19.51	AU-Q6	0.17	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	963	R	29.85	AU-Q7	0.34	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	42	R	94.05	AU-Q8	7.74	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.80	R	25,598.51	AU-Q9	116.07	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,993.11	AU-Q10	40.63	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	35	R	206.05	AU-Q11	5.46	AU1.12	/	AU1.13				
AU1.13	Total area	m2	191	R	-									
	Concrete / earthworks					AU-R1					8.73	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					16.27	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					5.74	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.15	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					19.52	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					253.58	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.19	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					165.74	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					52.60	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.36	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					3.49	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	29	R	-									
BA1.2	Steel	t	3.22	R	13,929.59	BA-Q1	9.01	BA1.1	/	BA1.2				
BA1.3	Handrail	m	27	R	661.20	BA-Q2	1.07	BA1.1	/	BA1.3				
BA1.4	Grating	m2	13	R	892.67	BA-Q3	2.23	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	15	R	170.20	BA-Q4	1.93	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	226.48	BA-Q5	5.80	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					21.07	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.60	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					81.84	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					61.50	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2,291	R	-									
BB1.2	Steel	t	42.93	R	20,766.69	BB-Q1	53.37	BB1.1	/	BB1.2				
BB1.3	Handrail	m	101	R	675.77	BB-Q2	22.68	BB1.1	/	BB1.3				
BB1.4	Grating	m2	120	R	857.33	BB-Q3	19.09	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	112	R	169.49	BB-Q4	20.46	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	16	R	1,865.41	BB-Q5	143.19	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					30.73	BB1.2	/	BB1.3
	Steel / grating					BB-R2					24.22	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					122.52	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.13	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	18,370	R	-									
BC1.2	Steel	t	210.58	R	21,880.16	BC-Q1	87.24	BC1.1	/	BC1.2				
BC1.3	Handrail	m	585	R	531.17	BC-Q2	31.40	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,390	R	867.82	BC-Q3	3.41	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	384	R	281.57	BC-Q4	47.84	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	99	R	104.52	BC-Q5	185.56	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	52	R	1,691.04	BC-Q6	353.27	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					41.19	BC1.2	/	BC1.3
	Steel / grating					BC-R2					25.21	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					77.71	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					209.34	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					12.94	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	550	R	-									
BD1.2	Steel	t	24.19	R	14,267.89	BD-Q1	22.74	BD1.1	/	BD1.2				
BD1.3	Handrail	m	17	R	506.53	BD-Q2	32.35	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	1,390.24	BD-Q3	78.57	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	11	R	176.27	BD-Q4	50.00	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	36	R	1,522.38	BD-Q5	15.28	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					28.17	BD1.1	/	BD1.2
	Steel / grating					BD-R2					10.26	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					80.94	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					9.37	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	57	R	-									
BE1.2	Steel	t	2.77	R	22,799.69	BE-Q1	20.58	BE1.1	/	BE1.2				
BE1.3	Handrail	m	55	R	380.66	BE-Q2	1.04	BE1.1	/	BE1.3				
BE1.4	Grating	m2	24	R	819.78	BE-Q3	2.38	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	45	R	265.42	BE-Q4	1.27	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	11	R	138.50	BE-Q5	5.18	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					59.90	BE1.2	/	BE1.3
	Steel / grating					BE-R2					27.81	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					85.90	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					164.62	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	290	R	-									
BF1.2	Steel	t	36.21	R	21,880.16	BF-Q1	8.01	BF1.1	/	BF1.2				
BF1.3	Handrail	m	14	R	340.95	BF-Q2	20.71	BF1.1	/	BF1.3				
BF1.4	Grating	m2	55	R	894.92	BF-Q3	5.27	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	15	R	172.06	BF-Q4	19.33	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	18	R	2,461.69	BF-Q5	16.11	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					64.17	BF1.1	/	BF1.2
	Steel / grating					BF-R2					24.45	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					127.17	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.89	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	21,451	R	-	C-Q1	0.33	C1.1	/	C1.2				
C1.2	Total work units	WU	64,391	R	285.26									
C1.3	Pipe supports	kg	7,827	R	-	C-Q2	2.74	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,844	R	-	C-Q3	0.18	C1.4	/	C1.2				
C1.5	Number of welds	No	15,106	R	-	C-Q4	0.70	C1.5	/	C1.1				
C1.6	Total fittings	No	7,543	R	-	C-Q5	0.35	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,599	R	-	C-Q6	0.34	C1.7	/	C1.6				
C1.8	Support number	No	1,671	R	-	C-Q7	0.21	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	64,391	R	285.26	DA-Q1	57.49	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,120	R	32.14									
	Average cost per examination / WU					DA-R1					8.88	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	64,391	R	285.26	DB-Q1	142.14	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	453	R	57.13									
	Average cost per examination / WU					DB-R1					4.99	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	64,391	R	285.26	DC-Q1	292.69	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	220	R	74.30									
	Average cost per examination / WU					DC-R1					3.84	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	64,391	R	285.26	DD-Q1	46.49	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,385	R	35.04									
	Average cost per examination / WU					DD-R1					8.14	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	64,391	R	64,391.13	DE-Q1	74.44	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	865	R	865.02									
	Average cost per examination / WU					DE-R1					74.44	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	64,391	R	285.26	E-Q1	160.05	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	402.33	R	342.29	E-Q2	188.26	E1.1	/	E1.3				
E1.3	Structural steel	t	342.03	R	15,646.08									
	WU cost / install mechanical weight - receive					E-R1					0.83	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					45.71	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	64,391	R	285.26									
F1.2	Painting to piping	m2	3,711	R	98.63	F-Q1	17.35	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	2,088	R	224.58	F-Q2	30.84	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	272.32	R	264.52									
F1.5	Painting to mechanical equipment	m2	1,205	R	126.13	F-Q3	0.23	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	414	R	246.66	F-Q4	0.66	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.44	F1.2	/	F1.3
	Work unit / paint					F-R2					2.89	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.27	F1.1	/	F1.3
	Install plant / paint					F-R4					2.10	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.07	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	24,667	R	30.95									
G1.2	Electrical cable terminations	No	1,340	R	115.51	G-Q1	18.41	G1.1	/	G1.2				
G1.3	Electrical equipment	No	102	R	261.63	G-Q2	241.83	G1.1	/	G1.3				
G1.4	DB's	No	14	R	996.70	G-Q3	7.29	G1.3	/	G1.4				
G1.5	Rack	m	7,692	R	132.98	G-Q4	3.21	G1.1	/	G1.5				
G1.6	Support steel	kg	10,543	R	20.99	G-Q5	0.73	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	24,757	R	11.60	G-Q6	1.00	G1.1	/	G1.7				
G1.8	Instruments	No	1,081	R	122.53	G-Q7	22.90	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,875	R	117.32	G-Q8	0.38	G1.8	/	G1.9				
G1.10	Light fittings	No	603	R	216.72	G-Q9	5.91	G1.10	/	G1.3				
G1.11	Conduit	m	5,792	R	21.24	G-Q10	4.26	G1.1	/	G1.11				
G1.12	Instrument stands	No	236	R	752.81	G-Q11	4.58	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.27	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.12	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.26	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.46	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.47	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.23	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.14	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.09	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	8,266	R	51.00	AB-Q1	2.45	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,368	R	13.48									
AB1.3	Back fill and compact	m3	7,366	R	54.38	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,345	R	3.48	AB-Q3	2.47	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,777	R	5.19	AB-Q4	2.19	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.78	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.94	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					14.66	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.83	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	285,976.84									
AC1.2	EO for raking equipment	Item	1	R	34,292.00									
AC1.3	Number of piles	No	292	R	-									
AC1.4	Move rig to new position	No	141	R	179.40	AC-Q1	2.07	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	20.86	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	10	R	205.37	AC-Q3	1.40	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	91	R	129.55	AC-Q4	0.15	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	7,274	R	210.70	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	497	R	283.69	AC-Q6	0.59	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	159	R	678.56	AC-Q7	1.84	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	186	R	358.95	AC-Q8	1.57	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	955	R	632.53	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	54	R	388.52	AC-Q10	0.26	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	19.01	R	7,227.31	AC-Q11	15.36	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	169.44	R	10,520.97	AC-Q12	1.72	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,902	R	1,323.85	AC-Q13	0.15	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	179	R	1,957.61	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	128,868.14		1.00		/					
AC1.19	Load test to pile	No	3	R	52,196.79	AC-Q15	97.33	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	55,769.96	AC-Q16	292.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	272	R	322.76	AC-Q17	1.07	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					216.02	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.90	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.14	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.16	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.61	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.51	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.27	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.48	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.29	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.69	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.95	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.48	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					97.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					39.43	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					42.13	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	219	R	219.29	AD-Q1	0.24	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	921	R	921.06									
AD1.3	Kerbing	m	388	R	387.72	AD-Q2	0.15	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,522	R	2,522.15									
AD1.5	Remove top soil	m3	875	R	875.48	AD-Q3	0.38	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,283	R	2,282.60	AD-Q4	0.47	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	1,860	R	1,859.59									
AD1.8	Reduce levels	m3	1,424	R	1,424.48	AD-Q5	0.77	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	688	R	688.46	AD-Q6	2.07	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	538	R	538.17	AD-Q7	1.28	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	316	R	315.68	AD-Q8	4.51	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,151	R	2,150.80	AD-Q9	4.00	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	453	R	452.72	AD-Q10	1.06	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	281	R	280.70	AD-Q11	1.17	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	359	R	359.05	AD-Q12	0.72	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	41	R	40.96	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	4.21	AD-Q14	0.11	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	12	R	11.66	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	375	R	375.21	AD-Q16	0.97	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.24	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					0.47	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					0.77	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					2.07	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					1.28	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					4.51	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					3.32	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					4.00	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					1.06	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.72	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					1.17	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.72	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					0.93	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.11	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.01	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					0.03	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.97	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	275	R	1,184.53	AE-Q1	4.44	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	62	R	1,897.60	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	249	R	-									
AE1.4	Rip and compact	m2	1,922	R	5.13									
AE1.5	Formwork to plinth	m2	285	R	185.37	AE-Q3	4.60	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	218	R	150.27	AE-Q4	0.79	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.74	R	11,110.75	AE-Q5	0.02	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,402	R	145.50	AE-Q6	642.25	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,006	R	75.16	AE-Q7	3.66	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	771	R	65.06	AE-Q8	2.80	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.62	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					230.90	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.13	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					76.36	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.06	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.05	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,798	R	-	AF-Q1	17.10	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	339	R	46.11	AF-Q2	1.04	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	326	R	101.20	AF-Q3	0.60	AF1.2	/	AF1.4				
AF1.4	Working space	m2	568	R	36.57	AF-Q4	0.41	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	140	R	1,343.87	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	346	R	102.62	AF-Q6	0.44	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	9	R	833.84	AF-Q7	0.06	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,192.30	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	152	R	-	AF-Q9	0.42	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	360	R	10.29									
AF1.11	Formwork to bases	m2	260	R	147.83	AF-Q10	1.86	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	152	R	161.59	AF-Q11	16.89	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	17	R	277.64	AF-Q12	5.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.82	R	6,590.19	AF-Q13	0.09	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	20.02	R	7,150.71	AF-Q14	7.59	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	519	R	37.20	AF-Q15	0.27	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	31	R	164.83	AF-Q16	0.29	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	3,561.11	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	84	R	417.02									
	Base excavation / backfill					AF-R1					0.46	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.26	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					29.14	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					13.10	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					18.08	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.89	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.06	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					130.60	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.11	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.19	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.23	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.92	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					36.13	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.06	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.22	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	250	R	60.12	AG-Q1	1.50	AG1.1	/	AG1.4				
AG1.2	Working space	m2	922	R	52.58	AG-Q2	0.27	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	63	R	72.08	AG-Q3	3.97	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	167	R	1,147.05	AG-Q4	0.82	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	72	R	1,852.22	AG-Q5	2.32	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	218	R	-									
AG1.7	Wood float	m2	221	R	12.94	AG-Q6	0.33	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	203	R	43.85	AG-Q7	0.82	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	356	R	156.38	AG-Q8	0.47	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	211	R	199.44	AG-Q9	0.34	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	20.83	R	12,121.88	AG-Q10	10.47	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,972	R	23.19	AG-Q11	0.07	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,924	R	40.72	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.85	R	7,413.97	AG-Q13	25.26	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.87	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.20	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.14	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.11	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					10.57	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.46	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	432	R	42.48	AH-Q1	8.47	AH1.1	/	AH1.4				
AH1.2	Working space	m2	54	R	33.38	AH-Q2	8.00	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	202	R	105.21	AH-Q3	2.14	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	51	R	1,180.73	AH-Q4	0.50	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	20	R	1,745.98	AH-Q5	2.55	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	145	R	1,184.53	AH-Q6	0.35	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	1,897.60	AH-Q7	3.92	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	854.75	AH-Q8	12.75	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	180	R	-									
AH1.10	Blinding	m2	102	R	69.23	AH-Q9	1.76	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	712	R	7.39	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	130	R	172.67	AH-Q11	0.39	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	62	R	255.96	AH-Q12	0.21	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	27	R	169.10	AH-Q13	0.15	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	280	R	241.06	AH-Q14	0.07	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	16	R	116.15	AH-Q15	9.06	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	48	R	56.46	AH-Q16	3.02	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.38	R	7,916.24	AH-Q17	0.18	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	13.12	R	10,060.15	AH-Q18	13.72	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	430	R	128.30	AH-Q19	0.34	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	925	R	52.04	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,957	R	42.33	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.90	R	8,210.15	AH-Q22	200.00	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	522	R	75.16	AH-Q23	0.28	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	198	R	79.16	AH-Q24	0.73	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.27	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.40	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					17.06	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					159.77	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.68	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.00	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.62	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.38	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					6.84	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.41	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.05	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.24	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					10.20	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					20.98	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.79	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					78.41	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					193.32	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					237.66	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.14	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					15.76	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					14.96	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	409	R	50.81	AI-Q1	6.60	AI1.1	/	AI1.5				
AI1.2	Working space	m2	670	R	34.79	AI-Q2	0.61	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	171	R	100.56	AI-Q3	2.39	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	154	R	60.28	AI-Q4	0.40	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	62	R	1,142.23	AI-Q5	4.43	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	14	R	1,252.83	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	111	R	-									
AI1.8	Wood float	m2	176	R	5.66									
AI1.9	Formwork bases	m2	163	R	152.64	AI-Q7	0.38	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	149	R	164.91	AI-Q8	0.09	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.70	R	12,940.79	AI-Q9	11.44	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,366	R	28.37	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.14	R	7,284.14	AI-Q11	54.39	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.46	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.51	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					18.95	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.91	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					201.81	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.48	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.60	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					456.14	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.16	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	430	R	93.30	AJ-Q1	5.38	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	706	R	30.44	AJ-Q2	0.61	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	145	R	71.51	AJ-Q3	2.97	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	427	R	65.88	AJ-Q4	0.19	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	80	R	1,852.22	AJ-Q5	2.67	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	36	R	893.90	AJ-Q6	2.22	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	30	R	1,187.74									
AJ1.8	Total concrete	m3	148	R	-									
AJ1.9	Wood float	m2	396	R	12.94	AJ-Q7	0.37	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	197	R	145.53	AJ-Q8	0.41	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	201	R	152.19	AJ-Q9	0.18	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	11.02	R	7,633.79	AJ-Q10	13.43	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,914	R	66.16	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,406	R	25.90	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	0.85	R	7,109.95	AJ-Q13	94.12	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					3.07	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.30	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					28.12	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					143.14	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					12.73	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.87	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					115.38	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					294.74	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.26	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	412	R	59.04	AK-Q1	2.03	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,257	R	46.47	AK-Q2	0.33	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	193	R	76.98	AK-Q3	2.13	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	302	R	92.15	AK-Q4	0.67	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	203	R	1,283.52	AK-Q5	20.30	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	2,033.55									
AK1.7	Concrete plinth	m3	43	R	851.18	AK-Q6	4.72	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	333	R	-									
AK1.9	Wood float	m2	586	R	5.18	AK-Q7	0.35	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	313	R	160.21	AK-Q8	0.65	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	132	R	167.15	AK-Q9	0.33	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	45	R	161.75	AK-Q10	0.22	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	26.87	R	10,520.97	AK-Q11	12.39	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,224	R	39.36	AK-Q12	0.06	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.16	R	7,082.77	AK-Q13	154.17	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.27	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.77	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					13.93	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					247.78	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					8.01	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.09	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					12.57	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					267.30	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.18	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	357	R	61.82	AL-Q1	1.83	AL1.1	/	AL1.5				
AL1.2	Working space	m2	2,362	R	39.50	AL-Q2	0.15	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	136	R	126.77	AL-Q3	2.63	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	221	R	102.25	AL-Q4	0.88	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	195	R	890.17	AL-Q5	1.60	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	122	R	1,187.99	AL-Q6	3.30	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	37	R	1,022.45	AL-Q7	5.27	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	305	R	-									
AL1.9	Wood float	m2	396	R	10.06	AL-Q8	0.49	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	300	R	204.33	AL-Q9	0.65	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,232	R	177.17	AL-Q10	0.10	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	167	R	182.60	AL-Q11	0.22	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	90	R	209.95	AL-Q12	0.41	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	250.46	AL-Q13	11.09	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	44.06	R	11,110.75	AL-Q14	6.92	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	12,100	R	34.46	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	257	R	39.99	AL-Q16	1.19	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.92	R	11,879.45	AL-Q17	331.52	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.57	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.49	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					8.71	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					88.49	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					4.36	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.60	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.71	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.87	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.60	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.08	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					322.42	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					277.84	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.07	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	998	R	60.12	AM-Q1	5.12	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,545	R	50.63	AM-Q2	0.39	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	951	R	75.55	AM-Q3	1.05	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	778	R	93.14	AM-Q4	0.25	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	195	R	934.84									
AM1.6	Concrete column	m3	109	R	1,242.15	AM-Q5	1.79	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	140	R	1,018.18	AM-Q6	0.78	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	182	R	1,183.70	AM-Q7	1.07	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	51	R	1,257.37	AM-Q8	2.14	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	113	R	1,187.99	AM-Q9	0.96	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,167	R	-									
AM1.12	Wood float	m2	1,477	R	7.70	AM-Q10	0.79	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	996	R	221.31	AM-Q11	0.20	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	707	R	185.29	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	551	R	226.57	AM-Q13	0.25	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	304	R	322.99	AM-Q14	0.46	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	426	R	152.62	AM-Q15	0.43	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	358.95	AM-Q16	21.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	532	R	152.94	AM-Q17	0.10	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	158.77	R	9,878.02	AM-Q18	7.35	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,124	R	32.55	AM-Q19	0.28	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,156	R	43.37	AM-Q20	0.54	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	64	R	938.66	AM-Q21	2.48	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.98	R	6,119.20	AM-Q22	1190.82	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.19	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.80	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					10.04	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.75	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.92	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.79	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.74	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.79	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					121.41	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					4.22	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.49	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.15	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.70	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.84	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					7.78	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.22	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					303.47	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					227.76	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.52	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.15	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	247	R	57.01	AO-Q1	1.06	AO1.1	/	AO1.5				
AO1.2	Working space	m2	576	R	34.12	AO-Q2	0.43	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	106	R	94.01	AO-Q3	2.33	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	31	R	62.82	AO-Q4	7.55	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	234	R	1,409.02									
AO1.6	Concrete column	m3	18	R	1,355.64	AO-Q5	13.00	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	1,486.42	AO-Q6	1.64	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	1,897.60	AO-Q7	58.50	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	854.75	AO-Q8	18.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	40	R	-									
AO1.11	Wood float	m2	46	R	8.63	AO-Q9	5.09	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	137	R	207.77	AO-Q10	1.71	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	167	R	169.39	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	58	R	216.65	AO-Q12	0.19	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	214.19	AO-Q13	0.55	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	284.11	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	67	R	394.23	AO-Q15	3.49	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	229.67	AO-Q16	0.24	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.75	R	7,374.80	AO-Q17	6.96	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,708	R	51.34	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,394	R	39.58	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	19	R	1,917.50	AO-Q20	2.11	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.61	R	5,594.90	AO-Q21	89.66	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.67	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.61	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					22.43	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					163.27	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.78	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.86	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.94	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					8.00	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.77	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.01	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.26	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					143.65	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					186.33	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.25	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					3.85	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	872	R	44.42	AP-Q1	1.18	AP1.1	/	AP1.5				
AP1.2	Working space	m2	577	R	34.91	AP-Q2	1.51	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,100	R	72.08	AP-Q3	0.79	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	194	R	61.02	AP-Q4	3.80	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	737	R	1,199.60	AP-Q5	0.62	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,197	R	210.52									
AP1.7	Rough formwork	m2	274	R	114.37	AP-Q6	2.69	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,250	R	169.20	AP-Q7	0.59	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,446	R	18.49	AP-Q8	0.14	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	156	R	43.85	AP-Q9	4.72	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	54	R	77.45	AP-Q10	13.65	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	326	R	45.16	AP-Q11	2.26	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.52	R	7,089.23	AP-Q12	484.87	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,631	R	214.47	AP-Q13	0.45	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,318	R	-	AP-Q14	4.50	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,666	R	114.33	AP-Q15	1.99	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,800	R	226.55	AP-Q16	1.84	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	5,335	R	112.36	AP-Q17	0.62	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	12	R	1,767.71	AP-Q18	276.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,384	R	282.25	AP-Q19	1.39	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,173	R	223.32	AP-Q20	1.05	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	72.76	R	6,506.49	AP-Q21	10.13	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	37,764.13									
AP1.24	Structural steel	Item	1	R	97,786.36									
AP1.25	Plumbing and drainage	Item	1	R	62,264.38									
AP1.26	Small power and lighting	Item	1	R	530,448.80									
AP1.27	External works	Item	1	R	229,214.12									
	Excavations / concrete					AP-R1					0.04	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.27	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.62	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.66	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					30.91	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					10.49	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.09	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					64.88	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					27.36	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					15.49	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					144.08	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.17	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.49	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					28.72	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.91	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.12	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.76	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					0.96	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.80	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					15.03	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					9.57	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					81.53	AP1.26	/	AP1.22
	External works / concrete					AP-R23					191.08	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	80	R	1,764.70	AQ-Q1	3.56	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	285	R	124.43									
AQ1.3	Reinforcement	t	8.42	R	7,715.56	AQ-Q2	9.50	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	1,051	R	191.75	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	255	R	120.11	AQ-Q4	0.31	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	148	R	211.10	AQ-Q5	4.63	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	860	R	123.16	AQ-Q6	0.80	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	57.01	R	35,180.96	AQ-Q7	12.02	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	538	R	106.40	AQ-Q8	1.27	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	1	R	7,539.37	AQ-Q9	685.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	37	R	1,201.11	AQ-Q10	18.51	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,326	R	95.19	AQ-Q11	0.52	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	685	R	-									
	Concrete / reinforcement					AQ-R1					0.23	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					14.18	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.20	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					14.69	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					8.36	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					285.65	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.86	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.21	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					9.75	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.29	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	225	R	201.13	AR-Q1	2.96	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	76	R	1,653.30	AR-Q2	14.79	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.14	R	7,513.72									
AR1.4	Mesh	m2	608	R	185.18	AR-Q3	0.13	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	85	R	109.82	AR-Q4	0.89	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	81	R	331.16	AR-Q5	8.11	AR1.15	/	AR1.6				
AR1.7	Screed	m2	428	R	32.52	AR-Q6	1.54	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	24.52	R	39,180.82	AR-Q7	26.79	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	13	R	4,013.93	AR-Q8	1.89	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	60	R	937.89	AR-Q9	0.41	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	60	R	378.73	AR-Q10	0.41	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	515	R	202.83	AR-Q11	1.28	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	132	R	186.46	AR-Q12	4.98	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	30	R	1,135.64	AR-Q13	0.82	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	657	R	-									
	Earthworks / concrete					AR-R1					0.12	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.22	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					8.93	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					15.05	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.99	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					50.84	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					9.76	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					41.78	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.48	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					193.17	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.92	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					34.50	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	262	R	150.76	AS-Q1	2.98	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	128	R	59.09	AS-Q2	0.69	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	88	R	1,160.87	AS-Q3	10.27	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	8.57	R	10,520.97									
AS1.5	Mesh	m2	117	R	211.29	AS-Q4	0.75	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	192	R	159.83	AS-Q5	0.46	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	181	R	11.97	AS-Q6	0.49	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	25	R	117.47	AS-Q7	3.52	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	713	R	32.00	AS-Q8	0.12	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.91	R	10,273.65	AS-Q9	96.70	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	22	R	258.43	AS-Q10	0.50	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,629.20	AS-Q11	3.67	AS1.18	/	AS1.12				
AS1.13	Pipework	m	45	R	443.96	AS-Q12	3.24	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	688	R	55.11	AS-Q13	0.13	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.75	R	24,434.12	AS-Q14	6.29	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.16	R	38,781.11	AS-Q15	125.86	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	146	R	-									
AS1.18	Total control room area	m2	11	R	-									
	Concrete / earthworks					AS-R1					7.70	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					19.65	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					49.79	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.26	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					96.98	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					9.88	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					328.78	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.61	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.11	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.43	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.27	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.16	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	158	R	165.58	AT-Q1	11.29	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	21	R	72.40	AT-Q2	0.67	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	14	R	2,083.37	AT-Q3	9.15	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.53	R	5,179.34									
AT1.5	Formwork	m2	138	R	160.21	AT-Q4	0.10	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	40	R	11.83	AT-Q5	0.35	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	18	R	121.22	AT-Q6	0.78	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.43	R	23.19	AT-Q7	32.56	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.63	R	7,310.57	AT-Q8	22.22	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.10	R	52.68	AT-Q9	140.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.63	R	24,434.12	AT-Q10	63.49	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.74	R	30,221.59	AT-Q11	22.99	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	31	R	211.10	AT-Q12	1.29	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	16	R	118.00	AT-Q13	2.50	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	40	R	-									
	Concrete / earthworks					AT-R1					12.58	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					28.78	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					13.00	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					176.11	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					17.19	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					223.34	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.44	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.28	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.21	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.17	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					9.87	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.79	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	316	R	142.41	AU-Q1	1.04	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	334	R	67.02	AU-Q2	0.91	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	304	R	1,405.43									
AU1.4	Reinforcement	t	44.06	R	6,506.49	AU-Q3	6.90	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,914	R	150.36	AU-Q4	0.16	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	114	R	89.44	AU-Q5	2.67	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,971	R	33.23	AU-Q6	0.15	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	901	R	50.50	AU-Q7	0.34	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	42	R	180.09	AU-Q8	7.24	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.95	R	32,502.77	AU-Q9	76.96	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	3,111.87	AU-Q10	38.00	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	35	R	295.59	AU-Q11	5.11	AU1.12	/	AU1.13				
AU1.13	Total area	m2	179	R	-									
	Concrete / earthworks					AU-R1					9.87	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					20.97	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					9.35	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.22	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.71	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					195.80	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.20	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					128.84	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					36.13	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.45	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.75	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,152	R	151.71	AV-Q1	0.65	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,793	R	94.18	AV-Q2	0.97	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,066	R	91.89	AV-Q3	0.67	AV1.10	/	AV1.3				
AV1.4	Pipework	m	68	R	718.79	AV-Q4	39.97	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	2,475.14	AV-Q5	17.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	14	R	1,243.98	AV-Q6	4.86	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	225	R	172.67	AV-Q7	0.06	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	30	R	125.63	AV-Q8	0.47	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	5.06	R	12,075.66	AV-Q9	2.77	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,718	R	-									
	Earthworks / lining					AV-R1					1.61	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.65	AV1.1	/	AV1.3
	Lining / paving					AV-R3					1.02	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.21	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.29	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.08	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					7.20	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					9.90	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.10	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	976	R	147.75	AW-Q1	10.73	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	127	R	88.43	AW-Q2	0.72	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	91	R	1,243.98	AW-Q3	4.53	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	20.11	R	8,377.70									
AW1.5	Mesh	m2	84	R	125.63	AW-Q4	1.08	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	655	R	145.53	AW-Q5	0.14	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,478	R	33.37	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.72	R	46,275.30	AW-Q7	14.34	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	39	R	-									
	Concrete / earthworks					AW-R1					8.42	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					14.07	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					66.69	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					8.55	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					251.05	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.18	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	24	R	-									
BA1.2	Steel	t	2.84	R	22,956.37	BA-Q1	8.45	BA1.1	/	BA1.2				
BA1.3	Handrail	m	29	R	1,276.03	BA-Q2	0.83	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	1,500.69	BA-Q3	1.71	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	15	R	300.14	BA-Q4	1.60	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	351.52	BA-Q5	6.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					17.99	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.30	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					76.49	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					65.31	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,305	R	-									
BB1.2	Steel	t	76.96	R	23,502.26	BB-Q1	16.96	BB1.1	/	BB1.2				
BB1.3	Handrail	m	104	R	1,060.46	BB-Q2	12.55	BB1.1	/	BB1.3				
BB1.4	Grating	m2	106	R	1,476.59	BB-Q3	12.31	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	155	R	396.69	BB-Q4	8.42	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	12	R	3,336.24	BB-Q5	108.75	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					22.16	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.92	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					59.25	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.04	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,328	R	-									
BC1.2	Steel	t	207.46	R	23,976.87	BC-Q1	64.24	BC1.1	/	BC1.2				
BC1.3	Handrail	m	520	R	875.93	BC-Q2	25.63	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,982	R	2,219.11	BC-Q3	3.35	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	700	R	413.90	BC-Q4	19.04	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	44	R	260.99	BC-Q5	302.91	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	64	R	4,699.54	BC-Q6	208.25	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					27.37	BC1.2	/	BC1.3
	Steel / grating					BC-R2					10.80	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					57.93	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					91.87	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					5.10	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	721	R	-									
BD1.2	Steel	t	20.99	R	23,528.34	BD-Q1	34.35	BD1.1	/	BD1.2				
BD1.3	Handrail	m	12	R	1,295.26	BD-Q2	60.08	BD1.1	/	BD1.3				
BD1.4	Grating	m2	13	R	2,043.65	BD-Q3	55.46	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	11	R	473.35	BD-Q4	65.55	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	32	R	2,456.09	BD-Q5	22.53	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.16	BD1.1	/	BD1.2
	Steel / grating					BD-R2					11.51	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					49.71	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					9.58	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	34	R	-									
BE1.2	Steel	t	4.05	R	22,678.96	BE-Q1	8.40	BE1.1	/	BE1.2				
BE1.3	Handrail	m	34	R	1,199.95	BE-Q2	1.00	BE1.1	/	BE1.3				
BE1.4	Grating	m2	22	R	1,512.77	BE-Q3	1.55	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	51	R	457.13	BE-Q4	0.67	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	8	R	255.57	BE-Q5	4.25	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					18.90	BE1.2	/	BE1.3
	Steel / grating					BE-R2					14.99	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					49.61	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					88.74	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	420	R	-									
BF1.2	Steel	t	33.87	R	17,251.58	BF-Q1	12.40	BF1.1	/	BF1.2				
BF1.3	Handrail	m	14	R	918.36	BF-Q2	30.00	BF1.1	/	BF1.3				
BF1.4	Grating	m2	62	R	2,006.65	BF-Q3	6.77	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	14	R	498.73	BF-Q4	30.00	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	22	R	2,094.76	BF-Q5	19.09	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					18.79	BF1.1	/	BF1.2
	Steel / grating					BF-R2					8.60	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					34.59	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.24	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	29,489	R	-	C-Q1	0.37	C1.1	/	C1.2				
C1.2	Total work units	WU	80,384	R	299.29									
C1.3	Pipe supports	kg	11,821	R	-	C-Q2	2.49	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	8,474	R	-	C-Q3	0.11	C1.4	/	C1.2				
C1.5	Number of welds	No	11,309	R	-	C-Q4	0.38	C1.5	/	C1.1				
C1.6	Total fittings	No	10,550	R	-	C-Q5	0.36	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,682	R	-	C-Q6	0.25	C1.7	/	C1.6				
C1.8	Support number	No	2,618	R	-	C-Q7	0.22	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	80,384	R	299.29	DA-Q1	86.06	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	934	R	54.22									
	Average cost per examination / WU					DA-R1					5.52	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	80,384	R	299.29	DB-Q1	189.58	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	424	R	130.62									
	Average cost per examination / WU					DB-R1					2.29	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	80,384	R	299.29	DC-Q1	303.34	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	265	R	174.46									
	Average cost per examination / WU					DC-R1					1.72	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	80,384	R	299.29	DD-Q1	86.71	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	927	R	42.63									
	Average cost per examination / WU					DD-R1					7.02	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	80,384	R	299.29	DE-Q1	99.00	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	812	R	134.50									
	Average cost per examination / WU					DE-R1					2.23	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	80,384	R	299.29	E-Q1	296.30	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	271.29	R	643.28	E-Q2	240.25	E1.1	/	E1.3				
E1.3	Structural steel	t	334.58	R	27,607.57									
	WU cost / install mechanical weight - receive					E-R1					0.47	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					42.92	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	80,384	R	299.29									
F1.2	Painting to piping	m2	3,765	R	132.69	F-Q1	21.35	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,339	R	528.67	F-Q2	60.03	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	306.50	R	455.32									
F1.5	Painting to mechanical equipment	m2	1,680	R	174.04	F-Q3	0.18	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	385	R	664.05	F-Q4	0.80	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.25	F1.2	/	F1.3
	Work unit / paint					F-R2					2.26	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.57	F1.1	/	F1.3
	Install plant / paint					F-R4					2.62	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.69	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	30,332	R	51.14									
G1.2	Electrical cable terminations	No	1,755	R	113.65	G-Q1	17.28	G1.1	/	G1.2				
G1.3	Electrical equipment	No	169	R	510.75	G-Q2	179.48	G1.1	/	G1.3				
G1.4	DB's	No	12	R	3,021.98	G-Q3	14.08	G1.3	/	G1.4				
G1.5	Rack	m	5,760	R	168.18	G-Q4	5.27	G1.1	/	G1.5				
G1.6	Support steel	kg	10,066	R	25.13	G-Q5	0.57	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	25,327	R	20.72	G-Q6	1.20	G1.1	/	G1.7				
G1.8	Instruments	No	1,083	R	288.72	G-Q7	23.39	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,689	R	97.11	G-Q8	0.40	G1.8	/	G1.9				
G1.10	Light fittings	No	461	R	349.20	G-Q9	2.73	G1.10	/	G1.3				
G1.11	Conduit	m	3,221	R	46.56	G-Q10	9.42	G1.1	/	G1.11				
G1.12	Instrument stands	No	370	R	891.63	G-Q11	2.93	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.45	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.17	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.10	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.04	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.30	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.21	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.07	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	8,437	R	36.17	AB-Q1	2.45	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,438	R	8.92									
AB1.3	Back fill and compact	m3	7,519	R	35.99	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,186	R	2.30	AB-Q3	2.65	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,856	R	3.68	AB-Q4	2.19	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.05	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.01	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					15.73	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.83	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	169,050.03									
AC1.2	EO for raking equipment	Item	1	R	22,091.28									
AC1.3	Number of piles	No	274	R	-									
AC1.4	Move rig to new position	No	186	R	193.75	AC-Q1	1.47	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	19.57	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	14	R	203.65	AC-Q3	1.00	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	136	R	111.23	AC-Q4	0.10	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,431	R	117.20	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	491	R	230.20	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	170	R	469.69	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	156	R	214.46	AC-Q8	1.76	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	610	R	273.06	AC-Q9	0.45	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	95	R	497.21	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.00	R	5,154.63	AC-Q11	15.22	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	236.94	R	6,837.48	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,671	R	1,009.67	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	183	R	1,090.75	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	74,272.50		1.00		/					
AC1.19	Load test to pile	No	4	R	31,780.79	AC-Q15	68.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	47,944.34	AC-Q16	274.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	184	R	258.97	AC-Q17	1.49	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					167.43	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.20	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.95	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.47	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.27	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.49	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.75	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					6.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					73.56	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					31.48	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					47.49	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	209	R	74.28	AD-Q1	0.22	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	940	R	56.84									
AD1.3	Kerbing	m	396	R	130.57	AD-Q2	0.16	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,403	R	-									
AD1.5	Remove top soil	m3	834	R	21.65	AD-Q3	0.59	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,412	R	83.92	AD-Q4	0.21	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,907	R	2.79									
AD1.8	Reduce levels	m3	1,242	R	22.42	AD-Q5	0.32	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	719	R	35.16	AD-Q6	1.73	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	549	R	156.08	AD-Q7	1.31	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	322	R	107.14	AD-Q8	3.86	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,195	R	16.07	AD-Q9	4.00	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	431	R	9.95	AD-Q10	0.64	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	287	R	3.30	AD-Q11	1.09	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	367	R	558.30	AD-Q12	0.72	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	39	R	114.51	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	137.14	AD-Q14	0.10	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	242.43	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	788	R	2.44	AD-Q16	1.99	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.31	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					7.76	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.04	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.64	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.23	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					2.39	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.22	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.84	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.88	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.05	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.86	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	230	R	707.73	AE-Q1	5.75	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	40	R	819.17	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	439	R	-									
AE1.4	Rip and compact	m2	1,820	R	3.66									
AE1.5	Formwork to plinth	m2	398	R	120.47	AE-Q3	9.95	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	191	R	114.61	AE-Q4	0.83	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.82	R	6,190.72	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,904	R	83.86	AE-Q6	498.43	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,314	R	45.76	AE-Q7	5.71	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	553	R	55.94	AE-Q8	2.40	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					193.37	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.15	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					73.82	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.06	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,398	R	-	AF-Q1	15.88	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	340	R	33.76	AF-Q2	1.33	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	256	R	91.30	AF-Q3	0.50	AF1.2	/	AF1.4				
AF1.4	Working space	m2	677	R	24.16	AF-Q4	0.53	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	180	R	1,251.43	AF-Q5	0.02	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	353	R	33.33	AF-Q6	0.51	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	8	R	859.81	AF-Q7	0.04	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	818.86	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	181	R	-	AF-Q9	0.53	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	343	R	4.71									
AF1.11	Formwork to bases	m2	266	R	110.07	AF-Q10	1.48	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	155	R	114.18	AF-Q11	19.38	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	18	R	183.10	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.73	R	4,989.15	AF-Q13	0.09	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	19.07	R	5,052.60	AF-Q14	9.49	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	321	R	37.30	AF-Q15	0.56	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	28	R	109.10	AF-Q16	0.29	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	2,525.36	AF-Q17	0.04	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	124	R	456.89									
	Base excavation / backfill					AF-R1					0.37	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.40	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					37.07	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					37.55	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					25.47	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.65	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					265.70	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.09	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.13	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.22	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.99	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					33.55	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					7.88	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.74	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.18	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	237	R	41.95	AG-Q1	1.39	AG1.1	/	AG1.4				
AG1.2	Working space	m2	875	R	28.67	AG-Q2	0.27	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	68	R	59.71	AG-Q3	3.49	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	170	R	1,028.88	AG-Q4	1.42	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	120	R	1,313.50	AG-Q5	1.42	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	222	R	-									
AG1.7	Wood float	m2	232	R	8.36	AG-Q6	0.52	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	120	R	30.48	AG-Q7	1.42	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	365	R	101.01	AG-Q8	0.47	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	146	R	147.04	AG-Q9	0.82	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	27.72	R	3,749.32	AG-Q10	8.01	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,267	R	24.51	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	4,453	R	35.82	AG-Q12	0.05	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.32	R	4,907.11	AG-Q13	51.72	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.68	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.42	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.03	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.10	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.11	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					3.64	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					4.77	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	190	R	39.93	AH-Q1	3.80	AH1.1	/	AH1.4				
AH1.2	Working space	m2	70	R	34.93	AH-Q2	2.71	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	255	R	69.64	AH-Q3	0.75	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	50	R	837.31	AH-Q4	0.74	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	26	R	1,238.16	AH-Q5	1.92	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	80	R	707.73	AH-Q6	0.63	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	819.17	AH-Q7	3.85	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	1,093.85	AH-Q8	12.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	253	R	-									
AH1.10	Blinding	m2	68	R	42.24	AH-Q9	3.72	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	768	R	5.23	AH-Q10	0.33	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	168	R	108.24	AH-Q11	0.30	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	64	R	180.86	AH-Q12	0.20	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	24	R	98.33	AH-Q13	0.17	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	260	R	107.02	AH-Q14	0.10	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	16	R	142.18	AH-Q15	5.00	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	45	R	37.15	AH-Q16	1.78	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.52	R	7,690.77	AH-Q17	0.43	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	5.84	R	4,117.85	AH-Q18	43.32	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	654	R	91.19	AH-Q19	0.12	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,172	R	25.05	AH-Q20	0.22	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,865	R	30.02	AH-Q21	0.14	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.91	R	5,822.23	AH-Q22	278.02	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	533	R	53.30	AH-Q23	0.15	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	227	R	52.13	AH-Q24	0.35	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.14	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.57	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.82	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					160.10	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.68	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.18	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.02	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.77	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.74	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					4.53	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					11.12	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					11.57	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					4.98	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					19.05	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.87	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					45.16	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					164.39	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					137.17	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.14	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					13.28	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					13.58	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	183	R	33.63	AI-Q1	3.00	AI1.1	/	AI1.5				
AI1.2	Working space	m2	652	R	24.67	AI-Q2	0.28	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	146	R	79.49	AI-Q3	1.25	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	208	R	39.90	AI-Q4	0.29	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	61	R	810.01	AI-Q5	4.36	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	14	R	888.44	AI-Q6	0.36	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	113	R	-									
AI1.8	Wood float	m2	168	R	3.75									
AI1.9	Formwork bases	m2	166	R	108.24	AI-Q7	0.37	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	145	R	164.73	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	12.41	R	3,937.49	AI-Q9	9.11	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,313	R	27.40	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.95	R	4,686.11	AI-Q11	64.21	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.36	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.42	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					20.30	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.91	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					216.00	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.48	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.39	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					143.70	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.17	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	475	R	50.82	AJ-Q1	3.49	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	662	R	24.02	AJ-Q2	0.72	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	123	R	79.64	AJ-Q3	3.86	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	287	R	42.34	AJ-Q4	0.47	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	136	R	1,251.43	AJ-Q5	5.04	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	17	R	647.09	AJ-Q6	8.00	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	27	R	551.89									
AJ1.8	Total concrete	m3	135	R	-									
AJ1.9	Wood float	m2	369	R	6.96	AJ-Q7	0.37	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	179	R	115.70	AJ-Q8	0.76	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	215	R	124.99	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	18.16	R	7,773.22	AJ-Q10	7.43	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	2,811	R	22.56	AJ-Q11	0.05	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,671	R	24.41	AJ-Q12	0.08	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.79	R	6,849.04	AJ-Q13	75.98	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.12	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.64	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					29.56	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					179.80	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.82	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.18	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					344.56	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					318.44	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.18	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	411	R	40.26	AK-Q1	1.79	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,253	R	31.58	AK-Q2	0.33	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	138	R	57.31	AK-Q3	2.98	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	366	R	41.39	AK-Q4	0.63	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	230	R	1,188.22	AK-Q5	32.86	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	1,094.27									
AK1.7	Concrete plinth	m3	63	R	837.31	AK-Q6	3.65	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	337	R	-									
AK1.9	Wood float	m2	356	R	4.99	AK-Q7	0.65	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	626	R	102.01	AK-Q8	0.37	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	149	R	164.73	AK-Q9	0.42	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	35	R	88.12	AK-Q10	0.20	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	40.71	R	5,231.84	AK-Q11	8.28	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,162	R	26.13	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.78	R	4,751.85	AK-Q13	89.15	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.03	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.27	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.70	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					28.71	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					238.12	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					11.65	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.08	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					12.42	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					200.22	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.25	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	535	R	42.48	AL-Q1	4.91	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,327	R	34.67	AL-Q2	0.40	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	230	R	54.57	AL-Q3	2.33	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	327	R	42.24	AL-Q4	0.33	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	109	R	830.35	AL-Q5	0.87	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	125	R	854.73	AL-Q6	2.02	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	62	R	647.09	AL-Q7	1.76	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	324	R	-									
AL1.9	Wood float	m2	342	R	5.22	AL-Q8	0.32	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	433	R	168.77	AL-Q9	0.25	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,238	R	84.26	AL-Q10	0.10	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	159	R	132.18	AL-Q11	0.39	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	86	R	151.98	AL-Q12	0.72	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	12	R	265.46	AL-Q13	10.42	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	44.97	R	4,117.85	AL-Q14	7.20	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	12,352	R	25.01	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	263	R	27.33	AL-Q16	1.23	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.94	R	7,861.13	AL-Q17	344.68	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.23	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.78	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.66	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					159.07	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.97	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.97	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					4.92	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					4.90	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					10.14	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.26	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					4.90	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					2.44	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					164.65	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					150.67	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.11	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	951	R	40.62	AM-Q1	3.50	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,706	R	24.08	AM-Q2	0.56	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,367	R	69.61	AM-Q3	0.70	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	341	R	41.73	AM-Q4	0.80	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	272	R	790.64									
AM1.6	Concrete column	m3	101	R	867.20	AM-Q5	2.69	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	162	R	763.84	AM-Q6	0.62	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	241	R	1,341.09	AM-Q7	1.13	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	45	R	690.42	AM-Q8	2.24	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	116	R	786.14	AM-Q9	0.87	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,328	R	-									
AM1.12	Wood float	m2	1,408	R	5.20	AM-Q10	0.94	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	668	R	105.25	AM-Q11	0.41	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,125	R	138.55	AM-Q12	0.09	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	516	R	127.46	AM-Q13	0.31	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	280	R	191.96	AM-Q14	0.58	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	758	R	160.88	AM-Q15	0.32	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	245.46	AM-Q16	25.25	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	451	R	108.00	AM-Q17	0.10	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	90.42	R	8,957.50	AM-Q18	14.69	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,245	R	17.14	AM-Q19	0.31	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,329	R	28.08	AM-Q20	0.57	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	46	R	940.11	AM-Q21	1.97	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.52	R	4,132.05	AM-Q22	873.68	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.69	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.58	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					18.95	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.91	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.04	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.59	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.15	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.01	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					152.05	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.51	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.99	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.98	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.26	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.11	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					4.89	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					6.39	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					522.61	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					319.00	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.53	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.19	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	4,101	R	52.12	AN-Q1	1.93	AN1.1	/	AN1.5				
AN1.2	Working space	m2	183	R	25.84	AN-Q2	22.41	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	502	R	60.43	AN-Q3	8.17	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,423	R	63.78	AN-Q4	1.50	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,130	R	1,100.79	AN-Q5								
AN1.6	Concrete column	m3	60	R	861.07	AN-Q6	35.50	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	41	R	930.22	AN-Q7	1.46	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	122	R	1,378.93	AN-Q8	17.46	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	1,192.30	AN-Q9	15.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,953	R	-				/					
AN1.11	Wood float	m2	1,890	R	5.92	AN-Q10	1.13	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	292	R	177.17	AN-Q11	7.29	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	529	R	195.68	AN-Q12	0.11	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	150	R	99.33	AN-Q13	0.27	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	58	R	150.51	AN-Q14	0.71	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	29	R	129.54	AN-Q15	0.14	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	5	R	248.23	AN-Q16	426.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,552	R	161.14	AN-Q17	0.08	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	409.72	R	5,217.68	AN-Q18	4.77	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	12,511	R	23.10	AN-Q19	0.16	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,624	R	26.78	AN-Q20	0.26	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	104	R	1,213.75	AN-Q21	18.78	AN1.10	/	AN1.22				
AN1.23	Grout	m3	3.04	R	8,252.68	AN-Q22	700.66	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.02	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.86	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					17.26	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					185.94	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					6.21	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					9.36	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					6.18	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.40	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.75	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					9.20	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					8.56	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					225.87	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					194.83	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.13	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					4.30	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	251	R	37.84	AO-Q1	1.22	AO1.1	/	AO1.5				
AO1.2	Working space	m2	630	R	34.93	AO-Q2	0.40	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	172	R	63.67	AO-Q3	1.46	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	31	R	42.26	AO-Q4	6.61	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	205	R	1,299.57									
AO1.6	Concrete column	m3	24	R	716.83	AO-Q5	8.54	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	13	R	777.80	AO-Q6	1.85	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	7	R	885.23	AO-Q7	29.29	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,309.02	AO-Q8	24.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	42	R	-									
AO1.11	Wood float	m2	32	R	5.34	AO-Q9	6.41	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	159	R	137.52	AO-Q10	1.29	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	151	R	120.12	AO-Q11	0.16	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	62	R	128.00	AO-Q12	0.21	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	30	R	234.66	AO-Q13	0.43	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	3	R	113.25	AO-Q14	0.33	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	55	R	249.14	AO-Q15	3.73	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	104.53	AO-Q16	0.41	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.87	R	5,229.84	AO-Q17	7.16	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,785	R	36.41	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	4,880	R	36.46	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	8	R	859.11	AO-Q20	5.25	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.62	R	4,731.88	AO-Q21	56.63	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.08	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.59	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					30.75	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					243.37	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					9.45	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.08	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					3.31	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					5.97	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.12	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					11.56	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.47	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					143.64	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					143.44	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.27	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.09	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,447	R	40.92	AP-Q1	1.68	AP1.1	/	AP1.5				
AP1.2	Working space	m2	686	R	28.01	AP-Q2	2.11	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,599	R	83.91	AP-Q3	0.90	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	225	R	44.29	AP-Q4	3.82	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	860	R	819.92	AP-Q5	0.37	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,354	R	139.31									
AP1.7	Rough formwork	m2	225	R	76.02	AP-Q6	3.82	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,335	R	111.96	AP-Q7	0.64	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,824	R	11.94	AP-Q8	0.18	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	128	R	30.48	AP-Q9	6.72	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	57	R	50.03	AP-Q10	15.09	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	337	R	33.29	AP-Q11	2.55	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.99	R	5,145.80	AP-Q12	868.69	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,870	R	146.59	AP-Q13	0.46	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,709	R	-	AP-Q14	5.48	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,579	R	72.26	AP-Q15	2.98	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,535	R	138.11	AP-Q16	3.07	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,675	R	53.62	AP-Q17	1.01	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	11	R	1,223.13	AP-Q18	428.09	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,986	R	189.00	AP-Q19	1.58	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,231	R	134.14	AP-Q20	1.11	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	122.13	R	8,743.29	AP-Q21	7.04	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	26,140.00									
AP1.24	Structural steel	Item	1	R	67,686.86									
AP1.25	Plumbing and drainage	Item	1	R	43,098.86									
AP1.26	Small power and lighting	Item	1	R	367,172.00									
AP1.27	External works	Item	1	R	158,660.00									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.46	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.49	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					18.51	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					62.76	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					10.79	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.32	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					68.67	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					26.90	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					16.39	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					262.64	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.16	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.35	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					63.31	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.73	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.12	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.78	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.09	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					2.99	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					7.74	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					4.93	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					41.99	AP1.26	/	AP1.22
	External works / concrete					AP-R23					193.51	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	129	R	1,318.53	AQ-Q1	1.02	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	132	R	70.24									
AQ1.3	Reinforcement	t	8.66	R	5,380.58	AQ-Q2	14.90	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	1,157	R	85.13	AQ-Q3	0.11	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	140	R	147.04	AQ-Q4	0.92	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	130	R	147.02	AQ-Q5	7.99	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,389	R	111.42	AQ-Q6	0.75	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	43.48	R	16,468.17	AQ-Q7	23.90	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	421	R	116.31	AQ-Q8	2.47	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	7,943.08	AQ-Q9	519.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	37	R	1,028.84	AQ-Q10	28.08	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	904	R	45.52	AQ-Q11	1.15	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,039	R	-									
	Concrete / reinforcement					AQ-R1					0.25	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					18.77	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					15.49	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					8.97	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					8.97	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					147.80	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.04	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.48	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					9.23	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.45	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	135	R	90.07	AR-Q1	2.76	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	49	R	819.17	AR-Q2	6.48	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	7.56	R	6,960.88									
AR1.4	Mesh	m2	450	R	85.91	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	121	R	160.79	AR-Q4	0.40	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	80	R	158.84	AR-Q5	8.43	AR1.15	/	AR1.6				
AR1.7	Screed	m2	673	R	37.54	AR-Q6	1.00	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	33.28	R	14,098.60	AR-Q7	20.25	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	19	R	1,812.52	AR-Q8	1.75	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	43	R	667.41	AR-Q9	0.77	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	46	R	243.24	AR-Q10	0.72	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	829	R	91.69	AR-Q11	0.81	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	95	R	123.86	AR-Q12	7.09	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	48	R	704.08	AR-Q13	0.69	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	674	R	-									
	Earthworks / concrete					AR-R1					0.11	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.12	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.54	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.09	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.16	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					21.82	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					7.78	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					21.12	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.74	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					153.76	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.35	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					20.02	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	312	R	151.75	AS-Q1	3.00	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	170	R	36.46	AS-Q2	0.61	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	104	R	1,221.51	AS-Q3	12.79	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	8.13	R	4,306.47									
AS1.5	Mesh	m2	217	R	86.68	AS-Q4	0.48	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	138	R	141.43	AS-Q5	0.75	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	130	R	7.83	AS-Q6	0.80	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	43	R	45.04	AS-Q7	2.42	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	502	R	23.83	AS-Q8	0.21	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.91	R	6,546.55	AS-Q9	114.29	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	34	R	144.82	AS-Q10	0.35	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,605.79	AS-Q11	4.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	69	R	399.72	AS-Q12	1.32	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	580	R	28.66	AS-Q13	0.18	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.10	R	12,865.56	AS-Q14	5.71	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.45	R	20,544.48	AS-Q15	62.76	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	91	R	-									
AS1.18	Total control room area	m2	12	R	-									
	Concrete / earthworks					AS-R1					8.05	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					33.50	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					49.68	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					8.64	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					156.00	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					27.12	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					180.72	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.06	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.19	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.33	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.21	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	151	R	130.14	AT-Q1	7.19	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	14	R	43.48	AT-Q2	1.50	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	21	R	975.31	AT-Q3	15.44	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.36	R	5,971.38									
AT1.5	Formwork	m2	141	R	132.20	AT-Q4	0.15	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	28	R	11.94	AT-Q5	0.75	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	36	R	37.65	AT-Q6	0.58	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.44	R	22.87	AT-Q7	47.73	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.65	R	5,615.94	AT-Q8	32.31	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.12	R	37.31	AT-Q9	175.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.65	R	17,189.04	AT-Q10	56.92	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.19	R	23,240.22	AT-Q11	31.09	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	51	R	144.82	AT-Q12	0.73	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	16	R	109.40	AT-Q13	2.31	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	37	R	-									
	Concrete / earthworks					AT-R1					7.49	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					22.43	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					7.38	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					81.68	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					25.90	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					261.10	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.61	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.35	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.26	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.73	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.32	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,624	R	119.52	AV-Q1	0.56	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,505	R	74.38	AV-Q2	1.03	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,867	R	92.49	AV-Q3	0.90	AV1.10	/	AV1.3				
AV1.4	Pipework	m	89	R	268.08	AV-Q4	28.96	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	2,372.13	AV-Q5	22.25	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	20	R	796.39	AV-Q6	4.45	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	315	R	155.81	AV-Q7	0.06	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	34	R	116.75	AV-Q8	0.59	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.45	R	5,479.55	AV-Q9	5.80	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,577	R	-									
	Earthworks / lining					AV-R1					1.61	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.29	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.80	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.45	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.11	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.09	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.11	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					6.82	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.15	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,057	R	99.78	AW-Q1	10.79	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	140	R	40.07	AW-Q2	0.70	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	98	R	803.54	AW-Q3	6.59	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	14.87	R	5,919.57									
AW1.5	Mesh	m2	80	R	95.51	AW-Q4	1.23	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	535	R	164.43	AW-Q5	0.18	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,924	R	23.08	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3.22	R	28,175.41	AW-Q7	13.35	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	43	R	-									
	Concrete / earthworks					AW-R1					8.05	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					20.05	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					61.98	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					4.89	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					256.48	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.21	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	26	R	-									
BA1.2	Steel	t	2.85	R	19,018.56	BA-Q1	9.12	BA1.1	/	BA1.2				
BA1.3	Handrail	m	25	R	844.57	BA-Q2	1.04	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	1,064.21	BA-Q3	1.86	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	212.85	BA-Q4	1.86	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	249.28	BA-Q5	4.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					22.52	BA1.2	/	BA1.3
	Steel / grating					BA-R2					17.87	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					89.35	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					76.29	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,123	R	-									
BB1.2	Steel	t	47.82	R	16,666.63	BB-Q1	23.48	BB1.1	/	BB1.2				
BB1.3	Handrail	m	103	R	1,088.12	BB-Q2	10.90	BB1.1	/	BB1.3				
BB1.4	Grating	m2	142	R	728.29	BB-Q3	7.91	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	114	R	225.98	BB-Q4	9.85	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	21	R	2,365.90	BB-Q5	53.48	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					15.32	BB1.2	/	BB1.3
	Steel / grating					BB-R2					22.88	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					73.75	BB1.2	/	BB1.5

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Year of construction 1995

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.04	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,555	R	-									
BC1.2	Steel	t	299.38	R	27,947.98	BC-Q1	45.28	BC1.1	/	BC1.2				
BC1.3	Handrail	m	533	R	620.11	BC-Q2	25.43	BC1.1	/	BC1.3				
BC1.4	Grating	m2	6,202	R	1,617.76	BC-Q3	2.19	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	311	R	169.42	BC-Q4	43.59	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	67	R	185.51	BC-Q5	202.31	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	80	R	2,262.27	BC-Q6	169.44	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					45.07	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.28	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					164.96	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					150.65	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					12.35	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	510	R	-									
BD1.2	Steel	t	19.64	R	19,245.63	BD-Q1	25.97	BD1.1	/	BD1.2				
BD1.3	Handrail	m	18	R	899.64	BD-Q2	28.33	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	1,113.13	BD-Q3	63.75	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	8	R	144.50	BD-Q4	63.75	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	24	R	2,221.41	BD-Q5	21.25	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					21.39	BD1.1	/	BD1.2
	Steel / grating					BD-R2					17.29	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					133.19	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					8.66	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	40	R	-									
BE1.2	Steel	t	4.34	R	16,268.06	BE-Q1	9.22	BE1.1	/	BE1.2				
BE1.3	Handrail	m	30	R	863.50	BE-Q2	1.33	BE1.1	/	BE1.3				
BE1.4	Grating	m2	23	R	1,479.39	BE-Q3	1.74	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	43	R	213.98	BE-Q4	0.93	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	191.69	BE-Q5	5.71	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					18.84	BE1.2	/	BE1.3
	Steel / grating					BE-R2					11.00	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					76.03	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					84.87	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	441	R	-									
BF1.2	Steel	t	19.96	R	11,991.43	BF-Q1	22.09	BF1.1	/	BF1.2				
BF1.3	Handrail	m	14	R	593.18	BF-Q2	31.50	BF1.1	/	BF1.3				
BF1.4	Grating	m2	43	R	1,479.39	BF-Q3	10.26	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	18	R	154.26	BF-Q4	24.50	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	17	R	2,213.38	BF-Q5	25.94	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.22	BF1.1	/	BF1.2
	Steel / grating					BF-R2					8.11	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					77.74	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					5.42	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	29,482	R	-	C-Q1	0.47	C1.1	/	C1.2				
C1.2	Total work units	WU	63,022	R	237.95									
C1.3	Pipe supports	kg	5,194	R	-	C-Q2	5.68	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	8,074	R	-	C-Q3	0.13	C1.4	/	C1.2				
C1.5	Number of welds	No	11,544	R	-	C-Q4	0.39	C1.5	/	C1.1				
C1.6	Total fittings	No	5,778	R	-	C-Q5	0.20	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,405	R	-	C-Q6	0.42	C1.7	/	C1.6				
C1.8	Support number	No	1,978	R	-	C-Q7	0.38	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	63,022	R	237.95	DA-Q1	75.84	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	831	R	35.89									
	Average cost per examination / WU					DA-R1					6.63	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	63,022	R	237.95	DB-Q1	164.98	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	382	R	75.56									
	Average cost per examination / WU					DB-R1					3.15	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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Year of construction 1995

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	63,022	R	237.95	DC-Q1	313.54	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	201	R	113.60									
	Average cost per examination / WU					DC-R1					2.09	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	63,022	R	237.95	DD-Q1	48.89	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,289	R	26.98									
	Average cost per examination / WU					DD-R1					8.82	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	63,022	R	237.95	DE-Q1	107.36	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	587	R	154.05									
	Average cost per examination / WU					DE-R1					1.54	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	63,022	R	237.95	E-Q1	244.86	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	257.38	R	318.00	E-Q2	189.05	E1.1	/	E1.3				
E1.3	Structural steel	t	333.36	R	19,109.71									
	WU cost / install mechanical weight - receive					E-R1					0.75	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					60.09	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	63,022	R	237.95									
F1.2	Painting to piping	m2	3,870	R	104.30	F-Q1	16.28	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	2,085	R	268.82	F-Q2	30.23	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	184.95	R	462.33									
F1.5	Painting to mechanical equipment	m2	1,976	R	122.69	F-Q3	0.09	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	264	R	280.12	F-Q4	0.70	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.39	F1.2	/	F1.3
	Work unit / paint					F-R2					2.28	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.89	F1.1	/	F1.3
	Install plant / paint					F-R4					3.77	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.65	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	44,653	R	53.83									
G1.2	Electrical cable terminations	No	1,298	R	93.12	G-Q1	34.40	G1.1	/	G1.2				
G1.3	Electrical equipment	No	115	R	620.36	G-Q2	388.29	G1.1	/	G1.3				
G1.4	DB's	No	15	R	1,382.36	G-Q3	7.67	G1.3	/	G1.4				
G1.5	Rack	m	9,452	R	204.75	G-Q4	4.72	G1.1	/	G1.5				
G1.6	Support steel	kg	11,130	R	29.14	G-Q5	0.85	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	24,130	R	21.58	G-Q6	1.85	G1.1	/	G1.7				
G1.8	Instruments	No	1,053	R	112.66	G-Q7	22.92	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,802	R	114.41	G-Q8	0.38	G1.8	/	G1.9				
G1.10	Light fittings	No	734	R	359.05	G-Q9	6.38	G1.10	/	G1.3				
G1.11	Conduit	m	2,412	R	18.05	G-Q10	18.51	G1.1	/	G1.11				
G1.12	Instrument stands	No	231	R	631.72	G-Q11	4.56	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.58	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.09	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.45	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.98	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.85	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.26	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.19	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.19	G1.7	/	G1.8

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Year of construction 1998

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,931	R	43.23	AB-Q1	2.29	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,026	R	11.43									
AB1.3	Back fill and compact	m3	6,177	R	35.75	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	2,805	R	3.55	AB-Q3	2.47	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,168	R	4.40	AB-Q4	2.19	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.78	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.21	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					12.18	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.83	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	241,318.91									
AC1.2	EO for raking equipment	Item	1	R	26,404.60									
AC1.3	Number of piles	No	241	R	-									
AC1.4	Move rig to new position	No	153	R	231.58	AC-Q1	1.58	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	11	R	-	AC-Q2	21.91	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	260.80	AC-Q3	0.92	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	120	R	142.45	AC-Q4	0.09	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,461	R	150.09	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	432	R	294.80	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	150	R	601.50	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	120	R	256.34	AC-Q8	2.01	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	537	R	349.68	AC-Q9	0.45	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	78	R	709.76	AC-Q10	0.14	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	15.85	R	6,161.07	AC-Q11	15.21	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	208.55	R	8,756.25	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,372	R	1,206.81	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	150	R	1,303.71	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	95,115.21		1.00		/					
AC1.19	Load test to pile	No	3	R	40,699.28	AC-Q15	80.33	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	61,398.72	AC-Q16	241.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	162	R	331.65	AC-Q17	1.49	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.96	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.22	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.95	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.50	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.59	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.26	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					78.82	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					33.72	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.27	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	183	R	86.76	AD-Q1	0.24	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	770	R	71.62									
AD1.3	Kerbing	m	324	R	128.56	AD-Q2	0.14	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,258	R	-									
AD1.5	Remove top soil	m3	731	R	35.08	AD-Q3	0.36	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,043	R	107.47	AD-Q4	0.44	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	1,665	R	3.34									
AD1.8	Reduce levels	m3	1,190	R	26.80	AD-Q5	0.71	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	621	R	52.61	AD-Q6	1.92	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	403	R	186.55	AD-Q7	1.54	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	283	R	137.20	AD-Q8	4.20	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,797	R	19.21	AD-Q9	4.46	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	378	R	11.62	AD-Q10	1.14	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	235	R	4.16	AD-Q11	1.17	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	300	R	549.72	AD-Q12	0.73	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	37	R	171.32	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	222.15	AD-Q14	0.11	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	10	R	310.46	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	336	R	2.91	AD-Q16	1.04	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.21	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					10.50	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.02	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.51	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.28	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					2.04	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.59	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.69	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.09	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.33	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.73	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.41	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	177	R	845.91	AE-Q1	5.06	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	35	R	1,049.05	AE-Q2	0.11	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	360	R	-									
AE1.4	Rip and compact	m2	1,602	R	4.37									
AE1.5	Formwork to plinth	m2	350	R	154.28	AE-Q3	10.00	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	157	R	136.99	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.14	R	7,399.46	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,564	R	107.39	AE-Q6	498.09	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,156	R	58.61	AE-Q7	6.53	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	454	R	71.63	AE-Q8	2.56	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.81	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					193.57	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.15	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					68.90	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	2,795	R	-	AF-Q1	9.81	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	285	R	43.23	AF-Q2	0.98	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	290	R	109.12	AF-Q3	0.51	AF1.2	/	AF1.4				
AF1.4	Working space	m2	564	R	30.94	AF-Q4	0.76	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	217	R	1,602.62	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	130	R	39.84	AF-Q6	1.71	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	11	R	1,027.68	AF-Q7	0.05	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	978.74	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	222	R	-	AF-Q9	1.22	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	182	R	5.63									
AF1.11	Formwork to bases	m2	223	R	131.56	AF-Q10	1.03	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	127	R	143.87	AF-Q11	11.55	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	15	R	180.28	AF-Q12	7.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.63	R	7,464.23	AF-Q13	0.10	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	16.72	R	8,184.30	AF-Q14	13.28	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	465	R	47.76	AF-Q15	0.47	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	23	R	111.22	AF-Q16	0.48	AF1.7	/	AF1.17				
AF1.18	Manhole	No	4	R	3,180.31	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	72	R	502.36									
	Base excavation / backfill					AF-R1					0.40	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.40	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					37.07	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					40.23	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					23.77	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.61	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					284.66	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.08	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.14	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.18	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.91	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					33.56	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					9.24	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.19	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.16	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	234	R	51.05	AG-Q1	1.77	AG1.1	/	AG1.4				
AG1.2	Working space	m2	962	R	45.98	AG-Q2	0.24	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	40	R	51.47	AG-Q3	5.85	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	132	R	1,074.76	AG-Q4	0.73	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	105	R	1,526.88	AG-Q5	1.26	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	160	R	-									
AG1.7	Wood float	m2	128	R	6.16	AG-Q6	0.82	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	182	R	53.47	AG-Q7	0.73	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	298	R	137.27	AG-Q8	0.44	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	176	R	189.46	AG-Q9	0.60	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	14.08	R	4,706.28	AG-Q10	11.36	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,000	R	28.59	AG-Q11	0.08	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,660	R	47.68	AG-Q12	0.06	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.05	R	6,432.25	AG-Q13	51.22	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.90	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.01	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.13	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.12	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.38	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.98	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	235	R	43.97	AH-Q1	5.73	AH1.1	/	AH1.4				
AH1.2	Working space	m2	86	R	30.10	AH-Q2	2.73	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	251	R	87.01	AH-Q3	0.94	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	41	R	1,012.52	AH-Q4	0.63	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	23	R	1,343.08	AH-Q5	1.78	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	118	R	1,717.43	AH-Q6	0.35	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	10	R	770.21	AH-Q7	4.10	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	968.17	AH-Q8	20.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	204	R	-									
AH1.10	Blinding	m2	65	R	50.49	AH-Q9	3.14	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	609	R	5.49	AH-Q10	0.33	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	120	R	125.75	AH-Q11	0.34	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	51	R	226.07	AH-Q12	0.20	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	23	R	139.58	AH-Q13	0.09	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	132	R	136.65	AH-Q14	0.17	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	20	R	128.96	AH-Q15	5.90	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	42	R	78.07	AH-Q16	2.81	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.23	R	4,901.32	AH-Q17	0.44	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	5.04	R	6,541.16	AH-Q18	40.48	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	524	R	160.22	AH-Q19	0.23	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,072	R	29.82	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,680	R	25.67	AH-Q21	0.12	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.78	R	6,151.81	AH-Q22	261.54	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	438	R	59.69	AH-Q23	0.27	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	178	R	66.60	AH-Q24	0.66	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.46	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.51	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					20.05	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					184.43	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.75	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.59	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.31	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.05	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					8.05	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					3.41	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.94	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					9.83	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					13.32	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					22.00	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.75	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					40.83	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					219.35	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					254.82	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					28.77	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					25.79	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	151	R	34.28	AI-Q1	1.86	AI1.1	/	AI1.5				
AI1.2	Working space	m2	536	R	31.07	AI-Q2	0.28	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	131	R	87.01	AI-Q3	1.15	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	174	R	52.16	AI-Q4	0.47	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	81	R	1,490.37	AI-Q5	6.75	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	12	R	1,024.90	AI-Q6	0.59	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	99	R	-									
AI1.8	Wood float	m2	138	R	4.71									
AI1.9	Formwork bases	m2	146	R	126.26	AI-Q7	0.55	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	166	R	131.26	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	6.90	R	6,380.96	AI-Q9	14.35	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,428	R	50.90	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.82	R	5,062.67	AI-Q11	98.78	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.02	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.10	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.39	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					28.57	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.45	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					316.43	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.80	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.81	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					125.36	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.29	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	418	R	62.15	AJ-Q1	3.83	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	595	R	29.78	AJ-Q2	0.70	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	156	R	106.68	AJ-Q3	2.68	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	227	R	44.46	AJ-Q4	0.48	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	109	R	1,003.32	AJ-Q5	3.30	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	15	R	1,430.50	AJ-Q6	7.27	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	33	R	1,053.08									
AJ1.8	Total concrete	m3	183	R	-									
AJ1.9	Wood float	m2	217	R	7.16	AJ-Q7	0.84	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	161	R	138.62	AJ-Q8	0.68	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	182	R	144.63	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	14.92	R	10,488.33	AJ-Q10	12.27	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	2,319	R	23.00	AJ-Q11	0.05	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,372	R	30.75	AJ-Q12	0.08	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.35	R	6,414.85	AJ-Q13	80.74	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.06	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.09	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.58	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					22.57	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					140.13	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.24	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					9.89	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					456.01	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					341.08	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.16	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	513	R	85.35	AK-Q1	2.00	AK1.1	/	AK1.5				
AK1.2	Working space	m2	580	R	22.64	AK-Q2	0.88	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	164	R	65.41	AK-Q3	3.13	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	291	R	45.57	AK-Q4	0.88	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	257	R	1,023.97	AK-Q5	28.56	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	1,367.32									
AK1.7	Concrete plinth	m3	26	R	1,375.98	AK-Q6	9.88	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	219	R	-									
AK1.9	Wood float	m2	315	R	7.40	AK-Q7	0.82	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	467	R	221.46	AK-Q8	0.55	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	131	R	176.79	AK-Q9	0.20	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	256.74	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	20.76	R	6,501.16	AK-Q11	10.55	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,247	R	53.24	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.54	R	5,696.89	AK-Q13	86.22	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.08	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					3.77	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.30	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					22.47	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					138.37	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					4.62	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.78	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					5.33	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					122.11	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.18	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	405	R	48.12	AL-Q1	2.40	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,754	R	40.45	AL-Q2	0.23	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	225	R	64.43	AL-Q3	1.80	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	163	R	77.82	AL-Q4	1.04	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	169	R	863.02	AL-Q5	1.97	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	86	R	980.01	AL-Q6	2.05	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	42	R	1,510.69	AL-Q7	4.02	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	383	R	-									
AL1.9	Wood float	m2	254	R	6.61	AL-Q8	0.67	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	189	R	172.56	AL-Q9	0.89	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	700	R	137.89	AL-Q10	0.12	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	143	R	221.82	AL-Q11	0.29	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	77	R	197.00	AL-Q12	0.55	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	18	R	146.34	AL-Q13	4.78	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	20.26	R	6,725.73	AL-Q14	18.90	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	10,171	R	39.78	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	209	R	33.75	AL-Q16	1.83	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.87	R	8,038.11	AL-Q17	440.23	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.06	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.19	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.75	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					11.09	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					130.56	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.88	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.88	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					5.00	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.81	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.11	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					7.67	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.81	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					10.32	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					169.07	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					199.28	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.11	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	855	R	67.98	AM-Q1	2.46	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,458	R	30.76	AM-Q2	0.59	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	749	R	98.49	AM-Q3	1.14	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	380	R	56.60	AM-Q4	0.91	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	347	R	1,186.95									
AM1.6	Concrete column	m3	75	R	1,490.37	AM-Q5	4.63	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	133	R	1,021.61	AM-Q6	0.56	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	212	R	1,717.43	AM-Q7	1.64	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	42	R	1,162.77	AM-Q8	1.79	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	144	R	1,723.66	AM-Q9	0.52	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	618	R	-									
AM1.12	Wood float	m2	1,310	R	9.94	AM-Q10	0.47	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	634	R	124.39	AM-Q11	0.55	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	598	R	186.71	AM-Q12	0.13	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	610	R	246.15	AM-Q13	0.22	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	170	R	154.83	AM-Q14	0.78	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	705	R	251.85	AM-Q15	0.30	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	507.99	AM-Q16	18.75	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	503	R	115.07	AM-Q17	0.08	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	137.37	R	6,384.73	AM-Q18	4.50	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	2,913	R	41.61	AM-Q19	0.21	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	1,998	R	34.05	AM-Q20	0.31	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	52	R	934.45	AM-Q21	2.64	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.85	R	6,158.63	AM-Q22	727.06	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.21	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.69	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					20.97	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.80	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.16	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.69	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.02	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.69	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					119.41	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					9.54	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.15	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					6.60	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.98	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.01	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					6.84	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					10.10	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					153.44	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					187.51	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					6.83	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.19	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,009	R	43.97	AN-Q1	0.86	AN1.1	/	AN1.5				
AN1.2	Working space	m2	298	R	30.10	AN-Q2	6.74	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	450	R	63.35	AN-Q3	4.46	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,320	R	78.09	AN-Q4	1.78	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,349	R	1,561.48	AN-Q5								
AN1.6	Concrete column	m3	68	R	968.17	AN-Q6	34.54	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	25	R	1,003.32	AN-Q7	2.72	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	121	R	1,430.50	AN-Q8	19.41	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	1,021.61	AN-Q9	17.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,363	R	-				/					
AN1.11	Wood float	m2	2,181	R	6.52	AN-Q10	1.08	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	105	R	124.39	AN-Q11	22.37	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	315	R	195.97	AN-Q12	0.22	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	156	R	173.52	AN-Q13	0.16	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	65	R	126.27	AN-Q14	0.38	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	28	R	276.50	AN-Q15	0.14	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	310.58	AN-Q16	587.25	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,127	R	136.97	AN-Q17	0.11	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	328.48	R	9,954.58	AN-Q18	7.19	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	10,972	R	23.53	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,194	R	35.83	AN-Q20	0.33	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	126	R	1,141.57	AN-Q21	18.75	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.09	R	5,294.57	AN-Q22	2155.05	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.03	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.46	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.69	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					20.00	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					239.49	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					12.55	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.78	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					7.95	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.94	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.23	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					3.69	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					10.44	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					423.06	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					277.83	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.29	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					8.72	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	195	R	36.60	AO-Q1	1.08	AO1.1	/	AO1.5				
AO1.2	Working space	m2	752	R	30.95	AO-Q2	0.26	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	141	R	81.34	AO-Q3	1.38	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	27	R	55.37	AO-Q4	6.67	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	180	R	770.21									
AO1.6	Concrete column	m3	20	R	1,027.90	AO-Q5	9.00	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	10	R	1,490.37	AO-Q6	2.00	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	1,024.90	AO-Q7	45.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,641.88	AO-Q8	20.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	32	R	-									
AO1.11	Wood float	m2	28	R	6.25	AO-Q9	6.43	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	140	R	183.80	AO-Q10	1.29	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	133	R	145.50	AO-Q11	0.15	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	46	R	181.47	AO-Q12	0.22	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	18	R	222.57	AO-Q13	0.56	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	180.89	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	56	R	397.26	AO-Q15	3.21	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	21	R	146.50	AO-Q16	0.19	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.66	R	7,553.34	AO-Q17	6.87	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,034	R	43.36	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,673	R	29.49	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	9	R	1,086.03	AO-Q20	3.56	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.62	R	8,183.18	AO-Q21	38.96	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.18	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.45	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					13.91	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					123.23	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					4.19	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.21	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.70	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.06	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.75	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					9.08	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.00	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					174.20	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					256.13	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.09	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.96	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	950	R	87.44	AP-Q1	1.39	AP1.1	/	AP1.5				
AP1.2	Working space	m2	445	R	21.65	AP-Q2	2.13	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	926	R	67.01	AP-Q3	1.03	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	185	R	45.41	AP-Q4	3.70	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	684	R	1,093.14	AP-Q5	0.31	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,183	R	111.62									
AP1.7	Rough formwork	m2	158	R	134.79	AP-Q6	4.33	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,155	R	222.39	AP-Q7	0.59	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,658	R	8.80	AP-Q8	0.26	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	195	R	52.94	AP-Q9	3.51	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	46	R	47.06	AP-Q10	14.87	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	406	R	28.59	AP-Q11	1.68	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.82	R	8,561.30	AP-Q12	834.15	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,487	R	279.17	AP-Q13	0.46	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,367	R	-	AP-Q14	6.38	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,390	R	118.03	AP-Q15	3.14	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,737	R	219.67	AP-Q16	2.51	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,911	R	79.59	AP-Q17	1.50	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	1,311.57	AP-Q18	623.86	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,949	R	326.46	AP-Q19	1.11	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,337	R	128.47	AP-Q20	1.87	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	107.50	R	10,164.00	AP-Q21	6.36	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	32,675.00									
AP1.24	Structural steel	Item	1	R	84,608.57									
AP1.25	Plumbing and drainage	Item	1	R	53,873.57									
AP1.26	Small power and lighting	Item	1	R	458,965.00									
AP1.27	External works	Item	1	R	198,325.00									
	Excavations / concrete					AP-R1					0.08	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					4.04	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.30	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					24.07	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					91.06	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					8.11	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					4.92	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					124.22	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					20.65	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					23.23	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					355.51	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.13	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					9.26	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					46.27	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					3.51	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.21	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.86	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.17	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.21	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.32	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.30	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					45.16	AP1.26	/	AP1.22
	External works / concrete					AP-R23					181.43	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	92	R	773.44	AQ-Q1	1.74	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	160	R	130.80									
AQ1.3	Reinforcement	t	11.72	R	6,228.37	AQ-Q2	7.85	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	620	R	108.56	AQ-Q3	0.15	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	223	R	186.91	AQ-Q4	0.41	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	112	R	165.41	AQ-Q5	8.17	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	994	R	106.81	AQ-Q6	0.92	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	50.00	R	30,710.91	AQ-Q7	18.30	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	440	R	90.95	AQ-Q8	2.08	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	1	R	9,283.32	AQ-Q9	915.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	30	R	1,730.54	AQ-Q10	30.50	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	742	R	56.15	AQ-Q11	1.23	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	915	R	-									
	Concrete / reinforcement					AQ-R1					0.12	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.91	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.12	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					4.14	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.68	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					287.53	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.85	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.30	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					16.20	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.90	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	104	R	175.12	AR-Q1	2.42	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	43	R	1,216.03	AR-Q2	6.92	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.21	R	9,716.53									
AR1.4	Mesh	m2	396	R	89.72	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	150	R	134.79	AR-Q4	0.29	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	70	R	255.76	AR-Q5	5.43	AR1.15	/	AR1.6				
AR1.7	Screed	m2	592	R	27.24	AR-Q6	0.64	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	24.11	R	30,766.30	AR-Q7	15.76	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	2,388.33	AR-Q8	2.19	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	52	R	1,237.88	AR-Q9	0.46	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	55	R	208.42	AR-Q10	0.44	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	428	R	100.05	AR-Q11	0.89	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	96	R	134.38	AR-Q12	3.96	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	26	R	1,371.13	AR-Q13	0.93	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	380	R	-									
	Earthworks / concrete					AR-R1					0.14	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.13	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					13.55	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					9.02	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.75	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					44.64	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					12.88	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					24.85	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					5.94	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					307.51	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.34	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					22.44	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	358	R	147.99	AS-Q1	6.07	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	92	R	51.74	AS-Q2	0.64	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	59	R	1,485.28	AS-Q3	8.45	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	6.98	R	8,704.44									
AS1.5	Mesh	m2	119	R	111.01	AS-Q4	0.50	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	251	R	198.86	AS-Q5	0.24	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	110	R	9.99	AS-Q6	0.54	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	29	R	75.53	AS-Q7	2.03	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	605	R	43.36	AS-Q8	0.10	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.14	R	6,441.73	AS-Q9	51.75	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	28	R	123.34	AS-Q10	0.25	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	2,056.41	AS-Q11	3.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	54	R	440.02	AS-Q12	2.26	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	358	R	54.94	AS-Q13	0.16	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.49	R	14,404.45	AS-Q14	4.70	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.08	R	26,405.22	AS-Q15	112.96	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	122	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					10.04	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					28.71	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					78.41	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.47	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					148.68	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					19.66	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					200.75	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.38	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.23	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.60	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.33	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	298	R	147.99	AU-Q1	1.19	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	230	R	52.16	AU-Q2	1.09	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	251	R	1,343.08									
AU1.4	Reinforcement	t	47.64	R	7,163.18	AU-Q3	5.27	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,048	R	191.49	AU-Q4	0.24	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	204	R	65.01	AU-Q5	1.23	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,269	R	43.95	AU-Q6	0.20	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	580	R	34.16	AU-Q7	0.43	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	33	R	232.85	AU-Q8	7.61	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.51	R	18,476.87	AU-Q9	71.51	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	9	R	2,949.17	AU-Q10	27.89	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	20	R	207.89	AU-Q11	11.00	AU1.12	/	AU1.13				
AU1.13	Total area	m2	220	R	-									
	Concrete / earthworks					AU-R1					9.08	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					25.75	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.01	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.19	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					20.66	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					162.98	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.39	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					209.69	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					30.76	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.46	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					6.46	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	880	R	196.98	AW-Q1	6.72	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	78	R	50.49	AW-Q2	1.68	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	131	R	739.56	AW-Q3	10.69	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	12.25	R	6,253.35									
AW1.5	Mesh	m2	101	R	151.72	AW-Q4	1.30	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	450	R	131.26	AW-Q5	0.29	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,441	R	30.01	AW-Q6	0.05	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	3.69	R	17,235.42	AW-Q7	9.49	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	35	R	-									
	Concrete / earthworks					AW-R1					3.75	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					14.65	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					41.22	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.63	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					208.38	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.36	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	22	R	-									
BA1.2	Steel	t	3.30	R	33,976.27	BA-Q1	6.67	BA1.1	/	BA1.2				
BA1.3	Handrail	m	14	R	651.19	BA-Q2	1.57	BA1.1	/	BA1.3				
BA1.4	Grating	m2	13	R	1,297.01	BA-Q3	1.69	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	13	R	253.48	BA-Q4	1.69	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	296.88	BA-Q5	4.40	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					52.18	BA1.2	/	BA1.3
	Steel / grating					BA-R2					26.20	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					134.04	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					114.44	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	922	R	-									
BB1.2	Steel	t	42.09	R	19,916.63	BB-Q1	21.91	BB1.1	/	BB1.2				
BB1.3	Handrail	m	140	R	919.89	BB-Q2	6.59	BB1.1	/	BB1.3				
BB1.4	Grating	m2	70	R	1,516.30	BB-Q3	13.17	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	89	R	336.73	BB-Q4	10.36	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	12	R	4,313.67	BB-Q5	76.83	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					21.65	BB1.2	/	BB1.3
	Steel / grating					BB-R2					13.14	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					59.15	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					4.62	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	15,091	R	-									
BC1.2	Steel	t	263.50	R	35,661.50	BC-Q1	57.27	BC1.1	/	BC1.2				
BC1.3	Handrail	m	423	R	651.19	BC-Q2	35.68	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,972	R	1,297.01	BC-Q3	3.04	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	269	R	374.53	BC-Q4	56.10	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	54	R	220.42	BC-Q5	279.46	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	74	R	3,968.98	BC-Q6	203.93	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					54.76	BC1.2	/	BC1.3
	Steel / grating					BC-R2					27.50	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					95.22	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					161.79	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.99	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	419	R	-									
BD1.2	Steel	t	17.29	R	24,646.44	BD-Q1	24.23	BD1.1	/	BD1.2				
BD1.3	Handrail	m	16	R	1,152.10	BD-Q2	26.19	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	1,323.71	BD-Q3	52.38	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	9	R	260.64	BD-Q4	46.56	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	31	R	3,982.59	BD-Q5	13.52	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					21.39	BD1.1	/	BD1.2
	Steel / grating					BD-R2					18.62	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					94.56	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					6.19	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	29	R	-									
BE1.2	Steel	t	2.33	R	17,930.24	BE-Q1	12.45	BE1.1	/	BE1.2				
BE1.3	Handrail	m	48	R	789.74	BE-Q2	0.60	BE1.1	/	BE1.3				
BE1.4	Grating	m2	27	R	1,736.23	BE-Q3	1.07	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	33	R	294.71	BE-Q4	0.88	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	221.13	BE-Q5	4.83	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					22.70	BE1.2	/	BE1.3
	Steel / grating					BE-R2					10.33	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					60.84	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					81.08	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	243	R	-									
BF1.2	Steel	t	30.32	R	21,036.77	BF-Q1	8.01	BF1.1	/	BF1.2				
BF1.3	Handrail	m	12	R	806.16	BF-Q2	20.25	BF1.1	/	BF1.3				
BF1.4	Grating	m2	51	R	1,906.20	BF-Q3	4.76	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	9	R	193.63	BF-Q4	27.00	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	15	R	2,581.74	BF-Q5	16.20	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					26.10	BF1.1	/	BF1.2
	Steel / grating					BF-R2					11.04	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					108.64	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.15	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	25,949	R	-	C-Q1	0.50	C1.1	/	C1.2				
C1.2	Total work units	WU	51,510	R	271.61									
C1.3	Pipe supports	kg	6,440	R	-	C-Q2	4.03	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	6,632	R	-	C-Q3	0.13	C1.4	/	C1.2				
C1.5	Number of welds	No	10,161	R	-	C-Q4	0.39	C1.5	/	C1.1				
C1.6	Total fittings	No	4,746	R	-	C-Q5	0.18	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,116	R	-	C-Q6	0.45	C1.7	/	C1.6				
C1.8	Support number	No	1,941	R	-	C-Q7	0.30	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	51,510	R	271.61	DA-Q1	75.53	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	682	R	42.89									
	Average cost per examination / WU					DA-R1					6.33	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	51,510	R	271.61	DB-Q1	168.89	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	305	R	95.26									
	Average cost per examination / WU					DB-R1					2.85	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	51,510	R	271.61	DC-Q1	261.47	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	197	R	148.50									
	Average cost per examination / WU					DC-R1					1.83	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	51,510	R	271.61	DD-Q1	69.33	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	743	R	47.73									
	Average cost per examination / WU					DD-R1					5.69	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	51,510	R	271.61	DE-Q1	69.42	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	742	R	184.09									
	Average cost per examination / WU					DE-R1					1.48	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	51,510	R	271.61	E-Q1	196.33	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	262.36	R	452.42	E-Q2	179.85	E1.1	/	E1.3				
E1.3	Structural steel	t	286.40	R	23,887.14									
	WU cost / install mechanical weight - receive					E-R1					0.60	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					52.80	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	51,510	R	271.61									
F1.2	Painting to piping	m2	4,447	R	169.96	F-Q1	11.58	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,393	R	522.38	F-Q2	36.98	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	225.81	R	280.72									
F1.5	Painting to mechanical equipment	m2	1,458	R	115.67	F-Q3	0.15	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	315	R	360.08	F-Q4	0.72	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.33	F1.2	/	F1.3
	Work unit / paint					F-R2					1.60	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.52	F1.1	/	F1.3
	Install plant / paint					F-R4					2.43	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.78	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	27,560	R	39.94									
G1.2	Electrical cable terminations	No	1,070	R	115.37	G-Q1	25.76	G1.1	/	G1.2				
G1.3	Electrical equipment	No	96	R	606.42	G-Q2	287.08	G1.1	/	G1.3				
G1.4	DB's	No	11	R	2,252.67	G-Q3	8.73	G1.3	/	G1.4				
G1.5	Rack	m	6,176	R	231.86	G-Q4	4.46	G1.1	/	G1.5				
G1.6	Support steel	kg	9,796	R	20.54	G-Q5	0.63	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	20,578	R	23.77	G-Q6	1.34	G1.1	/	G1.7				
G1.8	Instruments	No	1,148	R	216.78	G-Q7	17.93	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,497	R	162.59	G-Q8	0.77	G1.8	/	G1.9				
G1.10	Light fittings	No	376	R	260.04	G-Q9	3.92	G1.10	/	G1.3				
G1.11	Conduit	m	2,793	R	40.72	G-Q10	9.87	G1.1	/	G1.11				
G1.12	Instrument stands	No	206	R	636.74	G-Q11	5.57	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.35	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.27	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					0.98	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.94	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.17	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.15	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.04	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.11	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,116	R	28.95	AB-Q1	2.14	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,328	R	7.65									
AB1.3	Back fill and compact	m3	6,341	R	28.59	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,085	R	2.55	AB-Q3	2.31	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,484	R	2.95	AB-Q4	2.04	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.78	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.01	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.35	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.81	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	147,992.31									
AC1.2	EO for raking equipment	Item	1	R	19,339.48									
AC1.3	Number of piles	No	253	R	-									
AC1.4	Move rig to new position	No	172	R	169.61	AC-Q1	1.47	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	19.46	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	19	R	325.18	AC-Q3	0.68	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	69	R	52.31	AC-Q4	0.19	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,023	R	100.75	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	458	R	191.11	AC-Q6	0.55	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	153	R	454.72	AC-Q7	1.65	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	123	R	146.41	AC-Q8	2.06	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	551	R	246.73	AC-Q9	0.46	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	87	R	435.27	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.61	R	4,512.54	AC-Q11	15.23	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	218.55	R	5,985.77	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,541	R	883.90	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	169	R	954.88	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	118,594.62		1.00		/					
AC1.19	Load test to pile	No	2	R	14,945.33	AC-Q15	126.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	41,214.10	AC-Q16	253.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	172	R	215.00	AC-Q17	1.47	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					167.43	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.52	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.51	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.17	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.28	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.49	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.75	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					6.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					16.91	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.63	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	111	R	36.61	AD-Q1	0.13	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	874	R	48.86									
AD1.3	Kerbing	m	453	R	118.86	AD-Q2	0.20	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,314	R	-									
AD1.5	Remove top soil	m3	1,057	R	34.43	AD-Q3	1.03	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,030	R	32.28	AD-Q4	0.40	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,662	R	3.41									
AD1.8	Reduce levels	m3	1,268	R	18.24	AD-Q5	0.48	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	901	R	52.65	AD-Q6	1.41	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	286	R	80.59	AD-Q7	3.15	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	326	R	93.69	AD-Q8	3.89	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,943	R	10.78	AD-Q9	6.79	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	407	R	9.49	AD-Q10	0.53	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	289	R	2.83	AD-Q11	0.90	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	412	R	493.99	AD-Q12	0.64	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	27	R	82.74	AD-Q13	0.91	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	130.01	AD-Q14	0.06	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	11	R	202.20	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	404	R	1.94	AD-Q16	0.89	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.75	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					10.10	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					5.35	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.35	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.65	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.19	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.61	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.13	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					2.99	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.47	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.02	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.16	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.70	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.09	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.70	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	182	R	483.15	AE-Q1	5.06	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	36	R	740.20	AE-Q2	0.11	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	405	R	-									
AE1.4	Rip and compact	m2	1,679	R	3.20									
AE1.5	Formwork to plinth	m2	367	R	105.46	AE-Q3	10.19	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	177	R	100.33	AE-Q4	0.97	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.53	R	5,419.57	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,571	R	133.90	AE-Q6	728.33	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	665	R	21.52	AE-Q7	3.65	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	511	R	48.08	AE-Q8	2.81	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.65	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					150.98	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.14	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.21	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.47	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.10	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	2,869	R	-	AF-Q1	9.17	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	313	R	31.02	AF-Q2	1.83	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	171	R	34.33	AF-Q3	0.57	AF1.2	/	AF1.4				
AF1.4	Working space	m2	545	R	21.16	AF-Q4	0.57	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	177	R	957.96	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	201	R	37.76	AF-Q6	1.21	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	10	R	715.48	AF-Q7	0.06	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	702.25	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	244	R	-	AF-Q9	1.40	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	174	R	3.77									
AF1.11	Formwork to bases	m2	245	R	94.40	AF-Q10	1.38	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	156	R	98.11	AF-Q11	15.60	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	20	R	162.01	AF-Q12	6.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.20	R	3,604.91	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	16.26	R	4,789.93	AF-Q14	15.01	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	509	R	31.11	AF-Q15	0.35	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	33	R	112.40	AF-Q16	0.30	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	3,194.55	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	103	R	389.71									
	Base excavation / backfill					AF-R1					0.90	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.47	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					30.88	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					25.37	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					23.07	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.73	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					254.10	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.10	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.14	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.23	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.75	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					30.79	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					6.37	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.46	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	362	R	61.24	AG-Q1	2.74	AG1.1	/	AG1.4				
AG1.2	Working space	m2	454	R	15.16	AG-Q2	0.80	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	60	R	32.96	AG-Q3	6.03	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	132	R	688.21	AG-Q4	0.93	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	113	R	1,001.84	AG-Q5	1.17	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	195	R	-									
AG1.7	Wood float	m2	140	R	4.63	AG-Q6	0.81	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	142	R	61.96	AG-Q7	0.93	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	537	R	69.31	AG-Q8	0.25	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	96	R	92.49	AG-Q9	1.18	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	19.22	R	6,959.12	AG-Q10	10.15	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	3,018	R	29.14	AG-Q11	0.06	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,720	R	23.85	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2	R	6,332.01	AG-Q13	56.50	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.09	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.25	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.54	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.09	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.10	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.09	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					10.11	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					9.20	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	392	R	37.46	AH-Q1	11.53	AH1.1	/	AH1.4				
AH1.2	Working space	m2	68	R	23.94	AH-Q2	5.76	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	303	R	44.76	AH-Q3	1.29	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	34	R	1,040.21	AH-Q4	0.39	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	32	R	957.96	AH-Q5	1.06	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	60	R	733.01	AH-Q6	0.57	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	1,083.93	AH-Q7	2.62	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	769.49	AH-Q8	11.33	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	161	R	-									
AH1.10	Blinding	m2	88	R	53.77	AH-Q9	1.83	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	652	R	4.55	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	123	R	154.54	AH-Q11	0.28	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	42	R	104.63	AH-Q12	0.31	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	38	R	171.93	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	218	R	160.37	AH-Q14	0.15	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	22	R	135.87	AH-Q15	2.73	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	49	R	30.82	AH-Q16	1.22	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.80	R	5,842.62	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	12.56	R	6,804.95	AH-Q18	12.82	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	441	R	62.83	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	827	R	21.37	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,485	R	30.60	AH-Q21	0.11	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.83	R	4,605.28	AH-Q22	193.98	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	391	R	36.27	AH-Q23	0.15	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	256	R	67.56	AH-Q24	0.23	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.56	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.84	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.35	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					228.62	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.09	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.42	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.96	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.35	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					6.73	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					10.36	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.48	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.97	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					5.39	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					23.78	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.86	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					108.31	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					318.43	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					222.38	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.23	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					20.21	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					10.85	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	234	R	34.40	AI-Q1	2.52	AI1.1	/	AI1.5				
AI1.2	Working space	m2	863	R	26.99	AI-Q2	0.27	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	105	R	48.97	AI-Q3	2.23	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	185	R	42.82	AI-Q4	0.50	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	93	R	1,043.78	AI-Q5	8.45	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	11	R	619.57	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	68	R	-									
AI1.8	Wood float	m2	262	R	6.09									
AI1.9	Formwork bases	m2	149	R	91.11	AI-Q7	0.62	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	158	R	91.11	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.23	R	5,985.77	AI-Q9	9.41	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,458	R	26.28	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.89	R	6,246.85	AI-Q11	104.49	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.27	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.70	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					24.38	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.68	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					171.39	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.46	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.80	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					227.77	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.17	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	429	R	49.71	AJ-Q1	5.88	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	749	R	21.37	AJ-Q2	0.57	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	167	R	76.54	AJ-Q3	2.57	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	211	R	27.79	AJ-Q4	0.35	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	73	R	719.89	AJ-Q5	1.97	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	29	R	957.96	AJ-Q6	2.52	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	37	R	688.21									
AJ1.8	Total concrete	m3	136	R	-									
AJ1.9	Wood float	m2	277	R	4.55	AJ-Q7	0.49	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	162	R	99.93	AJ-Q8	0.45	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	284	R	158.33	AJ-Q9	0.10	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	13.34	R	3,282.28	AJ-Q10	10.19	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,523	R	24.58	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,321	R	27.36	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.16	R	4,295.85	AJ-Q13	62.93	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.33	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.65	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					25.90	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					158.22	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.20	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.05	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					133.53	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					119.97	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	565	R	37.41	AK-Q1	2.83	AK1.1	/	AK1.5				
AK1.2	Working space	m2	595	R	22.16	AK-Q2	0.95	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	181	R	50.17	AK-Q3	3.12	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	411	R	43.87	AK-Q4	0.49	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	200	R	1,069.35	AK-Q5	25.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	8	R	734.70									
AK1.7	Concrete plinth	m3	59	R	1,093.58	AK-Q6	3.39	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	355	R	-									
AK1.9	Wood float	m2	304	R	6.13	AK-Q7	0.66	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	489	R	92.44	AK-Q8	0.41	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	189	R	140.76	AK-Q9	0.31	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	43	R	80.68	AK-Q10	0.19	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	26.44	R	7,142.48	AK-Q11	13.43	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	7,443	R	18.06	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.14	R	4,307.51	AK-Q13	165.89	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.03	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.69	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.75	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					24.38	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					174.45	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					11.57	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.77	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.11	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					395.49	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.25	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	323	R	36.13	AL-Q1	3.08	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,909	R	27.65	AL-Q2	0.17	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	169	R	43.15	AL-Q3	1.91	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	283	R	40.61	AL-Q4	0.37	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	105	R	1,043.78	AL-Q5	0.89	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	118	R	1,083.93	AL-Q6	2.00	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	59	R	963.67	AL-Q7	1.78	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	306	R	-									
AL1.9	Wood float	m2	323	R	5.18	AL-Q8	0.33	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	233	R	155.10	AL-Q9	0.45	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	741	R	148.66	AL-Q10	0.16	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	183	R	99.88	AL-Q11	0.32	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	77	R	131.26	AL-Q12	0.77	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	147.89	AL-Q13	10.73	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	45.87	R	6,755.85	AL-Q14	6.67	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	13,844	R	31.81	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	208	R	16.84	AL-Q16	1.47	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.88	R	4,324.03	AL-Q17	347.73	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.03	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.31	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.84	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					25.70	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					201.50	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.96	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.96	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.73	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					9.65	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.29	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					7.34	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					9.65	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					6.52	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					212.38	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					401.18	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.24	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,403	R	35.91	AM-Q1	7.42	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,466	R	22.16	AM-Q2	0.96	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	781	R	59.86	AM-Q3	1.80	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	651	R	40.61	AM-Q4	0.29	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	189	R	851.65									
AM1.6	Concrete column	m3	98	R	619.57	AM-Q5	1.93	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	143	R	709.11	AM-Q6	0.69	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	152	R	940.62	AM-Q7	1.24	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	43	R	1,061.63	AM-Q8	2.28	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	133	R	1,093.58	AM-Q9	0.74	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,198	R	-									
AM1.12	Wood float	m2	1,433	R	6.13	AM-Q10	0.84	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	863	R	134.11	AM-Q11	0.22	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	680	R	148.66	AM-Q12	0.14	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	500	R	99.88	AM-Q13	0.29	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	169	R	195.72	AM-Q14	0.85	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	682	R	129.79	AM-Q15	0.22	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	364.48	AM-Q16	16.33	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	316	R	71.92	AM-Q17	0.14	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	96.54	R	4,581.09	AM-Q18	12.41	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,288	R	27.87	AM-Q19	0.23	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,021	R	24.43	AM-Q20	0.59	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	58	R	625.78	AM-Q21	1.66	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.77	R	4,418.86	AM-Q22	1555.84	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.62	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.60	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					20.97	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.37	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.20	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.91	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.80	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.78	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					138.93	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.35	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					7.10	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.62	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.17	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					1.95	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					8.43	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					14.76	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					164.37	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					187.52	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					7.32	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.19	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	172	R	30.79	AO-Q1	1.30	AO1.1	/	AO1.5				
AO1.2	Working space	m2	518	R	21.08	AO-Q2	0.33	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	142	R	60.94	AO-Q3	1.21	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	21	R	51.61	AO-Q4	6.29	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	132	R	715.48									
AO1.6	Concrete column	m3	31	R	1,058.01	AO-Q5	4.26	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	10	R	755.59	AO-Q6	3.10	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	788.34	AO-Q7	33.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,154.29	AO-Q8	31.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	27	R	-									
AO1.11	Wood float	m2	28	R	4.71	AO-Q9	4.71	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	131	R	123.04	AO-Q10	1.01	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	148	R	104.40	AO-Q11	0.21	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	46	R	121.52	AO-Q12	0.22	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	15	R	149.05	AO-Q13	0.67	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	129.79	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	71	R	285.04	AO-Q15	1.86	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	105.11	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.06	R	5,419.57	AO-Q17	5.34	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,407	R	31.11	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,163	R	19.75	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	779.23	AO-Q20	2.70	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.45	R	6,544.89	AO-Q21	29.66	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.46	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.51	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					13.86	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					151.91	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.82	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.22	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.07	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					10.13	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.65	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					8.89	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.50	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					174.21	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					274.41	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.11	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.96	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,780	R	26.92	AP-Q1	2.66	AP1.1	/	AP1.5				
AP1.2	Working space	m2	398	R	21.16	AP-Q2	4.47	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	965	R	43.62	AP-Q3	1.84	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	163	R	36.93	AP-Q4	4.10	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	668	R	1,018.82	AP-Q5	0.43	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,547	R	68.72									
AP1.7	Rough formwork	m2	241	R	95.10	AP-Q6	2.77	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,679	R	136.39	AP-Q7	0.40	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,906	R	6.45	AP-Q8	0.23	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	151	R	35.45	AP-Q9	4.42	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	34	R	44.76	AP-Q10	19.65	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	305	R	30.26	AP-Q11	2.19	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.11	R	5,733.27	AP-Q12	601.80	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,029	R	171.21	AP-Q13	0.33	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,906	R	-	AP-Q14	4.35	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,440	R	96.28	AP-Q15	2.02	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,910	R	110.55	AP-Q16	1.52	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	5,128	R	73.47	AP-Q17	0.57	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	821.70	AP-Q18	415.14	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,544	R	218.62	AP-Q19	0.64	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,700	R	92.18	AP-Q20	1.08	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	101.12	R	7,292.74	AP-Q21	6.61	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	22,883.87									
AP1.24	Structural steel	Item	1	R	59,255.44									
AP1.25	Plumbing and drainage	Item	1	R	37,730.25									
AP1.26	Small power and lighting	Item	1	R	321,435.22									
AP1.27	External works	Item	1	R	138,896.52									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.27	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.62	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					27.59	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					106.12	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					10.71	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.47	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					157.96	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					28.74	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					22.76	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					241.00	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.18	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.58	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					65.97	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.33	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.21	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.78	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.86	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.14	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.13	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.17	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					44.08	AP1.26	/	AP1.22
	External works / concrete					AP-R23					136.33	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	73	R	717.79	AQ-Q1	2.22	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	162	R	146.35									
AQ1.3	Reinforcement	t	9	R	3,296.04	AQ-Q2	8.11	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	621	R	72.99	AQ-Q3	0.12	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	293	R	128.72	AQ-Q4	0.25	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	101	R	134.57	AQ-Q5	8.44	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	767	R	73.08	AQ-Q6	1.11	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	55.81	R	22,615.86	AQ-Q7	15.27	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	448	R	48.66	AQ-Q8	1.90	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	6,070.44	AQ-Q9	426.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	40	R	1,059.53	AQ-Q10	21.30	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	771	R	40.83	AQ-Q11	1.11	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	852	R	-									
	Concrete / reinforcement					AQ-R1					0.22	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					4.90	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.83	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.58	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.33	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					309.47	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.67	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.27	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.50	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.79	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	219	R	119.72	AR-Q1	4.56	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	48	R	1,202.80	AR-Q2	6.68	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	7.19	R	3,432.63									
AR1.4	Mesh	m2	436	R	76.35	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	148	R	140.51	AR-Q4	0.32	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	77	R	121.23	AR-Q5	5.94	AR1.15	/	AR1.6				
AR1.7	Screed	m2	415	R	18.91	AR-Q6	1.10	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	28.67	R	14,825.90	AR-Q7	15.94	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	10	R	1,443.79	AR-Q8	2.87	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	41	R	540.68	AR-Q9	0.70	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	58	R	269.87	AR-Q10	0.49	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	477	R	72.20	AR-Q11	0.96	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	136	R	88.36	AR-Q12	3.36	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	30	R	897.43	AR-Q13	0.96	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	457	R	-									
	Earthworks / concrete					AR-R1					0.10	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.35	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					15.75	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.56	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					9.92	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					63.61	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					10.27	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					27.42	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.00	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					205.34	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.22	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					16.52	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	251	R	91.35	AS-Q1	2.44	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	135	R	37.06	AS-Q2	0.76	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	103	R	1,095.55	AS-Q3	19.11	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	5.39	R	3,604.91									
AS1.5	Mesh	m2	128	R	79.83	AS-Q4	0.80	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	231	R	96.85	AS-Q5	0.45	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	125	R	7.17	AS-Q6	0.82	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	24	R	54.20	AS-Q7	4.29	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	1,101	R	31.11	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.91	R	4,291.94	AS-Q9	113.19	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	29	R	124.65	AS-Q10	0.24	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,867.00	AS-Q11	2.33	AS1.18	/	AS1.12				
AS1.13	Pipework	m	62	R	272.54	AS-Q12	2.31	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	529	R	35.39	AS-Q13	0.19	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.46	R	22,833.87	AS-Q14	2.85	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.83	R	16,940.28	AS-Q15	172.29	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	143	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					11.99	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					29.56	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					45.16	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					11.31	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					152.80	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					20.21	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					115.88	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					4.02	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.26	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.16	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.21	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.07	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	145	R	90.25	AT-Q1	18.13	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	13	R	36.53	AT-Q2	0.62	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	8	R	1,232.27	AT-Q3	4.65	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.72	R	3,282.28									
AT1.5	Formwork	m2	173	R	94.76	AT-Q4	0.05	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	37	R	11.20	AT-Q5	0.22	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	23	R	38.46	AT-Q6	0.35	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.61	R	20.44	AT-Q7	13.11	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.30	R	5,995.89	AT-Q8	26.67	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.13	R	23.85	AT-Q9	61.54	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.60	R	19,170.48	AT-Q10	50.00	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.68	R	19,224.65	AT-Q11	17.86	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	58	R	148.62	AT-Q12	0.52	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	16	R	110.36	AT-Q13	1.88	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	30	R	-									
	Concrete / earthworks					AT-R1					13.65	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					33.73	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					13.00	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					110.02	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					32.04	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					160.58	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.86	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.21	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.17	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.17	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					8.29	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.35	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	346	R	88.46	AU-Q1	1.80	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	366	R	57.82	AU-Q2	0.52	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	192	R	541.67									
AU1.4	Reinforcement	t	42.09	R	4,580.13	AU-Q3	4.56	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,153	R	88.19	AU-Q4	0.17	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	136	R	34.33	AU-Q5	1.41	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,770	R	20.94	AU-Q6	0.11	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	866	R	20.65	AU-Q7	0.22	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	63	R	101.70	AU-Q8	3.05	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.62	R	26,432.84	AU-Q9	73.28	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,966.74	AU-Q10	24.00	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	32	R	124.27	AU-Q11	6.03	AU1.12	/	AU1.13				
AU1.13	Total area	m2	193	R	-									
	Concrete / earthworks					AU-R1					6.12	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					9.37	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					6.14	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.12	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.78	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					218.73	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.17	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					221.80	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					45.04	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.28	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.36	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,594	R	136.40	AV-Q1	0.55	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,529	R	58.99	AV-Q2	0.78	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,594	R	55.50	AV-Q3	0.55	AV1.10	/	AV1.3				
AV1.4	Pipework	m	66	R	294.61	AV-Q4	29.97	AV1.10	/	AV1.4				
AV1.5	Manholes	No	2	R	3,568.35	AV-Q5	33.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	28	R	515.79	AV-Q6	2.36	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	201	R	94.76	AV-Q7	0.14	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	21	R	99.76	AV-Q8	1.33	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	5.09	R	4,567.74	AV-Q9	5.50	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	1,978	R	-									
	Earthworks / lining					AV-R1					2.31	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					2.46	AV1.1	/	AV1.3
	Lining / paving					AV-R3					1.06	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.46	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.08	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.11	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.44	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					5.17	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.11	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	899	R	91.62	AW-Q1	9.99	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	131	R	58.07	AW-Q2	0.69	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	90	R	796.83	AW-Q3	8.84	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	10.18	R	3,846.29									
AW1.5	Mesh	m2	77	R	74.53	AW-Q4	1.17	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	493	R	128.72	AW-Q5	0.18	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,747	R	15.07	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	1.88	R	17,194.01	AW-Q7	20.21	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	38	R	-									
	Concrete / earthworks					AW-R1					8.70	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					13.72	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					51.61	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					6.19	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					255.23	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.22	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	23	R	-									
BA1.2	Steel	t	3.63	R	24,378.20	BA-Q1	6.34	BA1.1	/	BA1.2				
BA1.3	Handrail	m	14	R	407.01	BA-Q2	1.64	BA1.1	/	BA1.3				
BA1.4	Grating	m2	13	R	930.62	BA-Q3	1.77	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	203.64	BA-Q4	1.64	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	265.87	BA-Q5	5.75	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					59.90	BA1.2	/	BA1.3
	Steel / grating					BA-R2					26.20	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					119.71	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					91.69	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	807	R	-									
BB1.2	Steel	t	45.53	R	21,082.87	BB-Q1	17.72	BB1.1	/	BB1.2				
BB1.3	Handrail	m	132	R	858.44	BB-Q2	6.11	BB1.1	/	BB1.3				
BB1.4	Grating	m2	100	R	811.24	BB-Q3	8.07	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	111	R	178.28	BB-Q4	7.27	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	21	R	2,036.04	BB-Q5	38.43	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					24.56	BB1.2	/	BB1.3
	Steel / grating					BB-R2					25.99	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					118.26	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					10.35	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,540	R	-									
BC1.2	Steel	t	263.09	R	24,975.46	BC-Q1	51.47	BC1.1	/	BC1.2				
BC1.3	Handrail	m	499	R	517.88	BC-Q2	27.13	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,148	R	927.90	BC-Q3	4.30	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	405	R	190.32	BC-Q4	33.43	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	63	R	259.51	BC-Q5	214.92	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	81	R	1,417.19	BC-Q6	167.16	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					48.23	BC1.2	/	BC1.3
	Steel / grating					BC-R2					26.92	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					131.23	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					96.24	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					17.62	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	472	R	-									
BD1.2	Steel	t	18.33	R	14,590.55	BD-Q1	25.75	BD1.1	/	BD1.2				
BD1.3	Handrail	m	16	R	722.83	BD-Q2	29.50	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	947.59	BD-Q3	59.00	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	9	R	283.79	BD-Q4	52.44	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	23	R	2,043.42	BD-Q5	20.52	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					20.19	BD1.1	/	BD1.2
	Steel / grating					BD-R2					15.40	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					51.41	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.14	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	61	R	-									
BE1.2	Steel	t	1.88	R	15,314.24	BE-Q1	32.45	BE1.1	/	BE1.2				
BE1.3	Handrail	m	36	R	594.84	BE-Q2	1.69	BE1.1	/	BE1.3				
BE1.4	Grating	m2	30	R	889.67	BE-Q3	2.03	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	33	R	262.30	BE-Q4	1.85	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	154.37	BE-Q5	10.17	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					25.75	BE1.2	/	BE1.3
	Steel / grating					BE-R2					17.21	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					58.38	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					99.20	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	267	R	-									
BF1.2	Steel	t	23.62	R	15,278.18	BF-Q1	11.30	BF1.1	/	BF1.2				
BF1.3	Handrail	m	21	R	614.46	BF-Q2	12.71	BF1.1	/	BF1.3				
BF1.4	Grating	m2	28	R	1,560.53	BF-Q3	9.54	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	13	R	314.91	BF-Q4	20.54	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	22	R	1,417.19	BF-Q5	12.14	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					24.86	BF1.1	/	BF1.2
	Steel / grating					BF-R2					9.79	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					48.52	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					10.78	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	24,958	R	-	C-Q1	0.44	C1.1	/	C1.2				
C1.2	Total work units	WU	56,527	R	254.64									
C1.3	Pipe supports	kg	10,749	R	-	C-Q2	2.32	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	7,295	R	-	C-Q3	0.13	C1.4	/	C1.2				
C1.5	Number of welds	No	10,431	R	-	C-Q4	0.42	C1.5	/	C1.1				
C1.6	Total fittings	No	4,156	R	-	C-Q5	0.17	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,289	R	-	C-Q6	0.55	C1.7	/	C1.6				
C1.8	Support number	No	1,825	R	-	C-Q7	0.17	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	56,527	R	254.64	DA-Q1	76.80	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	736	R	53.13									
	Average cost per examination / WU					DA-R1					4.79	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	56,527	R	254.64	DB-Q1	199.74	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	283	R	67.62									
	Average cost per examination / WU					DB-R1					3.77	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	56,527	R	254.64	DC-Q1	269.18	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	210	R	121.92									
	Average cost per examination / WU					DC-R1					2.09	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	56,527	R	254.64	DD-Q1	46.41	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,218	R	34.33									
	Average cost per examination / WU					DD-R1					7.42	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	56,527	R	254.64	DE-Q1	65.73	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	860	R	107.41									
	Average cost per examination / WU					DE-R1					2.37	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	56,527	R	254.64	E-Q1	209.87	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	269.34	R	263.83	E-Q2	183.83	E1.1	/	E1.3				
E1.3	Structural steel	t	307.49	R	16,729.31									
	WU cost / install mechanical weight - receive					E-R1					0.97	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					63.41	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	56,527	R	254.64									
F1.2	Painting to piping	m2	3,292	R	86.28	F-Q1	17.17	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,495	R	278.10	F-Q2	37.81	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	318.73	R	413.07									
F1.5	Painting to mechanical equipment	m2	1,088	R	122.61	F-Q3	0.29	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	402	R	226.84	F-Q4	0.79	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.31	F1.2	/	F1.3
	Work unit / paint					F-R2					2.95	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.92	F1.1	/	F1.3
	Install plant / paint					F-R4					3.37	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.82	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	29,414	R	33.18									
G1.2	Electrical cable terminations	No	1,872	R	106.76	G-Q1	15.71	G1.1	/	G1.2				
G1.3	Electrical equipment	No	99	R	333.37	G-Q2	297.11	G1.1	/	G1.3				
G1.4	DB's	No	12	R	1,171.52	G-Q3	8.25	G1.3	/	G1.4				
G1.5	Rack	m	5,306	R	102.19	G-Q4	5.54	G1.1	/	G1.5				
G1.6	Support steel	kg	10,756	R	21.25	G-Q5	0.49	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	20,020	R	12.36	G-Q6	1.47	G1.1	/	G1.7				
G1.8	Instruments	No	1,150	R	153.89	G-Q7	17.41	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,518	R	79.97	G-Q8	0.76	G1.8	/	G1.9				
G1.10	Light fittings	No	595	R	294.48	G-Q9	6.01	G1.10	/	G1.3				
G1.11	Conduit	m	2,493	R	16.52	G-Q10	11.80	G1.1	/	G1.11				
G1.12	Instrument stands	No	203	R	567.42	G-Q11	5.67	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.31	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.28	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.01	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.56	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.32	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.11	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.15	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	8,441	R	44.23	AB-Q1	2.55	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,306	R	10.91									
AB1.3	Back fill and compact	m3	6,748	R	43.67	AB-Q2	1.25	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,064	R	3.63	AB-Q3	2.75	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,461	R	4.50	AB-Q4	2.44	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.05	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.01	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					12.18	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.83	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	251,998.24									
AC1.2	EO for raking equipment	Item	1	R	27,573.11									
AC1.3	Number of piles	No	269	R	-									
AC1.4	Move rig to new position	No	170	R	241.82	AC-Q1	1.58	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	20.69	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	20	R	463.62	AC-Q3	0.65	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	69	R	79.91	AC-Q4	0.19	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,989	R	143.64	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	455	R	272.48	AC-Q6	0.59	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	142	R	575.35	AC-Q7	1.89	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	174	R	315.01	AC-Q8	1.55	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	865	R	527.65	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	87	R	741.17	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.67	R	6,433.72	AC-Q11	15.22	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	232.58	R	9,143.75	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,531	R	1,260.21	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	168	R	1,361.41	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	169,085.35		1.00		/					
AC1.19	Load test to pile	No	2	R	22,830.20	AC-Q15	134.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	58,760.68	AC-Q16	269.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	170	R	306.54	AC-Q17	1.58	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.97	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.56	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.46	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.42	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.59	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.26	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.12	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.63	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	111	R	52.20	AD-Q1	0.12	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	930	R	74.65									
AD1.3	Kerbing	m	450	R	97.42	AD-Q2	0.18	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,462	R	-									
AD1.5	Remove top soil	m3	1,124	R	38.94	AD-Q3	1.10	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,023	R	69.21	AD-Q4	0.43	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,644	R	4.66									
AD1.8	Reduce levels	m3	1,259	R	30.87	AD-Q5	0.48	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	959	R	80.43	AD-Q6	1.31	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	285	R	107.24	AD-Q7	3.36	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	324	R	143.12	AD-Q8	3.89	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,391	R	14.46	AD-Q9	4.88	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	284	R	9.72	AD-Q10	0.74	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	433	R	5.62	AD-Q11	0.63	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	188	R	476.76	AD-Q12	0.96	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	39	R	150.74	AD-Q13	0.42	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	195.52	AD-Q14	0.09	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	12	R	301.50	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	402	R	2.97	AD-Q16	0.89	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.70	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					8.36	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					6.62	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.38	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.75	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.22	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.86	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.13	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.79	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.91	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.06	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.89	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.55	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					2.01	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					3.09	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	257	R	1,039.54	AE-Q1	4.59	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	56	R	1,582.95	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	402	R	-									
AE1.4	Rip and compact	m2	1,787	R	4.56									
AE1.5	Formwork to plinth	m2	391	R	161.10	AE-Q3	6.98	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	175	R	143.05	AE-Q4	0.68	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.50	R	7,726.91	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,736	R	190.90	AE-Q6	781.71	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	660	R	32.88	AE-Q7	2.57	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	508	R	68.55	AE-Q8	1.98	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.66	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					227.97	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.48	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	2,850	R	-	AF-Q1	8.56	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	333	R	44.23	AF-Q2	1.96	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	170	R	49.15	AF-Q3	0.57	AF1.2	/	AF1.4				
AF1.4	Working space	m2	580	R	30.16	AF-Q4	0.63	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	210	R	1,493.80	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	199	R	54.96	AF-Q6	1.31	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	11	R	1,633.52	AF-Q7	0.05	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,072.75	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	260	R	-	AF-Q9	1.50	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	173	R	5.38									
AF1.11	Formwork to bases	m2	260	R	144.20	AF-Q10	1.24	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	234	R	194.70	AF-Q11	21.27	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	9	R	156.36	AF-Q12	3.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.74	R	6,567.53	AF-Q13	0.11	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	15.70	R	7,203.43	AF-Q14	16.56	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	529	R	46.38	AF-Q15	0.40	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	36	R	160.25	AF-Q16	0.31	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	4,879.93	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	84	R	595.31									
	Base excavation / backfill					AF-R1					0.90	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.47	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					33.77	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					27.18	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					36.93	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.72	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					277.66	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.10	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.12	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.91	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					32.21	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					10.19	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.51	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	367	R	85.21	AG-Q1	2.48	AG1.1	/	AG1.4				
AG1.2	Working space	m2	493	R	22.70	AG-Q2	0.74	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	42	R	69.55	AG-Q3	8.74	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	148	R	1,616.19	AG-Q4	0.68	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	91	R	1,023.38	AG-Q5	1.63	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	233	R	-									
AG1.7	Wood float	m2	172	R	6.81	AG-Q6	0.53	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	217	R	88.32	AG-Q7	0.68	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	275	R	99.23	AG-Q8	0.54	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	136	R	131.85	AG-Q9	0.67	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	27.78	R	9,086.16	AG-Q10	8.39	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,336	R	32.70	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,352	R	40.47	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.79	R	10,772.37	AG-Q13	50.84	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.27	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.82	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.00	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.06	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					5.62	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.67	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	265	R	51.66	AH-Q1	5.41	AH1.1	/	AH1.4				
AH1.2	Working space	m2	94	R	46.53	AH-Q2	2.82	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	245	R	103.76	AH-Q3	1.08	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	49	R	753.40	AH-Q4	0.74	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	29	R	1,077.28	AH-Q5	1.69	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	87	R	1,123.97	AH-Q6	0.56	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	1,402.51	AH-Q7	3.77	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	1,175.46	AH-Q8	12.25	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	131	R	-									
AH1.10	Blinding	m2	66	R	47.59	AH-Q9	1.98	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	649	R	6.73	AH-Q10	0.20	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	124	R	180.20	AH-Q11	0.40	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	36	R	203.38	AH-Q12	0.36	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	30	R	232.23	AH-Q13	0.13	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	232	R	134.80	AH-Q14	0.13	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	23	R	178.52	AH-Q15	3.78	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	65	R	70.74	AH-Q16	1.34	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.81	R	9,903.88	AH-Q17	0.23	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.79	R	5,878.81	AH-Q18	16.82	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	618	R	169.11	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	893	R	25.70	AH-Q20	0.15	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,410	R	35.56	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.91	R	9,441.34	AH-Q22	143.96	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	305	R	46.70	AH-Q23	0.29	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	317	R	51.18	AH-Q24	0.27	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.07	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.11	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.50	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					15.83	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					111.95	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.70	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.67	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.54	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.64	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					4.18	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.90	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.06	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.99	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.30	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					15.89	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.68	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					34.76	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					228.75	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					165.32	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.08	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					24.07	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					21.96	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	233	R	52.55	AI-Q1	2.35	AI1.1	/	AI1.5				
AI1.2	Working space	m2	918	R	41.23	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	105	R	74.80	AI-Q3	2.22	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	197	R	65.42	AI-Q4	0.50	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	99	R	1,594.45	AI-Q5	9.90	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	10	R	883.35	AI-Q6	0.38	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	73	R	-									
AI1.8	Wood float	m2	260	R	10.38									
AI1.9	Formwork bases	m2	159	R	129.90	AI-Q7	0.62	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	204	R	139.26	AI-Q8	0.05	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.02	R	7,099.84	AI-Q9	8.09	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	4,083	R	51.33	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.75	R	6,698.74	AI-Q11	132.00	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.27	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.70	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					24.37	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.81	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					153.61	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.27	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.34	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					138.32	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.24	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	316	R	52.04	AJ-Q1	6.20	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,125	R	46.87	AJ-Q2	0.28	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	90	R	56.21	AJ-Q3	3.51	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	200	R	45.51	AJ-Q4	0.26	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	51	R	1,095.48	AJ-Q5	1.06	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	23	R	1,630.58	AJ-Q6	2.22	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	48	R	1,011.01									
AJ1.8	Total concrete	m3	148	R	-									
AJ1.9	Wood float	m2	301	R	7.10	AJ-Q7	0.49	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	255	R	197.84	AJ-Q8	0.20	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	168	R	143.81	AJ-Q9	0.14	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.63	R	9,089.64	AJ-Q10	13.92	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	5,002	R	36.43	AJ-Q11	0.01	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,591	R	31.03	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.72	R	6,124.78	AJ-Q13	29.65	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.11	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.93	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					24.07	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					154.29	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					5.54	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					11.34	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					249.51	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					292.93	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.18	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	377	R	53.02	AK-Q1	1.22	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,046	R	46.37	AK-Q2	0.36	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	192	R	71.69	AK-Q3	1.96	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	334	R	60.55	AK-Q4	0.93	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	310	R	1,721.10	AK-Q5	62.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	5	R	1,493.80									
AK1.7	Concrete plinth	m3	44	R	1,493.80	AK-Q6	7.05	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	275	R	-									
AK1.9	Wood float	m2	327	R	7.38	AK-Q7	0.95	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	576	R	236.07	AK-Q8	0.54	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	178	R	98.81	AK-Q9	0.25	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	29	R	156.62	AK-Q10	0.17	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	40.51	R	8,925.08	AK-Q11	6.79	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,349	R	35.68	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.51	R	6,486.79	AK-Q13	109.56	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.03	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.74	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					28.42	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					233.21	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.29	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					15.12	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.54	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					250.14	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.27	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	347	R	77.08	AL-Q1	1.64	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,795	R	41.99	AL-Q2	0.19	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	170	R	69.55	AL-Q3	2.04	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	276	R	83.26	AL-Q4	0.77	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	212	R	923.81	AL-Q5	1.35	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	157	R	1,057.32	AL-Q6	2.49	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	63	R	1,402.51	AL-Q7	3.37	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	304	R	-									
AL1.9	Wood float	m2	321	R	5.12	AL-Q8	0.66	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	471	R	129.90	AL-Q9	0.45	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,305	R	204.65	AL-Q10	0.12	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	109	R	181.20	AL-Q11	0.58	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	73	R	169.09	AL-Q12	0.86	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	226.82	AL-Q13	15.70	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	32.85	R	9,086.16	AL-Q14	9.25	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	14,375	R	30.76	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	285	R	46.75	AL-Q16	1.07	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.64	R	7,034.93	AL-Q17	475.00	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.08	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.84	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.11	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					11.10	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					180.43	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.87	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.87	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.11	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					7.74	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					5.17	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.29	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					7.74	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					6.18	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					295.39	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					194.36	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.13	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,013	R	81.03	AM-Q1	2.22	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,806	R	29.72	AM-Q2	0.56	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,409	R	87.12	AM-Q3	0.72	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	581	R	81.27	AM-Q4	0.79	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	457	R	1,673.54									
AM1.6	Concrete column	m3	101	R	1,095.71	AM-Q5	4.52	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	243	R	1,397.06	AM-Q6	0.42	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	151	R	1,100.90	AM-Q7	3.03	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	48	R	1,175.46	AM-Q8	2.10	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	111	R	1,026.16	AM-Q9	0.91	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,272	R	-									
AM1.12	Wood float	m2	1,349	R	6.79	AM-Q10	0.94	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	836	R	202.69	AM-Q11	0.55	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	667	R	155.66	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	765	R	240.82	AM-Q13	0.32	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	146	R	169.09	AM-Q14	1.66	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	539	R	329.44	AM-Q15	0.28	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	310.12	AM-Q16	20.20	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	654	R	135.37	AM-Q17	0.07	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	147.94	R	7,726.91	AM-Q18	8.60	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	6,089	R	30.76	AM-Q19	0.21	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,238	R	46.75	AM-Q20	0.39	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	37	R	785.06	AM-Q21	4.00	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.71	R	5,286.71	AM-Q22	1791.55	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.73	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.93	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					20.59	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.53	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.20	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.52	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.42	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.63	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					246.47	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					8.26	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.80	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					8.26	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.04	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					4.50	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.11	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.68	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					251.20	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					165.28	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.84	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.32	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,559	R	53.31	AN-Q1	1.74	AN1.1	/	AN1.5				
AN1.2	Working space	m2	235	R	41.97	AN-Q2	15.14	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	596	R	106.31	AN-Q3	5.97	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,336	R	53.36	AN-Q4	1.53	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,041	R	1,616.19	AN-Q5								
AN1.6	Concrete column	m3	57	R	1,023.38	AN-Q6	35.81	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	39	R	1,036.40	AN-Q7	1.46	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	181	R	1,402.51	AN-Q8	11.28	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	1,066.82	AN-Q9	11.40	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,760	R	-				/					
AN1.11	Wood float	m2	2,092	R	10.28	AN-Q10	0.98	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	182	R	131.49	AN-Q11	11.21	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	288	R	109.99	AN-Q12	0.20	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	170	R	165.43	AN-Q13	0.23	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	84	R	273.41	AN-Q14	0.46	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	27	R	195.26	AN-Q15	0.19	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	326.45	AN-Q16	680.33	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	799	R	96.05	AN-Q17	0.23	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	358.39	R	7,023.37	AN-Q18	4.91	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	15,054	R	41.54	AN-Q19	0.12	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	11,129	R	49.79	AN-Q20	0.16	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	90	R	1,131.48	AN-Q21	19.56	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.32	R	9,441.34	AN-Q22	879.74	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.03	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.27	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.50	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					30.29	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					157.22	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					12.29	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.26	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					3.79	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					9.30	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.17	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.46	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					14.60	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					169.07	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					141.06	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.17	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.21	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	159	R	89.45	AO-Q1	1.13	AO1.1	/	AO1.5				
AO1.2	Working space	m2	551	R	45.75	AO-Q2	0.29	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	141	R	71.53	AO-Q3	1.13	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	40	R	62.55	AO-Q4	3.53	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	141	R	1,799.94									
AO1.6	Concrete column	m3	31	R	1,793.43	AO-Q5	4.55	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	10	R	804.29	AO-Q6	3.10	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	6	R	1,073.39	AO-Q7	23.50	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	923.81	AO-Q8	31.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	40	R	-									
AO1.11	Wood float	m2	46	R	10.04	AO-Q9	3.07	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	93	R	137.51	AO-Q10	1.52	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	147	R	147.61	AO-Q11	0.21	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	67	R	169.09	AO-Q12	0.15	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	17	R	273.41	AO-Q13	0.59	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	329.44	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	50	R	340.60	AO-Q15	2.82	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	20	R	158.60	AO-Q16	0.30	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.13	R	10,613.80	AO-Q17	7.80	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,105	R	28.92	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,010	R	51.70	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	7	R	1,385.14	AO-Q20	5.71	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.57	R	6,327.93	AO-Q21	39.50	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.96	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.25	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					28.78	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					179.28	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					13.09	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					4.76	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					2.94	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					12.15	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.36	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					2.80	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					6.77	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					367.01	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					205.30	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.28	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					7.66	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,786	R	77.08	AP-Q1	2.68	AP1.1	/	AP1.5				
AP1.2	Working space	m2	523	R	41.99	AP-Q2	3.41	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,532	R	68.06	AP-Q3	1.17	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	142	R	58.53	AP-Q4	4.69	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	666	R	1,026.16	AP-Q5	0.32	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,113	R	158.43									
AP1.7	Rough formwork	m2	379	R	151.03	AP-Q6	1.76	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,668	R	203.43	AP-Q7	0.40	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,093	R	12.98	AP-Q8	0.22	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	161	R	52.08	AP-Q9	4.14	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	50	R	67.28	AP-Q10	13.32	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	454	R	40.80	AP-Q11	1.47	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.32	R	7,034.93	AP-Q12	504.55	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,015	R	227.03	AP-Q13	0.33	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,093	R	-	AP-Q14	4.64	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,040	R	120.30	AP-Q15	2.97	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,594	R	223.91	AP-Q16	1.94	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,326	R	81.13	AP-Q17	0.93	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	1,114.89	AP-Q18	441.86	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,835	R	333.29	AP-Q19	0.64	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,873	R	136.45	AP-Q20	1.08	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	119.96	R	4,794.34	AP-Q21	5.55	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	34,121.00									
AP1.24	Structural steel	Item	1	R	88,352.84									
AP1.25	Plumbing and drainage	Item	1	R	56,257.69									
AP1.26	Small power and lighting	Item	1	R	479,276.04									
AP1.27	External works	Item	1	R	207,101.67									
	Excavations / concrete					AP-R1					0.08	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.84	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.13	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					17.53	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					30.26	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					6.79	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.04	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					79.06	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					19.70	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					15.25	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					117.51	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.15	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					8.53	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					21.41	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.80	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.20	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.68	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.66	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					7.12	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					18.43	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					11.73	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					99.97	AP1.26	/	AP1.22
	External works / concrete					AP-R23					201.82	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	110	R	1,460.49	AQ-Q1	1.55	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	171	R	132.31									
AQ1.3	Reinforcement	t	8.65	R	7,480.18	AQ-Q2	12.72	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	701	R	134.68	AQ-Q3	0.16	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	194	R	132.60	AQ-Q4	0.57	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	179	R	244.76	AQ-Q5	6.22	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	869	R	116.82	AQ-Q6	1.28	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	34.28	R	15,125.87	AQ-Q7	32.47	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	478	R	103.30	AQ-Q8	2.33	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	11,773.30	AQ-Q9	371.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	35	R	1,186.94	AQ-Q10	31.80	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	965	R	46.31	AQ-Q11	1.15	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,113	R	-									
	Concrete / reinforcement					AQ-R1					0.20	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.04	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					10.84	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					11.01	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.97	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					129.48	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.88	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.78	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.16	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.52	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	133	R	229.08	AR-Q1	1.87	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	71	R	1,095.71	AR-Q2	16.59	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.28	R	8,890.37									
AR1.4	Mesh	m2	443	R	116.76	AR-Q3	0.16	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	161	R	151.03	AR-Q4	0.44	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	78	R	183.46	AR-Q5	9.53	AR1.15	/	AR1.6				
AR1.7	Screed	m2	660	R	39.83	AR-Q6	1.13	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	31.15	R	20,982.12	AR-Q7	23.85	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	9	R	3,676.15	AR-Q8	3.46	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	43	R	824.02	AR-Q9	0.72	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	58	R	420.98	AR-Q10	0.54	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	508	R	94.06	AR-Q11	1.46	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	145	R	105.59	AR-Q12	5.12	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	32	R	1,789.27	AR-Q13	0.97	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	743	R	-									
	Earthworks / concrete					AR-R1					0.21	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.12	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.38	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.25	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.97	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					27.51	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					5.71	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					25.46	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.96	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					223.07	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.12	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					11.73	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	274	R	149.60	AS-Q1	2.74	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	130	R	65.42	AS-Q2	0.77	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	100	R	1,882.39	AS-Q3	17.79	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	5.62	R	4,679.69									
AS1.5	Mesh	m2	124	R	119.49	AS-Q4	0.81	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	245	R	151.03	AS-Q5	0.41	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	128	R	15.65	AS-Q6	0.78	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	35	R	45.84	AS-Q7	2.86	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	750	R	32.11	AS-Q8	0.13	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.71	R	8,545.32	AS-Q9	140.85	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	32	R	210.16	AS-Q10	0.25	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	3,179.09	AS-Q11	2.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	43	R	388.57	AS-Q12	3.95	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	767	R	54.06	AS-Q13	0.13	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.16	R	34,880.58	AS-Q14	3.70	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.89	R	25,877.64	AS-Q15	191.01	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	170	R	-									
AS1.18	Total control room area	m2	8	R	-									
	Concrete / earthworks					AS-R1					12.58	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					28.77	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					39.16	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					12.46	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					120.28	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					41.06	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					145.74	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					4.84	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.22	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.13	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.18	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.07	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	155	R	128.67	AT-Q1	7.75	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	20	R	55.84	AT-Q2	1.00	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	20	R	807.66	AT-Q3	14.60	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.37	R	6,829.21									
AT1.5	Formwork	m2	142	R	131.32	AT-Q4	0.14	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	41	R	16.70	AT-Q5	0.49	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	27	R	65.12	AT-Q6	0.74	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.41	R	31.13	AT-Q7	48.78	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.44	R	6,486.79	AT-Q8	45.45	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.09	R	59.78	AT-Q9	222.22	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.58	R	23,044.68	AT-Q10	81.03	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.39	R	27,963.74	AT-Q11	33.81	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	44	R	200.95	AT-Q12	1.07	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	18	R	123.63	AT-Q13	2.61	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	47	R	-									
	Concrete / earthworks					AT-R1					6.28	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					14.46	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					6.15	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					48.36	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					12.40	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					219.38	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.52	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.12	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.30	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.24	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					4.02	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.63	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	423	R	117.58	AU-Q1	0.99	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	216	R	55.08	AU-Q2	1.98	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	427	R	1,427.83									
AU1.4	Reinforcement	t	41.53	R	9,143.75	AU-Q3	10.28	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,747	R	144.41	AU-Q4	0.24	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	153	R	77.27	AU-Q5	2.79	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,458	R	52.36	AU-Q6	0.17	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	708	R	47.90	AU-Q7	0.60	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	46	R	266.96	AU-Q8	9.28	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.94	R	26,653.09	AU-Q9	145.24	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	4,570.00	AU-Q10	53.38	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	25	R	177.72	AU-Q11	9.52	AU1.12	/	AU1.13				
AU1.13	Total area	m2	238	R	-									
	Concrete / earthworks					AU-R1					12.14	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					25.92	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					9.89	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.16	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					18.48	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					174.63	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.34	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					190.89	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					34.25	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.31	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					8.03	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	6,410	R	180.20	AV-Q1	0.55	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,342	R	63.40	AV-Q2	1.49	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,722	R	68.53	AV-Q3	1.28	AV1.10	/	AV1.3				
AV1.4	Pipework	m	91	R	414.95	AV-Q4	38.40	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	4,721.76	AV-Q5	30.33	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	25	R	1,011.01	AV-Q6	3.64	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	224	R	137.88	AV-Q7	0.11	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	25	R	81.91	AV-Q8	1.00	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	5.23	R	6,530.09	AV-Q9	4.78	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,494	R	-									
	Earthworks / lining					AV-R1					2.84	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					2.63	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.93	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.43	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.09	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.06	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					7.33	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					12.34	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.15	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	25	R	-									
BA1.2	Steel	t	3.87	R	37,239.67	BA-Q1	6.46	BA1.1	/	BA1.2				
BA1.3	Handrail	m	14	R	580.29	BA-Q2	1.79	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	1,421.59	BA-Q3	1.79	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	438.16	BA-Q4	1.79	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	174.26	BA-Q5	5.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					64.17	BA1.2	/	BA1.3
	Steel / grating					BA-R2					26.20	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					84.99	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					213.70	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,210	R	-									
BB1.2	Steel	t	67.83	R	30,058.74	BB-Q1	17.84	BB1.1	/	BB1.2				
BB1.3	Handrail	m	152	R	1,007.13	BB-Q2	7.96	BB1.1	/	BB1.3				
BB1.4	Grating	m2	98	R	1,379.11	BB-Q3	12.35	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	98	R	427.68	BB-Q4	12.35	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	15	R	2,818.41	BB-Q5	80.67	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					29.85	BB1.2	/	BB1.3
	Steel / grating					BB-R2					21.80	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					70.28	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					10.67	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	12,859	R	-									
BC1.2	Steel	t	256.03	R	28,939.00	BC-Q1	50.22	BC1.1	/	BC1.2				
BC1.3	Handrail	m	472	R	886.94	BC-Q2	27.24	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,505	R	1,641.57	BC-Q3	3.67	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	696	R	417.46	BC-Q4	18.48	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	47	R	190.59	BC-Q5	273.60	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	59	R	2,878.12	BC-Q6	217.95	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					32.63	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.63	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					69.32	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					151.84	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					10.05	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	689	R	-									
BD1.2	Steel	t	19.04	R	21,429.73	BD-Q1	36.19	BD1.1	/	BD1.2				
BD1.3	Handrail	m	17	R	1,058.26	BD-Q2	40.53	BD1.1	/	BD1.3				
BD1.4	Grating	m2	6	R	1,519.55	BD-Q3	114.83	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	11	R	274.62	BD-Q4	62.64	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	27	R	4,074.92	BD-Q5	25.52	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					20.25	BD1.1	/	BD1.2
	Steel / grating					BD-R2					14.10	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					78.03	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					5.26	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	39	R	-									
BE1.2	Steel	t	3.92	R	21,005.54	BE-Q1	9.95	BE1.1	/	BE1.2				
BE1.3	Handrail	m	43	R	1,262.76	BE-Q2	0.91	BE1.1	/	BE1.3				
BE1.4	Grating	m2	24	R	1,044.09	BE-Q3	1.63	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	53	R	280.97	BE-Q4	0.74	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	220.80	BE-Q5	5.57	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					16.63	BE1.2	/	BE1.3
	Steel / grating					BE-R2					20.12	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					74.76	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					95.13	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	464	R	-									
BF1.2	Steel	t	36.91	R	22,612.65	BF-Q1	12.57	BF1.1	/	BF1.2				
BF1.3	Handrail	m	12	R	1,161.86	BF-Q2	38.67	BF1.1	/	BF1.3				
BF1.4	Grating	m2	50	R	1,446.93	BF-Q3	9.28	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	19	R	280.21	BF-Q4	24.42	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	13	R	2,847.62	BF-Q5	35.69	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					19.46	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.63	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					80.70	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.94	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	22,497	R	-	C-Q1	0.26	C1.1	/	C1.2				
C1.2	Total work units	WU	85,040	R	453.05									
C1.3	Pipe supports	kg	11,265	R	-	C-Q2	2.00	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,823	R	-	C-Q3	0.14	C1.4	/	C1.2				
C1.5	Number of welds	No	12,772	R	-	C-Q4	0.57	C1.5	/	C1.1				
C1.6	Total fittings	No	6,184	R	-	C-Q5	0.27	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,950	R	-	C-Q6	0.48	C1.7	/	C1.6				
C1.8	Support number	No	1,523	R	-	C-Q7	0.14	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	85,040	R	453.05	DA-Q1	60.18	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,413	R	75.75									
	Average cost per examination / WU					DA-R1					5.98	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	85,040	R	453.05	DB-Q1	164.17	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	518	R	81.18									
	Average cost per examination / WU					DB-R1					5.58	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	85,040	R	453.05	DC-Q1	381.35	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	223	R	263.04									
	Average cost per examination / WU					DC-R1					1.72	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	85,040	R	453.05	DD-Q1	72.01	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,181	R	65.12									
	Average cost per examination / WU					DD-R1					6.96	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	85,040	R	453.05	DE-Q1	213.13	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	399	R	122.83									
	Average cost per examination / WU					DE-R1					3.69	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	85,040	R	453.05	E-Q1	225.94	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	376.38	R	667.11	E-Q2	266.25	E1.1	/	E1.3				
E1.3	Structural steel	t	319.40	R	24,944.24									
	WU cost / install mechanical weight - receive					E-R1					0.68	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					37.39	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	85,040	R	453.05									
F1.2	Painting to piping	m2	5,098	R	192.24	F-Q1	16.68	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,191	R	258.37	F-Q2	71.40	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	375.71	R	437.33									
F1.5	Painting to mechanical equipment	m2	1,017	R	136.14	F-Q3	0.37	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	494	R	350.90	F-Q4	0.76	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.74	F1.2	/	F1.3
	Work unit / paint					F-R2					2.36	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.75	F1.1	/	F1.3
	Install plant / paint					F-R4					3.21	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.25	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	47,930	R	72.97									
G1.2	Electrical cable terminations	No	942	R	130.73	G-Q1	50.88	G1.1	/	G1.2				
G1.3	Electrical equipment	No	111	R	559.64	G-Q2	431.80	G1.1	/	G1.3				
G1.4	DB's	No	12	R	2,312.79	G-Q3	9.25	G1.3	/	G1.4				
G1.5	Rack	m	7,937	R	166.89	G-Q4	6.04	G1.1	/	G1.5				
G1.6	Support steel	kg	7,333	R	15.28	G-Q5	1.08	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	22,294	R	19.06	G-Q6	2.15	G1.1	/	G1.7				
G1.8	Instruments	No	1,166	R	207.68	G-Q7	19.12	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,508	R	115.34	G-Q8	0.77	G1.8	/	G1.9				
G1.10	Light fittings	No	461	R	412.25	G-Q9	4.15	G1.10	/	G1.3				
G1.11	Conduit	m	4,472	R	47.82	G-Q10	10.72	G1.1	/	G1.11				
G1.12	Instrument stands	No	333	R	1,081.57	G-Q11	3.50	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.56	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.13	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.24	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.53	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					4.78	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.44	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.18	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.17	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.09	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	9,706	R	27.89	AB-Q1	2.55	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,801	R	7.37									
AB1.3	Back fill and compact	m3	7,759	R	27.54	AB-Q2	1.25	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,550	R	2.29	AB-Q3	2.13	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,979	R	2.84	AB-Q4	2.44	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.78	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.01	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					12.18	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.82	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	170,281.50									
AC1.2	EO for raking equipment	Item	1	R	18,631.84									
AC1.3	Number of piles	No	255	R	-									
AC1.4	Move rig to new position	No	245	R	152.51	AC-Q1	1.04	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	20	R	-	AC-Q2	12.75	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	25	R	292.39	AC-Q3	0.80	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	79	R	50.39	AC-Q4	0.25	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,736	R	97.06	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	655	R	170.58	AC-Q6	0.39	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	163	R	433.36	AC-Q7	1.56	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	214	R	198.67	AC-Q8	1.19	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	995	R	356.55	AC-Q9	0.26	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	97	R	500.83	AC-Q10	0.21	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	21.42	R	4,347.43	AC-Q11	11.90	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	220.31	R	6,178.66	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,203	R	794.79	AC-Q13	0.12	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	261	R	919.94	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	106,638.17		1.00		/					
AC1.19	Load test to pile	No	2	R	14,398.47	AC-Q15	127.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	39,706.06	AC-Q16	255.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	245	R	264.80	AC-Q17	1.04	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					214.25	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					23.44	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.52	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.55	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.45	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.63	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.12	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					49.96	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.33	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	127	R	32.92	AD-Q1	0.11	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,146	R	50.44									
AD1.3	Kerbing	m	243	R	61.44	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,892	R	-									
AD1.5	Remove top soil	m3	1,154	R	29.33	AD-Q3	0.69	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,664	R	43.65	AD-Q4	0.37	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,161	R	3.15									
AD1.8	Reduce levels	m3	1,551	R	20.86	AD-Q5	0.49	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,181	R	54.35	AD-Q6	1.31	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	327	R	67.63	AD-Q7	3.61	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	399	R	96.71	AD-Q8	3.89	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,175	R	12.51	AD-Q9	6.65	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	340	R	7.05	AD-Q10	0.77	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	332	R	3.30	AD-Q11	1.40	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	293	R	306.93	AD-Q12	1.37	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	70	R	131.88	AD-Q13	1.21	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	130.71	AD-Q14	0.29	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	14	R	203.73	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	462	R	1.87	AD-Q16	1.90	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.65	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					9.31	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					6.62	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.38	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.80	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.22	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.80	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.18	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.49	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.91	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.11	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.05	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					5.00	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.15	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					2.13	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					3.32	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	317	R	655.61	AE-Q1	4.88	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	65	R	1,069.64	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	452	R	-									
AE1.4	Rip and compact	m2	2,166	R	3.08									
AE1.5	Formwork to plinth	m2	370	R	108.86	AE-Q3	5.69	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	252	R	90.22	AE-Q4	0.79	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.46	R	5,221.27	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,370	R	120.40	AE-Q6	617.22	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	759	R	20.73	AE-Q7	2.39	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	584	R	46.32	AE-Q8	1.84	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.61	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.86	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					43.37	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,511	R	-	AF-Q1	9.17	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	383	R	29.46	AF-Q2	2.29	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	167	R	46.83	AF-Q3	0.54	AF1.2	/	AF1.4				
AF1.4	Working space	m2	703	R	29.85	AF-Q4	0.58	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	221	R	738.24	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	251	R	35.95	AF-Q6	1.16	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	20	R	1,154.60	AF-Q7	0.09	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	594.41	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	292	R	-	AF-Q9	1.40	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	209	R	6.27									
AF1.11	Formwork to bases	m2	292	R	90.41	AF-Q10	1.32	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	179	R	114.21	AF-Q11	8.95	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	14	R	100.66	AF-Q12	4.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	3.10	R	5,745.90	AF-Q13	0.19	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	16.32	R	4,815.69	AF-Q14	17.89	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	636	R	31.34	AF-Q15	0.35	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	44	R	108.28	AF-Q16	0.45	AF1.7	/	AF1.17				
AF1.18	Manhole	No	9	R	3,297.49	AF-Q17	0.09	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	99	R	375.45									
	Base excavation / backfill					AF-R1					0.63	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.99	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.06	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.54	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					39.19	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.81	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					117.74	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.17	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.19	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					23.56	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					10.66	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.97	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	283	R	35.05	AG-Q1	1.25	AG1.1	/	AG1.4				
AG1.2	Working space	m2	1,049	R	27.68	AG-Q2	0.27	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	77	R	47.11	AG-Q3	3.68	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	226	R	741.33	AG-Q4	0.80	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	90	R	800.86	AG-Q5	2.51	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	268	R	-									
AG1.7	Wood float	m2	192	R	6.51	AG-Q6	0.47	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	281	R	48.53	AG-Q7	0.80	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	270	R	92.62	AG-Q8	0.84	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	165	R	136.96	AG-Q9	0.55	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	25.03	R	4,815.69	AG-Q10	10.71	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,686	R	31.29	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,854	R	22.23	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	4	R	5,403.88	AG-Q13	22.50	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.79	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.34	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.12	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.17	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.50	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					7.29	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	280	R	44.87	AH-Q1	3.59	AH1.1	/	AH1.4				
AH1.2	Working space	m2	78	R	22.24	AH-Q2	3.59	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	294	R	52.02	AH-Q3	0.95	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	78	R	1,044.06	AH-Q4	0.99	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	24	R	1,075.47	AH-Q5	3.25	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	124	R	666.83	AH-Q6	0.63	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	26	R	902.93	AH-Q7	3.00	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	1,040.49	AH-Q8	19.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	368	R	-									
AH1.10	Blinding	m2	79	R	37.23	AH-Q9	4.66	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,273	R	5.86	AH-Q10	0.29	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	143	R	93.30	AH-Q11	0.55	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	46	R	99.61	AH-Q12	0.57	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	29	R	96.40	AH-Q13	0.14	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	285	R	131.37	AH-Q14	0.08	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	25	R	87.42	AH-Q15	4.96	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	73	R	47.30	AH-Q16	1.70	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.06	R	4,587.41	AH-Q17	0.15	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	13.80	R	6,269.83	AH-Q18	26.67	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	618	R	64.62	AH-Q19	0.20	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	985	R	21.57	AH-Q20	0.37	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	3,167	R	30.83	AH-Q21	0.12	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.04	R	4,640.00	AH-Q22	353.85	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	371	R	36.55	AH-Q23	0.33	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	312	R	38.77	AH-Q24	0.40	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.02	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.86	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					28.04	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					178.17	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.97	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.57	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.16	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.00	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.19	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					9.06	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					10.79	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.19	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					7.63	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					14.10	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.73	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					97.03	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					290.67	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					203.37	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.23	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					18.24	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					17.20	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	429	R	61.70	AI-Q1	3.80	AI1.1	/	AI1.5				
AI1.2	Working space	m2	591	R	14.26	AI-Q2	0.73	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	132	R	47.29	AI-Q3	3.25	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	234	R	39.94	AI-Q4	0.48	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	113	R	1,135.18	AI-Q5	9.42	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	12	R	475.15	AI-Q6	0.35	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	84	R	-									
AI1.8	Wood float	m2	327	R	5.99									
AI1.9	Formwork bases	m2	187	R	99.61	AI-Q7	0.60	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	169	R	107.61	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	15.69	R	6,692.30	AI-Q9	5.35	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,537	R	19.42	AI-Q10	0.04	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.04	R	4,324.30	AI-Q11	108.65	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					4.33	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.30	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					28.42	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					2.39	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					189.51	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.40	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.42	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					344.61	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.26	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	389	R	35.16	AJ-Q1	4.42	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,386	R	31.67	AJ-Q2	0.28	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	103	R	35.45	AJ-Q3	3.78	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	220	R	24.48	AJ-Q4	0.40	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	88	R	727.94	AJ-Q5	2.00	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	38	R	941.74	AJ-Q6	2.32	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	44	R	775.29									
AJ1.8	Total concrete	m3	164	R	-									
AJ1.9	Wood float	m2	511	R	6.69	AJ-Q7	0.32	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	155	R	74.86	AJ-Q8	0.57	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	245	R	92.84	AJ-Q9	0.16	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	19.02	R	6,269.83	AJ-Q10	8.62	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,071	R	23.45	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,897	R	31.34	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.42	R	4,224.74	AJ-Q13	61.97	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.11	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.99	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					29.74	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					108.81	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					9.72	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					10.14	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					267.37	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					200.06	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	468	R	35.83	AK-Q1	1.50	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,181	R	31.33	AK-Q2	0.40	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	216	R	48.68	AK-Q3	2.17	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	582	R	62.43	AK-Q4	0.53	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	311	R	507.25	AK-Q5	28.27	AK1.5		AK1.6				
AK1.6	Concrete column	m3	11	R	1,065.98									
AK1.7	Concrete plinth	m3	74	R	674.99	AK-Q6	4.20	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	291	R	-									
AK1.9	Wood float	m2	403	R	4.49	AK-Q7	0.77	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	729	R	145.30	AK-Q8	0.43	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	126	R	65.45	AK-Q9	0.59	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	36	R	96.40	AK-Q10	0.31	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	33.87	R	5,992.92	AK-Q11	8.59	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	7,822	R	23.25	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.09	R	6,143.43	AK-Q13	94.17	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.74	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					8.13	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					112.97	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					3.49	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					10.31	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					11.06	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					257.76	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.08	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	599	R	53.45	AL-Q1	2.71	AL1.1	/	AL1.5				
AL1.2	Working space	m2	2,465	R	19.60	AL-Q2	0.24	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	196	R	60.31	AL-Q3	3.06	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	339	R	36.45	AL-Q4	0.65	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	221	R	705.91	AL-Q5	1.08	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	204	R	722.54	AL-Q6	4.25	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	48	R	1,075.47	AL-Q7	4.60	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	519	R	-									
AL1.9	Wood float	m2	281	R	6.03	AL-Q8	0.79	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	336	R	89.60	AL-Q9	0.66	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,380	R	131.75	AL-Q10	0.15	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	175	R	124.99	AL-Q11	0.27	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	66	R	106.64	AL-Q12	0.73	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	14	R	153.27	AL-Q13	14.57	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	52.77	R	6,843.92	AL-Q14	9.84	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	13,232	R	19.40	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	385	R	31.59	AL-Q16	1.35	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.70	R	4,436.77	AL-Q17	741.43	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.08	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.73	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.89	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.37	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					117.07	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.98	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.98	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.88	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					8.60	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					5.48	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					10.09	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					8.60	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					7.02	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					352.78	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					216.65	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.16	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,096	R	39.80	AM-Q1	4.46	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,570	R	20.33	AM-Q2	0.43	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,010	R	65.10	AM-Q3	1.09	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	794	R	48.53	AM-Q4	0.31	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	246	R	720.88									
AM1.6	Concrete column	m3	190	R	1,065.98	AM-Q5	1.29	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	141	R	756.75	AM-Q6	1.35	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	196	R	817.52	AM-Q7	1.26	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	55	R	1,026.50	AM-Q8	3.45	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	192	R	741.33	AM-Q9	0.99	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,004	R	-									
AM1.12	Wood float	m2	1,739	R	4.63	AM-Q10	0.58	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	982	R	121.00	AM-Q11	0.25	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	767	R	99.32	AM-Q12	0.25	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	686	R	149.13	AM-Q13	0.21	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	303	R	216.50	AM-Q14	0.47	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	1,094	R	90.95	AM-Q15	0.18	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	213.91	AM-Q16	38.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	509	R	91.14	AM-Q17	0.11	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	120.31	R	5,886.68	AM-Q18	8.35	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,056	R	19.40	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,859	R	25.84	AM-Q20	0.26	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	45	R	559.38	AM-Q21	2.67	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.75	R	3,646.66	AM-Q22	1338.67	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.96	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.61	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					14.85	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.68	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.95	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.88	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.70	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.97	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					155.70	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.96	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.07	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.50	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					10.73	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.54	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					8.15	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					11.26	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					303.44	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					227.81	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.52	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.20	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,119	R	34.38	AN-Q1	1.24	AN1.1	/	AN1.5				
AN1.2	Working space	m2	283	R	30.07	AN-Q2	11.02	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	701	R	67.84	AN-Q3	4.45	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,561	R	34.77	AN-Q4	1.61	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,514	R	669.64	AN-Q5								
AN1.6	Concrete column	m3	66	R	741.33	AN-Q6	38.09	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	45	R	1,026.50	AN-Q7	1.47	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	160	R	703.64	AN-Q8	15.71	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	707.97	AN-Q9	13.20	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	3,432	R	-				/					
AN1.11	Wood float	m2	1,925	R	4.59	AN-Q10	1.31	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	172	R	136.96	AN-Q11	14.62	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	419	R	110.42	AN-Q12	0.16	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	202	R	135.02	AN-Q13	0.22	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	69	R	124.59	AN-Q14	0.65	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	49	R	165.26	AN-Q15	0.10	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	229.32	AN-Q16	628.50	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,317	R	109.00	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	735.20	R	6,532.26	AN-Q18	4.67	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	10,921	R	17.73	AN-Q19	0.31	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	8,599	R	23.51	AN-Q20	0.40	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	160	R	998.82	AN-Q21	21.45	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.07	R	4,173.68	AN-Q22	1214.49	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.14	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.51	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					19.26	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					145.89	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					4.89	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.60	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.24	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.71	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					4.48	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.28	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					6.46	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					368.43	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					277.85	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.16	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.54	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	261	R	30.67	AO-Q1	0.95	AO1.1	/	AO1.5				
AO1.2	Working space	m2	1,007	R	19.68	AO-Q2	0.26	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	120	R	48.50	AO-Q3	2.18	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	37	R	38.28	AO-Q4	7.41	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	274	R	775.29									
AO1.6	Concrete column	m3	27	R	1,135.18	AO-Q5	10.15	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	19	R	475.15	AO-Q6	1.42	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	8	R	722.54	AO-Q7	34.25	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	902.93	AO-Q8	27.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	66	R	-									
AO1.11	Wood float	m2	43	R	5.20	AO-Q9	6.37	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	135	R	131.89	AO-Q10	2.03	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	235	R	86.78	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	97	R	169.54	AO-Q12	0.20	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	106.64	AO-Q13	0.95	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	8	R	128.79	AO-Q14	0.13	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	44	R	287.19	AO-Q15	6.23	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	98.84	AO-Q16	0.47	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	10.50	R	3,877.46	AO-Q17	6.29	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,788	R	20.52	AO-Q18	0.04	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,620	R	31.39	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	13	R	739.64	AO-Q20	5.08	AO1.10	/	AO1.22				
AO1.23	Grout	m3	6.05	R	3,557.46	AO-Q21	45.29	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.56	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.63	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					20.25	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					149.09	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.88	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					2.80	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.46	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					13.08	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					1.65	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					7.01	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.31	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					188.96	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					123.53	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.22	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.24	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	2,154	R	51.71	AP-Q1	2.50	AP1.1	/	AP1.5				
AP1.2	Working space	m2	959	R	20.75	AP-Q2	2.25	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,632	R	42.43	AP-Q3	1.32	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	213	R	48.82	AP-Q4	4.05	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	862	R	741.33	AP-Q5	0.35	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,429	R	50.39									
AP1.7	Rough formwork	m2	439	R	121.00	AP-Q6	1.96	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	2,289	R	140.32	AP-Q7	0.38	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,440	R	6.40	AP-Q8	0.25	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	187	R	35.93	AP-Q9	4.61	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	64	R	42.43	AP-Q10	13.47	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	558	R	27.57	AP-Q11	1.54	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.99	R	4,436.77	AP-Q12	870.71	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,758	R	143.18	AP-Q13	0.49	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,630	R	-	AP-Q14	4.21	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,684	R	81.29	AP-Q15	1.35	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,821	R	151.30	AP-Q16	1.99	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,688	R	54.82	AP-Q17	0.98	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	1,053.04	AP-Q18	403.33	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	5,435	R	289.70	AP-Q19	0.67	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,600	R	60.56	AP-Q20	1.01	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	142.63	R	4,728.71	AP-Q21	6.04	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	22,505.04									
AP1.24	Structural steel	Item	1	R	58,274.49									
AP1.25	Plumbing and drainage	Item	1	R	37,105.64									
AP1.26	Small power and lighting	Item	1	R	316,113.98									
AP1.27	External works	Item	1	R	136,597.14									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.49	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.22	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					15.18	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					93.84	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					6.13	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.28	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					115.83	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					20.63	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					17.47	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					171.52	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.17	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					9.12	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					31.25	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.61	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.14	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.49	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.36	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.76	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.32	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.85	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					66.85	AP1.26	/	AP1.22
	External works / concrete					AP-R23					184.26	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	126	R	685.65	AQ-Q1	1.67	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	211	R	85.91									
AQ1.3	Reinforcement	t	9.95	R	4,261.37	AQ-Q2	12.66	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	806	R	78.63	AQ-Q3	0.16	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	223	R	99.61	AQ-Q4	0.57	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	221	R	149.74	AQ-Q5	5.26	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	999	R	126.41	AQ-Q6	1.16	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	42.06	R	9,539.53	AQ-Q7	27.63	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	550	R	69.80	AQ-Q8	2.11	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	6,838.54	AQ-Q9	387.33	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	30	R	1,200.54	AQ-Q10	38.73	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	958	R	27.36	AQ-Q11	1.21	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,162	R	-									
	Concrete / reinforcement					AQ-R1					0.16	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.98	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					8.72	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.88	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.58	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					75.46	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.55	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.72	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					9.50	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					4.62	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	146	R	91.75	AR-Q1	1.64	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	89	R	1,065.98	AR-Q2	18.90	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.71	R	4,815.69									
AR1.4	Mesh	m2	522	R	86.71	AR-Q3	0.17	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	132	R	131.89	AR-Q4	0.67	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	138	R	132.54	AR-Q5	3.96	AR1.15	/	AR1.6				
AR1.7	Screed	m2	520	R	12.67	AR-Q6	1.05	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	37.93	R	14,317.12	AR-Q7	14.39	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	19	R	2,194.55	AR-Q8	2.00	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	49	R	525.78	AR-Q9	0.77	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	57	R	260.70	AR-Q10	0.67	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	870	R	120.44	AR-Q11	0.63	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	174	R	89.03	AR-Q12	3.14	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	47	R	1,209.05	AR-Q13	0.81	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	546	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.22	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					12.29	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.08	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					8.04	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					84.13	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					6.52	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					27.23	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.02	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					118.87	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.74	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					11.84	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	237	R	91.96	AS-Q1	3.29	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	156	R	55.40	AS-Q2	0.46	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	72	R	666.83	AS-Q3	5.39	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	13.37	R	4,437.84									
AS1.5	Mesh	m2	153	R	81.13	AS-Q4	0.47	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	320	R	155.71	AS-Q5	0.23	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	208	R	4.61	AS-Q6	0.35	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	30	R	46.16	AS-Q7	2.40	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	1,240	R	26.91	AS-Q8	0.06	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.99	R	4,640.00	AS-Q9	72.73	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	39	R	132.85	AS-Q10	0.38	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	2,148.19	AS-Q11	3.75	AS1.18	/	AS1.12				
AS1.13	Pipework	m	54	R	262.56	AS-Q12	3.89	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	1,013	R	36.53	AS-Q13	0.07	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.54	R	21,998.37	AS-Q14	5.91	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.04	R	17,486.17	AS-Q15	201.92	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	210	R	-									
AS1.18	Total control room area	m2	15	R	-									
	Concrete / earthworks					AS-R1					7.25	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					12.04	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					54.70	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					4.28	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					144.65	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					14.45	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					164.91	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.54	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.14	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.20	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.25	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	314	R	130.65	AU-Q1	0.68	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	260	R	31.39	AU-Q2	1.79	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	465	R	720.88									
AU1.4	Reinforcement	t	73.62	R	5,886.68	AU-Q3	6.32	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,311	R	99.61	AU-Q4	0.35	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	219	R	52.21	AU-Q5	2.12	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	3,614	R	33.02	AU-Q6	0.13	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	851	R	24.67	AU-Q7	0.55	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	56	R	100.11	AU-Q8	8.30	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	4.65	R	28,252.80	AU-Q9	100.00	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,395.69	AU-Q10	58.13	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	27	R	121.01	AU-Q11	14.70	AU1.12	/	AU1.13				
AU1.13	Total area	m2	397	R	-									
	Concrete / earthworks					AU-R1					5.52	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					22.97	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.24	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.12	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					13.81	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					178.28	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.21	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					238.62	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					58.80	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.52	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.96	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	811	R	90.43	AW-Q1	6.99	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	146	R	35.58	AW-Q2	0.79	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	116	R	1,051.65	AW-Q3	3.90	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	29.75	R	4,597.99									
AW1.5	Mesh	m2	136	R	114.07	AW-Q4	0.85	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	519	R	85.68	AW-Q5	0.22	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,713	R	21.09	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	5.25	R	28,157.31	AW-Q7	8.57	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	45	R	-									
	Concrete / earthworks					AW-R1					11.63	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					29.56	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					40.31	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					12.27	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					218.02	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.16	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	30	R	-									
BA1.2	Steel	t	4.76	R	22,919.97	BA-Q1	6.30	BA1.1	/	BA1.2				
BA1.3	Handrail	m	16	R	384.35	BA-Q2	1.88	BA1.1	/	BA1.3				
BA1.4	Grating	m2	17	R	874.94	BA-Q3	1.76	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	22	R	184.23	BA-Q4	1.36	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	149.01	BA-Q5	7.50	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					59.63	BA1.2	/	BA1.3
	Steel / grating					BA-R2					26.20	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					124.41	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					153.81	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,392	R	-									
BB1.2	Steel	t	83.56	R	21,762.26	BB-Q1	16.66	BB1.1	/	BB1.2				
BB1.3	Handrail	m	187	R	649.95	BB-Q2	7.44	BB1.1	/	BB1.3				
BB1.4	Grating	m2	123	R	902.05	BB-Q3	11.32	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	174	R	302.30	BB-Q4	8.00	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	17	R	1,561.68	BB-Q5	81.88	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					33.48	BB1.2	/	BB1.3
	Steel / grating					BB-R2					24.13	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					71.99	BB1.2	/	BB1.5

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Year of construction 2006

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					13.94	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	24,354	R	-									
BC1.2	Steel	t	210.92	R	15,713.51	BC-Q1	115.47	BC1.1	/	BC1.2				
BC1.3	Handrail	m	595	R	560.69	BC-Q2	40.93	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,162	R	1,002.24	BC-Q3	5.85	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	800	R	297.21	BC-Q4	30.44	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	54	R	102.52	BC-Q5	451.00	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	68	R	1,912.51	BC-Q6	358.15	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					28.03	BC1.2	/	BC1.3
	Steel / grating					BC-R2					15.68	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					52.87	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					153.27	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.22	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	945	R	-									
BD1.2	Steel	t	33.29	R	23,974.63	BD-Q1	28.39	BD1.1	/	BD1.2				
BD1.3	Handrail	m	11	R	400.27	BD-Q2	85.91	BD1.1	/	BD1.3				
BD1.4	Grating	m2	9	R	915.21	BD-Q3	105.00	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	159.53	BD-Q4	78.75	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	43	R	1,852.91	BD-Q5	21.98	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					59.90	BD1.1	/	BD1.2
	Steel / grating					BD-R2					26.20	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					150.28	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					12.94	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	48	R	-									
BE1.2	Steel	t	4.09	R	24,061.60	BE-Q1	11.74	BE1.1	/	BE1.2				
BE1.3	Handrail	m	53	R	715.09	BE-Q2	0.91	BE1.1	/	BE1.3				
BE1.4	Grating	m2	30	R	1,605.00	BE-Q3	1.60	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	38	R	184.23	BE-Q4	1.26	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	8	R	237.35	BE-Q5	6.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					33.65	BE1.2	/	BE1.3
	Steel / grating					BE-R2					14.99	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					130.61	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					101.38	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	315	R	-									
BF1.2	Steel	t	39.11	R	13,515.23	BF-Q1	8.05	BF1.1	/	BF1.2				
BF1.3	Handrail	m	23	R	715.09	BF-Q2	13.70	BF1.1	/	BF1.3				
BF1.4	Grating	m2	68	R	901.52	BF-Q3	4.63	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	13	R	272.42	BF-Q4	24.23	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	28	R	1,561.68	BF-Q5	11.25	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					18.90	BF1.1	/	BF1.2
	Steel / grating					BF-R2					14.99	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					49.61	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.65	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	23,359	R	-	C-Q1	0.45	C1.1	/	C1.2				
C1.2	Total work units	WU	51,959	R	244.44									
C1.3	Pipe supports	kg	8,917	R	-	C-Q2	2.62	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	13,594	R	-	C-Q3	0.26	C1.4	/	C1.2				
C1.5	Number of welds	No	14,686	R	-	C-Q4	0.63	C1.5	/	C1.1				
C1.6	Total fittings	No	7,619	R	-	C-Q5	0.33	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,634	R	-	C-Q6	0.48	C1.7	/	C1.6				
C1.8	Support number	No	1,876	R	-	C-Q7	0.21	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	51,959	R	244.44	DA-Q1	26.78	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,940	R	52.25									
	Average cost per examination / WU					DA-R1					4.68	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	51,959	R	244.44	DB-Q1	115.98	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	448	R	62.22									
	Average cost per examination / WU					DB-R1					3.93	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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Year of construction 2006

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	51,959	R	244.44	DC-Q1	131.54	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	395	R	177.74									
	Average cost per examination / WU					DC-R1					1.38	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	51,959	R	244.44	DD-Q1	37.14	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,399	R	32.19									
	Average cost per examination / WU					DD-R1					7.59	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	51,959	R	244.44	DE-Q1	58.25	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	892	R	120.58									
	Average cost per examination / WU					DE-R1					2.03	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	51,959	R	244.44	E-Q1	178.99	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	290.29	R	274.41	E-Q2	135.28	E1.1	/	E1.3				
E1.3	Structural steel	t	384.08	R	16,452.37									
	WU cost / install mechanical weight - receive					E-R1					0.89	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					59.96	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	51,959	R	244.44									
F1.2	Painting to piping	m2	6,618	R	105.63	F-Q1	7.85	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,953	R	315.06	F-Q2	26.60	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	413.89	R	404.85									
F1.5	Painting to mechanical equipment	m2	1,290	R	79.15	F-Q3	0.32	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	479	R	236.71	F-Q4	0.86	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.34	F1.2	/	F1.3
	Work unit / paint					F-R2					2.31	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.78	F1.1	/	F1.3
	Install plant / paint					F-R4					5.11	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.71	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	48,302	R	33.47									
G1.2	Electrical cable terminations	No	1,500	R	88.34	G-Q1	32.20	G1.1	/	G1.2				
G1.3	Electrical equipment	No	135	R	378.17	G-Q2	357.79	G1.1	/	G1.3				
G1.4	DB's	No	26	R	1,562.81	G-Q3	5.19	G1.3	/	G1.4				
G1.5	Rack	m	7,111	R	104.72	G-Q4	6.79	G1.1	/	G1.5				
G1.6	Support steel	kg	8,642	R	14.54	G-Q5	0.82	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	38,363	R	18.03	G-Q6	1.26	G1.1	/	G1.7				
G1.8	Instruments	No	1,428	R	156.43	G-Q7	26.86	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,960	R	72.75	G-Q8	0.73	G1.8	/	G1.9				
G1.10	Light fittings	No	762	R	278.57	G-Q9	5.64	G1.10	/	G1.3				
G1.11	Conduit	m	3,192	R	27.37	G-Q10	15.13	G1.1	/	G1.11				
G1.12	Instrument stands	No	262	R	772.67	G-Q11	5.45	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.38	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.09	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.24	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.22	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.30	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.32	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.12	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.25	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.12	G1.7	/	G1.8

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Year of construction 1994

	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,595	R	7.74	AB-Q1	1.98	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,331	R	2.19									
AB1.3	Back fill and compact	m3	6,345	R	7.65	AB-Q2	1.04	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,987	R	0.68	AB-Q3	1.65	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,486	R	0.84	AB-Q4	1.89	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.53	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.01	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.38	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.21	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	47,280.50									
AC1.2	EO for raking equipment	Item	1	R	5,542.85									
AC1.3	Number of piles	No	291	R	-									
AC1.4	Move rig to new position	No	160	R	42.35	AC-Q1	1.82	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	22.38	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	14	R	52.73	AC-Q3	0.93	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	149	R	30.86	AC-Q4	0.09	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,206	R	24.67	AC-Q5	0.07	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	501	R	51.92	AC-Q6	0.58	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	134	R	128.92	AC-Q7	2.17	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	188	R	59.10	AC-Q8	1.55	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	934	R	106.07	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	81	R	139.06	AC-Q10	0.16	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.80	R	1,293.33	AC-Q11	16.35	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	251.06	R	1,838.11	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,439	R	220.68	AC-Q13	0.20	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	169	R	255.43	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	19,230.83		1.00		/					
AC1.19	Load test to pile	No	4	R	8,816.54	AC-Q15	72.75	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	10,092.94	AC-Q16	291.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	188	R	58.41	AC-Q17	1.55	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					214.25	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.12	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.25	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.58	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.27	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.48	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.63	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.33	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.14	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					39.95	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					45.74	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	104	R	9.79	AD-Q1	0.11	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	937	R	14.01									
AD1.3	Kerbing	m	200	R	14.55	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,364	R	-									
AD1.5	Remove top soil	m3	1,032	R	7.46	AD-Q3	0.74	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,389	R	13.25	AD-Q4	0.25	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,140	R	1.35									
AD1.8	Reduce levels	m3	1,359	R	5.59	AD-Q5	0.33	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,035	R	14.73	AD-Q6	1.31	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	268	R	19.72	AD-Q7	3.86	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	350	R	26.20	AD-Q8	3.88	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,463	R	3.87	AD-Q9	5.46	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	323	R	1.86	AD-Q10	0.95	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	281	R	1.19	AD-Q11	1.62	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	336	R	107.04	AD-Q12	1.41	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	44	R	43.54	AD-Q13	1.68	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	5	R	30.56	AD-Q14	0.22	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	10	R	38.72	AD-Q15	0.03	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	874	R	1.15	AD-Q16	4.37	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.70	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					5.53	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.14	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.38	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.75	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.90	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.20	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.42	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.74	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.13	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.08	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					7.36	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.99	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					2.10	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.66	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.08	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	277	R	195.04	AE-Q1	4.54	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	61	R	318.21	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	378	R	-									
AE1.4	Rip and compact	m2	1,800	R	0.92									
AE1.5	Formwork to plinth	m2	422	R	32.39	AE-Q3	6.92	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	165	R	25.05	AE-Q4	0.60	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.53	R	1,449.74	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,943	R	21.71	AE-Q6	550.42	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,436	R	12.70	AE-Q7	5.18	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	428	R	11.78	AE-Q8	1.55	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.61	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.00	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.13	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					66.78	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.06	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,684	R	-	AF-Q1	12.13	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	386	R	8.18	AF-Q2	1.89	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	204	R	13.00	AF-Q3	0.52	AF1.2	/	AF1.4				
AF1.4	Working space	m2	746	R	8.88	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	152	R	204.98	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	251	R	10.69	AF-Q6	0.62	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	343.49	AF-Q7	0.11	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	154.04	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	156	R	-	AF-Q9	0.47	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	330	R	1.74									
AF1.11	Formwork to bases	m2	258	R	26.90	AF-Q10	1.70	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	152	R	41.20	AF-Q11	8.94	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	16	R	35.11	AF-Q12	8.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.95	R	1,896.83	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	24.59	R	1,125.93	AF-Q14	6.34	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	461	R	7.96	AF-Q15	0.33	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	38	R	32.65	AF-Q16	0.45	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	594.78	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	97	R	77.26									
	Base excavation / backfill					AF-R1					0.63	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.92	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.06	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					19.17	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					41.99	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.75	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.02	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					117.80	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.12	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.23	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					25.75	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					10.52	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.65	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	248	R	6.86	AG-Q1	1.20	AG1.1	/	AG1.4				
AG1.2	Working space	m2	857	R	6.21	AG-Q2	0.29	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	61	R	17.40	AG-Q3	4.07	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	206	R	225.13	AG-Q4	1.93	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	70	R	243.21	AG-Q5	2.94	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	236	R	-									
AG1.7	Wood float	m2	257	R	1.08	AG-Q6	0.27	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	107	R	10.81	AG-Q7	1.93	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	352	R	36.76	AG-Q8	0.59	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	180	R	26.25	AG-Q9	0.39	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	20.47	R	1,990.92	AG-Q10	11.53	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,215	R	5.96	AG-Q11	0.11	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	4,435	R	10.95	AG-Q12	0.05	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.69	R	885.23	AG-Q13	41.42	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.03	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.91	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					2.54	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.00	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.16	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.11	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					8.84	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.05	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					3.93	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	329	R	10.19	AH-Q1	4.33	AH1.1	/	AH1.4				
AH1.2	Working space	m2	99	R	9.65	AH-Q2	3.32	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	193	R	9.41	AH-Q3	1.70	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	76	R	215.27	AH-Q4	0.72	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	18	R	232.55	AH-Q5	4.22	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	125	R	200.89	AH-Q6	0.61	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	297.06	AH-Q7	5.85	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	273.57	AH-Q8	19.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	141	R	-									
AH1.10	Blinding	m2	106	R	15.95	AH-Q9	1.33	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	527	R	1.40	AH-Q10	0.27	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	132	R	30.50	AH-Q11	0.58	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	37	R	38.30	AH-Q12	0.35	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	35	R	30.66	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	160	R	18.40	AH-Q14	0.11	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	23	R	26.26	AH-Q15	5.43	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	61	R	12.43	AH-Q16	2.05	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.68	R	1,288.66	AH-Q17	0.19	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.80	R	1,709.37	AH-Q18	16.02	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	912	R	36.43	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,330	R	8.01	AH-Q20	0.11	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,467	R	9.17	AH-Q21	0.06	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.93	R	1,288.35	AH-Q22	151.61	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	355	R	10.15	AH-Q23	0.35	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	343	R	21.94	AH-Q24	0.36	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.06	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					1.08	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					13.50	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					153.76	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.93	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.07	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.72	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.79	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.06	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.76	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					8.92	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					12.64	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					7.65	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					16.16	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.75	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					46.92	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					213.40	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					186.41	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.17	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					19.79	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					9.16	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	230	R	9.62	AI-Q1	2.84	AI1.1	/	AI1.5				
AI1.2	Working space	m2	915	R	5.95	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	106	R	14.13	AI-Q3	2.17	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	290	R	18.13	AI-Q4	0.28	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	81	R	147.29	AI-Q5	5.40	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	15	R	210.62	AI-Q6	0.42	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	113	R	-									
AI1.8	Wood float	m2	191	R	1.43									
AI1.9	Formwork bases	m2	168	R	27.72	AI-Q7	0.48	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	142	R	28.93	AI-Q8	0.11	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	12.83	R	2,097.67	AI-Q9	8.81	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,084	R	4.60	AI-Q10	0.04	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.85	R	1,265.08	AI-Q11	95.29	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.07	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.62	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.68	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					8.12	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.70	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					103.00	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					5.31	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.28	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					456.02	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.12	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	307	R	8.58	AJ-Q1	2.60	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,106	R	5.90	AJ-Q2	0.28	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	89	R	18.21	AJ-Q3	3.45	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	266	R	10.85	AJ-Q4	0.44	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	118	R	268.62	AJ-Q5	3.03	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	22	R	225.13	AJ-Q6	5.36	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	39	R	215.78									
AJ1.8	Total concrete	m3	139	R	-									
AJ1.9	Wood float	m2	418	R	2.10	AJ-Q7	0.33	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	127	R	17.73	AJ-Q8	0.93	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	201	R	27.16	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	14.25	R	1,364.17	AJ-Q10	9.75	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,641	R	6.75	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,387	R	9.75	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.27	R	1,173.04	AJ-Q13	92.91	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.03	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.45	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.47	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					24.76	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					127.91	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					15.15	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					8.29	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					202.10	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					139.91	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.23	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	382	R	10.15	AK-Q1	2.43	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,035	R	8.88	AK-Q2	0.37	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	189	R	13.04	AK-Q3	2.02	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	524	R	16.92	AK-Q4	0.30	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	157	R	147.91	AK-Q5	17.44	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	215.27									
AK1.7	Concrete plinth	m3	47	R	232.55	AK-Q6	3.34	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	262	R	-									
AK1.9	Wood float	m2	377	R	1.89	AK-Q7	0.42	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	657	R	35.15	AK-Q8	0.24	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	92	R	26.90	AK-Q9	0.51	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	44.09	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	28.85	R	1,398.38	AK-Q11	9.08	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,021	R	7.91	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.64	R	1,783.93	AK-Q13	71.98	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.78	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					8.74	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					78.26	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					4.21	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					8.64	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					4.88	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					176.79	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.08	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	483	R	13.59	AL-Q1	3.38	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,379	R	5.95	AL-Q2	0.35	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	261	R	17.09	AL-Q3	1.85	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	216	R	8.89	AL-Q4	0.66	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	143	R	196.00	AL-Q5	1.24	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	115	R	302.14	AL-Q6	1.72	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	67	R	204.98	AL-Q7	2.13	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	297	R	-									
AL1.9	Wood float	m2	429	R	1.71	AL-Q8	0.33	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	294	R	24.88	AL-Q9	0.49	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,209	R	39.19	AL-Q10	0.10	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	143	R	34.70	AL-Q11	0.47	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	54	R	25.25	AL-Q12	1.24	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	44.84	AL-Q13	10.45	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	47.20	R	1,740.22	AL-Q14	6.29	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,046	R	5.89	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	321	R	8.95	AL-Q16	0.93	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.62	R	1,347.36	AL-Q17	479.03	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.28	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.80	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					22.05	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					114.62	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.65	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.65	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.88	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.91	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.71	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.12	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.91	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.57	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					295.45	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					194.44	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.15	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	989	R	10.19	AM-Q1	3.61	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,774	R	6.04	AM-Q2	0.56	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,479	R	19.91	AM-Q3	0.67	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	320	R	8.33	AM-Q4	0.86	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	274	R	214.95									
AM1.6	Concrete column	m3	136	R	215.27	AM-Q5	2.01	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	160	R	225.13	AM-Q6	0.85	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	169	R	243.21	AM-Q7	1.62	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	82	R	305.38	AM-Q8	1.66	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	122	R	204.79	AM-Q9	1.11	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	842	R	-									
AM1.12	Wood float	m2	2,128	R	1.93	AM-Q10	0.40	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	855	R	40.13	AM-Q11	0.32	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	709	R	27.58	AM-Q12	0.19	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	806	R	44.36	AM-Q13	0.20	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	154	R	54.56	AM-Q14	1.04	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	747	R	35.87	AM-Q15	0.23	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	60.15	AM-Q16	34.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	444	R	27.24	AM-Q17	0.18	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	89.10	R	1,922.69	AM-Q18	9.45	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,183	R	5.96	AM-Q19	0.20	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,295	R	6.92	AM-Q20	0.37	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	45	R	229.41	AM-Q21	1.98	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.50	R	921.92	AM-Q22	561.33	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.69	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.51	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					25.80	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.00	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.95	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.88	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.70	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.05	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					111.37	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.36	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.08	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.13	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.81	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.74	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.71	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					11.21	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					322.60	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					277.85	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.38	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.23	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,334	R	14.81	AN-Q1	1.31	AN1.1	/	AN1.5				
AN1.2	Working space	m2	379	R	6.04	AN-Q2	6.16	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	659	R	19.91	AN-Q3	3.54	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,402	R	8.33	AN-Q4	1.27	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,780	R	214.95	AN-Q5								
AN1.6	Concrete column	m3	53	R	176.19	AN-Q6	33.58	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	36	R	204.84	AN-Q7	1.47	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	233	R	217.59	AN-Q8	7.64	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	205.58	AN-Q9	13.25	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,444	R	-				/					
AN1.11	Wood float	m2	2,204	R	1.33	AN-Q10	0.81	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	179	R	38.30	AN-Q11	9.94	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	343	R	32.06	AN-Q12	0.15	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	165	R	39.21	AN-Q13	0.22	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	57	R	39.34	AN-Q14	0.63	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	43	R	37.52	AN-Q15	0.09	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	63.58	AN-Q16	445.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,154	R	41.64	AN-Q17	0.20	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	644.18	R	1,232.21	AN-Q18	3.79	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	8,336	R	8.01	AN-Q19	0.29	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,534	R	8.11	AN-Q20	0.32	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	131	R	323.88	AN-Q21	18.66	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.82	R	1,012.53	AN-Q22	978.02	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.07	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.45	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.74	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					25.80	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					161.62	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.61	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.22	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.21	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					5.50	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.22	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.48	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.23	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					153.83	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					151.94	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.21	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					3.80	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	188	R	15.55	AO-Q1	1.33	AO1.1	/	AO1.5				
AO1.2	Working space	m2	565	R	6.03	AO-Q2	0.33	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	145	R	20.90	AO-Q3	1.30	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	44	R	7.62	AO-Q4	3.20	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	141	R	196.53									
AO1.6	Concrete column	m3	27	R	286.10	AO-Q5	5.22	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	214.95	AO-Q6	2.45	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	204.98	AO-Q7	35.25	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	328.38	AO-Q8	27.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	53	R	-									
AO1.11	Wood float	m2	32	R	1.37	AO-Q9	4.41	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	153	R	29.88	AO-Q10	0.92	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	126	R	28.61	AO-Q11	0.21	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	54	R	47.89	AO-Q12	0.20	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	17	R	50.07	AO-Q13	0.65	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	38.31	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	79	R	93.80	AO-Q15	1.78	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	29.30	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	7.17	R	1,510.67	AO-Q17	7.39	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,146	R	8.67	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	4,533	R	7.18	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	146.34	AO-Q20	4.82	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.67	R	1,265.08	AO-Q21	52.81	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.08	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.58	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.74	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					25.79	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					143.45	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.58	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					4.49	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.29	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					10.00	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.29	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					8.57	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.00	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					174.24	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					210.40	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.16	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					10.32	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,881	R	17.07	AP-Q1	3.91	AP1.1	/	AP1.5				
AP1.2	Working space	m2	583	R	8.09	AP-Q2	3.23	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	980	R	17.51	AP-Q3	1.92	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	203	R	11.09	AP-Q4	2.37	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	481	R	232.55	AP-Q5	0.30	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,606	R	36.56									
AP1.7	Rough formwork	m2	359	R	44.13	AP-Q6	1.34	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,793	R	29.88	AP-Q7	0.27	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,105	R	2.84	AP-Q8	0.15	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	164	R	9.98	AP-Q9	2.93	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	80	R	12.89	AP-Q10	6.01	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	313	R	6.46	AP-Q11	1.54	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.25	R	2,106.08	AP-Q12	384.80	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,491	R	26.33	AP-Q13	0.32	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,462	R	-	AP-Q14	7.20	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,555	R	23.61	AP-Q15	2.23	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,210	R	46.33	AP-Q16	1.57	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,812	R	19.51	AP-Q17	1.23	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	240.71	AP-Q18	494.57	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,973	R	32.19	AP-Q19	0.70	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,955	R	26.39	AP-Q20	1.17	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	94.71	R	1,740.22	AP-Q21	5.08	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	6,535.00									
AP1.24	Structural steel	Item	1	R	16,921.71									
AP1.25	Plumbing and drainage	Item	1	R	10,774.71									
AP1.26	Small power and lighting	Item	1	R	91,793.00									
AP1.27	External works	Item	1	R	39,665.00									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.11	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.97	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					20.97	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					47.60	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					5.27	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.78	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					81.88	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					23.30	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					18.04	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					269.38	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.11	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					9.85	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					37.56	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.35	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.11	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.82	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.00	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.76	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					9.72	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					6.19	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					52.75	AP1.26	/	AP1.22
	External works / concrete					AP-R23					170.57	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	120	R	302.14	AQ-Q1	1.49	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	179	R	26.07									
AQ1.3	Reinforcement	t	13.87	R	1,341.77	AQ-Q2	8.65	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	661	R	15.69	AQ-Q3	0.18	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	290	R	25.25	AQ-Q4	0.41	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	156	R	51.15	AQ-Q5	4.56	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	855	R	20.80	AQ-Q6	0.83	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	66.79	R	4,233.87	AQ-Q7	10.66	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	492	R	26.28	AQ-Q8	1.45	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	1,756.16	AQ-Q9	237.33	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	35	R	320.63	AQ-Q10	20.34	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,259	R	17.98	AQ-Q11	0.57	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	712	R	-									
	Concrete / reinforcement					AQ-R1					0.23	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.59	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					19.26	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					11.97	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.91	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					203.55	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.26	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.41	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					15.41	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.16	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	163	R	27.36	AR-Q1	2.55	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	64	R	215.27	AR-Q2	11.99	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.34	R	1,432.64									
AR1.4	Mesh	m2	451	R	25.79	AR-Q3	0.14	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	198	R	39.24	AR-Q4	0.32	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	88	R	36.61	AR-Q5	8.48	AR1.15	/	AR1.6				
AR1.7	Screed	m2	436	R	5.31	AR-Q6	1.71	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	46.43	R	5,962.77	AR-Q7	16.07	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	17	R	727.74	AR-Q8	2.73	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	45	R	145.99	AR-Q9	1.03	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	67	R	77.56	AR-Q10	0.69	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	442	R	30.35	AR-Q11	1.69	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	98	R	28.00	AR-Q12	7.61	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	40	R	225.72	AR-Q13	1.16	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	746	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.15	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					8.35	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.49	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.88	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					40.54	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.19	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					40.84	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.88	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					196.47	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.92	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					26.42	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	258	R	26.90	AS-Q1	4.03	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	186	R	14.09	AS-Q2	0.34	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	64	R	202.50	AS-Q3	5.24	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	12.22	R	1,896.83									
AS1.5	Mesh	m2	134	R	21.74	AS-Q4	0.48	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	288	R	42.19	AS-Q5	0.22	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	105	R	1.34	AS-Q6	0.61	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	26	R	12.51	AS-Q7	2.46	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	737	R	8.32	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.01	R	1,222.84	AS-Q9	63.37	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	31	R	39.71	AS-Q10	0.35	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	275.03	AS-Q11	2.75	AS1.18	/	AS1.12				
AS1.13	Pipework	m	47	R	80.65	AS-Q12	3.13	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	888	R	7.18	AS-Q13	0.07	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.48	R	5,608.69	AS-Q14	4.44	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.91	R	7,311.33	AS-Q15	161.54	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	147	R	-									
AS1.18	Total control room area	m2	11	R	-									
	Concrete / earthworks					AS-R1					7.53	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					14.37	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					87.25	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					4.80	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					151.12	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					16.19	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					227.98	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.51	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.17	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.34	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.26	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.14	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	163	R	27.46	AT-Q1	7.76	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	14	R	11.60	AT-Q2	1.50	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	21	R	329.63	AT-Q3	16.41	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.28	R	878.01									
AT1.5	Formwork	m2	133	R	27.16	AT-Q4	0.16	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	46	R	1.82	AT-Q5	0.46	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	18	R	18.21	AT-Q6	1.17	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.43	R	5.94	AT-Q7	48.84	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.62	R	1,808.25	AT-Q8	33.87	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.09	R	7.19	AT-Q9	233.33	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.62	R	4,700.69	AT-Q10	45.16	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.71	R	8,235.43	AT-Q11	16.37	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	43	R	37.51	AT-Q12	0.65	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	14	R	26.70	AT-Q13	2.00	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	28	R	-									
	Concrete / earthworks					AT-R1					12.00	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					28.42	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					12.14	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					181.12	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					18.10	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					147.81	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.83	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.18	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.19	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.11	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					8.79	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.40	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	522	R	38.87	AU-Q1	1.85	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	167	R	8.72	AU-Q2	1.69	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	282	R	204.32									
AU1.4	Reinforcement	t	64.50	R	1,751.25	AU-Q3	4.37	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,072	R	27.66	AU-Q4	0.26	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	142	R	14.50	AU-Q5	1.99	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,083	R	5.96	AU-Q6	0.14	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	698	R	6.70	AU-Q7	0.40	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	44	R	42.13	AU-Q8	6.41	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	4.29	R	6,834.72	AU-Q9	65.73	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	5	R	573.56	AU-Q10	56.40	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	23	R	55.34	AU-Q11	9.48	AU1.12	/	AU1.13				
AU1.13	Total area	m2	218	R	-									
	Concrete / earthworks					AU-R1					5.26	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					23.43	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.39	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.12	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					14.09	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					293.83	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.26	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					261.38	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					41.57	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.36	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					3.69	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,921	R	35.36	AV-Q1	0.59	AV1.10	/	AV1.1				
AV1.2	Lining	m2	4,319	R	11.61	AV-Q2	0.53	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,141	R	15.21	AV-Q3	0.74	AV1.10	/	AV1.3				
AV1.4	Pipework	m	79	R	75.19	AV-Q4	29.24	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	591.67	AV-Q5	26.33	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	26	R	302.14	AV-Q6	3.04	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	230	R	26.34	AV-Q7	0.11	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	26	R	22.02	AV-Q8	1.00	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	5.18	R	2,185.82	AV-Q9	5.02	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,310	R	-									
	Earthworks / lining					AV-R1					3.05	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					2.32	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.76	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.47	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.13	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					11.47	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					13.72	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.14	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,467	R	37.94	AW-Q1	8.89	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	87	R	10.58	AW-Q2	1.90	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	165	R	312.86	AW-Q3	12.47	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	13.23	R	1,125.93									
AW1.5	Mesh	m2	76	R	21.72	AW-Q4	2.17	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	456	R	35.14	AW-Q5	0.36	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,946	R	8.40	AW-Q6	0.06	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.93	R	4,917.37	AW-Q7	19.80	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	58	R	-									
	Concrete / earthworks					AW-R1					8.25	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					29.57	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					51.84	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					8.90	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					134.04	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.23	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	22	R	-									
BA1.2	Steel	t	2.61	R	4,150.73	BA-Q1	8.43	BA1.1	/	BA1.2				
BA1.3	Handrail	m	25	R	206.34	BA-Q2	0.88	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	261.78	BA-Q3	1.57	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	17	R	53.02	BA-Q4	1.29	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	57.96	BA-Q5	7.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.12	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.86	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					78.29	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					71.61	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,219	R	-									
BB1.2	Steel	t	73.22	R	6,474.14	BB-Q1	16.65	BB1.1	/	BB1.2				
BB1.3	Handrail	m	153	R	215.53	BB-Q2	7.97	BB1.1	/	BB1.3				
BB1.4	Grating	m2	124	R	268.35	BB-Q3	9.83	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	149	R	89.93	BB-Q4	8.18	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	12	R	404.71	BB-Q5	101.58	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					30.04	BB1.2	/	BB1.3
	Steel / grating					BB-R2					24.13	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					71.99	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					16.00	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	14,485	R	-									
BC1.2	Steel	t	214.03	R	4,141.18	BC-Q1	67.68	BC1.1	/	BC1.2				
BC1.3	Handrail	m	475	R	167.59	BC-Q2	30.49	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,158	R	454.91	BC-Q3	2.81	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	570	R	38.56	BC-Q4	25.41	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	65	R	45.44	BC-Q5	222.85	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	91	R	705.73	BC-Q6	159.18	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					24.71	BC1.2	/	BC1.3
	Steel / grating					BC-R2					9.10	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					107.40	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					91.14	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					5.87	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	615	R	-									
BD1.2	Steel	t	29.17	R	4,356.61	BD-Q1	21.08	BD1.1	/	BD1.2				
BD1.3	Handrail	m	9	R	162.43	BD-Q2	68.33	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	291.03	BD-Q3	76.88	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	14	R	63.68	BD-Q4	43.93	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	27	R	802.31	BD-Q5	22.78	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					26.82	BD1.1	/	BD1.2
	Steel / grating					BD-R2					14.97	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					68.41	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					5.43	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	37	R	-									
BE1.2	Steel	t	3.41	R	4,164.20	BE-Q1	10.85	BE1.1	/	BE1.2				
BE1.3	Handrail	m	60	R	236.07	BE-Q2	0.62	BE1.1	/	BE1.3				
BE1.4	Grating	m2	33	R	209.13	BE-Q3	1.12	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	38	R	83.92	BE-Q4	0.97	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	9	R	33.37	BE-Q5	4.11	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					17.64	BE1.2	/	BE1.3
	Steel / grating					BE-R2					19.91	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					49.62	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					124.79	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	397	R	-									
BF1.2	Steel	t	24.84	R	4,207.35	BF-Q1	15.98	BF1.1	/	BF1.2				
BF1.3	Handrail	m	20	R	202.68	BF-Q2	19.85	BF1.1	/	BF1.3				
BF1.4	Grating	m2	41	R	250.32	BF-Q3	9.68	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	19	R	58.94	BF-Q4	20.89	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	14	R	783.12	BF-Q5	28.36	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.76	BF1.1	/	BF1.2
	Steel / grating					BF-R2					16.81	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					71.38	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					5.37	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	23,703	R	-	C-Q1	0.46	C1.1	/	C1.2				
C1.2	Total work units	WU	51,041	R	91.09									
C1.3	Pipe supports	kg	7,512	R	-	C-Q2	3.16	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	12,159	R	-	C-Q3	0.24	C1.4	/	C1.2				
C1.5	Number of welds	No	13,136	R	-	C-Q4	0.55	C1.5	/	C1.1				
C1.6	Total fittings	No	11,601	R	-	C-Q5	0.49	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,629	R	-	C-Q6	0.14	C1.7	/	C1.6				
C1.8	Support number	No	1,538	R	-	C-Q7	0.20	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	51,041	R	91.09	DA-Q1	35.13	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,453	R	10.39									
	Average cost per examination / WU					DA-R1					8.77	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	51,041	R	91.09	DB-Q1	136.11	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	375	R	17.27									
	Average cost per examination / WU					DB-R1					5.27	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	51,041	R	91.09	DC-Q1	147.52	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	346	R	48.16									
	Average cost per examination / WU					DC-R1					1.89	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	51,041	R	91.09	DD-Q1	36.69	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,391	R	9.80									
	Average cost per examination / WU					DD-R1					9.29	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	51,041	R	91.09	DE-Q1	64.04	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	797	R	30.66									
	Average cost per examination / WU					DE-R1					2.97	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	51,041	R	91.09	E-Q1	200.66	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	254.36	R	81.64	E-Q2	155.39	E1.1	/	E1.3				
E1.3	Structural steel	t	328.48	R	4,777.43									
	WU cost / install mechanical weight - receive					E-R1					1.12	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					58.52	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	51,041	R	91.09									
F1.2	Painting to piping	m2	2,529	R	18.14	F-Q1	20.18	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,807	R	89.86	F-Q2	28.25	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	242.51	R	87.60									
F1.5	Painting to mechanical equipment	m2	1,161	R	24.19	F-Q3	0.21	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	378	R	75.32	F-Q4	0.64	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.20	F1.2	/	F1.3
	Work unit / paint					F-R2					5.02	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.01	F1.1	/	F1.3
	Install plant / paint					F-R4					3.62	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.16	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	42,056	R	9.68									
G1.2	Electrical cable terminations	No	1,268	R	23.09	G-Q1	33.17	G1.1	/	G1.2				
G1.3	Electrical equipment	No	166	R	151.38	G-Q2	253.35	G1.1	/	G1.3				
G1.4	DB's	No	15	R	291.27	G-Q3	11.07	G1.3	/	G1.4				
G1.5	Rack	m	4,571	R	21.96	G-Q4	9.20	G1.1	/	G1.5				
G1.6	Support steel	kg	7,719	R	4.17	G-Q5	0.59	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	34,493	R	4.94	G-Q6	1.22	G1.1	/	G1.7				
G1.8	Instruments	No	864	R	29.72	G-Q7	39.92	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,204	R	32.96	G-Q8	0.39	G1.8	/	G1.9				
G1.10	Light fittings	No	433	R	60.25	G-Q9	2.61	G1.10	/	G1.3				
G1.11	Conduit	m	3,163	R	6.00	G-Q10	13.30	G1.1	/	G1.11				
G1.12	Instrument stands	No	232	R	147.94	G-Q11	3.72	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.42	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.06	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.52	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.61	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.32	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.44	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.16	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.15	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.17	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,723	R	11.90	AB-Q1	2.36	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,843	R	3.15									
AB1.3	Back fill and compact	m3	5,803	R	9.11	AB-Q2	1.16	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,403	R	1.05	AB-Q3	1.98	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	2,976	R	1.21	AB-Q4	2.26	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.78	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.31	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.33	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.83	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	66,322.99									
AC1.2	EO for raking equipment	Item	1	R	8,358.64									
AC1.3	Number of piles	No	248	R	-									
AC1.4	Move rig to new position	No	147	R	66.15	AC-Q1	1.69	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	12	R	-	AC-Q2	20.67	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	11	R	82.56	AC-Q3	1.09	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	136	R	46.92	AC-Q4	0.09	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	3,846	R	42.87	AC-Q5	0.06	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	428	R	73.68	AC-Q6	0.58	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	136	R	198.12	AC-Q7	1.82	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	172	R	78.46	AC-Q8	1.44	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	854	R	100.33	AC-Q9	0.29	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	83	R	195.07	AC-Q10	0.14	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.28	R	1,950.35	AC-Q11	15.23	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	214.30	R	2,884.04	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,316	R	344.74	AC-Q13	0.19	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	154	R	349.12	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	30,109.67		1.00		/					
AC1.19	Load test to pile	No	4	R	13,405.09	AC-Q15	62.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	17,539.34	AC-Q16	248.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	160	R	82.89	AC-Q17	1.55	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.25	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.09	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.57	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					38.88	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	123	R	22.92	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	845	R	24.76									
AD1.3	Kerbing	m	258	R	31.27	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,167	R	-									
AD1.5	Remove top soil	m3	690	R	8.99	AD-Q3	0.56	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,230	R	23.31	AD-Q4	0.17	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,960	R	2.02									
AD1.8	Reduce levels	m3	1,019	R	7.24	AD-Q5	0.26	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	593	R	13.78	AD-Q6	1.72	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	422	R	54.69	AD-Q7	1.41	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	297	R	40.50	AD-Q8	3.43	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,834	R	5.45	AD-Q9	4.35	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	254	R	3.07	AD-Q10	0.67	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	257	R	1.44	AD-Q11	0.98	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	238	R	133.69	AD-Q12	1.00	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	51	R	57.44	AD-Q13	0.92	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	56.93	AD-Q14	0.20	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	6	R	67.33	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	369	R	0.85	AD-Q16	1.43	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.45	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.58	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.53	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.25	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.18	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.69	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.28	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.57	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.05	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.84	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.82	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.15	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	254	R	258.91	AE-Q1	4.54	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	56	R	300.99	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	385	R	-									
AE1.4	Rip and compact	m2	1,646	R	1.38									
AE1.5	Formwork to plinth	m2	360	R	50.81	AE-Q3	6.43	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	151	R	39.13	AE-Q4	0.59	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.23	R	1,981.52	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,496	R	33.99	AE-Q6	463.16	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,314	R	19.30	AE-Q7	5.17	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	391	R	20.46	AE-Q8	1.54	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					187.62	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					58.30	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,999	R	-	AF-Q1	12.12	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	330	R	12.83	AF-Q2	1.76	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	187	R	29.86	AF-Q3	0.48	AF1.2	/	AF1.4				
AF1.4	Working space	m2	682	R	7.13	AF-Q4	0.42	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	139	R	322.43	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	230	R	15.84	AF-Q6	0.62	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	15	R	492.56	AF-Q7	0.11	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	221.87	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	142	R	-	AF-Q9	0.42	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	336	R	2.73									
AF1.11	Formwork to bases	m2	220	R	39.51	AF-Q10	1.58	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	139	R	42.46	AF-Q11	9.27	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	76.19	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.29	R	1,470.40	AF-Q13	0.15	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	15.78	R	1,962.35	AF-Q14	9.00	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	377	R	13.63	AF-Q15	0.37	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	33	R	46.82	AF-Q16	0.45	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	914.03	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	61	R	118.73									
	Base excavation / backfill					AF-R1					0.43	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.80	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.13	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.36	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					38.39	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.69	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					118.11	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.34	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.75	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					23.66	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					10.52	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.72	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	226	R	14.65	AG-Q1	1.69	AG1.1	/	AG1.4				
AG1.2	Working space	m2	874	R	12.61	AG-Q2	0.26	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	54	R	19.57	AG-Q3	4.19	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	134	R	311.38	AG-Q4	0.75	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	65	R	515.23	AG-Q5	2.06	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	280	R	-									
AG1.7	Wood float	m2	140	R	1.96	AG-Q6	0.46	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	178	R	24.13	AG-Q7	0.75	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	312	R	37.32	AG-Q8	0.43	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	122	R	39.03	AG-Q9	0.53	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	17.47	R	2,054.83	AG-Q10	16.03	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,644	R	7.72	AG-Q11	0.17	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,539	R	10.24	AG-Q12	0.11	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.66	R	2,454.95	AG-Q13	24.44	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.86	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.34	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.08	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.12	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.08	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.60	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					7.88	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	272	R	22.14	AH-Q1	4.39	AH1.1	/	AH1.4				
AH1.2	Working space	m2	96	R	12.06	AH-Q2	2.83	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	235	R	26.10	AH-Q3	1.16	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	62	R	453.21	AH-Q4	0.78	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	17	R	307.47	AH-Q5	3.65	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	90	R	308.19	AH-Q6	0.69	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	20	R	469.29	AH-Q7	3.10	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	242.66	AH-Q8	31.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	164	R	-									
AH1.10	Blinding	m2	79	R	16.63	AH-Q9	2.08	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	624	R	2.15	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	119	R	46.87	AH-Q11	0.52	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	59	R	58.85	AH-Q12	0.34	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	24	R	43.75	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	140	R	39.82	AH-Q14	0.12	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	29	R	56.50	AH-Q15	3.10	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	55	R	21.29	AH-Q16	1.64	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.62	R	1,848.32	AH-Q17	0.15	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	10.80	R	2,626.87	AH-Q18	15.19	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	483	R	47.42	AH-Q19	0.19	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	777	R	13.01	AH-Q20	0.21	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,150	R	8.85	AH-Q21	0.08	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.33	R	2,741.45	AH-Q22	123.31	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	210	R	11.07	AH-Q23	0.43	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	172	R	19.50	AH-Q24	0.52	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.84	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.85	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					27.25	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					210.80	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.47	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.47	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.97	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.87	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					9.67	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.97	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.55	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.72	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					5.45	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					14.48	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.70	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					55.40	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					201.91	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					296.82	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.17	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					27.84	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					15.80	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	214	R	15.10	AI-Q1	4.98	AI1.1	/	AI1.5				
AI1.2	Working space	m2	873	R	13.14	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	96	R	19.57	AI-Q3	2.23	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	273	R	25.37	AI-Q4	0.16	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	43	R	221.87	AI-Q5	3.31	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	294.80	AI-Q6	0.21	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	70	R	-									
AI1.8	Wood float	m2	203	R	1.95									
AI1.9	Formwork bases	m2	140	R	42.81	AI-Q7	0.31	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	184	R	67.82	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.54	R	1,405.99	AI-Q9	7.34	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,632	R	10.53	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.20	R	2,411.43	AI-Q11	35.83	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.07	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.15	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.77	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					8.75	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.75	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					113.78	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					5.18	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.35	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					133.52	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.09	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	237	R	11.48	AJ-Q1	3.25	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	616	R	9.06	AJ-Q2	0.38	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	146	R	26.11	AJ-Q3	1.62	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	244	R	15.19	AJ-Q4	0.30	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	73	R	429.15	AJ-Q5	2.21	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	23	R	306.48	AJ-Q6	3.17	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	33	R	333.17									
AJ1.8	Total concrete	m3	180	R	-									
AJ1.9	Wood float	m2	311	R	1.41	AJ-Q7	0.58	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	161	R	40.59	AJ-Q8	0.45	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	282	R	51.77	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.22	R	1,956.63	AJ-Q10	17.61	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,811	R	10.38	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,131	R	14.99	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.08	R	2,021.04	AJ-Q13	67.59	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.03	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.27	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.44	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					28.25	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					304.36	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.57	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.92	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					188.50	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					130.53	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.21	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	357	R	15.60	AK-Q1	1.44	AK1.1	/	AK1.5				
AK1.2	Working space	m2	902	R	13.65	AK-Q2	0.40	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	142	R	16.89	AK-Q3	2.51	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	300	R	15.82	AK-Q4	0.83	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	248	R	410.19	AK-Q5	27.56	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	453.21									
AK1.7	Concrete plinth	m3	38	R	307.47	AK-Q6	6.53	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	241	R	-									
AK1.9	Wood float	m2	526	R	2.99	AK-Q7	0.47	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	262	R	31.18	AK-Q8	0.95	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	126	R	41.43	AK-Q9	0.30	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	34	R	45.99	AK-Q10	0.26	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	24.63	R	2,148.96	AK-Q11	9.78	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,507	R	12.16	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.33	R	2,741.45	AK-Q13	72.37	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.92	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					25.93	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					137.19	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					13.16	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.42	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.85	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					176.72	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.15	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	412	R	23.28	AL-Q1	3.38	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,261	R	8.54	AL-Q2	0.33	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	239	R	26.27	AL-Q3	1.72	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	167	R	23.03	AL-Q4	0.73	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	122	R	464.31	AL-Q5	0.87	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	141	R	412.79	AL-Q6	3.00	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	47	R	322.90	AL-Q7	2.60	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	316	R	-									
AL1.9	Wood float	m2	224	R	3.29	AL-Q8	0.54	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	254	R	57.45	AL-Q9	0.48	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	937	R	37.80	AL-Q10	0.15	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	147	R	49.52	AL-Q11	0.32	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	65	R	54.66	AL-Q12	0.72	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	15	R	96.46	AL-Q13	9.40	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	40.29	R	2,981.00	AL-Q14	7.84	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	10,102	R	6.30	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	294	R	10.32	AL-Q16	1.07	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.53	R	1,932.52	AL-Q17	596.23	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.73	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.89	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					20.16	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					141.13	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.12	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.12	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.08	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.52	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					10.92	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.91	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.52	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					3.35	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					473.17	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					288.86	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.24	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	929	R	16.09	AM-Q1	4.07	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,462	R	9.93	AM-Q2	0.64	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,232	R	31.46	AM-Q3	0.75	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	287	R	10.66	AM-Q4	0.79	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	228	R	317.07									
AM1.6	Concrete column	m3	124	R	321.55	AM-Q5	1.84	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	141	R	303.93	AM-Q6	0.88	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	217	R	502.91	AM-Q7	1.05	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	48	R	294.00	AM-Q8	2.58	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	82	R	221.87	AM-Q9	1.51	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	785	R	-									
AM1.12	Wood float	m2	1,997	R	2.73	AM-Q10	0.39	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	540	R	39.38	AM-Q11	0.42	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	832	R	64.55	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	478	R	49.57	AM-Q13	0.29	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	159	R	61.81	AM-Q14	0.89	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	521	R	56.28	AM-Q15	0.42	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	94.36	AM-Q16	24.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	345	R	62.57	AM-Q17	0.14	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	120.76	R	1,544.19	AM-Q18	6.50	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,151	R	9.38	AM-Q19	0.19	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,315	R	10.25	AM-Q20	0.34	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	53	R	328.97	AM-Q21	2.28	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.66	R	1,327.84	AM-Q22	1189.39	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.62	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.51	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					29.74	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.99	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.04	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.63	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.08	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.43	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					116.14	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					8.05	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.13	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.92	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.98	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.22	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.94	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					4.70	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					164.63	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					150.65	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					4.69	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.24	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,203	R	15.27	AN-Q1	1.61	AN1.1	/	AN1.5				
AN1.2	Working space	m2	358	R	12.06	AN-Q2	6.15	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	331	R	19.33	AN-Q3	6.66	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,195	R	15.27	AN-Q4	1.14	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,366	R	325.20	AN-Q5								
AN1.6	Concrete column	m3	48	R	286.44	AN-Q6	28.46	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	43	R	502.91	AN-Q7	1.12	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	112	R	258.91	AN-Q8	12.20	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	294.80	AN-Q9	12.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,492	R	-				/					
AN1.11	Wood float	m2	1,385	R	1.95	AN-Q10	0.99	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	157	R	39.47	AN-Q11	8.70	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	511	R	51.96	AN-Q12	0.09	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	145	R	47.80	AN-Q13	0.30	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	54	R	56.43	AN-Q14	0.80	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	29	R	53.81	AN-Q15	0.14	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	137.34	AN-Q16	455.33	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,419	R	41.00	AN-Q17	0.08	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	342.08	R	1,981.52	AN-Q18	7.28	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	14,596	R	11.72	AN-Q19	0.17	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	6,991	R	17.17	AN-Q20	0.36	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	126	R	245.07	AN-Q21	19.78	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.66	R	1,845.54	AN-Q22	822.89	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.27	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.79	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					21.30	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					166.77	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					8.24	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					10.52	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.91	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					5.51	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.66	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.48	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					6.31	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					169.07	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					115.41	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.18	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					8.09	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	186	R	16.05	AO-Q1	1.42	AO1.1	/	AO1.5				
AO1.2	Working space	m2	425	R	7.80	AO-Q2	0.44	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	95	R	19.55	AO-Q3	1.96	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	39	R	21.13	AO-Q4	3.36	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	131	R	303.76									
AO1.6	Concrete column	m3	32	R	402.92	AO-Q5	4.09	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	10	R	301.33	AO-Q6	3.20	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	445.58	AO-Q7	32.75	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	410.35	AO-Q8	32.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	50	R	-									
AO1.11	Wood float	m2	39	R	2.88	AO-Q9	3.36	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	89	R	39.51	AO-Q10	1.47	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	155	R	43.89	AO-Q11	0.21	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	79	R	75.65	AO-Q12	0.13	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	11	R	44.41	AO-Q13	0.91	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	59.01	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	60	R	97.85	AO-Q15	2.18	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	45.03	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.83	R	2,321.52	AO-Q17	10.35	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,249	R	13.33	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,015	R	10.24	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	9	R	316.75	AO-Q20	5.56	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.60	R	2,721.67	AO-Q21	28.48	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.06	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.82	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					14.38	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					105.47	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					7.69	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					3.98	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					6.79	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					9.18	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.08	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					6.95	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					9.90	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					174.16	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					226.71	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.11	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					7.33	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	960	R	22.22	AP-Q1	2.00	AP1.1	/	AP1.5				
AP1.2	Working space	m2	475	R	13.14	AP-Q2	2.02	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,150	R	16.89	AP-Q3	0.83	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	302	R	23.60	AP-Q4	1.59	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	479	R	253.77	AP-Q5	0.36	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,313	R	32.51									
AP1.7	Rough formwork	m2	322	R	58.23	AP-Q6	1.49	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,100	R	45.16	AP-Q7	0.44	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,881	R	3.73	AP-Q8	0.12	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	143	R	15.65	AP-Q9	3.35	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	73	R	28.45	AP-Q10	6.56	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	283	R	8.94	AP-Q11	1.69	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.21	R	2,947.92	AP-Q12	395.87	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,094	R	39.67	AP-Q13	0.44	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,916	R	-	AP-Q14	6.09	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,460	R	37.71	AP-Q15	2.00	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,408	R	71.19	AP-Q16	2.07	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,659	R	29.98	AP-Q17	0.63	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	343.49	AP-Q18	416.57	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,725	R	69.68	AP-Q19	1.07	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,018	R	56.78	AP-Q20	0.73	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	98.60	R	2,981.00	AP-Q21	4.86	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	9,802.50									
AP1.24	Structural steel	Item	1	R	25,382.57									
AP1.25	Plumbing and drainage	Item	1	R	16,162.07									
AP1.26	Small power and lighting	Item	1	R	137,689.50									
AP1.27	External works	Item	1	R	59,497.50									
	Excavations / concrete					AP-R1					0.09	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.69	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.32	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					10.75	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					91.69	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					4.36	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.62	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					68.03	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					16.22	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					8.92	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					333.45	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.09	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					6.73	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					41.87	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.32	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.12	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.57	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					0.70	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.29	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.51	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.42	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					46.19	AP1.26	/	AP1.22
	External works / concrete					AP-R23					234.45	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	80	R	468.44	AQ-Q1	2.69	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	215	R	36.97									
AQ1.3	Reinforcement	t	10.67	R	2,564.05	AQ-Q2	7.50	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	667	R	35.82	AQ-Q3	0.12	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	194	R	46.87	AQ-Q4	0.41	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	120	R	62.91	AQ-Q5	5.45	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,041	R	42.74	AQ-Q6	0.63	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	37.04	R	6,071.69	AQ-Q7	17.66	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	586	R	45.01	AQ-Q8	1.12	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	2,518.86	AQ-Q9	327.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	44	R	492.73	AQ-Q10	14.86	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	951	R	27.63	AQ-Q11	0.69	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	654	R	-									
	Concrete / reinforcement					AQ-R1					0.18	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					12.67	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					13.08	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					9.99	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.45	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					142.06	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.05	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.41	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					11.53	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.55	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	136	R	40.35	AR-Q1	2.34	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	58	R	321.55	AR-Q2	12.31	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.71	R	1,934.13									
AR1.4	Mesh	m2	578	R	53.34	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	116	R	37.77	AR-Q4	0.50	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	59	R	39.67	AR-Q5	6.36	AR1.15	/	AR1.6				
AR1.7	Screed	m2	407	R	7.86	AR-Q6	0.92	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	43.57	R	8,440.45	AR-Q7	8.61	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	714.20	AR-Q8	3.96	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	53	R	341.69	AR-Q9	0.82	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	40	R	86.65	AR-Q10	1.09	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	457	R	34.38	AR-Q11	0.82	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	90	R	27.69	AR-Q12	4.17	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	41	R	547.49	AR-Q13	1.06	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	375	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.17	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					6.03	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.51	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					8.11	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					40.91	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.82	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					24.70	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.94	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					245.50	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.81	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					15.42	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	345	R	50.05	AS-Q1	6.05	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	125	R	16.98	AS-Q2	0.46	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	57	R	356.09	AS-Q3	4.88	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	11.69	R	2,845.25									
AS1.5	Mesh	m2	100	R	28.15	AS-Q4	0.57	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	165	R	39.47	AS-Q5	0.35	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	166	R	3.73	AS-Q6	0.34	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	22	R	19.33	AS-Q7	2.59	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	924	R	11.72	AS-Q8	0.06	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.79	R	2,021.04	AS-Q9	72.15	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	29	R	54.97	AS-Q10	0.28	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	938.86	AS-Q11	2.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	31	R	86.73	AS-Q12	2.58	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	710	R	13.67	AS-Q13	0.08	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.58	R	6,342.41	AS-Q14	5.06	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.80	R	7,365.20	AS-Q15	100.00	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	80	R	-									
AS1.18	Total control room area	m2	8	R	-									
	Concrete / earthworks					AS-R1					7.11	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					20.97	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					101.07	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					9.02	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					95.47	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					18.42	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					242.77	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					4.11	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.18	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.45	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.39	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	120	R	33.64	AT-Q1	10.00	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	14	R	15.83	AT-Q2	0.86	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	326.38	AT-Q3	7.36	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.63	R	1,876.01									
AT1.5	Formwork	m2	189	R	55.14	AT-Q4	0.06	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	24	R	2.79	AT-Q5	0.50	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	22	R	19.69	AT-Q6	0.55	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.29	R	6.02	AT-Q7	41.38	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.38	R	1,897.62	AT-Q8	31.58	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.11	R	13.67	AT-Q9	109.09	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.85	R	8,960.63	AT-Q10	35.29	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.90	R	7,657.07	AT-Q11	33.33	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	50	R	54.31	AT-Q12	0.60	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	16	R	41.02	AT-Q13	1.88	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	30	R	-									
	Concrete / earthworks					AT-R1					9.70	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					20.62	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					5.92	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					116.98	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					16.58	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					311.63	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.44	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.21	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.25	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.01	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.32	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	433	R	51.08	AU-Q1	1.07	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	184	R	16.29	AU-Q2	2.19	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	403	R	467.68									
AU1.4	Reinforcement	t	59.52	R	2,387.59	AU-Q3	6.77	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	969	R	39.52	AU-Q4	0.42	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	203	R	27.31	AU-Q5	1.99	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,627	R	8.92	AU-Q6	0.25	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	608	R	10.24	AU-Q7	0.66	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	56	R	58.17	AU-Q8	7.20	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	1.80	R	7,588.91	AU-Q9	223.89	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	7	R	812.39	AU-Q10	57.57	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	19	R	58.14	AU-Q11	10.42	AU1.12	/	AU1.13				
AU1.13	Total area	m2	198	R	-									
	Concrete / earthworks					AU-R1					9.16	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					28.71	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					11.83	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.20	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					17.12	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					267.67	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.31	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					233.16	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					41.05	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.58	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					8.04	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	5,222	R	55.14	AV-Q1	0.61	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,412	R	16.53	AV-Q2	1.33	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,622	R	23.83	AV-Q3	1.22	AV1.10	/	AV1.3				
AV1.4	Pipework	m	95	R	138.19	AV-Q4	33.77	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	858.57	AV-Q5	31.67	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	28	R	393.29	AV-Q6	3.39	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	286	R	42.35	AV-Q7	0.10	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	30	R	45.52	AV-Q8	0.93	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.00	R	1,950.35	AV-Q9	9.33	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,208	R	-									
	Earthworks / lining					AV-R1					3.34	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					2.31	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.69	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.40	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.16	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					9.29	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					8.64	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.20	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	17	R	-									
BA1.2	Steel	t	2.39	R	6,378.63	BA-Q1	7.11	BA1.1	/	BA1.2				
BA1.3	Handrail	m	21	R	353.46	BA-Q2	0.81	BA1.1	/	BA1.3				
BA1.4	Grating	m2	13	R	375.47	BA-Q3	1.31	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	19	R	81.53	BA-Q4	0.89	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	69.16	BA-Q5	4.25	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					18.05	BA1.2	/	BA1.3
	Steel / grating					BA-R2					16.99	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					78.24	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					92.23	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,130	R	-									
BB1.2	Steel	t	40.60	R	6,211.77	BB-Q1	27.83	BB1.1	/	BB1.2				
BB1.3	Handrail	m	97	R	226.98	BB-Q2	11.65	BB1.1	/	BB1.3				
BB1.4	Grating	m2	160	R	592.15	BB-Q3	7.06	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	69	R	66.44	BB-Q4	16.38	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	10	R	666.73	BB-Q5	113.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					27.37	BB1.2	/	BB1.3
	Steel / grating					BB-R2					10.49	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					93.49	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					9.32	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,523	R	-									
BC1.2	Steel	t	199.82	R	6,496.31	BC-Q1	67.68	BC1.1	/	BC1.2				
BC1.3	Handrail	m	645	R	333.79	BC-Q2	20.97	BC1.1	/	BC1.3				
BC1.4	Grating	m2	2,623	R	415.68	BC-Q3	5.16	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	390	R	107.44	BC-Q4	34.67	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	80	R	67.75	BC-Q5	169.04	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	54	R	805.22	BC-Q6	250.43	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					19.46	BC1.2	/	BC1.3
	Steel / grating					BC-R2					15.63	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					60.46	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					95.89	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.07	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	310	R	-									
BD1.2	Steel	t	16.76	R	6,211.77	BD-Q1	18.50	BD1.1	/	BD1.2				
BD1.3	Handrail	m	13	R	341.96	BD-Q2	23.85	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	418.41	BD-Q3	44.29	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	10	R	88.41	BD-Q4	31.00	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	36	R	1,299.05	BD-Q5	8.61	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.17	BD1.1	/	BD1.2
	Steel / grating					BD-R2					14.85	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					70.26	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					4.78	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	34	R	-									
BE1.2	Steel	t	3.45	R	10,698.45	BE-Q1	9.86	BE1.1	/	BE1.2				
BE1.3	Handrail	m	49	R	166.71	BE-Q2	0.69	BE1.1	/	BE1.3				
BE1.4	Grating	m2	19	R	408.40	BE-Q3	1.79	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	50	R	105.49	BE-Q4	0.68	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	66.34	BE-Q5	4.86	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					64.17	BE1.2	/	BE1.3
	Steel / grating					BE-R2					26.20	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					101.42	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					161.27	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	171	R	-									
BF1.2	Steel	t	22.94	R	9,031.03	BF-Q1	7.45	BF1.1	/	BF1.2				
BF1.3	Handrail	m	16	R	309.63	BF-Q2	10.69	BF1.1	/	BF1.3				
BF1.4	Grating	m2	35	R	405.91	BF-Q3	4.89	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	16	R	121.56	BF-Q4	10.69	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	24	R	697.28	BF-Q5	7.13	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					29.17	BF1.1	/	BF1.2
	Steel / grating					BF-R2					22.25	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					74.29	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					12.95	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	20,233	R	-	C-Q1	0.23	C1.1	/	C1.2				
C1.2	Total work units	WU	88,777	R	76.75									
C1.3	Pipe supports	kg	11,375	R	-	C-Q2	1.78	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,116	R	-	C-Q3	0.11	C1.4	/	C1.2				
C1.5	Number of welds	No	15,057	R	-	C-Q4	0.74	C1.5	/	C1.1				
C1.6	Total fittings	No	5,562	R	-	C-Q5	0.27	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,091	R	-	C-Q6	0.38	C1.7	/	C1.6				
C1.8	Support number	No	1,413	R	-	C-Q7	0.12	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	88,777	R	76.75	DA-Q1	83.12	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,068	R	18.50									
	Average cost per examination / WU					DA-R1					4.15	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	88,777	R	76.75	DB-Q1	262.65	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	338	R	40.80									
	Average cost per examination / WU					DB-R1					1.88	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	88,777	R	76.75	DC-Q1	256.58	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	346	R	48.16									
	Average cost per examination / WU					DC-R1					1.59	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	51,041	R	91.09	DD-Q1	36.69	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,391	R	9.80									
	Average cost per examination / WU					DD-R1					9.29	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	88,777	R	76.75	DE-Q1	166.56	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	533	R	36.96									
	Average cost per examination / WU					DE-R1					2.08	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	88,777	R	76.75	E-Q1	408.98	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	217.07	R	123.37	E-Q2	302.76	E1.1	/	E1.3				
E1.3	Structural steel	t	293.23	R	7,166.14									
	WU cost / install mechanical weight - receive					E-R1					0.62	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					58.09	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	88,777	R	76.75									
F1.2	Painting to piping	m2	2,267	R	48.12	F-Q1	39.16	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,122	R	143.57	F-Q2	79.12	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	256.86	R	119.25									
F1.5	Painting to mechanical equipment	m2	968	R	37.35	F-Q3	0.27	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	489	R	176.59	F-Q4	0.53	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.34	F1.2	/	F1.3
	Work unit / paint					F-R2					1.59	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.53	F1.1	/	F1.3
	Install plant / paint					F-R4					3.19	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.68	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	30,168	R	13.88									
G1.2	Electrical cable terminations	No	1,327	R	35.48	G-Q1	22.73	G1.1	/	G1.2				
G1.3	Electrical equipment	No	148	R	232.63	G-Q2	203.84	G1.1	/	G1.3				
G1.4	DB's	No	13	R	501.83	G-Q3	11.38	G1.3	/	G1.4				
G1.5	Rack	m	3,328	R	44.74	G-Q4	9.06	G1.1	/	G1.5				
G1.6	Support steel	kg	6,943	R	9.45	G-Q5	0.48	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	26,963	R	7.09	G-Q6	1.12	G1.1	/	G1.7				
G1.8	Instruments	No	807	R	45.67	G-Q7	33.41	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,921	R	50.65	G-Q8	0.42	G1.8	/	G1.9				
G1.10	Light fittings	No	324	R	78.01	G-Q9	2.19	G1.10	/	G1.3				
G1.11	Conduit	m	2,700	R	8.61	G-Q10	11.17	G1.1	/	G1.11				
G1.12	Instrument stands	No	299	R	303.29	G-Q11	2.70	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.39	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.06	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.46	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.61	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.47	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.31	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.18	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.14	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.16	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,393	R	28.45	AB-Q1	2.37	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,126	R	7.02									
AB1.3	Back fill and compact	m3	6,381	R	24.29	AB-Q2	1.16	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,493	R	3.01	AB-Q3	2.12	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,273	R	2.90	AB-Q4	2.26	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.05	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.17	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					9.45	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.81	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	147,975.43									
AC1.2	EO for raking equipment	Item	1	R	19,981.33									
AC1.3	Number of piles	No	230	R	-									
AC1.4	Move rig to new position	No	193	R	147.60	AC-Q1	1.19	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	15.33	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	184.20	AC-Q3	1.25	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	115	R	112.16	AC-Q4	0.13	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,256	R	95.66	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	543	R	176.13	AC-Q6	0.42	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	143	R	473.59	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	151	R	163.38	AC-Q8	1.52	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	588	R	239.84	AC-Q9	0.39	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	85	R	435.22	AC-Q10	0.18	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.85	R	4,662.31	AC-Q11	13.65	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	198.89	R	6,894.29	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,732	R	769.16	AC-Q13	0.13	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	202	R	778.94	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	67,178.69		1.00		/					
AC1.19	Load test to pile	No	3	R	32,044.86	AC-Q15	76.67	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	39,132.61	AC-Q16	230.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	203	R	198.15	AC-Q17	1.13	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.98	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.17	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.62	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.31	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					41.66	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	126	R	51.14	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	867	R	55.25									
AD1.3	Kerbing	m	264	R	74.74	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,483	R	-									
AD1.5	Remove top soil	m3	709	R	21.49	AD-Q3	0.52	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,352	R	55.72	AD-Q4	0.16	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,355	R	4.83									
AD1.8	Reduce levels	m3	977	R	16.15	AD-Q5	0.22	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	652	R	32.93	AD-Q6	1.50	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	434	R	145.74	AD-Q7	1.50	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	327	R	90.36	AD-Q8	2.99	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,016	R	13.03	AD-Q9	4.65	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	261	R	6.85	AD-Q10	0.67	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	264	R	3.21	AD-Q11	0.99	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	245	R	319.59	AD-Q12	1.00	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	57	R	137.32	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	136.10	AD-Q14	0.22	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	160.96	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	378	R	2.96	AD-Q16	1.43	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.45	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.34	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.49	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.23	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.18	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.69	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.28	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.51	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.09	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.84	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.82	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.15	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	223	R	539.15	AE-Q1	5.87	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	38	R	719.53	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	396	R	-									
AE1.4	Rip and compact	m2	1,703	R	3.31									
AE1.5	Formwork to plinth	m2	334	R	121.47	AE-Q3	8.79	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	199	R	87.31	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.23	R	4,421.02	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,663	R	75.85	AE-Q6	393.14	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,103	R	46.14	AE-Q7	4.95	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	535	R	45.65	AE-Q8	2.40	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.75	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					162.89	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					58.29	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.09	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,488	R	-	AF-Q1	12.13	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	370	R	29.65	AF-Q2	1.04	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	357	R	43.66	AF-Q3	0.96	AF1.2	/	AF1.4				
AF1.4	Working space	m2	384	R	30.11	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	143	R	703.10	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	228	R	53.56	AF-Q6	0.68	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	18	R	957.49	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	732.65	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	154	R	-	AF-Q9	0.49	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	316	R	4.37									
AF1.11	Formwork to bases	m2	274	R	96.66	AF-Q10	1.92	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	175	R	97.83	AF-Q11	9.72	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	18	R	169.96	AF-Q12	9.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.41	R	3,294.40	AF-Q13	0.09	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	16.58	R	4,377.35	AF-Q14	9.29	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	424	R	27.84	AF-Q15	0.34	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	35	R	114.26	AF-Q16	0.51	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	3,139.26	AF-Q17	0.12	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	67	R	255.67									
	Base excavation / backfill					AF-R1					0.68	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.98	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					23.71	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					13.13	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.29	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.04	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					160.89	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.14	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.23	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.75	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					25.26	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.38	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.75	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.08	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	244	R	53.84	AG-Q1	1.45	AG1.1	/	AG1.4				
AG1.2	Working space	m2	821	R	20.16	AG-Q2	0.30	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	67	R	47.88	AG-Q3	3.64	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	168	R	717.43	AG-Q4	0.84	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	100	R	1,149.32	AG-Q5	1.68	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	172	R	-									
AG1.7	Wood float	m2	147	R	4.38	AG-Q6	0.68	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	200	R	49.31	AG-Q7	0.84	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	327	R	91.07	AG-Q8	0.51	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	200	R	134.04	AG-Q9	0.50	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	19.61	R	5,014.23	AG-Q10	8.77	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,575	R	17.23	AG-Q11	0.11	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,792	R	24.48	AG-Q12	0.06	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.73	R	6,541.64	AG-Q13	36.63	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.08	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.37	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.89	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.07	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.13	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.12	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.99	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					9.12	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	457	R	54.42	AH-Q1	9.93	AH1.1	/	AH1.4				
AH1.2	Working space	m2	46	R	16.64	AH-Q2	9.93	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	273	R	59.83	AH-Q3	1.67	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	46	R	787.95	AH-Q4	0.53	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	20	R	755.22	AH-Q5	2.30	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	90	R	787.95	AH-Q6	0.51	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	20	R	1,153.72	AH-Q7	2.30	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	482.91	AH-Q8	23.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	164	R	-									
AH1.10	Blinding	m2	86	R	38.65	AH-Q9	1.91	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	661	R	4.51	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	184	R	150.77	AH-Q11	0.25	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	41	R	88.14	AH-Q12	0.49	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	19	R	73.73	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	157	R	91.72	AH-Q14	0.13	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	32	R	124.41	AH-Q15	2.81	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	42	R	32.51	AH-Q16	2.14	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.29	R	6,729.42	AH-Q17	0.30	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.69	R	4,565.47	AH-Q18	21.33	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	601	R	83.57	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	864	R	20.01	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,683	R	33.38	AH-Q21	0.06	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.81	R	4,279.93	AH-Q22	202.47	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	403	R	46.14	AH-Q23	0.22	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	193	R	46.62	AH-Q24	0.47	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.07	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					3.27	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.91	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					20.39	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					174.71	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.04	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.00	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.68	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.63	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					5.23	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					13.09	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.55	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.23	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.33	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					24.24	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.47	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					54.63	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					228.16	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					136.77	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.18	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					17.08	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					16.90	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	228	R	41.29	AI-Q1	2.81	AI1.1	/	AI1.5				
AI1.2	Working space	m2	1,004	R	30.67	AI-Q2	0.23	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	87	R	39.41	AI-Q3	2.62	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	188	R	36.92	AI-Q4	0.43	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	81	R	957.12	AI-Q5	5.79	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	14	R	708.76	AI-Q6	0.42	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	106	R	-									
AI1.8	Wood float	m2	192	R	5.01									
AI1.9	Formwork bases	m2	154	R	92.18	AI-Q7	0.53	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	208	R	147.67	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	6.06	R	3,294.40	AI-Q9	17.49	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,901	R	22.93	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.90	R	5,992.91	AI-Q11	90.00	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.35	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.05	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					25.92	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.35	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					191.04	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					10.38	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.80	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					143.67	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.16	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	243	R	25.73	AJ-Q1	2.19	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	677	R	20.22	AJ-Q2	0.36	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	179	R	63.72	AJ-Q3	1.36	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	249	R	36.51	AJ-Q4	0.45	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	111	R	940.15	AJ-Q5	3.08	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	22	R	787.95	AJ-Q6	5.05	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	36	R	717.43									
AJ1.8	Total concrete	m3	203	R	-									
AJ1.9	Wood float	m2	197	R	3.29	AJ-Q7	1.03	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	177	R	88.38	AJ-Q8	0.63	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	210	R	128.66	AJ-Q9	0.10	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	11.24	R	4,787.55	AJ-Q10	18.06	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,190	R	23.91	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,344	R	33.43	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.11	R	4,306.26	AJ-Q13	100.00	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.03	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.27	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.40	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					25.75	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					285.76	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.64	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.12	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					200.23	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					143.21	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.22	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	366	R	35.22	AK-Q1	1.88	AK1.1	/	AK1.5				
AK1.2	Working space	m2	991	R	27.63	AK-Q2	0.37	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	263	R	76.50	AK-Q3	1.39	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	284	R	27.77	AK-Q4	0.69	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	195	R	677.72	AK-Q5	21.67	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	1,083.39									
AK1.7	Concrete plinth	m3	45	R	686.01	AK-Q6	4.33	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	239	R	-									
AK1.9	Wood float	m2	527	R	4.47	AK-Q7	0.37	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	282	R	128.66	AK-Q8	0.69	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	126	R	91.88	AK-Q9	0.36	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	39	R	150.61	AK-Q10	0.23	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.72	R	4,805.92	AK-Q11	8.62	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,836	R	26.27	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.41	R	6,904.81	AK-Q13	70.09	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.27	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.46	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					24.40	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					151.62	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.27	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.47	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.19	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					182.94	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.10	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	442	R	41.29	AL-Q1	2.65	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,310	R	30.67	AL-Q2	0.34	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	222	R	39.41	AL-Q3	1.99	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	347	R	55.06	AL-Q4	0.48	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	167	R	940.15	AL-Q5	1.08	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	155	R	1,061.11	AL-Q6	3.23	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	48	R	1,093.03	AL-Q7	3.48	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	324	R	-									
AL1.9	Wood float	m2	469	R	5.84	AL-Q8	0.36	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	463	R	137.33	AL-Q9	0.36	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	577	R	84.34	AL-Q10	0.27	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	144	R	118.38	AL-Q11	0.33	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	62	R	167.96	AL-Q12	0.77	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	163.14	AL-Q13	14.09	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	43.23	R	5,287.34	AL-Q14	7.49	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	14,255	R	30.87	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	219	R	36.43	AL-Q16	1.48	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.68	R	4,056.04	AL-Q17	476.47	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.04	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.35	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.05	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					17.08	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					160.98	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.89	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.89	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					6.85	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					9.23	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					12.58	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					6.51	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					9.23	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					6.70	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					171.28	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					145.14	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.23	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	957	R	36.11	AM-Q1	3.78	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,056	R	21.98	AM-Q2	0.91	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	851	R	65.68	AM-Q3	1.12	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	569	R	38.65	AM-Q4	0.44	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	253	R	709.18									
AM1.6	Concrete column	m3	145	R	1,173.45	AM-Q5	1.74	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	153	R	604.12	AM-Q6	0.95	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	257	R	702.32	AM-Q7	0.98	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	34	R	1,001.35	AM-Q8	4.26	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	102	R	715.13	AM-Q9	1.42	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	820	R	-									
AM1.12	Wood float	m2	1,376	R	4.40	AM-Q10	0.60	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	915	R	117.91	AM-Q11	0.28	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	549	R	109.54	AM-Q12	0.26	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	878	R	176.53	AM-Q13	0.17	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	175	R	124.94	AM-Q14	0.87	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	585	R	203.85	AM-Q15	0.44	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	324.47	AM-Q16	29.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	660	R	110.78	AM-Q17	0.05	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	67.96	R	6,638.92	AM-Q18	12.07	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,271	R	18.01	AM-Q19	0.19	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,300	R	23.89	AM-Q20	0.36	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	62	R	639.24	AM-Q21	1.10	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.57	R	4,502.58	AM-Q22	1438.60	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.64	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.55	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					18.35	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.60	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.17	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.01	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.71	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.99	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					161.18	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.01	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					3.42	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.84	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					10.71	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					1.86	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.51	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					9.04	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					368.62	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					277.90	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.39	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.16	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,351	R	51.67	AN-Q1	1.86	AN1.1	/	AN1.5				
AN1.2	Working space	m2	245	R	28.14	AN-Q2	9.60	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	460	R	46.62	AN-Q3	5.11	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,905	R	55.81	AN-Q4	0.67	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,267	R	769.11	AN-Q5								
AN1.6	Concrete column	m3	49	R	1,093.03	AN-Q6	25.86	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	47	R	677.72	AN-Q7	1.04	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	130	R	917.67	AN-Q8	9.75	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	1,068.82	AN-Q9	8.17	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,449	R	-				/					
AN1.11	Wood float	m2	1,610	R	4.67	AN-Q10	0.79	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	186	R	117.91	AN-Q11	6.81	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	339	R	109.54	AN-Q12	0.14	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	215	R	133.95	AN-Q13	0.22	AN1.7	/	AN1.14				

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AN1.15	Formwork to soffits beams	m2	55	R	152.07	AN-Q14	0.85	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	30	R	198.29	AN-Q15	0.20	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	291.87	AN-Q16	316.75	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,199	R	100.46	AN-Q17	0.11	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	437.04	R	5,179.62	AN-Q18	3.32	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	9,174	R	35.10	AN-Q19	0.16	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	10,724	R	24.48	AN-Q20	0.14	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	77	R	993.25	AN-Q21	18.82	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.75	R	4,416.66	AN-Q22	724.00	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.07	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.84	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					1.11	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					13.78	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					164.69	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					6.52	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.06	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					4.46	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					9.98	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.32	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.39	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					9.13	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					147.57	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					211.59	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.17	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					5.21	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	209	R	35.54	AO-Q1	1.45	AO1.1	/	AO1.5				
AO1.2	Working space	m2	407	R	31.08	AO-Q2	0.51	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	104	R	46.62	AO-Q3	2.01	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	40	R	51.58	AO-Q4	3.60	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	144	R	619.26									
AO1.6	Concrete column	m3	35	R	753.44	AO-Q5	4.11	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	940.15	AO-Q6	3.18	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	7	R	787.95	AO-Q7	20.57	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	851.22	AO-Q8	35.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	58	R	-									
AO1.11	Wood float	m2	29	R	4.51	AO-Q9	4.97	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	101	R	101.24	AO-Q10	1.43	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	153	R	121.23	AO-Q11	0.23	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	79	R	203.42	AO-Q12	0.14	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	12	R	90.22	AO-Q13	0.92	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	138.23	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	66	R	238.77	AO-Q15	2.18	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	153.83	AO-Q16	0.50	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	7.44	R	3,073.05	AO-Q17	7.80	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,286	R	21.52	AO-Q18	0.03	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,432	R	31.90	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	835.70	AO-Q20	5.80	AO1.10	/	AO1.22				
AO1.23	Grout	m3	5.20	R	5,094.45	AO-Q21	27.69	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.06	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.14	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.76	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					12.01	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					137.31	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.12	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					4.62	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					10.42	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					6.21	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.94	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					6.16	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.12	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					142.80	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					96.33	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.12	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					3.68	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,194	R	49.76	AP-Q1	1.30	AP1.1	/	AP1.5				
AP1.2	Working space	m2	528	R	21.02	AP-Q2	2.26	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,435	R	69.68	AP-Q3	0.83	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	183	R	37.04	AP-Q4	5.02	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	919	R	1,095.00	AP-Q5	0.62	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,474	R	60.05									
AP1.7	Rough formwork	m2	337	R	62.05	AP-Q6	2.73	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,771	R	105.37	AP-Q7	0.52	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,121	R	8.70	AP-Q8	0.29	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	152	R	40.59	AP-Q9	6.05	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	84	R	54.17	AP-Q10	10.94	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	255	R	31.09	AP-Q11	3.60	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.83	R	3,543.87	AP-Q12	1107.23	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,077	R	131.29	AP-Q13	0.44	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,975	R	-	AP-Q14	3.24	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,199	R	62.84	AP-Q15	1.35	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,170	R	94.24	AP-Q16	1.37	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,278	R	48.43	AP-Q17	0.91	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	6	R	1,070.24	AP-Q18	495.83	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,055	R	183.86	AP-Q19	0.97	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,534	R	106.27	AP-Q20	0.66	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	74.91	R	6,801.57	AP-Q21	12.27	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	22,872.50									
AP1.24	Structural steel	Item	1	R	59,226.00									
AP1.25	Plumbing and drainage	Item	1	R	37,711.50									
AP1.26	Small power and lighting	Item	1	R	321,275.50									
AP1.27	External works	Item	1	R	138,827.50									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.37	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.71	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					29.56	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					113.27	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					17.65	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					10.39	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					125.86	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					26.98	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					20.21	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					218.77	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.31	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					17.43	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					72.17	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.71	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.12	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.71	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.24	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.36	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.71	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.54	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					47.24	AP1.26	/	AP1.22
	External works / concrete					AP-R23					126.78	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	106	R	957.12	AQ-Q1	1.62	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	172	R	90.21									
AQ1.3	Reinforcement	t	8.42	R	6,968.21	AQ-Q2	12.59	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	894	R	60.05	AQ-Q3	0.12	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	322	R	144.14	AQ-Q4	0.33	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	122	R	131.32	AQ-Q5	5.59	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,276	R	95.35	AQ-Q6	0.53	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	38.01	R	14,514.38	AQ-Q7	17.94	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	601	R	107.60	AQ-Q8	1.13	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	6,021.33	AQ-Q9	341.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	52	R	1,177.86	AQ-Q10	13.12	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	999	R	61.65	AQ-Q11	0.68	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	682	R	-									
	Concrete / reinforcement					AQ-R1					0.14	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					10.61	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					15.94	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.64	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.29	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					152.22	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.13	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.41	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					12.35	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.55	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	229	R	122.59	AR-Q1	5.09	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	45	R	753.44	AR-Q2	12.20	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	3.69	R	3,073.05									
AR1.4	Mesh	m2	409	R	78.47	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	158	R	122.98	AR-Q4	0.28	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	76	R	126.72	AR-Q5	6.01	AR1.15	/	AR1.6				
AR1.7	Screed	m2	628	R	25.07	AR-Q6	0.73	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	30.70	R	11,881.69	AR-Q7	14.89	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	19	R	1,636.62	AR-Q8	1.62	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	31	R	754.96	AR-Q9	0.99	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	41	R	201.54	AR-Q10	0.75	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	684	R	107.67	AR-Q11	0.67	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	94	R	67.40	AR-Q12	4.86	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	37	R	1,199.41	AR-Q13	0.83	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	457	R	-									
	Earthworks / concrete					AR-R1					0.16	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.25	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate		Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh						AR-R3					9.60	AR1.2	/	AR1.4
	Concrete / formwork						AR-R4					6.13	AR1.2	/	AR1.5
	Concrete / brickwork						AR-R5					5.95	AR1.2	/	AR1.6
	Concrete / screed						AR-R6					30.05	AR1.2	/	AR1.7
	Structural steel / cat ladders						AR-R7					7.26	AR1.8	/	AR1.9
	Structural steel / hand rail						AR-R8					15.74	AR1.8	/	AR1.10
	Hand rail / kick plates						AR-R9					3.75	AR1.10	/	AR1.11
	Structural steel / roof covering						AR-R10					110.35	AR1.8	/	AR1.12
	Side cladding / roof covering						AR-R11					0.63	AR1.13	/	AR1.12
	Structural steel / floor grating						AR-R12					9.91	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**														
AS1.1	Earthworks	m3	0	R	-		AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-		AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-		AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0.00	R	-										
AS1.5	Mesh	m2	0	R	-		AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-		AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-		AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-		AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-		AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.00	R	-		AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-		AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-		AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-		AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-		AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0.00	R	-		AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.00	R	-		AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-										
AS1.18	Total control room area	m2	0	R	-										
	Concrete / earthworks						AS-R1						AS1.3	/	AS1.1
	Concrete / blinding						AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement						AS-R3						AS1.4	/	AS1.5
	Concrete / formwork						AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete						AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints						AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel						AS-R7						AS1.4	/	AS1.9
	Concrete / pipework						AS-R8						AS1.3	/	AS1.13
	Concrete / grout						AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork						AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork						AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows						AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**														
AT1.1	Earthworks	m3	0	R	-		AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-		AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-		AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-										
AT1.5	Formwork	m2	0	R	-		AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-		AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-		AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-		AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-		AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-		AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-		AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-		AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-		AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-		AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-										
	Concrete / earthworks						AT-R1						AT1.3	/	AT1.1
	Concrete / blinding						AT-R2						AT1.3	/	AT1.2
	Concrete / formwork						AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete						AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints						AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel						AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts						AT-R7						AT1.8	/	AT1.10
	Concrete / grout						AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork						AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork						AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork						AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering						AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**														
AU1.1	Earthworks	m3	476	R	136.12		AU-Q1	1.07	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	203	R	38.95		AU-Q2	2.18	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	443	R	1,118.00										
AU1.4	Reinforcement	t	61.08	R	6,362.13		AU-Q3	7.25	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,065	R	94.48		AU-Q4	0.42	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	191	R	71.39		AU-Q5	2.32	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,826	R	15.75		AU-Q6	0.24	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	832	R	23.98		AU-Q7	0.53	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	42	R	97.29	AU-Q8	10.55	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.56	R	25,589.66	AU-Q9	173.05	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	12	R	1,926.49	AU-Q10	36.92	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	15	R	128.27	AU-Q11	13.60	AU1.12	/	AU1.13				
AU1.13	Total area	m2	204	R	-									
	Concrete / earthworks					AU-R1					8.21	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					28.70	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					11.83	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.18	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.66	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					403.94	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.25	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					265.31	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					65.39	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.58	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					8.72	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	18	R	-									
BA1.2	Steel	t	2.45	R	14,994.79	BA-Q1	7.35	BA1.1	/	BA1.2				
BA1.3	Handrail	m	24	R	722.19	BA-Q2	0.75	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	1,018.60	BA-Q3	1.29	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	222.87	BA-Q4	1.29	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	230.61	BA-Q5	3.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.76	BA1.2	/	BA1.3
	Steel / grating					BA-R2					14.72	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					67.28	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					65.02	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,160	R	-									
BB1.2	Steel	t	44.64	R	22,193.41	BB-Q1	25.99	BB1.1	/	BB1.2				
BB1.3	Handrail	m	106	R	542.60	BB-Q2	10.94	BB1.1	/	BB1.3				
BB1.4	Grating	m2	176	R	1,415.54	BB-Q3	6.59	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	70	R	148.24	BB-Q4	16.57	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	10	R	1,268.73	BB-Q5	116.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					40.90	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.68	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					149.71	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					17.49	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,384	R	-									
BC1.2	Steel	t	302.91	R	21,662.68	BC-Q1	44.18	BC1.1	/	BC1.2				
BC1.3	Handrail	m	349	R	446.80	BC-Q2	38.35	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,421	R	949.30	BC-Q3	3.91	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	624	R	262.17	BC-Q4	21.45	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	58	R	154.29	BC-Q5	230.76	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	57	R	2,876.87	BC-Q6	234.81	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					48.48	BC1.2	/	BC1.3
	Steel / grating					BC-R2					22.82	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					82.63	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					140.40	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.53	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	614	R	-									
BD1.2	Steel	t	18.53	R	14,849.23	BD-Q1	33.14	BD1.1	/	BD1.2				
BD1.3	Handrail	m	13	R	817.47	BD-Q2	47.23	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	1,004.95	BD-Q3	76.75	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	15	R	322.47	BD-Q4	40.93	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	32	R	1,354.44	BD-Q5	19.19	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.16	BD1.1	/	BD1.2
	Steel / grating					BD-R2					14.78	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					46.05	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					10.96	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	38	R	-									
BE1.2	Steel	t	3.90	R	23,294.21	BE-Q1	9.74	BE1.1	/	BE1.2				
BE1.3	Handrail	m	31	R	390.62	BE-Q2	1.23	BE1.1	/	BE1.3				
BE1.4	Grating	m2	21	R	889.23	BE-Q3	1.81	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	38	R	250.59	BE-Q4	1.00	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	152.92	BE-Q5	5.43	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					59.63	BE1.2	/	BE1.3
	Steel / grating					BE-R2					26.20	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					92.96	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					152.33	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	265	R	-									
BF1.2	Steel	t	35.31	R	22,153.45	BF-Q1	7.50	BF1.1	/	BF1.2				
BF1.3	Handrail	m	19	R	511.37	BF-Q2	13.95	BF1.1	/	BF1.3				
BF1.4	Grating	m2	36	R	1,245.14	BF-Q3	7.36	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	17	R	188.27	BF-Q4	15.59	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	22	R	1,884.89	BF-Q5	12.05	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					43.32	BF1.1	/	BF1.2
	Steel / grating					BF-R2					17.79	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					117.67	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					11.75	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	15,799	R	-	C-Q1	0.28	C1.1	/	C1.2				
C1.2	Total work units	WU	56,477	R	187.28									
C1.3	Pipe supports	kg	10,739	R	-	C-Q2	1.47	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,939	R	-	C-Q3	0.19	C1.4	/	C1.2				
C1.5	Number of welds	No	14,152	R	-	C-Q4	0.90	C1.5	/	C1.1				
C1.6	Total fittings	No	6,244	R	-	C-Q5	0.40	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,304	R	-	C-Q6	0.53	C1.7	/	C1.6				
C1.8	Support number	No	1,400	R	-	C-Q7	0.13	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	56,477	R	187.28	DA-Q1	54.30	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,040	R	38.05									
	Average cost per examination / WU					DA-R1					4.92	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	56,477	R	187.28	DB-Q1	122.78	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	460	R	66.21									
	Average cost per examination / WU					DB-R1					2.83	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	56,477	R	187.28	DC-Q1	259.07	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	218	R	107.70									
	Average cost per examination / WU					DC-R1					1.74	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	56,477	R	187.28	DD-Q1	42.95	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,315	R	32.80									
	Average cost per examination / WU					DD-R1					5.71	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	56,477	R	187.28	DE-Q1	103.25	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	547	R	88.35									
	Average cost per examination / WU					DE-R1					2.12	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	56,477	R	187.28	E-Q1	160.37	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	352.16	R	412.87	E-Q2	179.44	E1.1	/	E1.3				
E1.3	Structural steel	t	314.74	R	16,721.00									
	WU cost / install mechanical weight - receive					E-R1					0.45	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					40.50	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	56,477	R	187.28									
F1.2	Painting to piping	m2	4,499	R	82.15	F-Q1	12.55	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,690	R	314.52	F-Q2	33.42	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	243.01	R	306.58									
F1.5	Painting to mechanical equipment	m2	1,063	R	80.44	F-Q3	0.23	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	553	R	384.50	F-Q4	0.44	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.26	F1.2	/	F1.3
	Work unit / paint					F-R2					2.28	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.60	F1.1	/	F1.3
	Install plant / paint					F-R4					3.81	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.80	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	33,174	R	33.97									
G1.2	Electrical cable terminations	No	1,459	R	81.74	G-Q1	22.74	G1.1	/	G1.2				
G1.3	Electrical equipment	No	163	R	518.93	G-Q2	203.52	G1.1	/	G1.3				
G1.4	DB's	No	13	R	1,069.26	G-Q3	12.54	G1.3	/	G1.4				
G1.5	Rack	m	5,154	R	91.95	G-Q4	6.44	G1.1	/	G1.5				
G1.6	Support steel	kg	10,688	R	15.20	G-Q5	0.48	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	33,051	R	16.53	G-Q6	1.00	G1.1	/	G1.7				
G1.8	Instruments	No	828	R	103.09	G-Q7	39.92	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,112	R	102.56	G-Q8	0.39	G1.8	/	G1.9				
G1.10	Light fittings	No	601	R	353.37	G-Q9	3.69	G1.10	/	G1.3				
G1.11	Conduit	m	4,576	R	25.68	G-Q10	7.25	G1.1	/	G1.11				
G1.12	Instrument stands	No	292	R	725.02	G-Q11	2.84	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.42	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.49	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.32	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.23	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.37	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.10	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.16	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.16	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,745	R	41.02	AB-Q1	2.21	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,056	R	10.84									
AB1.3	Back fill and compact	m3	5,822	R	37.52	AB-Q2	1.16	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,414	R	4.35	AB-Q3	1.98	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	2,986	R	5.17	AB-Q4	2.26	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.78	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.09	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					9.43	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					7.93	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	233,338.65									
AC1.2	EO for raking equipment	Item	1	R	29,407.50									
AC1.3	Number of piles	No	225	R	-									
AC1.4	Move rig to new position	No	176	R	232.74	AC-Q1	1.28	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	16.07	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	425.27	AC-Q3	1.17	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	112	R	90.55	AC-Q4	0.13	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,138	R	151.25	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	531	R	262.24	AC-Q6	0.42	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	139	R	682.68	AC-Q7	1.62	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	138	R	236.54	AC-Q8	1.63	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	575	R	345.72	AC-Q9	0.39	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	93	R	686.29	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	15.37	R	6,861.75	AC-Q11	14.64	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	194.41	R	10,146.67	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,581	R	1,212.87	AC-Q13	0.14	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	185	R	1,228.29	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	155,099.13		1.00		/					
AC1.19	Load test to pile	No	3	R	25,870.52	AC-Q15	75.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	61,874.61	AC-Q16	225.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	199	R	295.02	AC-Q17	1.13	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.25	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.35	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.56	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.20	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					127.88	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					21.33	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.02	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	126	R	80.65	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	865	R	87.12									
AD1.3	Kerbing	m	386	R	200.64	AD-Q2	0.22	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,779	R	-									
AD1.5	Remove top soil	m3	709	R	31.06	AD-Q3	0.56	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,274	R	77.77	AD-Q4	0.18	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,972	R	7.85									
AD1.8	Reduce levels	m3	895	R	19.86	AD-Q5	0.23	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	594	R	50.03	AD-Q6	1.51	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	433	R	192.42	AD-Q7	1.37	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	304	R	142.49	AD-Q8	2.94	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,878	R	19.18	AD-Q9	4.34	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	260	R	10.80	AD-Q10	0.68	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	264	R	5.06	AD-Q11	0.67	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	358	R	857.90	AD-Q12	0.68	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	29	R	108.56	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	196.69	AD-Q14	0.08	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	224.65	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	527	R	4.27	AD-Q16	1.37	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.96	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					2.53	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.26	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.14	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.55	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.05	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.04	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.54	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.98	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.12	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.02	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	203	R	780.58	AE-Q1	5.49	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	37	R	1,037.17	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	431	R	-									
AE1.4	Rip and compact	m2	1,554	R	4.87									
AE1.5	Formwork to plinth	m2	327	R	178.77	AE-Q3	8.84	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	181	R	137.68	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.86	R	6,971.40	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,625	R	175.11	AE-Q6	420.98	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,078	R	37.25	AE-Q7	5.31	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	523	R	72.19	AE-Q8	2.58	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.75	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					160.28	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.18	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					39.81	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.05	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.09	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,991	R	-	AF-Q1	8.79	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	454	R	62.22	AF-Q2	2.48	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	183	R	68.62	AF-Q3	0.86	AF1.2	/	AF1.4				
AF1.4	Working space	m2	526	R	48.53	AF-Q4	0.31	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	140	R	1,084.27	AF-Q5	0.02	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	341	R	85.05	AF-Q6	0.55	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	8	R	853.73	AF-Q7	0.06	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,134.37	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	187	R	-	AF-Q9	0.75	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	248	R	7.81									
AF1.11	Formwork to bases	m2	251	R	136.21	AF-Q10	1.79	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	155	R	213.77	AF-Q11	19.38	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	18	R	213.49	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.10	R	7,029.86	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	15.94	R	10,395.26	AF-Q14	11.73	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	303	R	33.74	AF-Q15	0.46	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	33	R	201.96	AF-Q16	0.24	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	4,733.40	AF-Q17	0.15	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	53	R	332.75									
	Base excavation / backfill					AF-R1					0.91	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.28	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					17.43	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					12.75	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					13.72	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.05	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.07	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					138.83	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.25	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.19	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					32.14	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					4.23	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.26	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.07	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	296	R	56.46	AG-Q1	2.00	AG1.1	/	AG1.4				
AG1.2	Working space	m2	645	R	36.07	AG-Q2	0.46	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	62	R	67.46	AG-Q3	4.77	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	148	R	1,567.66	AG-Q4	1.03	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	103	R	1,443.71	AG-Q5	1.44	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	134	R	-									
AG1.7	Wood float	m2	141	R	10.40	AG-Q6	0.73	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	143	R	59.74	AG-Q7	1.03	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	310	R	160.96	AG-Q8	0.48	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	205	R	202.11	AG-Q9	0.50	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	17.89	R	7,229.34	AG-Q10	7.49	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,443	R	21.18	AG-Q11	0.09	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,547	R	37.18	AG-Q12	0.05	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.73	R	8,637.06	AG-Q13	37.73	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.64	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.19	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.10	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.14	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.61	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.01	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.51	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	407	R	52.63	AH-Q1	7.83	AH1.1	/	AH1.4				
AH1.2	Working space	m2	44	R	44.38	AH-Q2	9.25	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	181	R	96.08	AH-Q3	2.25	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	52	R	1,078.28	AH-Q4	0.79	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	18	R	1,172.15	AH-Q5	2.89	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	124	R	1,857.10	AH-Q6	0.42	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	16	R	777.32	AH-Q7	3.25	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	1,111.49	AH-Q8	26.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	247	R	-									
AH1.10	Blinding	m2	66	R	55.73	AH-Q9	3.74	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	740	R	6.97	AH-Q10	0.33	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	175	R	232.90	AH-Q11	0.30	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	38	R	152.65	AH-Q12	0.42	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	15	R	150.99	AH-Q13	0.13	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	151	R	209.02	AH-Q14	0.12	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	27	R	179.37	AH-Q15	4.59	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	42	R	50.21	AH-Q16	2.95	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.13	R	10,395.26	AH-Q17	0.35	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	6.17	R	5,941.92	AH-Q18	40.03	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	548	R	120.49	AH-Q19	0.23	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,187	R	41.24	AH-Q20	0.21	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,680	R	39.60	AH-Q21	0.15	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.82	R	7,681.44	AH-Q22	301.22	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	375	R	40.74	AH-Q23	0.33	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	176	R	68.01	AH-Q24	0.70	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.19	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.55	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					19.35	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					154.70	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.92	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.58	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.39	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.97	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					4.63	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					5.09	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.36	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.61	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					10.35	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					36.99	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.75	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					49.31	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					144.08	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					150.05	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.14	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					45.58	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					27.31	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	222	R	63.79	AI-Q1	3.00	AI1.1	/	AI1.5				
AI1.2	Working space	m2	982	R	47.37	AI-Q2	0.23	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	74	R	56.82	AI-Q3	3.00	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	184	R	57.04	AI-Q4	0.40	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	74	R	1,648.08	AI-Q5	5.69	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	1,021.87	AI-Q6	0.42	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	103	R	-									
AI1.8	Wood float	m2	175	R	7.23									
AI1.9	Formwork bases	m2	123	R	119.97	AI-Q7	0.60	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	127	R	138.86	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	10.22	R	9,183.71	AI-Q9	10.08	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,631	R	35.62	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.20	R	8,483.94	AI-Q11	61.67	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.35	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.12	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					28.89	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.61	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					227.95	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					13.74	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.36	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					257.82	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.19	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	189	R	54.90	AJ-Q1	1.75	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	651	R	48.02	AJ-Q2	0.29	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	150	R	65.82	AJ-Q3	1.26	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	243	R	52.64	AJ-Q4	0.44	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	108	R	1,452.30	AJ-Q5	3.72	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	20	R	1,136.04	AJ-Q6	5.40	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	29	R	933.73									
AJ1.8	Total concrete	m3	124	R	-									
AJ1.9	Wood float	m2	333	R	9.18	AJ-Q7	0.37	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	161	R	137.31	AJ-Q8	0.67	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	282	R	182.14	AJ-Q9	0.07	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.28	R	6,746.34	AJ-Q10	12.06	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,701	R	52.26	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,414	R	42.00	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.08	R	9,881.32	AJ-Q13	100.00	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.14	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.83	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					27.59	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					158.20	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.58	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.24	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					129.09	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					160.63	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.15	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	538	R	55.03	AK-Q1	2.96	AK1.1	/	AK1.5				
AK1.2	Working space	m2	608	R	48.44	AK-Q2	0.88	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	257	R	65.03	AK-Q3	2.09	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	259	R	74.82	AK-Q4	0.70	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	182	R	1,068.68	AK-Q5	20.22	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	1,594.48									
AK1.7	Concrete plinth	m3	41	R	1,081.75	AK-Q6	4.44	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	197	R	-									
AK1.9	Wood float	m2	314	R	6.90	AK-Q7	0.58	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	498	R	185.49	AK-Q8	0.37	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	124	R	141.94	AK-Q9	0.33	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	35	R	232.66	AK-Q10	0.26	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	24.72	R	7,459.14	AK-Q11	7.97	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	8,070	R	61.90	AK-Q12	0.02	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.71	R	4,652.15	AK-Q13	72.69	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.14	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.85	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					14.28	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					154.88	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.76	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.62	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.85	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					120.50	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.23	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	316	R	59.04	AL-Q1	2.43	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,295	R	30.49	AL-Q2	0.24	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	247	R	96.08	AL-Q3	1.28	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	187	R	55.55	AL-Q4	0.70	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	130	R	1,080.76	AL-Q5	1.20	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	108	R	1,050.70	AL-Q6	1.69	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	64	R	1,599.94	AL-Q7	2.03	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	364	R	-									
AL1.9	Wood float	m2	272	R	6.50	AL-Q8	0.48	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	398	R	186.60	AL-Q9	0.33	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	632	R	224.04	AL-Q10	0.17	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	144	R	263.35	AL-Q11	0.44	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	90	R	265.81	AL-Q12	0.71	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	12	R	240.98	AL-Q13	9.00	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	36.68	R	7,809.87	AL-Q14	9.92	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	8,745	R	52.92	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	197	R	52.43	AL-Q16	1.85	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.75	R	5,588.24	AL-Q17	485.33	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.94	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.61	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.46	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					166.27	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.03	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.03	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					5.79	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.08	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					4.69	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					6.02	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.08	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					6.64	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					147.58	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					148.96	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.19	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,076	R	52.06	AM-Q1	3.80	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,443	R	31.69	AM-Q2	0.75	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,007	R	101.47	AM-Q3	1.07	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	436	R	55.73	AM-Q4	0.65	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	283	R	1,095.51									
AM1.6	Concrete column	m3	138	R	1,812.69	AM-Q5	2.05	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	126	R	812.93	AM-Q6	1.10	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	153	R	1,084.91	AM-Q7	1.85	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	60	R	1,443.71	AM-Q8	2.30	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	100	R	1,104.69	AM-Q9	1.38	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	776	R	-									
AM1.12	Wood float	m2	1,759	R	7.97	AM-Q10	0.44	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	643	R	202.11	AM-Q11	0.44	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	923	R	132.99	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	710	R	232.65	AM-Q13	0.18	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	171	R	195.60	AM-Q14	0.74	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	792	R	190.92	AM-Q15	0.19	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	346.70	AM-Q16	23.00	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	363	R	241.69	AM-Q17	0.17	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	158.13	R	5,173.18	AM-Q18	4.91	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	2,909	R	24.84	AM-Q19	0.27	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,004	R	24.27	AM-Q20	0.39	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	49	R	745.03	AM-Q21	3.23	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.78	R	8,637.06	AM-Q22	994.87	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.64	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.51	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					19.66	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.60	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.35	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.01	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.76	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.99	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					137.45	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.42	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					3.49	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.16	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					13.63	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.34	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.79	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					5.97	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					208.26	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					213.15	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					6.94	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.13	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,771	R	44.37	AN-Q1	2.58	AN1.1	/	AN1.5				
AN1.2	Working space	m2	168	R	32.55	AN-Q2	22.45	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	461	R	96.08	AN-Q3	8.18	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,599	R	55.55	AN-Q4	0.92	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,464	R	1,651.06	AN-Q5								
AN1.6	Concrete column	m3	49	R	1,081.75	AN-Q6	29.88	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	47	R	1,732.95	AN-Q7	1.04	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	100	R	780.58	AN-Q8	14.64	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	1,037.17	AN-Q9	12.25	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,759	R	-				/					
AN1.11	Wood float	m2	1,648	R	7.22	AN-Q10	0.89	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	185	R	138.99	AN-Q11	7.91	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	488	R	246.81	AN-Q12	0.10	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	160	R	125.84	AN-Q13	0.29	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	79	R	207.93	AN-Q14	0.59	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	25	R	224.63	AN-Q15	0.16	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	321.25	AN-Q16	366.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,044	R	209.02	AN-Q17	0.10	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	536.40	R	9,187.23	AN-Q18	3.28	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	8,003	R	32.14	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	10,739	R	54.45	AN-Q20	0.16	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	68	R	1,229.95	AN-Q21	25.87	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.63	R	7,497.75	AN-Q22	898.16	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.03	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.36	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.46	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					29.72	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					228.68	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					11.88	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					13.77	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.33	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.38	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					5.39	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.62	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					3.73	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					285.85	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					168.73	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.22	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					7.47	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	202	R	55.44	AO-Q1	1.04	AO1.1	/	AO1.5				
AO1.2	Working space	m2	677	R	42.42	AO-Q2	0.30	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	94	R	68.01	AO-Q3	2.15	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	31	R	73.03	AO-Q4	6.29	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	195	R	1,812.69									
AO1.6	Concrete column	m3	33	R	1,452.30	AO-Q5	5.91	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	13	R	1,452.30	AO-Q6	2.54	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	1,136.04	AO-Q7	48.75	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,227.27	AO-Q8	33.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	62	R	-									
AO1.11	Wood float	m2	41	R	11.54	AO-Q9	4.76	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	69	R	142.26	AO-Q10	2.83	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	147	R	234.73	AO-Q11	0.22	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	45	R	164.74	AO-Q12	0.29	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	22	R	195.60	AO-Q13	0.59	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	214.54	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	68	R	562.76	AO-Q15	2.87	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	18	R	103.64	AO-Q16	0.22	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.98	R	7,073.11	AO-Q17	12.45	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,999	R	41.24	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,688	R	39.60	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	1,207.73	AO-Q20	6.20	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.25	R	7,110.46	AO-Q21	60.00	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.31	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.82	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					24.82	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					157.08	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					12.74	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.82	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					7.42	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					6.19	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.58	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.72	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					10.96	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					171.51	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					178.61	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.25	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.86	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,519	R	56.22	AP-Q1	1.45	AP1.1	/	AP1.5				
AP1.2	Working space	m2	486	R	31.43	AP-Q2	3.13	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,307	R	112.59	AP-Q3	1.16	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	185	R	46.92	AP-Q4	5.66	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	1,047	R	1,058.96	AP-Q5	1.02	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,027	R	160.13									
AP1.7	Rough formwork	m2	251	R	142.81	AP-Q6	4.17	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,774	R	201.90	AP-Q7	0.59	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,723	R	10.80	AP-Q8	0.38	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	154	R	58.66	AP-Q9	6.80	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	49	R	75.60	AP-Q10	21.37	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	463	R	50.61	AP-Q11	2.26	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.59	R	4,357.76	AP-Q12	1774.58	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,361	R	199.44	AP-Q13	0.77	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,799	R	-	AP-Q14	3.63	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,406	R	93.97	AP-Q15	2.70	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,454	R	216.91	AP-Q16	2.61	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,300	R	92.79	AP-Q17	0.88	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	6	R	1,328.49	AP-Q18	633.17	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,986	R	265.70	AP-Q19	1.27	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,839	R	148.33	AP-Q20	1.34	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	121.20	R	11,070.06	AP-Q21	8.64	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	34,487.32									
AP1.24	Structural steel	Item	1	R	89,301.39									
AP1.25	Plumbing and drainage	Item	1	R	56,861.67									
AP1.26	Small power and lighting	Item	1	R	484,421.49									
AP1.27	External works	Item	1	R	209,325.10									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.79	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.50	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					22.57	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					69.13	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.42	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.24	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					98.05	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					18.05	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					14.01	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					218.73	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.24	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.27	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					51.04	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.15	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.75	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.34	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.12	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.07	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.14	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					43.76	AP1.26	/	AP1.22
	External works / concrete					AP-R23					197.67	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	97	R	1,283.48	AQ-Q1	1.73	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	168	R	132.76									
AQ1.3	Reinforcement	t	5.59	R	8,805.17	AQ-Q2	17.35	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	685	R	122.99	AQ-Q3	0.14	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	192	R	160.96	AQ-Q4	0.51	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	122	R	180.18	AQ-Q5	5.47	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,247	R	147.00	AQ-Q6	0.53	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	37.16	R	21,726.97	AQ-Q7	17.95	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	655	R	71.53	AQ-Q8	1.02	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	9,604.27	AQ-Q9	333.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	51	R	1,201.45	AQ-Q10	13.08	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,088	R	81.62	AQ-Q11	0.61	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	667	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					9.67	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					10.44	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.97	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.12	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					147.80	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.49	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.44	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					8.17	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.80	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	190	R	118.84	AR-Q1	3.88	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	49	R	1,080.76	AR-Q2	10.25	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.78	R	6,686.28									
AR1.4	Mesh	m2	589	R	169.69	AR-Q3	0.08	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	144	R	211.75	AR-Q4	0.34	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	75	R	182.70	AR-Q5	5.19	AR1.15	/	AR1.6				
AR1.7	Screed	m2	614	R	38.73	AR-Q6	0.63	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	25.28	R	32,414.29	AR-Q7	15.39	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	2,381.26	AR-Q8	2.30	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	54	R	1,094.95	AR-Q9	0.47	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	40	R	305.57	AR-Q10	0.63	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	613	R	168.11	AR-Q11	0.63	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	99	R	80.20	AR-Q12	3.93	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	42	R	1,852.78	AR-Q13	0.60	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	389	R	-									
	Earthworks / concrete					AR-R1					0.11	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.16	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					6.37	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.10	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.92	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					27.90	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					13.61	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					29.60	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.58	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					192.82	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.48	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					17.49	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	374	R	171.70	AS-Q1	4.25	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	125	R	58.44	AS-Q2	0.70	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	88	R	1,081.75	AS-Q3	12.57	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	7.00	R	11,027.85									
AS1.5	Mesh	m2	117	R	110.00	AS-Q4	0.75	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	192	R	193.99	AS-Q5	0.46	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	122	R	10.31	AS-Q6	0.72	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	24	R	68.84	AS-Q7	3.67	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	933	R	33.05	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.81	R	10,888.02	AS-Q9	108.64	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	32	R	184.93	AS-Q10	0.22	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	1,955.96	AS-Q11	1.75	AS1.18	/	AS1.12				
AS1.13	Pipework	m	41	R	414.42	AS-Q12	3.05	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	793	R	50.33	AS-Q13	0.11	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.54	R	22,514.39	AS-Q14	4.55	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.81	R	26,699.41	AS-Q15	154.32	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	125	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					6.30	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					18.51	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					100.25	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					5.58	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					104.92	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					15.71	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					333.67	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.61	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.10	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.49	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.41	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	151	R	124.28	AT-Q1	8.88	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	12	R	57.47	AT-Q2	1.42	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	17	R	1,443.15	AT-Q3	9.50	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.79	R	9,608.06									
AT1.5	Formwork	m2	169	R	211.75	AT-Q4	0.10	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	35	R	9.29	AT-Q5	0.49	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	22	R	68.62	AT-Q6	0.77	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.40	R	32.14	AT-Q7	42.50	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.53	R	9,776.50	AT-Q8	32.08	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.09	R	34.48	AT-Q9	188.89	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.68	R	21,872.27	AT-Q10	44.12	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.94	R	26,939.23	AT-Q11	31.91	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	50	R	285.07	AT-Q12	0.60	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	16	R	110.14	AT-Q13	1.88	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	30	R	-									
	Concrete / earthworks					AT-R1					11.61	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					25.11	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					6.82	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					155.34	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					21.03	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					298.94	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.93	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.15	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.44	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.36	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					5.06	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.59	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	200	R	202.93	AU-Q1	0.70	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	205	R	55.73	AU-Q2	1.40	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	286	R	1,095.51									
AU1.4	Reinforcement	t	51.17	R	10,506.72	AU-Q3	5.59	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,463	R	109.69	AU-Q4	0.20	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	230	R	110.28	AU-Q5	1.24	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,242	R	22.71	AU-Q6	0.23	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	610	R	34.57	AU-Q7	0.47	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	38	R	175.57	AU-Q8	7.53	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.33	R	36,894.29	AU-Q9	85.89	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	7	R	2,975.95	AU-Q10	40.86	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	22	R	184.93	AU-Q11	10.95	AU1.12	/	AU1.13				
AU1.13	Total area	m2	241	R	-									
	Concrete / earthworks					AU-R1					5.40	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					19.66	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					9.99	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.10	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					9.93	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					462.65	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.28	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					303.93	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					59.84	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.37	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.92	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	2,522	R	117.04	AV-Q1	1.63	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,687	R	57.12	AV-Q2	1.53	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,261	R	117.13	AV-Q3	1.26	AV1.10	/	AV1.3				
AV1.4	Pipework	m	64	R	295.67	AV-Q4	64.30	AV1.10	/	AV1.4				
AV1.5	Manholes	No	2	R	3,003.40	AV-Q5	32.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	19	R	1,509.84	AV-Q6	3.37	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	285	R	145.75	AV-Q7	0.07	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	21	R	115.00	AV-Q8	0.90	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.69	R	10,506.72	AV-Q9	5.15	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	4,115	R	-									
	Earthworks / lining					AV-R1					2.05	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.00	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.49	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.40	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.10	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					10.36	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					13.13	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.14	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	965	R	131.65	AW-Q1	7.85	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	70	R	82.14	AW-Q2	1.76	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	123	R	1,081.75	AW-Q3	8.92	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	13.79	R	6,971.40									
AW1.5	Mesh	m2	108	R	150.35	AW-Q4	1.14	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	395	R	131.29	AW-Q5	0.31	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,571	R	34.56	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.11	R	39,300.07	AW-Q7	24.64	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	52	R	-									
	Concrete / earthworks					AW-R1					8.22	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					13.17	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					46.37	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					8.24	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					201.72	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.18	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	24	R	-									
BA1.2	Steel	t	3.69	R	28,731.14	BA-Q1	6.50	BA1.1	/	BA1.2				
BA1.3	Handrail	m	16	R	896.46	BA-Q2	1.50	BA1.1	/	BA1.3				
BA1.4	Grating	m2	14	R	1,472.06	BA-Q3	1.71	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	13	R	311.06	BA-Q4	1.85	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	375.33	BA-Q5	4.80	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					32.05	BA1.2	/	BA1.3
	Steel / grating					BA-R2					19.52	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					92.37	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					76.55	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,157	R	-									
BB1.2	Steel	t	62.70	R	35,860.77	BB-Q1	18.45	BB1.1	/	BB1.2				
BB1.3	Handrail	m	94	R	687.31	BB-Q2	12.31	BB1.1	/	BB1.3				
BB1.4	Grating	m2	156	R	1,368.95	BB-Q3	7.42	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	68	R	395.30	BB-Q4	17.01	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	13	R	2,920.19	BB-Q5	89.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					52.18	BB1.2	/	BB1.3
	Steel / grating					BB-R2					26.20	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					90.72	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					12.28	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	12,610	R	-									
BC1.2	Steel	t	276.29	R	35,257.62	BC-Q1	45.64	BC1.1	/	BC1.2				
BC1.3	Handrail	m	320	R	549.41	BC-Q2	39.41	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,120	R	1,442.06	BC-Q3	4.04	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	521	R	296.19	BC-Q4	24.20	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	58	R	230.71	BC-Q5	217.41	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	80	R	4,648.54	BC-Q6	157.63	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					64.17	BC1.2	/	BC1.3
	Steel / grating					BC-R2					24.45	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					119.04	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					152.82	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.58	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	669	R	-									
BD1.2	Steel	t	16.91	R	21,854.35	BD-Q1	39.56	BD1.1	/	BD1.2				
BD1.3	Handrail	m	13	R	1,203.10	BD-Q2	51.46	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	1,398.41	BD-Q3	95.57	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	15	R	453.72	BD-Q4	44.60	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	18	R	2,050.79	BD-Q5	37.17	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.17	BD1.1	/	BD1.2
	Steel / grating					BD-R2					15.63	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					48.17	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					10.66	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	39	R	-									
BE1.2	Steel	t	3.92	R	29,260.89	BE-Q1	9.95	BE1.1	/	BE1.2				
BE1.3	Handrail	m	25	R	833.54	BE-Q2	1.56	BE1.1	/	BE1.3				
BE1.4	Grating	m2	20	R	2,111.72	BE-Q3	1.95	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	36	R	303.62	BE-Q4	1.08	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	270.30	BE-Q5	6.50	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					35.10	BE1.2	/	BE1.3
	Steel / grating					BE-R2					13.86	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					96.37	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					108.25	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	250	R	-									
BF1.2	Steel	t	31.79	R	29,249.68	BF-Q1	7.86	BF1.1	/	BF1.2				
BF1.3	Handrail	m	12	R	806.36	BF-Q2	20.83	BF1.1	/	BF1.3				
BF1.4	Grating	m2	54	R	1,832.53	BF-Q3	4.63	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	12	R	238.49	BF-Q4	20.83	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	16	R	2,717.57	BF-Q5	15.63	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					36.27	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.96	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					122.65	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					10.76	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	26,920	R	-	C-Q1	0.49	C1.1	/	C1.2				
C1.2	Total work units	WU	55,205	R	270.02									
C1.3	Pipe supports	kg	10,498	R	-	C-Q2	2.56	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	12,946	R	-	C-Q3	0.23	C1.4	/	C1.2				
C1.5	Number of welds	No	10,850	R	-	C-Q4	0.40	C1.5	/	C1.1				
C1.6	Total fittings	No	6,983	R	-	C-Q5	0.26	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,153	R	-	C-Q6	0.45	C1.7	/	C1.6				
C1.8	Support number	No	1,153	R	-	C-Q7	0.11	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	55,205	R	270.02	DA-Q1	50.46	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,094	R	54.85									
	Average cost per examination / WU					DA-R1					4.92	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	55,205	R	270.02	DB-Q1	117.96	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	468	R	140.12									
	Average cost per examination / WU					DB-R1					1.93	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	55,205	R	270.02	DC-Q1	277.41	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	199	R	163.61									
	Average cost per examination / WU					DC-R1					1.65	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	55,205	R	270.02	DD-Q1	47.67	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,158	R	41.54									
	Average cost per examination / WU					DD-R1					6.50	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	55,205	R	270.02	DE-Q1	100.74	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	548	R	127.67									
	Average cost per examination / WU					DE-R1					2.11	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	55,205	R	270.02	E-Q1	238.32	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	231.64	R	451.22	E-Q2	183.83	E1.1	/	E1.3				
E1.3	Structural steel	t	300.30	R	25,212.04									
	WU cost / install mechanical weight - receive					E-R1					0.60	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					55.88	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	55,205	R	270.02									
F1.2	Painting to piping	m2	3,039	R	120.90	F-Q1	18.17	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,652	R	485.86	F-Q2	33.42	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	221.70	R	442.02									
F1.5	Painting to mechanical equipment	m2	852	R	104.69	F-Q3	0.26	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	338	R	361.56	F-Q4	0.66	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.25	F1.2	/	F1.3
	Work unit / paint					F-R2					2.23	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.56	F1.1	/	F1.3
	Install plant / paint					F-R4					4.22	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.22	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	30,337	R	47.87									
G1.2	Electrical cable terminations	No	1,288	R	178.62	G-Q1	23.55	G1.1	/	G1.2				
G1.3	Electrical equipment	No	167	R	651.86	G-Q2	181.66	G1.1	/	G1.3				
G1.4	DB's	No	12	R	2,453.57	G-Q3	13.92	G1.3	/	G1.4				
G1.5	Rack	m	6,476	R	126.77	G-Q4	4.68	G1.1	/	G1.5				
G1.6	Support steel	kg	7,391	R	24.06	G-Q5	0.88	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	23,970	R	18.68	G-Q6	1.27	G1.1	/	G1.7				
G1.8	Instruments	No	1,216	R	161.05	G-Q7	19.71	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,296	R	179.79	G-Q8	0.94	G1.8	/	G1.9				
G1.10	Light fittings	No	588	R	300.37	G-Q9	3.52	G1.10	/	G1.3				
G1.11	Conduit	m	3,789	R	31.68	G-Q10	8.01	G1.1	/	G1.11				
G1.12	Instrument stands	No	307	R	798.00	G-Q11	3.96	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.27	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.27	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.51	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.99	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.38	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.16	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.12	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	5,775	R	61.93	AB-Q1	2.06	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,804	R	17.54									
AB1.3	Back fill and compact	m3	4,985	R	56.65	AB-Q2	1.16	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,132	R	6.56	AB-Q3	1.84	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	2,739	R	7.81	AB-Q4	2.11	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.53	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.09	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					9.44	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					7.93	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	352,305.73									
AC1.2	EO for raking equipment	Item	1	R	47,572.33									
AC1.3	Number of piles	No	197	R	-									
AC1.4	Move rig to new position	No	165	R	351.40	AC-Q1	1.19	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	15.15	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	19	R	687.96	AC-Q3	0.68	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	53	R	136.71	AC-Q4	0.25	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,409	R	228.36	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	440	R	395.95	AC-Q6	0.45	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	135	R	960.66	AC-Q7	1.46	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	101	R	507.26	AC-Q8	1.95	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	518	R	825.12	AC-Q9	0.38	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	73	R	1,036.19	AC-Q10	0.18	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	14.39	R	11,100.21	AC-Q11	13.69	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	169.92	R	16,414.20	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,480	R	1,831.25	AC-Q13	0.13	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	173	R	1,854.54	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	250,902.86		1.00		/					
AC1.19	Load test to pile	No	2	R	39,060.54	AC-Q15	98.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	93,421.21	AC-Q16	197.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	165	R	445.44	AC-Q17	1.19	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.98	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.38	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.52	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.28	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.45	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					137.01	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					21.33	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.01	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	85	R	118.68	AD-Q1	0.11	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	767	R	176.64									
AD1.3	Kerbing	m	217	R	170.15	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,882	R	-									
AD1.5	Remove top soil	m3	593	R	50.48	AD-Q3	0.36	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,653	R	191.94	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,963	R	5.54									
AD1.8	Reduce levels	m3	1,134	R	47.87	AD-Q5	0.38	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	838	R	100.39	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	265	R	250.13	AD-Q7	3.16	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	265	R	270.22	AD-Q8	4.28	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,784	R	22.28	AD-Q9	6.73	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	176	R	19.86	AD-Q10	0.93	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	234	R	7.21	AD-Q11	0.81	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	201	R	1,175.53	AD-Q12	1.08	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	36	R	361.55	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	5	R	393.75	AD-Q14	0.17	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	4	R	329.83	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	462	R	10.16	AD-Q16	2.13	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.67	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					9.11	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.64	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.48	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.40	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.18	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.91	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					8.61	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.68	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.12	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					6.91	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.12	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					2.31	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.94	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.06	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	149	R	1,673.97	AE-Q1	4.38	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	34	R	2,475.35	AE-Q2	0.10	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	338	R	-									
AE1.4	Rip and compact	m2	1,455	R	7.88									
AE1.5	Formwork to plinth	m2	285	R	289.20	AE-Q3	8.38	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	170	R	207.87	AE-Q4	1.14	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.61	R	10,525.75	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,591	R	283.28	AE-Q6	717.73	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	506	R	56.25	AE-Q7	3.40	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	449	R	108.99	AE-Q8	3.01	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.68	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.43	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.12	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.12	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					37.16	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,601	R	-	AF-Q1	10.12	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	356	R	73.62	AF-Q2	2.08	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	171	R	107.45	AF-Q3	0.51	AF1.2	/	AF1.4				
AF1.4	Working space	m2	694	R	82.12	AF-Q4	0.33	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	116	R	1,438.30	AF-Q5	0.02	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	285	R	86.14	AF-Q6	0.62	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	7	R	2,384.05	AF-Q7	0.06	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	1,702.60	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	178	R	-	AF-Q9	0.88	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	202	R	10.87									
AF1.11	Formwork to bases	m2	231	R	219.97	AF-Q10	1.99	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	216	R	355.50	AF-Q11	30.86	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	7	R	199.35	AF-Q12	3.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.50	R	11,398.39	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	18.14	R	11,415.19	AF-Q14	9.81	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	259	R	54.57	AF-Q15	0.45	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	30	R	326.72	AF-Q16	0.23	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	7,657.19	AF-Q17	0.16	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	43	R	502.40									
	Base excavation / backfill					AF-R1					0.69	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.90	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					19.54	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					16.70	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.38	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.18	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					132.32	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.15	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.15	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.12	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.00	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					26.36	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					7.30	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.86	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.07	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	283	R	125.12	AG-Q1	1.36	AG1.1	/	AG1.4				
AG1.2	Working space	m2	524	R	50.21	AG-Q2	0.54	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	57	R	108.95	AG-Q3	4.96	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	208	R	2,607.03	AG-Q4	1.70	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	41	R	1,348.04	AG-Q5	5.07	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	183	R	-									
AG1.7	Wood float	m2	160	R	11.42	AG-Q6	0.26	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	122	R	96.64	AG-Q7	1.70	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	284	R	260.39	AG-Q8	0.73	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	188	R	326.95	AG-Q9	0.22	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	18.40	R	10,859.74	AG-Q10	9.95	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,755	R	48.26	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,447	R	84.21	AG-Q12	0.05	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.33	R	15,574.58	AG-Q13	17.60	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.40	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.87	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.00	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.10	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.24	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.17	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.97	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	227	R	73.27	AH-Q1	5.54	AH1.1	/	AH1.4				
AH1.2	Working space	m2	73	R	51.27	AH-Q2	3.11	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	228	R	142.44	AH-Q3	1.00	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	41	R	1,875.98	AH-Q4	0.67	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	16	R	1,708.09	AH-Q5	2.56	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	117	R	2,736.34	AH-Q6	0.35	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	9	R	1,232.54	AH-Q7	4.56	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	1,637.70	AH-Q8	20.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	154	R	-									
AH1.10	Blinding	m2	61	R	92.27	AH-Q9	2.52	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	678	R	10.87	AH-Q10	0.23	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	161	R	351.58	AH-Q11	0.25	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	32	R	220.10	AH-Q12	0.28	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	19	R	209.99	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	194	R	227.54	AH-Q14	0.08	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	28	R	283.12	AH-Q15	4.18	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	36	R	76.70	AH-Q16	3.25	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.96	R	14,244.07	AH-Q17	0.21	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	9.53	R	18,214.32	AH-Q18	16.16	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	776	R	243.22	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	968	R	66.71	AH-Q20	0.16	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,580	R	59.79	AH-Q21	0.10	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.83	R	11,597.81	AH-Q22	185.54	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	431	R	125.35	AH-Q23	0.27	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	243	R	182.14	AH-Q24	0.48	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.43	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.51	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					20.33	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					172.58	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.10	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.69	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.52	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.15	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					5.34	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					5.60	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.80	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.51	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					9.66	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					35.68	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.78	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					74.89	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					273.04	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					304.64	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					21.83	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					15.02	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	197	R	93.23	AI-Q1	2.86	AI1.1	/	AI1.5				
AI1.2	Working space	m2	840	R	80.74	AI-Q2	0.23	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	64	R	73.16	AI-Q3	3.08	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	157	R	90.74	AI-Q4	0.44	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	69	R	2,278.75	AI-Q5	5.75	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	12	R	1,687.45	AI-Q6	0.42	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	90	R	-									
AI1.8	Wood float	m2	164	R	11.94									
AI1.9	Formwork bases	m2	99	R	181.14	AI-Q7	0.70	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	117	R	224.64	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.75	R	16,560.32	AI-Q9	10.29	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,414	R	53.78	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.10	R	13,724.42	AI-Q11	62.73	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.04	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.15	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.27	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					25.11	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.35	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					190.85	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.58	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.51	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					307.93	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.17	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	258	R	89.02	AJ-Q1	2.74	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	741	R	52.73	AJ-Q2	0.35	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	110	R	123.32	AJ-Q3	2.35	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	213	R	86.93	AJ-Q4	0.44	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	94	R	2,238.35	AJ-Q5	4.09	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	19	R	1,875.98	AJ-Q6	4.95	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	23	R	1,409.79									
AJ1.8	Total concrete	m3	114	R	-									
AJ1.9	Wood float	m2	285	R	16.56	AJ-Q7	0.40	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	147	R	207.32	AJ-Q8	0.64	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	259	R	294.64	AJ-Q9	0.07	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	9.47	R	10,894.98	AJ-Q10	12.04	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	5,180	R	86.90	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	966	R	39.22	AJ-Q12	0.10	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.67	R	15,984.94	AJ-Q13	56.29	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.69	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.72	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					25.75	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					135.17	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.80	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.37	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					125.37	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					277.79	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.14	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	318	R	125.12	AK-Q1	1.90	AK1.1	/	AK1.5				
AK1.2	Working space	m2	881	R	50.21	AK-Q2	0.36	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	154	R	110.08	AK-Q3	2.06	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	414	R	115.31	AK-Q4	0.40	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	167	R	1,613.54	AK-Q5	20.88	AK1.5		AK1.6				
AK1.6	Concrete column	m3	8	R	1,875.98									
AK1.7	Concrete plinth	m3	35	R	2,026.63	AK-Q6	4.77	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	301	R	-									
AK1.9	Wood float	m2	281	R	10.74	AK-Q7	0.59	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	536	R	287.59	AK-Q8	0.31	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	81	R	241.04	AK-Q9	0.43	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	25	R	238.41	AK-Q10	0.32	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	25.62	R	15,752.20	AK-Q11	11.75	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	4,887	R	75.99	AK-Q12	0.06	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.64	R	10,439.48	AK-Q13	114.02	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.08	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.49	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.14	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					13.99	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					150.24	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					5.61	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					8.41	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.87	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					207.29	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.15	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	304	R	132.74	AL-Q1	1.71	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,312	R	37.89	AL-Q2	0.23	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	211	R	108.99	AL-Q3	1.44	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	176	R	84.14	AL-Q4	1.01	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	178	R	1,654.05	AL-Q5	2.09	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	85	R	2,670.90	AL-Q6	2.18	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	39	R	2,579.37	AL-Q7	4.56	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	326	R	-									
AL1.9	Wood float	m2	235	R	10.53	AL-Q8	0.76	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	309	R	218.76	AL-Q9	0.58	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,099	R	358.58	AL-Q10	0.08	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	164	R	275.36	AL-Q11	0.24	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	82	R	316.61	AL-Q12	0.48	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	10	R	552.01	AL-Q13	8.50	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	31.41	R	10,267.97	AL-Q14	10.38	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	15,257	R	63.56	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	299	R	84.82	AL-Q16	1.09	AL1.8	/	AL1.17				

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AL1.18	Grout	m3	0.38	R	8,437.38	AL-Q17	857.89	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.08	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					3.50	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.22	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.66	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					157.08	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.62	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.62	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.56	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					9.37	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.45	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.15	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					9.37	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.67	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					161.55	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					121.06	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.20	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	922	R	85.97	AM-Q1	3.56	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,324	R	76.63	AM-Q2	0.70	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	924	R	85.78	AM-Q3	1.00	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	400	R	92.27	AM-Q4	0.65	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	259	R	1,708.09									
AM1.6	Concrete column	m3	127	R	2,736.34	AM-Q5	2.04	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	108	R	1,232.54	AM-Q6	1.18	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	140	R	1,637.70	AM-Q7	1.85	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	61	R	2,384.05	AM-Q8	2.08	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	86	R	1,708.09	AM-Q9	1.48	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	712	R	-									
AM1.12	Wood float	m2	1,253	R	18.21	AM-Q10	0.57	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	755	R	164.93	AM-Q11	0.34	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	594	R	243.98	AM-Q12	0.21	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	583	R	419.53	AM-Q13	0.19	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	149	R	295.33	AM-Q14	0.72	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	454	R	308.85	AM-Q15	0.31	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	560.86	AM-Q16	31.75	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	478	R	390.98	AM-Q17	0.13	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	69.75	R	7,810.71	AM-Q18	10.21	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	2,861	R	35.86	AM-Q19	0.25	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	1,831	R	54.59	AM-Q20	0.39	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	50	R	1,592.25	AM-Q21	1.40	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.69	R	10,222.65	AM-Q22	1031.88	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.12	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.00	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					18.51	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.62	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.39	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.04	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.72	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.00	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					93.80	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					10.36	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					2.94	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.17	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					11.22	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.20	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.53	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					6.10	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					217.81	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					143.08	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					4.91	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.17	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	259	R	125.55	AO-Q1	2.49	AO1.1	/	AO1.5				
AO1.2	Working space	m2	617	R	76.49	AO-Q2	0.42	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	91	R	102.68	AO-Q3	2.85	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	39	R	118.13	AO-Q4	2.67	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	104	R	2,483.83									
AO1.6	Concrete column	m3	19	R	2,483.83	AO-Q5	5.47	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	1,474.37	AO-Q6	1.73	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	6	R	2,544.68	AO-Q7	17.33	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,409.79	AO-Q8	19.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	31	R	-									
AO1.11	Wood float	m2	34	R	16.02	AO-Q9	3.06	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	79	R	226.32	AO-Q10	1.32	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	183	R	324.55	AO-Q11	0.10	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	42	R	272.04	AO-Q12	0.26	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	21	R	454.62	AO-Q13	0.52	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	312.63	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	64	R	829.19	AO-Q15	1.63	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	10	R	164.34	AO-Q16	0.60	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.58	R	10,421.76	AO-Q17	6.77	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,867	R	69.35	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,856	R	56.75	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	9	R	1,963.01	AO-Q20	3.44	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.22	R	17,549.82	AO-Q21	24.64	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.64	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.22	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					21.03	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					155.05	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					10.97	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					5.42	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					3.24	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.65	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					1.78	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					4.51	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					15.48	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					150.28	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					183.64	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.14	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.31	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,093	R	84.89	AP-Q1	1.87	AP1.1	/	AP1.5				
AP1.2	Working space	m2	510	R	50.85	AP-Q2	2.14	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,171	R	182.14	AP-Q3	0.93	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	143	R	66.13	AP-Q4	4.08	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	584	R	1,713.08	AP-Q5	0.34	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,701	R	241.78									
AP1.7	Rough formwork	m2	231	R	210.42	AP-Q6	2.53	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,105	R	339.55	AP-Q7	0.53	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,893	R	15.48	AP-Q8	0.20	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	129	R	95.35	AP-Q9	4.53	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	63	R	186.61	AP-Q10	9.27	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	345	R	35.71	AP-Q11	1.69	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.74	R	10,503.71	AP-Q12	789.19	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,920	R	400.19	AP-Q13	0.30	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,733	R	-	AP-Q14	4.68	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,476	R	152.01	AP-Q15	1.85	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,337	R	319.60	AP-Q16	2.04	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,678	R	156.05	AP-Q17	1.02	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	1,903.82	AP-Q18	390.43	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,499	R	431.86	AP-Q19	1.09	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,684	R	366.10	AP-Q20	0.74	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	90.42	R	7,810.71	AP-Q21	6.46	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	54,455.75									
AP1.24	Structural steel	Item	1	R	141,007.59									
AP1.25	Plumbing and drainage	Item	1	R	89,785.02									
AP1.26	Small power and lighting	Item	1	R	764,905.33									
AP1.27	External works	Item	1	R	330,525.97									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.67	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.47	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					25.90	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					32.31	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					8.14	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.05	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					110.66	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					17.97	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					9.18	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					218.73	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.16	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.27	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					24.44	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.56	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.21	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.93	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.09	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					6.97	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					18.05	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					11.50	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					97.93	AP1.26	/	AP1.22
	External works / concrete					AP-R23					192.94	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	47	R	2,384.05	AQ-Q1	3.00	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	141	R	216.70									
AQ1.3	Reinforcement	t	10.17	R	16,021.67	AQ-Q2	4.62	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	611	R	190.70	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	157	R	241.04	AQ-Q4	0.30	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	168	R	491.10	AQ-Q5	5.82	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	701	R	178.01	AQ-Q6	1.39	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	30.18	R	42,970.89	AQ-Q7	32.37	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	393	R	172.01	AQ-Q8	2.49	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	17,448.59	AQ-Q9	488.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	29	R	2,626.84	AQ-Q10	33.69	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	916	R	84.89	AQ-Q11	1.07	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	977	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.00	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					12.50	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					9.89	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.85	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					241.40	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.97	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.41	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.76	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.10	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	124	R	228.30	AR-Q1	3.26	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	38	R	1,898.38	AR-Q2	8.05	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.72	R	10,855.60									
AR1.4	Mesh	m2	383	R	177.54	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	106	R	318.04	AR-Q4	0.36	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	105	R	407.57	AR-Q5	3.81	AR1.15	/	AR1.6				
AR1.7	Screed	m2	245	R	46.52	AR-Q6	1.63	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	27.04	R	50,730.82	AR-Q7	14.79	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	10	R	3,976.74	AR-Q8	2.70	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	51	R	1,718.04	AR-Q9	0.53	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	37	R	480.93	AR-Q10	0.73	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	559	R	232.02	AR-Q11	0.72	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	83	R	215.42	AR-Q12	4.82	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	37	R	2,288.47	AR-Q13	0.73	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	400	R	-									
	Earthworks / concrete					AR-R1					0.12	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.17	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					10.69	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.97	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.66	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					40.81	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					12.76	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					29.53	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.57	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					218.65	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.93	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					22.17	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	236	R	217.39	AS-Q1	3.11	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	127	R	89.11	AS-Q2	0.60	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	76	R	2,862.25	AS-Q3	13.43	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	5.66	R	8,168.49									
AS1.5	Mesh	m2	109	R	181.69	AS-Q4	0.70	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	206	R	292.90	AS-Q5	0.37	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	108	R	15.86	AS-Q6	0.70	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	31	R	158.06	AS-Q7	2.45	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	772	R	73.24	AS-Q8	0.10	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.70	R	10,541.81	AS-Q9	108.57	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	20	R	450.13	AS-Q10	0.25	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	3,324.78	AS-Q11	2.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	49	R	931.95	AS-Q12	3.33	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	651	R	49.15	AS-Q13	0.12	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.45	R	37,454.86	AS-Q14	3.45	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.74	R	55,922.22	AS-Q15	220.27	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	163	R	-									
AS1.18	Total control room area	m2	5	R	-									
	Concrete / earthworks					AS-R1					13.17	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					32.12	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					44.96	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					9.77	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					180.47	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					18.11	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					111.53	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.07	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.27	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.22	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.15	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.14	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	171	R	218.82	AT-Q1	24.43	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	12	R	59.23	AT-Q2	0.58	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	7	R	1,761.42	AT-Q3	3.61	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.94	R	14,501.15									
AT1.5	Formwork	m2	159	R	306.31	AT-Q4	0.04	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	23	R	15.48	AT-Q5	0.30	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	20	R	111.00	AT-Q6	0.35	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.34	R	74.16	AT-Q7	20.59	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.49	R	10,135.76	AT-Q8	14.29	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.08	R	80.23	AT-Q9	87.50	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.58	R	34,245.67	AT-Q10	48.28	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.86	R	47,428.46	AT-Q11	32.56	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	46	R	304.99	AT-Q12	0.61	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	14	R	246.85	AT-Q13	2.00	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	28	R	-									
	Concrete / earthworks					AT-R1					8.05	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					29.74	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					5.75	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					113.79	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					15.87	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					195.54	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.92	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.42	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.31	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					5.78	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.24	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	2,160	R	343.17	AV-Q1	1.04	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,465	R	94.32	AV-Q2	0.91	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,571	R	197.77	AV-Q3	0.87	AV1.10	/	AV1.3				
AV1.4	Pipework	m	88	R	641.50	AV-Q4	25.43	AV1.10	/	AV1.4				
AV1.5	Manholes	No	2	R	7,290.62	AV-Q5	44.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	17	R	1,708.09	AV-Q6	5.18	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	234	R	251.17	AV-Q7	0.07	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	26	R	311.01	AV-Q8	0.65	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.89	R	7,810.71	AV-Q9	4.37	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,238	R	-									
	Earthworks / lining					AV-R1					3.64	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.74	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.48	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.53	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.09	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.06	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					6.80	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					5.49	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.22	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	22	R	-									
BA1.2	Steel	t	2.30	R	48,319.57	BA-Q1	9.57	BA1.1	/	BA1.2				
BA1.3	Handrail	m	17	R	1,284.69	BA-Q2	1.29	BA1.1	/	BA1.3				
BA1.4	Grating	m2	11	R	2,392.63	BA-Q3	2.00	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	17	R	767.75	BA-Q4	1.29	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	264.82	BA-Q5	5.50	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					37.61	BA1.2	/	BA1.3
	Steel / grating					BA-R2					20.20	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					62.94	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					182.46	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,215	R	-									
BB1.2	Steel	t	56.14	R	58,011.73	BB-Q1	21.64	BB1.1	/	BB1.2				
BB1.3	Handrail	m	72	R	968.55	BB-Q2	16.88	BB1.1	/	BB1.3				
BB1.4	Grating	m2	87	R	2,214.54	BB-Q3	13.97	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	112	R	596.85	BB-Q4	10.85	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	12	R	4,302.70	BB-Q5	101.25	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					59.90	BB1.2	/	BB1.3
	Steel / grating					BB-R2					26.20	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					97.20	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					13.48	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	16,363	R	-									
BC1.2	Steel	t	206.11	R	24,876.73	BC-Q1	79.39	BC1.1	/	BC1.2				
BC1.3	Handrail	m	405	R	1,324.27	BC-Q2	40.40	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,400	R	2,893.58	BC-Q3	3.72	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	375	R	447.21	BC-Q4	43.63	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	61	R	373.22	BC-Q5	268.25	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	72	R	7,519.91	BC-Q6	227.26	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					18.79	BC1.2	/	BC1.3
	Steel / grating					BC-R2					8.60	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					55.63	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					66.65	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					3.31	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	525	R	-									
BD1.2	Steel	t	15.83	R	35,353.64	BD-Q1	33.16	BD1.1	/	BD1.2				
BD1.3	Handrail	m	11	R	1,946.26	BD-Q2	47.73	BD1.1	/	BD1.3				
BD1.4	Grating	m2	6	R	1,905.96	BD-Q3	87.50	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	9	R	446.80	BD-Q4	58.33	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	28	R	5,986.90	BD-Q5	18.75	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.16	BD1.1	/	BD1.2
	Steel / grating					BD-R2					18.55	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					79.13	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					5.91	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	55	R	-									
BE1.2	Steel	t	1.57	R	27,321.95	BE-Q1	35.03	BE1.1	/	BE1.2				
BE1.3	Handrail	m	34	R	1,351.52	BE-Q2	1.62	BE1.1	/	BE1.3				
BE1.4	Grating	m2	23	R	2,318.91	BE-Q3	2.39	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	31	R	491.17	BE-Q4	1.77	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	437.26	BE-Q5	9.17	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					20.22	BE1.2	/	BE1.3
	Steel / grating					BE-R2					11.78	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					55.63	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					62.48	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	338	R	-									
BF1.2	Steel	t	27.22	R	52,743.82	BF-Q1	12.42	BF1.1	/	BF1.2				
BF1.3	Handrail	m	11	R	1,217.49	BF-Q2	30.73	BF1.1	/	BF1.3				
BF1.4	Grating	m2	50	R	2,964.47	BF-Q3	6.76	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	9	R	650.31	BF-Q4	37.56	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	14	R	6,776.72	BF-Q5	24.14	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					43.32	BF1.1	/	BF1.2
	Steel / grating					BF-R2					17.79	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					81.11	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.78	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	14,116	R	-	C-Q1	0.30	C1.1	/	C1.2				
C1.2	Total work units	WU	47,822	R	656.33									
C1.3	Pipe supports	kg	8,157	R	-	C-Q2	1.73	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,877	R	-	C-Q3	0.25	C1.4	/	C1.2				
C1.5	Number of welds	No	9,954	R	-	C-Q4	0.71	C1.5	/	C1.1				
C1.6	Total fittings	No	6,406	R	-	C-Q5	0.45	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,892	R	-	C-Q6	0.45	C1.7	/	C1.6				
C1.8	Support number	No	987	R	-	C-Q7	0.12	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	47,822	R	656.33	DA-Q1	51.09	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	936	R	90.58									
	Average cost per examination / WU					DA-R1					7.25	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	47,822	R	656.33	DB-Q1	121.68	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	393	R	226.67									
	Average cost per examination / WU					DB-R1					2.90	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	47,822	R	656.33	DC-Q1	170.19	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	281	R	328.29									
	Average cost per examination / WU					DC-R1					2.00	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	47,822	R	656.33	DD-Q1	53.43	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	895	R	58.54									
	Average cost per examination / WU					DD-R1					11.21	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	47,822	R	656.33	DE-Q1	104.41	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	458	R	207.52									
	Average cost per examination / WU					DE-R1					3.16	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	47,822	R	656.33	E-Q1	219.66	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	217.71	R	699.60	E-Q2	177.84	E1.1	/	E1.3				
E1.3	Structural steel	t	268.90	R	39,810.01									
	WU cost / install mechanical weight - receive					E-R1					0.94	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					56.90	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	47,822	R	656.33									
F1.2	Painting to piping	m2	2,846	R	195.58	F-Q1	16.80	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,444	R	797.57	F-Q2	33.12	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	207.62	R	662.47									
F1.5	Painting to mechanical equipment	m2	681	R	282.29	F-Q3	0.30	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	311	R	571.43	F-Q4	0.67	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.25	F1.2	/	F1.3
	Work unit / paint					F-R2					3.36	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.82	F1.1	/	F1.3
	Install plant / paint					F-R4					2.35	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.16	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	27,963	R	87.50									
G1.2	Electrical cable terminations	No	1,803	R	190.73	G-Q1	15.51	G1.1	/	G1.2				
G1.3	Electrical equipment	No	67	R	1,117.66	G-Q2	417.36	G1.1	/	G1.3				
G1.4	DB's	No	19	R	3,387.66	G-Q3	3.53	G1.3	/	G1.4				
G1.5	Rack	m	3,115	R	259.00	G-Q4	8.98	G1.1	/	G1.5				
G1.6	Support steel	kg	6,499	R	54.71	G-Q5	0.48	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	20,356	R	31.63	G-Q6	1.37	G1.1	/	G1.7				
G1.8	Instruments	No	718	R	287.73	G-Q7	28.35	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,876	R	270.96	G-Q8	0.38	G1.8	/	G1.9				
G1.10	Light fittings	No	352	R	500.46	G-Q9	5.25	G1.10	/	G1.3				
G1.11	Conduit	m	2,587	R	76.33	G-Q10	10.81	G1.1	/	G1.11				
G1.12	Instrument stands	No	180	R	1,109.80	G-Q11	3.99	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.46	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.08	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.33	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.15	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.60	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.34	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.17	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.12	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.11	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,927	R	28.99	AB-Q1	1.60	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	4,336	R	6.54									
AB1.3	Back fill and compact	m3	7,709	R	21.95	AB-Q2	0.90	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,830	R	3.06	AB-Q3	1.19	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,897	R	2.95	AB-Q4	1.41	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.43	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.32	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					9.47	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					9.83	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	162,074.08									
AC1.2	EO for raking equipment	Item	1	R	17,554.29									
AC1.3	Number of piles	No	398	R	-									
AC1.4	Move rig to new position	No	156	R	101.77	AC-Q1	2.55	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	17	R	-	AC-Q2	23.41	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	14	R	116.50	AC-Q3	1.21	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	118	R	63.74	AC-Q4	0.14	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	9,633	R	116.65	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	571	R	151.46	AC-Q6	0.70	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	125	R	376.87	AC-Q7	3.18	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	244	R	190.38	AC-Q8	1.63	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	1,303	R	318.89	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	59	R	224.85	AC-Q10	0.29	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	22.60	R	4,182.78	AC-Q11	17.61	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	256.50	R	4,188.94	AC-Q12	1.55	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,234	R	797.32	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	261	R	694.29	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	77,161.05		1.00		/					
AC1.19	Load test to pile	No	4	R	20,861.07	AC-Q15	99.50	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	49,716.68	AC-Q16	398.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	346	R	248.58	AC-Q17	1.15	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					203.27	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					22.02	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.13	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.15	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.55	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.19	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.47	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.24	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.40	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.28	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					1.00	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					5.25	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					0.87	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					96.78	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					26.16	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					62.35	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.31	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	163	R	43.88	AD-Q1	0.10	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,612	R	56.76									
AD1.3	Kerbing	m	341	R	65.30	AD-Q2	0.07	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	4,651	R	-									
AD1.5	Remove top soil	m3	916	R	17.09	AD-Q3	0.35	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,628	R	65.73	AD-Q4	0.35	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,645	R	2.04									
AD1.8	Reduce levels	m3	1,757	R	16.39	AD-Q5	0.66	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	880	R	39.24	AD-Q6	2.00	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	475	R	83.31	AD-Q7	1.85	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	407	R	123.19	AD-Q8	4.32	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,257	R	9.82	AD-Q9	4.75	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	386	R	8.29	AD-Q10	1.16	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	512	R	2.13	AD-Q11	1.13	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	461	R	282.37	AD-Q12	1.50	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	85	R	139.73	AD-Q13	1.35	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	85.44	AD-Q14	0.25	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	124.29	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	886	R	2.59	AD-Q16	2.60	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.77	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					8.38	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					8.03	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.42	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.47	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.13	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.68	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.12	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					6.69	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.78	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.13	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.32	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.14	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.31	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.90	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	361	R	628.26	AE-Q1	4.25	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	85	R	956.68	AE-Q2	0.16	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	275	R	-									
AE1.4	Rip and compact	m2	2,285	R	2.97									
AE1.5	Formwork to plinth	m2	431	R	73.81	AE-Q3	5.07	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	256	R	90.51	AE-Q4	0.71	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.45	R	3,940.55	AE-Q5	0.02	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,144	R	87.12	AE-Q6	393.39	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,422	R	30.04	AE-Q7	3.94	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	690	R	58.00	AE-Q8	1.91	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.66	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					211.54	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.08	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					45.23	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.05	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.09	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	6,742	R	-	AF-Q1	15.64	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	431	R	25.83	AF-Q2	1.42	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	303	R	40.39	AF-Q3	0.41	AF1.2	/	AF1.4				
AF1.4	Working space	m2	1,047	R	30.87	AF-Q4	0.35	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	151	R	471.04	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	268	R	32.38	AF-Q6	0.94	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	836.54	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	640.10	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	252	R	-	AF-Q9	0.75	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	336	R	3.81									
AF1.11	Formwork to bases	m2	322	R	67.81	AF-Q10	2.13	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	305	R	83.67	AF-Q11	16.05	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	11	R	129.37	AF-Q12	3.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.11	R	3,975.95	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	29.16	R	5,879.35	AF-Q14	8.64	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	411	R	19.19	AF-Q15	0.37	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	45	R	110.98	AF-Q16	0.42	AF1.7	/	AF1.17				
AF1.18	Manhole	No	11	R	3,033.09	AF-Q17	0.18	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	62	R	150.35									
	Base excavation / backfill					AF-R1					0.64	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.84	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					18.24	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					14.55	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.39	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.36	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					123.63	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.14	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.20	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					24.55	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					7.54	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.13	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.05	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	401	R	47.04	AG-Q1	1.37	AG1.1	/	AG1.4				
AG1.2	Working space	m2	872	R	17.62	AG-Q2	0.46	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	79	R	33.59	AG-Q3	5.08	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	292	R	613.60	AG-Q4	1.51	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	63	R	874.86	AG-Q5	4.63	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	258	R	-									
AG1.7	Wood float	m2	258	R	5.88	AG-Q6	0.24	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	194	R	33.99	AG-Q7	1.51	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	423	R	88.45	AG-Q8	0.69	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	271	R	129.51	AG-Q9	0.23	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	25.37	R	4,082.75	AG-Q10	10.17	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,333	R	23.32	AG-Q11	0.11	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,587	R	22.40	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.52	R	4,344.47	AG-Q13	17.90	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.08	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.37	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.71	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.06	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.14	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.15	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.65	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					7.08	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	258	R	25.71	AH-Q1	4.37	AH1.1	/	AH1.4				
AH1.2	Working space	m2	78	R	18.37	AH-Q2	3.31	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	352	R	53.55	AH-Q3	0.73	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	59	R	658.26	AH-Q4	0.67	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	20	R	541.04	AH-Q5	2.95	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	113	R	626.23	AH-Q6	0.52	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	23	R	836.22	AH-Q7	2.57	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	619.23	AH-Q8	19.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	326	R	-									
AH1.10	Blinding	m2	88	R	31.64	AH-Q9	3.70	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	948	R	5.78	AH-Q10	0.34	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	262	R	107.48	AH-Q11	0.23	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	50	R	122.92	AH-Q12	0.46	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	38	R	70.45	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	212	R	87.64	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	32	R	77.88	AH-Q15	3.53	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	83	R	29.16	AH-Q16	1.36	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.90	R	6,077.01	AH-Q17	0.13	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	14.74	R	3,767.96	AH-Q18	22.12	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	1,016	R	73.01	AH-Q19	0.11	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,610	R	17.87	AH-Q20	0.20	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	3,460	R	30.28	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.04	R	5,006.55	AH-Q22	313.46	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	495	R	27.93	AH-Q23	0.23	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	375	R	60.23	AH-Q24	0.30	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.40	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.48	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					20.80	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					113.89	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.22	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.05	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.79	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.06	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					6.12	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.80	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					8.79	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					6.17	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.04	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					21.48	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.61	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					51.61	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					210.85	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					124.44	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.13	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					22.42	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					10.40	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	284	R	32.71	AI-Q1	2.84	AI1.1	/	AI1.5				
AI1.2	Working space	m2	1,130	R	25.14	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	130	R	38.74	AI-Q3	2.18	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	359	R	47.76	AI-Q4	0.28	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	100	R	954.96	AI-Q5	5.56	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	18	R	592.11	AI-Q6	0.42	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	139	R	-									
AI1.8	Wood float	m2	237	R	4.19									
AI1.9	Formwork bases	m2	143	R	54.21	AI-Q7	0.70	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	169	R	83.05	AI-Q8	0.11	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	13.81	R	5,321.38	AI-Q9	10.07	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,557	R	20.64	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.62	R	4,915.91	AI-Q11	61.73	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.30	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.84	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					19.99	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.61	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					227.91	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					17.62	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.13	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					257.82	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.19	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	364	R	31.05	AJ-Q1	2.49	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,191	R	27.16	AJ-Q2	0.31	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	151	R	39.89	AJ-Q3	2.41	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	329	R	30.50	AJ-Q4	0.44	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	146	R	841.52	AJ-Q5	4.42	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	27	R	658.26	AJ-Q6	5.41	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	33	R	421.91									
AJ1.8	Total concrete	m3	164	R	-									
AJ1.9	Wood float	m2	450	R	5.32	AJ-Q7	0.36	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	217	R	79.56	AJ-Q8	0.67	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	381	R	105.54	AJ-Q9	0.07	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	13.20	R	3,358.75	AJ-Q10	12.42	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	7,297	R	20.45	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,464	R	25.45	AJ-Q12	0.10	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	2.40	R	4,798.35	AJ-Q13	60.83	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.14	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.78	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					27.59	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					158.18	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					10.58	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.24	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					164.24	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					131.97	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.18	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	656	R	41.82	AK-Q1	2.70	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,046	R	19.35	AK-Q2	0.63	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	277	R	45.25	AK-Q3	2.37	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	366	R	54.30	AK-Q4	0.66	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	243	R	911.47	AK-Q5	27.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	658.26									
AK1.7	Concrete plinth	m3	60	R	711.12	AK-Q6	4.05	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	518	R	-									
AK1.9	Wood float	m2	617	R	6.68	AK-Q7	0.39	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	436	R	60.52	AK-Q8	0.56	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	169	R	80.77	AK-Q9	0.36	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	35	R	77.06	AK-Q10	0.26	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	50.42	R	3,985.12	AK-Q11	10.27	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	11,468	R	27.87	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	1.94	R	5,036.35	AK-Q13	267.01	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.16	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.92	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					16.79	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					136.45	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					15.06	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					8.80	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.54	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					142.99	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.18	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	470	R	41.82	AL-Q1	2.24	AL1.1	/	AL1.5				
AL1.2	Working space	m2	2,029	R	32.40	AL-Q2	0.23	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	189	R	39.76	AL-Q3	2.49	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	264	R	50.32	AL-Q4	0.80	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	210	R	582.15	AL-Q5	1.29	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	163	R	949.78	AL-Q6	2.81	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	58	R	978.36	AL-Q7	3.62	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	534	R	-									
AL1.9	Wood float	m2	480	R	6.02	AL-Q8	0.44	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	364	R	77.01	AL-Q9	0.58	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,494	R	86.45	AL-Q10	0.11	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	177	R	132.42	AL-Q11	0.33	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	87	R	169.68	AL-Q12	0.67	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	20	R	195.98	AL-Q13	8.15	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	41.65	R	3,988.75	AL-Q14	12.82	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	17,516	R	23.90	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	289	R	22.95	AL-Q16	1.85	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.89	R	4,450.91	AL-Q17	600.00	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.29	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.05	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					11.57	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					96.70	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.61	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.61	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.56	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					7.39	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					10.99	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.77	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					7.39	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.99	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					166.89	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					173.80	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.13	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,455	R	31.23	AM-Q1	4.02	AM1.1	/	AM1.5				
AM1.2	Working space	m2	3,559	R	17.62	AM-Q2	0.41	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	731	R	56.95	AM-Q3	1.99	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	579	R	31.64	AM-Q4	0.63	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	362	R	908.36									
AM1.6	Concrete column	m3	207	R	836.54	AM-Q5	1.75	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	133	R	640.10	AM-Q6	1.56	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	213	R	946.53	AM-Q7	1.70	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	81	R	599.35	AM-Q8	2.56	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	151	R	657.29	AM-Q9	1.37	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,259	R	-									
AM1.12	Wood float	m2	2,703	R	6.39	AM-Q10	0.47	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	653	R	58.11	AM-Q11	0.55	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	878	R	85.59	AM-Q12	0.24	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	921	R	134.81	AM-Q13	0.14	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	219	R	113.34	AM-Q14	0.61	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	1,049	R	166.83	AM-Q15	0.20	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	189.94	AM-Q16	34.50	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	738	R	133.88	AM-Q17	0.11	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	100.67	R	2,878.25	AM-Q18	12.51	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,522	R	18.62	AM-Q19	0.36	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,785	R	31.55	AM-Q20	0.45	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	66	R	400.29	AM-Q21	1.53	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.21	R	3,933.81	AM-Q22	1040.50	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.03	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.77	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.55	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					28.71	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.09	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.42	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.96	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.52	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.38	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					142.15	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					15.63	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					4.75	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.65	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					9.77	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.37	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.94	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					4.48	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					154.58	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					91.23	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					7.19	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.23	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,039	R	29.87	AN-Q1	1.54	AN1.1	/	AN1.5				
AN1.2	Working space	m2	442	R	24.58	AN-Q2	6.88	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	605	R	39.41	AN-Q3	5.02	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	2,518	R	46.95	AN-Q4	0.79	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,979	R	688.42	AN-Q5								
AN1.6	Concrete column	m3	50	R	517.34	AN-Q6	39.58	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	42	R	641.58	AN-Q7	1.19	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	229	R	954.96	AN-Q8	8.64	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	592.11	AN-Q9	8.33	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	3,419	R	-				/					
AN1.11	Wood float	m2	2,198	R	4.00	AN-Q10	0.90	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	362	R	122.92	AN-Q11	5.47	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	318	R	70.45	AN-Q12	0.16	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	319	R	132.42	AN-Q13	0.13	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	67	R	126.00	AN-Q14	0.63	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	38	R	120.77	AN-Q15	0.16	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	208.61	AN-Q16	494.75	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	2,255	R	134.40	AN-Q17	0.10	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	342.78	R	2,684.86	AN-Q18	9.97	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	13,142	R	18.80	AN-Q19	0.26	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	12,384	R	21.85	AN-Q20	0.28	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	119	R	657.15	AN-Q21	28.73	AN1.10	/	AN1.22				
AN1.23	Grout	m3	3.20	R	6,135.79	AN-Q22	618.44	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.22	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.76	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					14.66	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					172.11	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.60	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					4.85	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.09	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					7.34	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.08	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.90	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.11	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					142.81	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					122.88	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.11	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					4.09	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	410	R	43.48	AO-Q1	2.27	AO1.1	/	AO1.5				
AO1.2	Working space	m2	660	R	18.37	AO-Q2	0.62	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	180	R	58.79	AO-Q3	2.28	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	39	R	32.29	AO-Q4	4.64	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	181	R	688.42									
AO1.6	Concrete column	m3	30	R	600.98	AO-Q5	6.03	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	20	R	874.86	AO-Q6	1.50	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	624.79	AO-Q7	36.20	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	923.90	AO-Q8	30.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	49	R	-									
AO1.11	Wood float	m2	50	R	6.02	AO-Q9	3.62	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	179	R	103.01	AO-Q10	1.01	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	207	R	95.70	AO-Q11	0.14	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	63	R	117.03	AO-Q12	0.32	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	34	R	166.83	AO-Q13	0.59	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	99.03	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	62	R	189.77	AO-Q15	2.92	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	26	R	111.50	AO-Q16	0.19	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.58	R	3,940.55	AO-Q17	7.45	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,956	R	23.90	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,800	R	22.95	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	13	R	664.79	AO-Q20	3.77	AO1.10	/	AO1.22				
AO1.23	Grout	m3	6.71	R	6,009.59	AO-Q21	26.97	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.06	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.37	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.74	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					21.32	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					114.36	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.68	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					7.48	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.24	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					6.28	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.61	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					9.33	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.60	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					164.88	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					171.70	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.11	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.93	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,691	R	32.67	AP-Q1	1.87	AP1.1	/	AP1.5				
AP1.2	Working space	m2	789	R	18.42	AP-Q2	2.14	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,810	R	63.90	AP-Q3	0.93	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	206	R	23.30	AP-Q4	4.39	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	904	R	600.98	AP-Q5	0.31	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,932	R	92.79									
AP1.7	Rough formwork	m2	331	R	79.56	AP-Q6	2.73	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	2,340	R	116.99	AP-Q7	0.39	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,849	R	6.26	AP-Q8	0.23	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	198	R	32.29	AP-Q9	4.57	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	101	R	63.90	AP-Q10	8.95	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	308	R	13.16	AP-Q11	2.94	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.15	R	3,596.75	AP-Q12	786.09	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,015	R	156.41	AP-Q13	0.45	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,227	R	-	AP-Q14	4.68	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,283	R	55.08	AP-Q15	1.85	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,918	R	120.84	AP-Q16	2.20	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	5,673	R	53.76	AP-Q17	0.75	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	769.77	AP-Q18	469.67	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,858	R	146.25	AP-Q19	1.10	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	5,857	R	125.36	AP-Q20	0.72	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	80.71	R	2,878.25	AP-Q21	11.20	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	19,983.21									
AP1.24	Structural steel	Item	1	R	51,744.49									
AP1.25	Plumbing and drainage	Item	1	R	32,947.73									
AP1.26	Small power and lighting	Item	1	R	280,691.52									
AP1.27	External works	Item	1	R	121,290.61									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.77	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.51	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					25.79	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					31.02	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.55	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.14	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					96.00	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					18.61	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					9.41	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					218.71	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.17	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.91	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					23.82	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.91	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.20	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					1.07	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.25	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					6.94	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					17.98	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					11.45	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					97.52	AP1.26	/	AP1.22
	External works / concrete					AP-R23					201.82	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	98	R	630.92	AQ-Q1	1.63	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	160	R	53.70									
AQ1.3	Reinforcement	t	11	R	4,113.29	AQ-Q2	8.91	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	1,228	R	88.69	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	360	R	112.41	AQ-Q4	0.27	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	150	R	111.71	AQ-Q5	9.14	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,383	R	63.05	AQ-Q6	0.99	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	57.97	R	16,155.04	AQ-Q7	23.65	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	705	R	103.56	AQ-Q8	1.94	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	5,511.04	AQ-Q9	457.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	60	R	1,033.05	AQ-Q10	22.85	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,060	R	33.52	AQ-Q11	1.29	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,371	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					11.75	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.11	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.61	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.65	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					256.23	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.64	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.34	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					16.38	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.88	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	189	R	79.81	AR-Q1	2.05	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	92	R	874.86	AR-Q2	14.77	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.23	R	3,975.95									
AR1.4	Mesh	m2	565	R	66.42	AR-Q3	0.16	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	229	R	107.44	AR-Q4	0.40	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	75	R	110.71	AR-Q5	7.53	AR1.15	/	AR1.6				
AR1.7	Screed	m2	551	R	16.12	AR-Q6	1.03	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	37.80	R	13,038.72	AR-Q7	14.95	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	15	R	1,360.74	AR-Q8	2.52	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	78	R	772.95	AR-Q9	0.48	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	50	R	148.74	AR-Q10	0.76	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	647	R	61.19	AR-Q11	0.87	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	186	R	82.18	AR-Q12	3.04	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	35	R	797.08	AR-Q13	1.08	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	565	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.22	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					13.17	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.14	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					7.90	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					54.27	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					9.58	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					16.87	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					5.20	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					213.09	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.34	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					16.36	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	496	R	85.52	AS-Q1	6.61	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	251	R	45.07	AS-Q2	0.30	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	75	R	624.79	AS-Q3	5.64	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	13.29	R	5,879.35									
AS1.5	Mesh	m2	196	R	69.30	AS-Q4	0.38	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	347	R	115.87	AS-Q5	0.22	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	136	R	5.96	AS-Q6	0.55	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	32	R	53.23	AS-Q7	2.34	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	1,137	R	27.54	AS-Q8	0.07	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.58	R	4,798.35	AS-Q9	47.47	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	52	R	149.51	AS-Q10	0.21	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,180.29	AS-Q11	3.67	AS1.18	/	AS1.12				
AS1.13	Pipework	m	60	R	321.09	AS-Q12	2.88	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	1,023	R	35.01	AS-Q13	0.07	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	3.32	R	17,570.85	AS-Q14	3.31	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.48	R	21,024.13	AS-Q15	116.89	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	173	R	-									
AS1.18	Total control room area	m2	11	R	-									
	Concrete / earthworks					AS-R1					7.31	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					13.86	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					84.84	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					5.39	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					104.83	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					11.74	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					213.48	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					1.95	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.13	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.33	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.28	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.13	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	202	R	133.68	AT-Q1	7.21	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	20	R	24.27	AT-Q2	1.40	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	28	R	592.11	AT-Q3	7.59	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	3.69	R	5,355.10									
AT1.5	Formwork	m2	176	R	77.22	AT-Q4	0.16	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	54	R	7.95	AT-Q5	0.52	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	29	R	39.76	AT-Q6	0.97	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.54	R	27.83	AT-Q7	51.85	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.60	R	3,760.07	AT-Q8	46.67	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.19	R	31.89	AT-Q9	147.37	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.55	R	10,328.93	AT-Q10	92.73	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.36	R	16,421.60	AT-Q11	37.50	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	69	R	117.69	AT-Q12	0.74	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	23	R	64.63	AT-Q13	2.22	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	51	R	-									
	Concrete / earthworks					AT-R1					4.43	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					24.40	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					7.67	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					74.48	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					14.89	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					192.42	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.87	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.16	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.52	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.33	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					5.03	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.82	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	513	R	106.47	AU-Q1	1.06	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	272	R	32.97	AU-Q2	1.78	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	483	R	946.53									
AU1.4	Reinforcement	t	88.45	R	3,442.97	AU-Q3	5.46	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,325	R	76.40	AU-Q4	0.36	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	179	R	41.89	AU-Q5	2.70	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,334	R	14.39	AU-Q6	0.21	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	1,143	R	21.91	AU-Q7	0.42	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	49	R	93.35	AU-Q8	9.86	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	4.86	R	17,766.42	AU-Q9	99.38	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	10	R	2,305.75	AU-Q10	48.30	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	28	R	150.45	AU-Q11	7.07	AU1.12	/	AU1.13				
AU1.13	Total area	m2	198	R	-									
	Concrete / earthworks					AU-R1					8.89	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					28.71	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					12.39	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.27	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					22.60	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					239.26	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.19	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					157.14	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					36.88	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.41	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					6.29	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,983	R	78.22	AV-Q1	0.70	AV1.10	/	AV1.1				
AV1.2	Lining	m2	4,823	R	46.15	AV-Q2	0.72	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,433	R	48.82	AV-Q3	1.01	AV1.10	/	AV1.3				
AV1.4	Pipework	m	122	R	329.00	AV-Q4	28.43	AV1.10	/	AV1.4				
AV1.5	Manholes	No	7	R	2,263.63	AV-Q5	17.43	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	24	R	645.25	AV-Q6	5.08	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	339	R	105.54	AV-Q7	0.07	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	42	R	106.50	AV-Q8	0.57	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.47	R	2,878.25	AV-Q9	6.92	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,469	R	-									
	Earthworks / lining					AV-R1					1.69	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.60	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.95	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.24	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.15	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.07	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					6.11	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					6.06	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.22	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,769	R	87.62	AW-Q1	15.38	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	99	R	26.65	AW-Q2	1.16	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	115	R	641.58	AW-Q3	4.16	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	27.65	R	6,077.01									
AW1.5	Mesh	m2	151	R	62.80	AW-Q4	0.76	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	493	R	108.12	AW-Q5	0.23	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	4,643	R	18.28	AW-Q6	0.02	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	4.80	R	15,659.85	AW-Q7	16.88	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	81	R	-									
	Concrete / earthworks					AW-R1					7.32	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					24.07	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					96.77	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.93	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					332.44	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.39	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	32	R	-									
BA1.2	Steel	t	4.86	R	16,647.87	BA-Q1	6.58	BA1.1	/	BA1.2				
BA1.3	Handrail	m	22	R	519.44	BA-Q2	1.45	BA1.1	/	BA1.3				
BA1.4	Grating	m2	18	R	810.29	BA-Q3	1.78	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	27	R	262.90	BA-Q4	1.19	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	97.59	BA-Q5	10.67	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					32.05	BA1.2	/	BA1.3
	Steel / grating					BA-R2					20.55	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					63.32	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					170.59	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,879	R	-									
BB1.2	Steel	t	86.82	R	20,351.65	BB-Q1	21.64	BB1.1	/	BB1.2				
BB1.3	Handrail	m	104	R	341.28	BB-Q2	18.07	BB1.1	/	BB1.3				
BB1.4	Grating	m2	135	R	776.90	BB-Q3	13.92	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	193	R	229.05	BB-Q4	9.74	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	18	R	1,626.89	BB-Q5	104.39	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					59.63	BB1.2	/	BB1.3
	Steel / grating					BB-R2					26.20	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					88.85	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					12.51	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	26,014	R	-									
BC1.2	Steel	t	183.98	R	9,167.08	BC-Q1	141.40	BC1.1	/	BC1.2				
BC1.3	Handrail	m	628	R	453.46	BC-Q2	41.42	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,619	R	1,130.95	BC-Q3	5.63	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	580	R	172.09	BC-Q4	44.85	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	94	R	135.24	BC-Q5	276.74	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	111	R	2,638.13	BC-Q6	234.36	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					20.22	BC1.2	/	BC1.3
	Steel / grating					BC-R2					8.11	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					53.27	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					67.78	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					3.47	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	905	R	-									
BD1.2	Steel	t	22.85	R	12,550.48	BD-Q1	39.61	BD1.1	/	BD1.2				
BD1.3	Handrail	m	18	R	619.78	BD-Q2	50.28	BD1.1	/	BD1.3				
BD1.4	Grating	m2	14	R	1,357.80	BD-Q3	64.64	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	11	R	123.33	BD-Q4	82.27	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	31	R	1,555.63	BD-Q5	29.19	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					20.25	BD1.1	/	BD1.2
	Steel / grating					BD-R2					9.24	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					101.76	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					8.07	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	78	R	-									
BE1.2	Steel	t	2.38	R	17,731.47	BE-Q1	32.77	BE1.1	/	BE1.2				
BE1.3	Handrail	m	48	R	471.43	BE-Q2	1.63	BE1.1	/	BE1.3				
BE1.4	Grating	m2	37	R	1,194.35	BE-Q3	2.11	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	48	R	172.75	BE-Q4	1.63	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	9	R	148.53	BE-Q5	8.67	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					37.61	BE1.2	/	BE1.3
	Steel / grating					BE-R2					14.85	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					102.64	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					119.38	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	352	R	-									
BF1.2	Steel	t	41.08	R	14,712.68	BF-Q1	8.57	BF1.1	/	BF1.2				
BF1.3	Handrail	m	16	R	687.75	BF-Q2	22.00	BF1.1	/	BF1.3				
BF1.4	Grating	m2	65	R	699.41	BF-Q3	5.42	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	28	R	244.49	BF-Q4	12.57	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	27	R	2,158.02	BF-Q5	13.04	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					21.39	BF1.1	/	BF1.2
	Steel / grating					BF-R2					21.04	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					60.18	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					6.82	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	41,518	R	-	C-Q1	0.34	C1.1	/	C1.2				
C1.2	Total work units	WU	122,444	R	246.75									
C1.3	Pipe supports	kg	7,061	R	-	C-Q2	5.88	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	9,400	R	-	C-Q3	0.08	C1.4	/	C1.2				
C1.5	Number of welds	No	14,401	R	-	C-Q4	0.35	C1.5	/	C1.1				
C1.6	Total fittings	No	8,952	R	-	C-Q5	0.22	C1.6	/	C1.1				
C1.7	Stud bolts	No	4,713	R	-	C-Q6	0.53	C1.7	/	C1.6				
C1.8	Support number	No	1,215	R	-	C-Q7	0.17	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	122,444	R	246.75	DA-Q1	82.84	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,478	R	31.78									
	Average cost per examination / WU					DA-R1					7.76	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	122,444	R	246.75	DB-Q1	201.39	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	608	R	81.19									
	Average cost per examination / WU					DB-R1					3.04	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	122,444	R	246.75	DC-Q1	416.48	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	294	R	128.31									
	Average cost per examination / WU					DC-R1					1.92	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	122,444	R	246.75	DD-Q1	94.84	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,291	R	20.63									
	Average cost per examination / WU					DD-R1					11.96	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	122,444	R	246.75	DE-Q1	172.94	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	708	R	70.28									
	Average cost per examination / WU					DE-R1					3.51	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	122,444	R	246.75	E-Q1	389.65	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	314.24	R	245.48	E-Q2	301.66	E1.1	/	E1.3				
E1.3	Structural steel	t	405.90	R	14,608.78									
	WU cost / install mechanical weight - receive					E-R1					1.01	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					59.51	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	122,444	R	246.75									
F1.2	Painting to piping	m2	4,108	R	69.43	F-Q1	29.81	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,624	R	220.22	F-Q2	75.40	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	371.84	R	276.69									
F1.5	Painting to mechanical equipment	m2	1,181	R	118.19	F-Q3	0.31	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	462	R	304.93	F-Q4	0.80	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.32	F1.2	/	F1.3
	Work unit / paint					F-R2					3.55	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.12	F1.1	/	F1.3
	Install plant / paint					F-R4					2.34	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.91	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	56,452	R	41.86									
G1.2	Electrical cable terminations	No	2,116	R	108.81	G-Q1	26.68	G1.1	/	G1.2				
G1.3	Electrical equipment	No	144	R	199.22	G-Q2	392.03	G1.1	/	G1.3				
G1.4	DB's	No	25	R	937.58	G-Q3	5.76	G1.3	/	G1.4				
G1.5	Rack	m	6,543	R	97.74	G-Q4	8.63	G1.1	/	G1.5				
G1.6	Support steel	kg	9,024	R	17.42	G-Q5	0.73	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	43,747	R	11.89	G-Q6	1.29	G1.1	/	G1.7				
G1.8	Instruments	No	853	R	108.17	G-Q7	51.29	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,034	R	59.02	G-Q8	0.42	G1.8	/	G1.9				
G1.10	Light fittings	No	510	R	182.02	G-Q9	3.54	G1.10	/	G1.3				
G1.11	Conduit	m	3,784	R	21.90	G-Q10	14.92	G1.1	/	G1.11				
G1.12	Instrument stands	No	438	R	518.19	G-Q11	1.95	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.38	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.21	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.21	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.91	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.40	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.43	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.23	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.20	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.11	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,005	R	16.24	AB-Q1	1.91	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,147	R	3.07									
AB1.3	Back fill and compact	m3	5,996	R	11.03	AB-Q2	1.00	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,232	R	1.43	AB-Q3	1.42	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,555	R	1.38	AB-Q4	1.69	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					5.29	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.47	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.36	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					11.77	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	66,322.99									
AC1.2	EO for raking equipment	Item	1	R	8,358.64									
AC1.3	Number of piles	No	289	R	-									
AC1.4	Move rig to new position	No	121	R	66.15	AC-Q1	2.39	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	22.23	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	8	R	82.56	AC-Q3	1.63	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	90	R	46.92	AC-Q4	0.14	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,404	R	42.87	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	454	R	73.68	AC-Q6	0.64	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	140	R	198.12	AC-Q7	2.06	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	171	R	78.46	AC-Q8	1.69	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	923	R	100.33	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	45	R	195.07	AC-Q10	0.29	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.01	R	1,950.35	AC-Q11	18.05	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	207.41	R	2,884.04	AC-Q12	1.39	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,539	R	344.74	AC-Q13	0.19	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	246	R	349.12	AC-Q14	0.05	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	30,109.67		1.00		/					
AC1.19	Load test to pile	No	4	R	13,405.09	AC-Q15	72.25	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	17,539.34	AC-Q16	289.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	172	R	82.89	AC-Q17	1.68	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.25	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.09	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.57	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.23	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					38.88	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	186	R	26.70	AD-Q1	0.20	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	917	R	22.37									
AD1.3	Kerbing	m	257	R	37.55	AD-Q2	0.07	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,784	R	-									
AD1.5	Remove top soil	m3	584	R	7.24	AD-Q3	0.46	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,280	R	20.11	AD-Q4	0.16	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,552	R	1.85									
AD1.8	Reduce levels	m3	1,268	R	8.28	AD-Q5	0.36	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	938	R	18.07	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	318	R	45.03	AD-Q7	2.95	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	317	R	48.64	AD-Q8	4.00	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,363	R	4.01	AD-Q9	4.29	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	384	R	3.58	AD-Q10	0.94	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	279	R	1.30	AD-Q11	1.49	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	238	R	160.56	AD-Q12	1.09	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	60	R	43.96	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	2	R	74.13	AD-Q14	0.23	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	6	R	57.95	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	717	R	1.79	AD-Q16	2.79	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.19	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.91	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.48	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.46	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.40	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.17	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.11	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.01	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.83	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.17	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.97	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.54	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.05	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	253	R	258.91	AE-Q1	4.22	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	60	R	300.99	AE-Q2	0.16	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	210	R	-									
AE1.4	Rip and compact	m2	1,618	R	1.38									
AE1.5	Formwork to plinth	m2	348	R	50.81	AE-Q3	5.80	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	176	R	39.13	AE-Q4	0.70	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.14	R	1,981.52	AE-Q5	0.02	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,955	R	33.99	AE-Q6	380.35	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,227	R	19.30	AE-Q7	4.85	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	422	R	20.46	AE-Q8	1.67	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					187.62	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.15	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					58.30	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,244	R	-	AF-Q1	15.61	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	336	R	13.29	AF-Q2	1.42	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	236	R	19.57	AF-Q3	0.41	AF1.2	/	AF1.4				
AF1.4	Working space	m2	815	R	14.48	AF-Q4	0.33	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	110	R	221.87	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	208	R	15.19	AF-Q6	0.94	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	429.15	AF-Q7	0.15	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	306.48	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	196	R	-	AF-Q9	0.80	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	244	R	1.96									
AF1.11	Formwork to bases	m2	211	R	29.69	AF-Q10	1.92	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	144	R	42.05	AF-Q11	8.47	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	16	R	60.68	AF-Q12	8.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.65	R	1,998.13	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	20.79	R	2,954.70	AF-Q14	9.43	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	291	R	9.69	AF-Q15	0.38	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	50	R	85.10	AF-Q16	0.34	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	664.83	AF-Q17	0.11	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	66	R	112.58									
	Base excavation / backfill					AF-R1					0.68	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.92	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					16.69	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					14.61	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.29	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.38	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					113.20	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.20	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					22.90	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.04	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.97	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.17	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	312	R	22.52	AG-Q1	2.26	AG1.1	/	AG1.4				
AG1.2	Working space	m2	633	R	9.04	AG-Q2	0.49	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	52	R	14.70	AG-Q3	6.00	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	138	R	308.37	AG-Q4	1.01	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	88	R	410.35	AG-Q5	1.57	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	202	R	-									
AG1.7	Wood float	m2	184	R	2.95	AG-Q6	0.48	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	137	R	17.16	AG-Q7	1.01	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	466	R	67.82	AG-Q8	0.30	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	172	R	28.39	AG-Q9	0.51	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	29.31	R	3,441.36	AG-Q10	6.89	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,619	R	6.15	AG-Q11	0.12	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,858	R	10.79	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.00	R	2,021.04	AG-Q13	44.00	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.07	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.40	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.65	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.06	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.22	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.07	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					11.16	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.55	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	350	R	22.52	AH-Q1	7.45	AH1.1	/	AH1.4				
AH1.2	Working space	m2	62	R	9.23	AH-Q2	5.65	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	261	R	27.31	AH-Q3	1.34	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	47	R	306.48	AH-Q4	0.68	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	14	R	453.21	AH-Q5	3.36	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	88	R	307.47	AH-Q6	0.53	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	17	R	492.56	AH-Q7	2.76	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	221.87	AH-Q8	15.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	253	R	-									
AH1.10	Blinding	m2	69	R	17.97	AH-Q9	3.67	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,125	R	1.92	AH-Q10	0.22	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	89	R	57.25	AH-Q11	0.53	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	65	R	52.72	AH-Q12	0.26	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	15	R	44.72	AH-Q13	0.20	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	158	R	61.91	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	23	R	40.95	AH-Q15	3.83	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	42	R	16.19	AH-Q16	2.10	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.33	R	2,845.25	AH-Q17	0.31	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.49	R	1,950.35	AH-Q18	33.78	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	588	R	54.65	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	803	R	7.72	AH-Q20	0.32	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,550	R	10.24	AH-Q21	0.10	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.27	R	2,454.95	AH-Q22	199.21	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	278	R	13.25	AH-Q23	0.32	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	257	R	25.64	AH-Q24	0.34	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.07	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.44	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.82	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					17.06	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					159.63	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.68	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.00	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.62	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.38	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					5.35	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					9.34	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.96	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.32	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					7.51	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					18.99	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.46	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					35.69	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					252.64	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					190.46	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.12	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					23.21	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					11.99	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	261	R	18.13	AI-Q1	3.43	AI1.1	/	AI1.5				
AI1.2	Working space	m2	874	R	8.72	AI-Q2	0.30	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	87	R	25.03	AI-Q3	3.00	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	188	R	16.98	AI-Q4	0.40	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	76	R	356.09	AI-Q5	5.85	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	447.11	AI-Q6	0.37	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	92	R	-									
AI1.8	Wood float	m2	206	R	1.95									
AI1.9	Formwork bases	m2	147	R	38.37	AI-Q7	0.52	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	194	R	58.43	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	10.03	R	2,981.00	AI-Q9	9.17	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,766	R	9.68	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.26	R	2,470.51	AI-Q11	60.32	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.08	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.72	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					20.97	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.80	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					182.61	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					9.28	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.65	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					307.95	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.14	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	285	R	20.39	AJ-Q1	2.97	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	849	R	8.93	AJ-Q2	0.34	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	127	R	25.64	AJ-Q3	2.24	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	242	R	23.03	AJ-Q4	0.40	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	96	R	265.40	AJ-Q5	2.82	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	24	R	307.19	AJ-Q6	4.00	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	34	R	298.65									
AJ1.8	Total concrete	m3	189	R	-									
AJ1.9	Wood float	m2	326	R	2.98	AJ-Q7	0.58	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	169	R	37.32	AJ-Q8	0.57	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	296	R	53.04	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	8.65	R	2,845.25	AJ-Q10	21.85	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,455	R	8.85	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,055	R	9.13	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.42	R	2,778.82	AJ-Q13	67.61	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.08	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.28	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.80	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					11.52	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					89.06	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.11	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.79	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					321.50	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					311.64	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.10	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	510	R	22.60	AK-Q1	1.63	AK1.1	/	AK1.5				
AK1.2	Working space	m2	759	R	13.77	AK-Q2	0.67	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	201	R	18.48	AK-Q3	2.54	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	542	R	20.26	AK-Q4	0.58	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	313	R	458.06	AK-Q5	31.30	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	320.52									
AK1.7	Concrete plinth	m3	38	R	442.37	AK-Q6	8.24	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	299	R	-									
AK1.9	Wood float	m2	480	R	1.96	AK-Q7	0.65	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	316	R	40.01	AK-Q8	0.99	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	132	R	41.18	AK-Q9	0.29	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	35	R	34.56	AK-Q10	0.29	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.74	R	2,051.81	AK-Q11	10.78	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,618	R	10.25	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.09	R	2,947.92	AK-Q13	96.76	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.64	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.22	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					22.61	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					233.70	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					11.45	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					10.74	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.27	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					200.18	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.16	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	479	R	15.23	AL-Q1	3.83	AL1.1	/	AL1.5				
AL1.2	Working space	m2	2,030	R	13.32	AL-Q2	0.24	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	170	R	19.57	AL-Q3	2.82	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	265	R	11.90	AL-Q4	0.47	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	125	R	308.37	AL-Q5	0.73	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	171	R	410.35	AL-Q6	3.11	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	55	R	313.99	AL-Q7	2.27	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	280	R	-									
AL1.9	Wood float	m2	367	R	2.12	AL-Q8	0.34	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	284	R	67.82	AL-Q9	0.44	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	852	R	31.47	AL-Q10	0.20	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	139	R	50.93	AL-Q11	0.40	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	97	R	73.75	AL-Q12	0.57	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	14	R	71.63	AL-Q13	12.21	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	34.84	R	2,845.25	AL-Q14	8.04	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	15,699	R	7.72	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	196	R	10.24	AL-Q16	1.43	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.57	R	1,787.35	AL-Q17	491.23	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.14	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.78	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					25.91	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					145.46	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					4.55	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.17	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					13.04	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.26	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.17	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.38	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					368.56	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					277.86	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.17	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	930	R	15.33	AM-Q1	2.66	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,049	R	12.06	AM-Q2	0.45	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	798	R	19.98	AM-Q3	1.17	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	412	R	23.35	AM-Q4	0.85	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	350	R	410.19									
AM1.6	Concrete column	m3	97	R	303.76	AM-Q5	3.61	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	221	R	402.92	AM-Q6	0.44	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	157	R	337.69	AM-Q7	2.23	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	35	R	253.77	AM-Q8	2.77	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	105	R	314.72	AM-Q9	0.92	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,075	R	-									
AM1.12	Wood float	m2	1,407	R	1.85	AM-Q10	0.76	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	908	R	53.04	AM-Q11	0.39	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	706	R	43.89	AM-Q12	0.14	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	860	R	75.65	AM-Q13	0.26	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	120	R	44.41	AM-Q14	1.84	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	536	R	59.01	AM-Q15	0.29	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	97.85	AM-Q16	19.40	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	403	R	46.51	AM-Q17	0.09	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	140.82	R	3,278.73	AM-Q18	7.63	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,429	R	6.72	AM-Q19	0.31	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,048	R	10.28	AM-Q20	0.52	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	36	R	177.25	AM-Q21	3.91	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.23	R	1,838.49	AM-Q22	873.98	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.27	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.77	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					17.57	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.35	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.02	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.21	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.62	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.30	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					221.72	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.73	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.33	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					9.07	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.92	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					4.12	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.33	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					5.46	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					487.91	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					318.94	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					18.50	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.22	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,008	R	23.28	AN-Q1	2.07	AN1.1	/	AN1.5				
AN1.2	Working space	m2	246	R	8.54	AN-Q2	12.23	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	696	R	26.27	AN-Q3	4.32	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,197	R	16.63	AN-Q4	1.22	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,455	R	348.83	AN-Q5								
AN1.6	Concrete column	m3	50	R	303.76	AN-Q6	29.10	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	47	R	402.92	AN-Q7	1.06	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	130	R	337.69	AN-Q8	11.19	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	322.90	AN-Q9	12.50	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,665	R	-				/					
AN1.11	Wood float	m2	1,535	R	1.93	AN-Q10	0.95	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	121	R	27.81	AN-Q11	12.02	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	337	R	44.08	AN-Q12	0.15	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	153	R	52.06	AN-Q13	0.31	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	76	R	76.80	AN-Q14	0.62	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	27	R	54.66	AN-Q15	0.15	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	5	R	137.81	AN-Q16	291.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,426	R	62.46	AN-Q17	0.09	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	368.30	R	1,848.32	AN-Q18	4.52	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	15,714	R	12.01	AN-Q19	0.11	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	6,739	R	10.76	AN-Q20	0.25	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	66	R	219.50	AN-Q21	25.23	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.60	R	1,897.62	AN-Q22	909.38	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.07	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.73	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.89	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					20.98	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					180.74	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					12.54	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.74	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					5.25	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.89	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.92	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.91	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.41	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					153.90	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					171.78	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.18	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					8.42	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	205	R	12.87	AO-Q1	1.07	AO1.1	/	AO1.5				
AO1.2	Working space	m2	849	R	8.85	AO-Q2	0.24	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	73	R	27.31	AO-Q3	2.81	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	28	R	15.79	AO-Q4	6.86	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	192	R	453.21									
AO1.6	Concrete column	m3	22	R	307.47	AO-Q5	8.73	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	13	R	402.92	AO-Q6	1.69	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	337.69	AO-Q7	48.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	364.81	AO-Q8	22.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	57	R	-									
AO1.11	Wood float	m2	39	R	2.63	AO-Q9	4.92	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	99	R	41.49	AO-Q10	1.94	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	108	R	29.48	AO-Q11	0.20	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	46	R	51.12	AO-Q12	0.28	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	22	R	75.08	AO-Q13	0.59	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	61.81	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	48	R	149.83	AO-Q15	4.00	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	15	R	27.59	AO-Q16	0.27	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	8.60	R	1,876.01	AO-Q17	6.63	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,464	R	8.76	AO-Q18	0.04	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,964	R	11.63	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	13	R	319.59	AO-Q20	4.38	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.34	R	2,666.75	AO-Q21	57.49	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.45	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.47	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					28.70	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					172.32	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					10.92	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					7.88	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.37	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					10.43	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.69	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.90	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					12.24	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					214.16	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					161.31	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.87	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,145	R	14.61	AP-Q1	1.13	AP1.1	/	AP1.5				
AP1.2	Working space	m2	732	R	8.75	AP-Q2	1.56	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,231	R	30.60	AP-Q3	0.93	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	194	R	11.95	AP-Q4	5.22	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	1,012	R	308.30	AP-Q5	0.80	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,261	R	31.18									
AP1.7	Rough formwork	m2	249	R	56.40	AP-Q6	4.06	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,580	R	42.92	AP-Q7	0.64	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	4,896	R	4.05	AP-Q8	0.21	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	113	R	21.14	AP-Q9	8.96	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	47	R	19.98	AP-Q10	21.53	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	398	R	9.82	AP-Q11	2.54	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.83	R	2,183.33	AP-Q12	1219.28	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,546	R	56.14	AP-Q13	0.65	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,802	R	-	AP-Q14	2.77	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,039	R	28.97	AP-Q15	1.37	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,456	R	69.49	AP-Q16	1.92	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,941	R	29.27	AP-Q17	0.95	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	4	R	296.76	AP-Q18	700.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,829	R	70.31	AP-Q19	0.73	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,914	R	51.54	AP-Q20	0.96	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	78.63	R	2,845.25	AP-Q21	12.87	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	9,802.50									
AP1.24	Structural steel	Item	1	R	25,382.57									
AP1.25	Plumbing and drainage	Item	1	R	16,162.07									
AP1.26	Small power and lighting	Item	1	R	137,689.50									
AP1.27	External works	Item	1	R	59,497.50									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.67	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.48	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					25.80	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					91.25	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					5.47	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.18	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					76.12	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					14.58	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					15.43	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					289.74	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.14	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.64	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					40.94	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.92	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.19	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.80	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.09	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.45	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.92	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.68	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					48.39	AP1.26	/	AP1.22
	External works / concrete					AP-R23					192.99	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	71	R	317.07	AQ-Q1	2.32	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	165	R	38.01									
AQ1.3	Reinforcement	t	12.10	R	2,893.92	AQ-Q2	5.87	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	891	R	49.68	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	239	R	52.72	AQ-Q4	0.30	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	119	R	56.14	AQ-Q5	8.96	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,223	R	21.51	AQ-Q6	0.87	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	31.63	R	6,365.79	AQ-Q7	33.70	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	705	R	31.72	AQ-Q8	1.51	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	2,833.72	AQ-Q9	533.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	44	R	519.16	AQ-Q10	24.23	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	824	R	16.84	AQ-Q11	1.29	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,066	R	-									
	Concrete / reinforcement					AQ-R1					0.11	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					8.34	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					6.38	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.01	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.65	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					295.95	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.47	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.45	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					24.14	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.28	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	147	R	40.11	AR-Q1	2.41	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	61	R	480.79	AR-Q2	12.32	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.95	R	1,476.56									
AR1.4	Mesh	m2	547	R	32.70	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	122	R	37.77	AR-Q4	0.50	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	75	R	78.48	AR-Q5	5.33	AR1.15	/	AR1.6				
AR1.7	Screed	m2	669	R	8.04	AR-Q6	0.60	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	21.69	R	6,047.29	AR-Q7	18.44	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	725.61	AR-Q8	1.97	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	58	R	241.65	AR-Q9	0.37	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	44	R	124.67	AR-Q10	0.49	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	480	R	32.74	AR-Q11	0.83	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	148	R	23.84	AR-Q12	2.70	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	20	R	401.50	AR-Q13	1.08	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	400	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.33	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate		Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh						AR-R3					14.70	AR1.2	/	AR1.4
	Concrete / formwork						AR-R4					12.73	AR1.2	/	AR1.5
	Concrete / brickwork						AR-R5					6.13	AR1.2	/	AR1.6
	Concrete / screed						AR-R6					59.80	AR1.2	/	AR1.7
	Structural steel / cat ladders						AR-R7					8.33	AR1.8	/	AR1.9
	Structural steel / hand rail						AR-R8					25.02	AR1.8	/	AR1.10
	Hand rail / kick plates						AR-R9					1.94	AR1.10	/	AR1.11
	Structural steel / roof covering						AR-R10					184.71	AR1.8	/	AR1.12
	Side cladding / roof covering						AR-R11					0.73	AR1.13	/	AR1.12
	Structural steel / floor grating						AR-R12					15.06	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**														
AS1.1	Earthworks	m3	0	R	-		AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-		AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-		AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0.00	R	-										
AS1.5	Mesh	m2	0	R	-		AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-		AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-		AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-		AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-		AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.00	R	-		AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-		AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-		AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-		AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-		AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0.00	R	-		AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.00	R	-		AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-										
AS1.18	Total control room area	m2	0	R	-										
	Concrete / earthworks						AS-R1						AS1.3	/	AS1.1
	Concrete / blinding						AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement						AS-R3						AS1.4	/	AS1.5
	Concrete / formwork						AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete						AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints						AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel						AS-R7						AS1.4	/	AS1.9
	Concrete / pipework						AS-R8						AS1.3	/	AS1.13
	Concrete / grout						AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork						AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork						AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows						AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**														
AT1.1	Earthworks	m3	218	R	36.97		AT-Q1	18.17	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	11	R	21.27		AT-Q2	1.09	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	303.76		AT-Q3	4.88	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.46	R	2,564.05										
AT1.5	Formwork	m2	134	R	56.84		AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	36	R	2.92		AT-Q5	0.33	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	23	R	19.34		AT-Q6	0.52	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.61	R	14.63		AT-Q7	19.67	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.42	R	1,549.52		AT-Q8	28.57	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.13	R	10.03		AT-Q9	92.31	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.42	R	8,960.63		AT-Q10	95.24	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.96	R	7,657.07		AT-Q11	41.67	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	56	R	81.03		AT-Q12	0.71	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	18	R	45.52		AT-Q13	2.22	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	40	R	-										
	Concrete / earthworks						AT-R1					8.22	AT1.3	/	AT1.1
	Concrete / blinding						AT-R2					14.28	AT1.3	/	AT1.2
	Concrete / formwork						AT-R3					5.34	AT1.3	/	AT1.5
	Concrete / finish to concrete						AT-R4					104.03	AT1.3	/	AT1.6
	Concrete / movement joints						AT-R5					15.71	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel						AT-R6					175.26	AT1.4	/	AT1.8
	Cast in steel / bolts						AT-R7					1.46	AT1.8	/	AT1.10
	Concrete / grout						AT-R8					0.20	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork						AT-R9					0.29	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork						AT-R10					0.33	AT1.4	/	AT1.12
	Concrete / brickwork						AT-R11					3.75	AT1.3	/	AT1.13
	Brickwork / roof covering						AT-R12					1.78	AT1.13	/	AT1.14
AU	**COOLING TOWER**														
AU1.1	Earthworks	m3	0	R	-		AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-		AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-										
AU1.4	Reinforcement	t	0.00	R	-		AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-		AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-		AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-		AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-		AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,617	R	36.69	AV-Q1	0.72	AV1.10	/	AV1.1				
AV1.2	Lining	m2	4,181	R	21.65	AV-Q2	0.62	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,492	R	24.54	AV-Q3	1.04	AV1.10	/	AV1.3				
AV1.4	Pipework	m	95	R	177.15	AV-Q4	27.26	AV1.10	/	AV1.4				
AV1.5	Manholes	No	5	R	1,086.47	AV-Q5	19.00	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	19	R	307.60	AV-Q6	5.00	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	304	R	53.04	AV-Q7	0.06	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	34	R	43.52	AV-Q8	0.56	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	2.25	R	1,998.13	AV-Q9	8.44	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,590	R	-									
	Earthworks / lining					AV-R1					1.69	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.50	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.88	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.21	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.16	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.07	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.80	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					7.07	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.15	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	862	R	54.62	AW-Q1	10.02	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	54	R	15.79	AW-Q2	1.59	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	86	R	453.21	AW-Q3	4.34	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	19.81	R	1,956.63									
AW1.5	Mesh	m2	75	R	52.24	AW-Q4	1.15	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	584	R	28.51	AW-Q5	0.15	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,626	R	8.58	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.75	R	10,721.70	AW-Q7	22.91	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	63	R	-									
	Concrete / earthworks					AW-R1					8.30	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					28.70	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					37.45	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					15.90	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					228.05	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.18	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	25	R	-									
BA1.2	Steel	t	3.78	R	8,366.47	BA-Q1	6.61	BA1.1	/	BA1.2				
BA1.3	Handrail	m	16	R	243.64	BA-Q2	1.56	BA1.1	/	BA1.3				
BA1.4	Grating	m2	11	R	343.09	BA-Q3	2.27	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	13	R	80.43	BA-Q4	1.92	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	88.50	BA-Q5	5.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					34.34	BA1.2	/	BA1.3
	Steel / grating					BA-R2					24.39	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					104.02	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					94.54	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,320	R	-									
BB1.2	Steel	t	71.15	R	8,316.97	BB-Q1	18.55	BB1.1	/	BB1.2				
BB1.3	Handrail	m	65	R	236.92	BB-Q2	20.31	BB1.1	/	BB1.3				
BB1.4	Grating	m2	103	R	600.23	BB-Q3	12.82	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	128	R	76.98	BB-Q4	10.31	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	14	R	763.09	BB-Q5	94.29	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					35.10	BB1.2	/	BB1.3
	Steel / grating					BB-R2					13.86	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					108.04	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					10.90	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	12,667	R	-									
BC1.2	Steel	t	247.02	R	8,313.78	BC-Q1	51.28	BC1.1	/	BC1.2				
BC1.3	Handrail	m	454	R	229.20	BC-Q2	27.90	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,922	R	520.87	BC-Q3	2.57	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	422	R	78.89	BC-Q4	30.02	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	66	R	96.14	BC-Q5	191.92	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	91	R	1,078.11	BC-Q6	139.20	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					36.27	BC1.2	/	BC1.3
	Steel / grating					BC-R2					15.96	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					105.38	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					86.48	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.71	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	522	R	-									
BD1.2	Steel	t	26.71	R	6,378.63	BD-Q1	19.54	BD1.1	/	BD1.2				
BD1.3	Handrail	m	9	R	353.46	BD-Q2	58.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	11	R	375.47	BD-Q3	47.45	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	8	R	108.08	BD-Q4	65.25	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	23	R	798.05	BD-Q5	22.70	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					18.05	BD1.1	/	BD1.2
	Steel / grating					BD-R2					16.99	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					59.02	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.99	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	37	R	-									
BE1.2	Steel	t	3.34	R	8,316.97	BE-Q1	11.08	BE1.1	/	BE1.2				
BE1.3	Handrail	m	38	R	236.92	BE-Q2	0.97	BE1.1	/	BE1.3				
BE1.4	Grating	m2	26	R	600.23	BE-Q3	1.42	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	34	R	87.23	BE-Q4	1.09	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	10	R	113.89	BE-Q5	3.70	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					35.10	BE1.2	/	BE1.3
	Steel / grating					BE-R2					13.86	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					95.35	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					73.03	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	280	R	-									
BF1.2	Steel	t	23.38	R	6,844.32	BF-Q1	11.98	BF1.1	/	BF1.2				
BF1.3	Handrail	m	13	R	222.44	BF-Q2	21.54	BF1.1	/	BF1.3				
BF1.4	Grating	m2	57	R	554.77	BF-Q3	4.91	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	12	R	80.24	BF-Q4	23.33	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	17	R	807.07	BF-Q5	16.47	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					30.77	BF1.1	/	BF1.2
	Steel / grating					BF-R2					12.34	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					85.30	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.48	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	19,139	R	-	C-Q1	0.23	C1.1	/	C1.2				
C1.2	Total work units	WU	83,772	R	109.08									
C1.3	Pipe supports	kg	6,158	R	-	C-Q2	3.11	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	7,311	R	-	C-Q3	0.09	C1.4	/	C1.2				
C1.5	Number of welds	No	10,454	R	-	C-Q4	0.55	C1.5	/	C1.1				
C1.6	Total fittings	No	6,498	R	-	C-Q5	0.34	C1.6	/	C1.1				
C1.7	Stud bolts	No	3,036	R	-	C-Q6	0.47	C1.7	/	C1.6				
C1.8	Support number	No	1,331	R	-	C-Q7	0.22	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	83,772	R	109.08	DA-Q1	78.07	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,073	R	17.91									
	Average cost per examination / WU					DA-R1					6.09	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	83,772	R	109.08	DB-Q1	185.75	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	451	R	40.80									
	Average cost per examination / WU					DB-R1					2.67	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	83,772	R	109.08	DC-Q1	266.79	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	314	R	59.10									
	Average cost per examination / WU					DC-R1					1.85	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	83,772	R	109.08	DD-Q1	104.72	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	800	R	13.74									
	Average cost per examination / WU					DD-R1					7.94	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	83,772	R	109.08	DE-Q1	185.75	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	451	R	29.76									
	Average cost per examination / WU					DE-R1					3.67	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	83,772	R	109.08	E-Q1	304.02	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	275.55	R	141.94	E-Q2	271.85	E1.1	/	E1.3				
E1.3	Structural steel	t	308.16	R	7,166.14									
	WU cost / install mechanical weight - receive					E-R1					0.77	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					50.49	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	83,772	R	109.08									
F1.2	Painting to piping	m2	4,801	R	57.77	F-Q1	17.45	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,179	R	156.72	F-Q2	71.05	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	269.93	R	113.01									
F1.5	Painting to mechanical equipment	m2	1,747	R	44.10	F-Q3	0.15	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	595	R	153.24	F-Q4	0.45	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.37	F1.2	/	F1.3
	Work unit / paint					F-R2					1.89	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.70	F1.1	/	F1.3
	Install plant / paint					F-R4					2.56	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.74	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	29,547	R	14.88									
G1.2	Electrical cable terminations	No	1,606	R	40.57	G-Q1	18.40	G1.1	/	G1.2				
G1.3	Electrical equipment	No	143	R	205.33	G-Q2	206.62	G1.1	/	G1.3				
G1.4	DB's	No	13	R	696.13	G-Q3	11.00	G1.3	/	G1.4				
G1.5	Rack	m	5,894	R	43.13	G-Q4	5.01	G1.1	/	G1.5				
G1.6	Support steel	kg	11,899	R	8.34	G-Q5	0.50	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	28,515	R	7.83	G-Q6	1.04	G1.1	/	G1.7				
G1.8	Instruments	No	1,509	R	69.93	G-Q7	18.90	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,535	R	34.34	G-Q8	0.98	G1.8	/	G1.9				
G1.10	Light fittings	No	631	R	117.97	G-Q9	4.41	G1.10	/	G1.3				
G1.11	Conduit	m	2,756	R	8.43	G-Q10	10.72	G1.1	/	G1.11				
G1.12	Instrument stands	No	323	R	352.04	G-Q11	4.67	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.37	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.29	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.77	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.78	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.35	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.13	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.23	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.11	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,259	R	25.90	AB-Q1	1.91	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,281	R	5.24									
AB1.3	Back fill and compact	m3	6,250	R	18.85	AB-Q2	1.00	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,117	R	2.29	AB-Q3	1.52	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,706	R	2.53	AB-Q4	1.69	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.94	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.37	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					11.31	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					10.24	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	105,792.92									
AC1.2	EO for raking equipment	Item	1	R	14,285.36									
AC1.3	Number of piles	No	229	R	-									
AC1.4	Move rig to new position	No	192	R	105.52	AC-Q1	1.19	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	15.27	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	12	R	131.69	AC-Q3	1.25	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	114	R	80.19	AC-Q4	0.13	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,236	R	68.39	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	541	R	125.92	AC-Q6	0.42	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	142	R	338.59	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	150	R	116.80	AC-Q8	1.53	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	586	R	171.47	AC-Q9	0.39	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	85	R	311.16	AC-Q10	0.18	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.78	R	3,333.25	AC-Q11	13.65	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	198.12	R	4,928.97	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,726	R	549.90	AC-Q13	0.13	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	202	R	556.89	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	48,028.45		1.00		/					
AC1.19	Load test to pile	No	3	R	22,910.01	AC-Q15	76.33	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	27,977.30	AC-Q16	229.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	203	R	141.67	AC-Q17	1.13	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.98	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.17	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.62	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.31	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.34	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					41.66	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	194	R	45.62	AD-Q1	0.22	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	892	R	38.24									
AD1.3	Kerbing	m	268	R	64.18	AD-Q2	0.07	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,944	R	-									
AD1.5	Remove top soil	m3	530	R	11.55	AD-Q3	0.40	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,334	R	34.36	AD-Q4	0.15	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,455	R	3.53									
AD1.8	Reduce levels	m3	1,322	R	13.21	AD-Q5	0.38	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	977	R	30.88	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	309	R	71.82	AD-Q7	3.16	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	308	R	77.59	AD-Q8	4.29	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,326	R	6.85	AD-Q9	4.29	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	401	R	6.11	AD-Q10	1.01	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	272	R	2.22	AD-Q11	1.50	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	248	R	274.41	AD-Q12	1.01	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	38	R	75.14	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	5	R	118.24	AD-Q14	0.14	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	99.05	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	685	R	3.05	AD-Q16	2.56	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.19	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.27	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.74	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.43	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.43	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.17	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.11	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.02	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.89	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.17	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.84	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.54	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.05	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	222	R	385.45	AE-Q1	5.84	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	38	R	514.42	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	394	R	-									
AE1.4	Rip and compact	m2	1,697	R	2.37									
AE1.5	Formwork to plinth	m2	333	R	86.84	AE-Q3	8.76	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	198	R	62.42	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.21	R	3,160.75	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,656	R	54.23	AE-Q6	393.35	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,098	R	32.99	AE-Q7	4.95	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	533	R	32.64	AE-Q8	2.40	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.75	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					162.64	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					58.28	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.09	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	2,797	R	-	AF-Q1	8.55	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	327	R	21.20	AF-Q2	1.47	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	222	R	31.21	AF-Q3	0.37	AF1.2	/	AF1.4				
AF1.4	Working space	m2	895	R	21.52	AF-Q4	0.28	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	91	R	502.67	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	214	R	38.29	AF-Q6	0.91	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	15	R	684.54	AF-Q7	0.16	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	523.80	AF-Q8	0.03	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	195	R	-	AF-Q9	0.75	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	259	R	3.12									
AF1.11	Formwork to bases	m2	205	R	47.55	AF-Q10	2.25	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	150	R	67.06	AF-Q11	10.00	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	18	R	105.87	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.60	R	3,253.54	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	21.67	R	4,811.10	AF-Q14	9.00	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	303	R	14.92	AF-Q15	0.30	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	53	R	132.47	AF-Q16	0.28	AF1.7	/	AF1.17				
AF1.18	Manhole	No	4	R	1,113.71	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	69	R	175.25									
	Base excavation / backfill					AF-R1					0.68	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.99	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					23.71	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					13.13	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					32.29	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.04	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					161.11	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.09	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.20	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					33.69	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.17	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.87	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.16	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	309	R	38.49	AG-Q1	2.15	AG1.1	/	AG1.4				
AG1.2	Working space	m2	674	R	14.42	AG-Q2	0.46	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	50	R	23.55	AG-Q3	6.18	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	144	R	491.78	AG-Q4	1.01	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	102	R	715.90	AG-Q5	1.41	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	197	R	-									
AG1.7	Wood float	m2	192	R	4.81	AG-Q6	0.53	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	143	R	26.42	AG-Q7	1.01	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	499	R	105.57	AG-Q8	0.29	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	103	R	47.55	AG-Q9	0.99	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	30.55	R	5,489.37	AG-Q10	6.45	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,575	R	10.50	AG-Q11	0.13	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,781	R	17.21	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.95	R	3,223.80	AG-Q13	52.31	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.08	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.37	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.61	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.21	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.07	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					11.16	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.56	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	347	R	22.00	AH-Q1	6.20	AH1.1	/	AH1.4				
AH1.2	Working space	m2	60	R	14.89	AH-Q2	5.78	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	198	R	34.28	AH-Q3	1.75	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	56	R	581.92	AH-Q4	0.60	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	16	R	862.62	AH-Q5	3.50	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	88	R	745.86	AH-Q6	0.64	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	17	R	442.73	AH-Q7	3.29	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	512.45	AH-Q8	18.67	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	167	R	-									
AH1.10	Blinding	m2	94	R	39.08	AH-Q9	1.78	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	890	R	4.97	AH-Q10	0.19	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	128	R	46.39	AH-Q11	0.44	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	56	R	66.33	AH-Q12	0.30	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	22	R	76.72	AH-Q13	0.14	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	148	R	89.62	AH-Q14	0.11	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	33	R	69.99	AH-Q15	2.67	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	33	R	27.66	AH-Q16	2.67	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.70	R	2,817.40	AH-Q17	0.23	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.31	R	3,224.58	AH-Q18	22.85	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	580	R	71.29	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,315	R	16.39	AH-Q20	0.13	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,649	R	16.76	AH-Q21	0.06	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.81	R	4,448.63	AH-Q22	206.17	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	290	R	29.87	AH-Q23	0.30	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	194	R	33.33	AH-Q24	0.45	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.48	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.64	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					14.89	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					117.09	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.67	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.78	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.31	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.14	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					12.54	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.67	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.68	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					9.63	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					10.66	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					26.97	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.87	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					45.23	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					196.74	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					192.40	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.13	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					24.97	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					22.38	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	222	R	28.92	AI-Q1	3.83	AI1.1	/	AI1.5				
AI1.2	Working space	m2	610	R	14.89	AI-Q2	0.36	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	151	R	42.77	AI-Q3	1.47	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	191	R	29.02	AI-Q4	0.30	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	58	R	608.57	AI-Q5	2.52	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	23	R	764.14	AI-Q6	0.30	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	54	R	-									
AI1.8	Wood float	m2	192	R	3.34									
AI1.9	Formwork bases	m2	132	R	84.30	AI-Q7	0.44	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	136	R	70.65	AI-Q8	0.17	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	10.20	R	3,780.11	AI-Q9	5.29	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,723	R	24.86	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.11	R	2,649.70	AI-Q11	52.25	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.94	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.68	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					20.97	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					0.80	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					182.21	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.22	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					10.82	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					152.06	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.23	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	391	R	38.84	AJ-Q1	6.98	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	673	R	14.24	AJ-Q2	0.58	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	177	R	43.82	AJ-Q3	2.21	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	417	R	39.36	AJ-Q4	0.13	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	56	R	423.34	AJ-Q5	1.81	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	22	R	525.00	AJ-Q6	2.55	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	31	R	656.08									
AJ1.8	Total concrete	m3	132	R	-									
AJ1.9	Wood float	m2	332	R	3.78	AJ-Q7	0.40	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	166	R	95.83	AJ-Q8	0.34	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	262	R	56.88	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	17.08	R	4,862.69	AJ-Q10	7.73	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	2,644	R	14.11	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,480	R	14.87	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.48	R	4,524.73	AJ-Q13	37.84	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.09	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.73	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.89	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					10.76	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					111.99	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					4.42	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					9.23	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					344.63	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					327.01	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.09	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	516	R	34.02	AK-Q1	2.28	AK1.1	/	AK1.5				
AK1.2	Working space	m2	727	R	15.40	AK-Q2	0.71	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	236	R	49.29	AK-Q3	2.19	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	360	R	25.27	AK-Q4	0.63	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	226	R	496.69	AK-Q5	32.29	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	511.27									
AK1.7	Concrete plinth	m3	52	R	756.03	AK-Q6	4.35	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	255	R	-									
AK1.9	Wood float	m2	360	R	3.12	AK-Q7	0.63	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	463	R	63.82	AK-Q8	0.49	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	126	R	65.69	AK-Q9	0.41	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	19	R	55.13	AK-Q10	0.37	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.72	R	3,272.87	AK-Q11	9.20	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,385	R	16.35	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.41	R	4,382.57	AK-Q13	74.78	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.21	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.69	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					19.66	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					159.20	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.78	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					11.51	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					9.27	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					200.18	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.11	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	326	R	26.03	AL-Q1	2.57	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,731	R	22.77	AL-Q2	0.19	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	186	R	31.21	AL-Q3	1.75	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	170	R	19.07	AL-Q4	0.75	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	127	R	491.78	AL-Q5	0.73	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	175	R	715.90	AL-Q6	4.07	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	43	R	511.27	AL-Q7	2.95	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	382	R	-									
AL1.9	Wood float	m2	278	R	3.26	AL-Q8	0.46	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	420	R	105.57	AL-Q9	0.30	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	603	R	52.71	AL-Q10	0.29	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	150	R	79.28	AL-Q11	0.29	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	75	R	131.03	AL-Q12	0.57	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	13	R	108.45	AL-Q13	13.46	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	54.08	R	4,175.03	AL-Q14	7.06	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	7,949	R	16.00	AL-Q15	0.05	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	209	R	19.80	AL-Q16	1.83	AL1.8	/	AL1.17				

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AL1.18	Grout	m3	0.51	R	4,635.58	AL-Q17	749.02	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.14	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.83	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					25.79	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					150.85	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.69	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.69	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					4.66	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.45	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					13.58	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					3.90	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.45	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.71	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					260.94	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					210.86	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.11	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	969	R	24.44	AM-Q1	2.85	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,381	R	21.04	AM-Q2	0.41	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	777	R	32.64	AM-Q3	1.25	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	430	R	26.76	AM-Q4	0.79	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	340	R	781.45									
AM1.6	Concrete column	m3	101	R	484.52	AM-Q5	3.37	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	231	R	688.62	AM-Q6	0.44	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	153	R	538.66	AM-Q7	2.22	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	34	R	345.25	AM-Q8	2.97	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	102	R	528.93	AM-Q9	0.99	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,144	R	-									
AM1.12	Wood float	m2	1,397	R	3.22	AM-Q10	0.82	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	901	R	86.36	AM-Q11	0.38	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	662	R	61.51	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	816	R	80.95	AM-Q13	0.28	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	123	R	131.03	AM-Q14	1.88	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	509	R	93.58	AM-Q15	0.30	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	229.10	AM-Q16	16.83	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	373	R	68.39	AM-Q17	0.09	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	126.02	R	4,277.31	AM-Q18	9.08	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,332	R	16.39	AM-Q19	0.26	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,416	R	20.29	AM-Q20	0.47	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	58	R	459.91	AM-Q21	2.17	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.14	R	4,121.27	AM-Q22	1003.51	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.03	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.16	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.75	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					29.20	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.61	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.13	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.45	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					2.26	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.48	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					242.69	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					9.05	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					8.51	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.26	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.88	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.01	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.65	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					5.05	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					260.97	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					210.81	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.30	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.19	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,201	R	34.01	AN-Q1	2.07	AN1.1	/	AN1.5				
AN1.2	Working space	m2	244	R	14.89	AN-Q2	13.12	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	691	R	42.77	AN-Q3	4.63	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,274	R	29.02	AN-Q4	1.22	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,548	R	608.57	AN-Q5								
AN1.6	Concrete column	m3	78	R	902.13	AN-Q6	19.85	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	25	R	352.43	AN-Q7	3.12	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	139	R	539.93	AN-Q8	11.14	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	563.33	AN-Q9	19.50	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,771	R	-				/					
AN1.11	Wood float	m2	2,392	R	5.74	AN-Q10	0.65	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	209	R	86.36	AN-Q11	7.41	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	367	R	80.23	AN-Q12	0.21	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	189	R	98.11	AN-Q13	0.13	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	79	R	90.53	AN-Q14	0.32	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	24	R	120.08	AN-Q15	0.17	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	166.62	AN-Q16	516.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,450	R	79.20	AN-Q17	0.10	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	362.49	R	4,746.40	AN-Q18	4.89	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	13,874	R	12.88	AN-Q19	0.13	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,875	R	17.08	AN-Q20	0.22	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	92	R	528.39	AN-Q21	19.25	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.46	R	4,540.24	AN-Q22	629.27	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.06	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					2.28	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.80	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					20.97	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					106.02	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					7.05	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					3.59	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					3.89	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					11.24	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.12	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.69	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					6.82	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					368.51	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					277.89	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.13	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					8.98	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	180	R	38.84	AO-Q1	0.98	AO1.1	/	AO1.5				
AO1.2	Working space	m2	539	R	14.24	AO-Q2	0.33	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	138	R	43.82	AO-Q3	1.30	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	29	R	26.48	AO-Q4	6.34	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	184	R	782.86									
AO1.6	Concrete column	m3	25	R	404.80	AO-Q5	7.36	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	688.62	AO-Q6	1.67	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	538.66	AO-Q7	46.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	581.92	AO-Q8	25.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	50	R	-									
AO1.11	Wood float	m2	44	R	4.52	AO-Q9	4.18	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	146	R	82.19	AO-Q10	1.26	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	156	R	76.61	AO-Q11	0.16	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	74	R	82.69	AO-Q12	0.20	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	15	R	150.39	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	90.01	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	55	R	216.94	AO-Q15	3.35	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	71.72	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.35	R	3,264.02	AO-Q17	9.35	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,015	R	15.67	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,926	R	28.75	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	520.18	AO-Q20	4.55	AO1.10	/	AO1.22				
AO1.23	Grout	m3	5.83	R	2,912.05	AO-Q21	31.56	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.73	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.89	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					29.56	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					173.20	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					9.53	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.33	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.58	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					5.28	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.17	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					6.47	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.51	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					208.30	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					113.53	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.27	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.27	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,483	R	39.79	AP-Q1	1.73	AP1.1	/	AP1.5				
AP1.2	Working space	m2	529	R	14.59	AP-Q2	2.80	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,116	R	44.89	AP-Q3	1.33	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	221	R	26.53	AP-Q4	3.87	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	856	R	596.17	AP-Q5	0.36	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,381	R	87.48									
AP1.7	Rough formwork	m2	185	R	44.36	AP-Q6	4.63	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,176	R	75.33	AP-Q7	0.73	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,402	R	4.65	AP-Q8	0.25	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	209	R	41.18	AP-Q9	4.10	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	51	R	30.31	AP-Q10	16.78	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	342	R	17.70	AP-Q11	2.50	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.84	R	5,399.10	AP-Q12	1019.05	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,942	R	63.01	AP-Q13	0.44	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,265	R	-	AP-Q14	3.81	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,161	R	49.51	AP-Q15	1.51	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,561	R	100.10	AP-Q16	2.09	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,323	R	35.26	AP-Q17	0.76	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	964.56	AP-Q18	466.43	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,221	R	114.44	AP-Q19	1.01	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,971	R	65.55	AP-Q20	1.10	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	78.99	R	4,555.72	AP-Q21	10.84	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	16,352.37									
AP1.24	Structural steel	Item	1	R	42,342.78									
AP1.25	Plumbing and drainage	Item	1	R	26,961.30									
AP1.26	Small power and lighting	Item	1	R	229,691.33									
AP1.27	External works	Item	1	R	99,252.74									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.73	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.89	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					22.47	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					52.08	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					13.44	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.91	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					128.21	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					14.48	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					19.67	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					257.39	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.11	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					12.04	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					45.51	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.79	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.07	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.55	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					0.96	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.59	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					9.29	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.92	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					50.42	AP1.26	/	AP1.22
	External works / concrete					AP-R23					166.48	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	115	R	821.69	AQ-Q1	1.17	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	135	R	47.11									
AQ1.3	Reinforcement	t	8.47	R	3,264.02	AQ-Q2	13.58	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	694	R	87.15	AQ-Q3	0.17	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	276	R	66.09	AQ-Q4	0.42	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	117	R	79.16	AQ-Q5	5.99	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	588	R	52.22	AQ-Q6	1.19	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	39.09	R	10,216.29	AQ-Q7	17.93	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	640	R	50.23	AQ-Q8	1.10	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	6,509.17	AQ-Q9	350.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	34	R	567.30	AQ-Q10	20.62	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	549	R	29.19	AQ-Q11	1.28	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	701	R	-									
	Concrete / reinforcement					AQ-R1					0.25	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					17.44	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.43	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					12.43	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					10.38	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					195.64	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.96	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.64	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.86	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.79	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	223	R	65.07	AR-Q1	6.56	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	34	R	516.28	AR-Q2	4.27	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	7.97	R	3,193.39									
AR1.4	Mesh	m2	437	R	81.04	AR-Q3	0.08	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	190	R	67.46	AR-Q4	0.18	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	111	R	139.71	AR-Q5	5.64	AR1.15	/	AR1.6				
AR1.7	Screed	m2	446	R	12.92	AR-Q6	1.40	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	34.69	R	10,359.23	AR-Q7	18.05	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	20	R	1,908.31	AR-Q8	1.73	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	71	R	367.96	AR-Q9	0.49	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	32	R	224.40	AR-Q10	1.08	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	490	R	77.94	AR-Q11	1.28	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	81	R	47.77	AR-Q12	7.73	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	29	R	922.08	AR-Q13	1.20	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	626	R	-									
	Earthworks / concrete					AR-R1					0.13	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.16	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					6.37	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.65	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.70	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					39.96	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					5.43	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					28.15	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.64	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					132.91	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.61	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					11.23	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	358	R	65.28	AS-Q1	5.59	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	214	R	42.33	AS-Q2	0.30	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	64	R	370.12	AS-Q3	8.38	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	7.64	R	2,694.00									
AS1.5	Mesh	m2	124	R	55.68	AS-Q4	0.52	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	266	R	100.40	AS-Q5	0.24	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	194	R	4.40	AS-Q6	0.33	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	22	R	43.82	AS-Q7	2.91	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	900	R	14.96	AS-Q8	0.07	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.24	R	3,069.73	AS-Q9	51.61	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	48	R	94.33	AS-Q10	0.21	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	705.46	AS-Q11	5.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	43	R	200.50	AS-Q12	2.79	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	544	R	18.78	AS-Q13	0.12	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.74	R	10,268.41	AS-Q14	5.75	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.29	R	17,885.76	AS-Q15	93.02	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	120	R	-									
AS1.18	Total control room area	m2	10	R	-									
	Concrete / earthworks					AS-R1					5.67	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					8.74	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					48.38	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					3.69	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					84.12	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					8.45	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					180.08	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					1.85	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.12	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.26	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.15	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.13	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	443	R	104.58	AU-Q1	1.52	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	175	R	19.07	AU-Q2	1.66	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	291	R	491.78									
AU1.4	Reinforcement	t	56.90	R	4,354.51	AU-Q3	5.11	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,437	R	86.36	AU-Q4	0.20	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	150	R	35.85	AU-Q5	1.94	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,805	R	14.49	AU-Q6	0.16	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	917	R	25.29	AU-Q7	0.32	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	51	R	110.82	AU-Q8	5.71	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.40	R	17,102.36	AU-Q9	85.59	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	1,435.20	AU-Q10	36.38	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	32	R	63.01	AU-Q11	5.25	AU1.12	/	AU1.13				
AU1.13	Total area	m2	168	R	-									
	Concrete / earthworks					AU-R1					4.70	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					25.79	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					5.69	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.11	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					13.72	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					300.52	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.25	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					172.18	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					39.29	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.34	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					7.80	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	25	R	-									
BA1.2	Steel	t	3.76	R	13,623.04	BA-Q1	6.65	BA1.1	/	BA1.2				
BA1.3	Handrail	m	17	R	425.06	BA-Q2	1.47	BA1.1	/	BA1.3				
BA1.4	Grating	m2	10	R	547.27	BA-Q3	2.50	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	137.46	BA-Q4	1.79	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	168.60	BA-Q5	5.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					32.05	BA1.2	/	BA1.3
	Steel / grating					BA-R2					24.89	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					99.11	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					80.80	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2,100	R	-									
BB1.2	Steel	t	32.35	R	8,204.43	BB-Q1	64.91	BB1.1	/	BB1.2				
BB1.3	Handrail	m	100	R	405.85	BB-Q2	21.00	BB1.1	/	BB1.3				
BB1.4	Grating	m2	134	R	696.34	BB-Q3	15.67	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	107	R	152.36	BB-Q4	19.63	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	14	R	1,331.29	BB-Q5	150.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					20.22	BB1.2	/	BB1.3
	Steel / grating					BB-R2					11.78	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					53.85	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					6.16	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,203	R	-									
BC1.2	Steel	t	240.31	R	15,838.30	BC-Q1	54.94	BC1.1	/	BC1.2				
BC1.3	Handrail	m	473	R	365.60	BC-Q2	27.91	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,130	R	890.19	BC-Q3	2.57	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	442	R	134.60	BC-Q4	29.87	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	105	R	168.91	BC-Q5	125.74	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	42	R	1,063.52	BC-Q6	314.36	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					43.32	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.79	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					117.67	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					93.77	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					14.89	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	504	R	-									
BD1.2	Steel	t	17.92	R	15,323.13	BD-Q1	28.13	BD1.1	/	BD1.2				
BD1.3	Handrail	m	14	R	387.02	BD-Q2	36.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	671.49	BD-Q3	63.00	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	15	R	175.98	BD-Q4	33.60	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	24	R	1,272.98	BD-Q5	21.00	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					39.59	BD1.1	/	BD1.2
	Steel / grating					BD-R2					22.82	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					87.07	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					12.04	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	37	R	-									
BE1.2	Steel	t	4.08	R	13,623.04	BE-Q1	9.07	BE1.1	/	BE1.2				
BE1.3	Handrail	m	28	R	425.06	BE-Q2	1.32	BE1.1	/	BE1.3				
BE1.4	Grating	m2	21	R	649.82	BE-Q3	1.76	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	40	R	194.61	BE-Q4	0.93	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	147.70	BE-Q5	5.29	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					32.05	BE1.2	/	BE1.3
	Steel / grating					BE-R2					20.96	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					70.00	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					92.23	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	410	R	-									
BF1.2	Steel	t	25.49	R	16,255.60	BF-Q1	16.08	BF1.1	/	BF1.2				
BF1.3	Handrail	m	15	R	292.06	BF-Q2	27.33	BF1.1	/	BF1.3				
BF1.4	Grating	m2	56	R	664.86	BF-Q3	7.32	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	13	R	128.41	BF-Q4	31.54	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	26	R	1,304.94	BF-Q5	15.77	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					55.66	BF1.1	/	BF1.2
	Steel / grating					BF-R2					24.45	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					126.59	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					12.46	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	18,838	R	-	C-Q1	0.25	C1.1	/	C1.2				
C1.2	Total work units	WU	73,961	R	135.10									
C1.3	Pipe supports	kg	12,162	R	-	C-Q2	1.55	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	13,847	R	-	C-Q3	0.19	C1.4	/	C1.2				
C1.5	Number of welds	No	11,605	R	-	C-Q4	0.62	C1.5	/	C1.1				
C1.6	Total fittings	No	7,469	R	-	C-Q5	0.40	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,183	R	-	C-Q6	0.29	C1.7	/	C1.6				
C1.8	Support number	No	1,784	R	-	C-Q7	0.15	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	73,961	R	135.10	DA-Q1	71.18	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,039	R	27.28									
	Average cost per examination / WU					DA-R1					4.95	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	73,961	R	135.10	DB-Q1	157.36	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	470	R	59.07									
	Average cost per examination / WU					DB-R1					2.29	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	73,961	R	135.10	DC-Q1	345.61	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	214	R	76.82									
	Average cost per examination / WU					DC-R1					1.76	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	73,961	R	135.10	DD-Q1	63.00	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,174	R	20.19									
	Average cost per examination / WU					DD-R1					6.69	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	73,961	R	135.10	DE-Q1	93.27	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	793	R	96.37									
	Average cost per examination / WU					DE-R1					1.40	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	73,961	R	135.10	E-Q1	315.52	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	234.41	R	172.26	E-Q2	235.91	E1.1	/	E1.3				
E1.3	Structural steel	t	313.52	R	11,954.44									
	WU cost / install mechanical weight - receive					E-R1					0.78	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					69.40	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	73,961	R	135.10									
F1.2	Painting to piping	m2	5,004	R	68.23	F-Q1	14.78	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,191	R	165.47	F-Q2	62.10	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	348.27	R	255.27									
F1.5	Painting to mechanical equipment	m2	1,105	R	61.65	F-Q3	0.32	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	361	R	188.46	F-Q4	0.96	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.41	F1.2	/	F1.3
	Work unit / paint					F-R2					1.98	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.82	F1.1	/	F1.3
	Install plant / paint					F-R4					4.14	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.35	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	31,552	R	24.38									
G1.2	Electrical cable terminations	No	1,225	R	64.19	G-Q1	25.76	G1.1	/	G1.2				
G1.3	Electrical equipment	No	174	R	372.42	G-Q2	181.33	G1.1	/	G1.3				
G1.4	DB's	No	9	R	513.06	G-Q3	19.33	G1.3	/	G1.4				
G1.5	Rack	m	5,068	R	78.54	G-Q4	6.23	G1.1	/	G1.5				
G1.6	Support steel	kg	10,047	R	14.52	G-Q5	0.50	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	21,540	R	8.75	G-Q6	1.46	G1.1	/	G1.7				
G1.8	Instruments	No	1,287	R	97.77	G-Q7	16.74	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,567	R	61.45	G-Q8	0.82	G1.8	/	G1.9				
G1.10	Light fittings	No	310	R	124.44	G-Q9	1.78	G1.10	/	G1.3				
G1.11	Conduit	m	3,027	R	14.00	G-Q10	10.42	G1.1	/	G1.11				
G1.12	Instrument stands	No	289	R	588.22	G-Q11	4.45	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.38	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.73	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.74	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.68	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.31	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.20	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.14	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.01	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.09	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,407	R	39.59	AB-Q1	1.78	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,598	R	8.59									
AB1.3	Back fill and compact	m3	6,397	R	28.81	AB-Q2	1.00	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,515	R	4.66	AB-Q3	1.42	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,793	R	3.87	AB-Q4	1.69	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.61	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.37	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					8.50	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					10.23	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	176,861.31									
AC1.2	EO for raking equipment	Item	1	R	22,289.70									
AC1.3	Number of piles	No	251	R	-									
AC1.4	Move rig to new position	No	197	R	176.41	AC-Q1	1.27	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	16.73	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	13	R	322.34	AC-Q3	1.15	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	125	R	68.63	AC-Q4	0.12	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,742	R	114.64	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	593	R	198.77	AC-Q6	0.42	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	156	R	517.44	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	154	R	179.29	AC-Q8	1.63	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	642	R	262.05	AC-Q9	0.39	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	104	R	520.18	AC-Q10	0.14	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.18	R	5,200.93	AC-Q11	14.61	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	217.27	R	7,690.77	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,766	R	919.31	AC-Q13	0.14	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	206	R	931.00	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	117,558.90		1.00		/					
AC1.19	Load test to pile	No	4	R	19,608.82	AC-Q15	62.75	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	46,898.46	AC-Q16	251.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	222	R	223.61	AC-Q17	1.13	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.38	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					24.25	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.35	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.56	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.20	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.37	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					127.88	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					21.33	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.01	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	111	R	38.24	AD-Q1	0.11	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,001	R	58.59									
AD1.3	Kerbing	m	283	R	94.96	AD-Q2	0.07	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	4,036	R	-									
AD1.5	Remove top soil	m3	545	R	15.05	AD-Q3	0.40	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,365	R	55.34	AD-Q4	0.14	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,868	R	4.94									
AD1.8	Reduce levels	m3	1,381	R	22.09	AD-Q5	0.36	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,021	R	48.19	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	346	R	120.07	AD-Q7	2.95	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	345	R	129.71	AD-Q8	4.00	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,173	R	19.51	AD-Q9	6.28	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	230	R	5.12	AD-Q10	0.63	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	305	R	3.40	AD-Q11	0.81	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	262	R	406.05	AD-Q12	1.08	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	42	R	114.82	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	6	R	197.67	AD-Q14	0.15	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	154.54	AD-Q15	0.02	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	751	R	4.76	AD-Q16	2.65	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.65	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.05	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.47	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.46	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.40	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.17	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.15	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.16	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					2.84	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.79	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.21	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					2.08	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.63	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.05	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	227	R	591.65	AE-Q1	5.40	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	42	R	786.14	AE-Q2	0.13	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	482	R	-									
AE1.4	Rip and compact	m2	1,737	R	3.69									
AE1.5	Formwork to plinth	m2	365	R	135.50	AE-Q3	8.69	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	202	R	104.35	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.31	R	5,284.04	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,816	R	132.73	AE-Q6	421.35	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,205	R	28.24	AE-Q7	5.31	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	584	R	54.71	AE-Q8	2.57	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.75	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					160.34	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.17	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.18	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					39.81	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.05	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.09	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,068	R	-	AF-Q1	9.16	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	335	R	36.22	AF-Q2	1.48	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	227	R	60.43	AF-Q3	0.41	AF1.2	/	AF1.4				
AF1.4	Working space	m2	813	R	35.05	AF-Q4	0.42	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	140	R	707.73	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	328	R	42.20	AF-Q6	0.65	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	18	R	1,093.85	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	810.01	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	214	R	-	AF-Q9	0.81	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	265	R	5.73									
AF1.11	Formwork to bases	m2	179	R	103.24	AF-Q10	1.28	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	162	R	162.03	AF-Q11	9.00	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	17	R	161.82	AF-Q12	5.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.80	R	5,328.35	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	22.64	R	7,879.19	AF-Q14	9.45	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	273	R	20.59	AF-Q15	0.51	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	36	R	132.06	AF-Q16	0.50	AF1.7	/	AF1.17				
AF1.18	Manhole	No	8	R	3,291.50	AF-Q17	0.11	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	71	R	288.66									
	Base excavation / backfill					AF-R1					0.60	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.03	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					19.54	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					16.77	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					30.20	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.14	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					123.51	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.15	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.15	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.20	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.68	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					34.37	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.28	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.45	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.09	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	339	R	53.40	AG-Q1	2.17	AG1.1	/	AG1.4				
AG1.2	Working space	m2	689	R	26.47	AG-Q2	0.49	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	44	R	51.13	AG-Q3	7.70	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	156	R	1,188.22	AG-Q4	1.21	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	96	R	1,094.27	AG-Q5	1.63	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	220	R	-									
AG1.7	Wood float	m2	200	R	7.88	AG-Q6	0.48	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	129	R	36.46	AG-Q7	1.21	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	343	R	105.25	AG-Q8	0.45	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	195	R	140.54	AG-Q9	0.49	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	26.75	R	6,837.48	AG-Q10	8.22	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,396	R	26.20	AG-Q11	0.09	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,438	R	32.43	AG-Q12	0.06	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.30	R	6,588.03	AG-Q13	29.09	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.50	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.96	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.03	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.09	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					5.75	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.54	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	477	R	68.53	AH-Q1	8.22	AH1.1	/	AH1.4				
AH1.2	Working space	m2	99	R	40.39	AH-Q2	4.82	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	202	R	79.49	AH-Q3	2.36	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	58	R	774.53	AH-Q4	0.84	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	34	R	1,048.77	AH-Q5	1.71	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	160	R	1,221.51	AH-Q6	0.36	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	10	R	676.73	AH-Q7	5.80	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	839.24	AH-Q8	19.33	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	158	R	-									
AH1.10	Blinding	m2	69	R	45.28	AH-Q9	2.29	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	952	R	6.04	AH-Q10	0.17	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	181	R	155.81	AH-Q11	0.32	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	42	R	160.50	AH-Q12	0.24	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	28	R	110.31	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	275	R	139.84	AH-Q14	0.12	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	31	R	150.15	AH-Q15	5.16	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	83	R	58.28	AH-Q16	1.93	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.81	R	5,341.76	AH-Q17	0.14	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	12.75	R	6,810.89	AH-Q18	12.39	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	595	R	89.45	AH-Q19	0.27	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,364	R	36.28	AH-Q20	0.12	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,930	R	33.35	AH-Q21	0.05	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.88	R	4,909.10	AH-Q22	179.55	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	483	R	48.03	AH-Q23	0.33	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	199	R	54.80	AH-Q24	0.80	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.09	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.70	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.86	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					17.11	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					128.23	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.74	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.63	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.14	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.92	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					4.97	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					4.22	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					7.61	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.50	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.14	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					20.96	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.78	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					76.14	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					187.73	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					204.22	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					25.43	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					22.29	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	249	R	71.67	AI-Q1	4.02	AI1.1	/	AI1.5				
AI1.2	Working space	m2	999	R	16.56	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	87	R	54.92	AI-Q3	2.86	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	215	R	46.39	AI-Q4	0.29	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	62	R	1,318.53	AI-Q5	2.70	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	23	R	551.89	AI-Q6	0.32	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	55	R	-									
AI1.8	Wood float	m2	196	R	6.96									
AI1.9	Formwork bases	m2	241	R	104.07	AI-Q7	0.26	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	145	R	79.50	AI-Q8	0.16	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.29	R	5,231.84	AI-Q9	6.63	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	4,944	R	26.13	AI-Q10	0.01	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.68	R	7,232.98	AI-Q11	91.18	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					4.33	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.30	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					28.42	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					2.39	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					189.44	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.67	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.94	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					200.22	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.18	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	438	R	54.36	AJ-Q1	5.41	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	703	R	23.81	AJ-Q2	0.62	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	185	R	68.37	AJ-Q3	2.37	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	266	R	46.39	AJ-Q4	0.30	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	81	R	972.83	AJ-Q5	2.70	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	36	R	1,442.09	AJ-Q6	2.25	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	30	R	563.37									
AJ1.8	Total concrete	m3	149	R	-									
AJ1.9	Wood float	m2	266	R	5.73	AJ-Q7	0.56	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	184	R	101.01	AJ-Q8	0.44	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	326	R	147.04	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.31	R	5,200.93	AJ-Q10	14.45	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	5,056	R	40.28	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,657	R	24.36	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.55	R	7,410.19	AJ-Q13	52.26	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.06	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.28	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.80	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					20.97	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					169.78	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					9.63	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					9.81	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					129.12	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					213.50	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.13	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	630	R	56.87	AK-Q1	2.73	AK1.1	/	AK1.5				
AK1.2	Working space	m2	744	R	24.02	AK-Q2	0.85	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	259	R	76.91	AK-Q3	2.43	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	369	R	42.24	AK-Q4	0.63	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	231	R	830.35	AK-Q5	33.00	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	1,251.43									
AK1.7	Concrete plinth	m3	57	R	647.09	AK-Q6	4.05	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	280	R	-									
AK1.9	Wood float	m2	369	R	5.22	AK-Q7	0.63	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	473	R	106.69	AK-Q8	0.49	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	138	R	160.79	AK-Q9	0.41	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	21	R	149.37	AK-Q10	0.33	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	28.37	R	5,593.51	AK-Q11	9.87	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,536	R	31.65	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.10	R	7,135.71	AK-Q13	90.32	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.37	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.74	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					19.66	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					159.07	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.78	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					4.02	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.38	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					176.73	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.12	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	334	R	40.26	AL-Q1	2.44	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,898	R	31.58	AL-Q2	0.18	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	190	R	57.31	AL-Q3	1.76	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	149	R	41.39	AL-Q4	0.92	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	137	R	1,188.22	AL-Q5	0.84	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	164	R	1,094.27	AL-Q6	3.35	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	49	R	837.31	AL-Q7	2.80	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	399	R	-									
AL1.9	Wood float	m2	250	R	4.50	AL-Q8	0.55	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	288	R	105.25	AL-Q9	0.48	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,142	R	155.79	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	152	R	130.58	AL-Q11	0.32	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	113	R	196.66	AL-Q12	0.43	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	12	R	191.02	AL-Q13	13.67	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	45.27	R	7,879.19	AL-Q14	8.81	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	12,435	R	22.81	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	264	R	26.47	AL-Q16	1.51	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.85	R	6,430.49	AL-Q17	469.41	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.03	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.27	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.70	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					28.71	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					264.05	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.09	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.09	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					11.29	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.41	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.02	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.26	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.41	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.38	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					345.43	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					297.66	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.18	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,045	R	61.53	AM-Q1	2.87	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,232	R	23.05	AM-Q2	0.47	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	967	R	54.71	AM-Q3	1.08	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	539	R	42.24	AM-Q4	0.68	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	364	R	949.56									
AM1.6	Concrete column	m3	105	R	1,192.30	AM-Q5	3.47	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	214	R	707.73	AM-Q6	0.49	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	188	R	819.17	AM-Q7	1.94	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	49	R	796.39	AM-Q8	2.14	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	165	R	1,212.69	AM-Q9	0.64	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,171	R	-									
AM1.12	Wood float	m2	1,532	R	4.93	AM-Q10	0.76	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	989	R	141.43	AM-Q11	0.37	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	612	R	177.91	AM-Q12	0.17	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	545	R	124.86	AM-Q13	0.39	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	243	R	201.48	AM-Q14	0.88	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	561	R	150.42	AM-Q15	0.34	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	379.22	AM-Q16	17.50	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	439	R	86.28	AM-Q17	0.11	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	159.26	R	7,005.00	AM-Q18	7.35	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,136	R	25.05	AM-Q19	0.28	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,162	R	31.01	AM-Q20	0.54	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	54	R	540.99	AM-Q21	2.95	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.34	R	6,799.85	AM-Q22	873.88	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.67	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.12	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					22.48	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.80	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.34	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.16	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.19	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.78	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					192.61	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.71	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.67	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.51	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.70	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					1.87	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					8.06	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					9.23	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					279.64	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					225.89	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					12.95	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.14	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,276	R	62.08	AN-Q1	2.07	AN1.1	/	AN1.5				
AN1.2	Working space	m2	267	R	16.97	AN-Q2	12.27	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	758	R	52.52	AN-Q3	4.32	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,304	R	44.36	AN-Q4	1.22	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,585	R	1,074.46	AN-Q5								
AN1.6	Concrete column	m3	85	R	900.51	AN-Q6	18.65	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	26	R	972.83	AN-Q7	3.27	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	142	R	707.73	AN-Q8	11.16	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	810.01	AN-Q9	21.25	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,813	R	-				/					
AN1.11	Wood float	m2	2,623	R	5.73	AN-Q10	0.60	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	264	R	103.24	AN-Q11	6.00	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	350	R	169.23	AN-Q12	0.24	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	169	R	176.41	AN-Q13	0.15	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	58	R	153.25	AN-Q14	0.45	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	44	R	226.62	AN-Q15	0.09	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	237.58	AN-Q16	396.25	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,179	R	103.27	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	658.16	R	6,673.97	AN-Q18	2.75	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	8,517	R	25.57	AN-Q19	0.21	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,698	R	31.65	AN-Q20	0.24	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	86	R	1,313.20	AN-Q21	21.08	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.82	R	6,588.03	AN-Q22	870.88	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.06	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					3.66	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					1.18	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					24.22	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					187.51	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					10.41	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					5.51	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					6.35	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					5.32	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					4.09	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					3.57	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					6.85	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					261.01	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					210.87	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.16	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					5.08	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	311	R	54.36	AO-Q1	1.30	AO1.1	/	AO1.5				
AO1.2	Working space	m2	575	R	23.81	AO-Q2	0.54	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	163	R	68.37	AO-Q3	1.91	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	32	R	35.57	AO-Q4	7.50	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	240	R	802.65									
AO1.6	Concrete column	m3	18	R	1,144.40	AO-Q5	13.33	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	16	R	1,118.88	AO-Q6	1.13	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	796.39	AO-Q7	48.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,212.69	AO-Q8	18.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	62	R	-									
AO1.11	Wood float	m2	48	R	7.94	AO-Q9	5.00	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	160	R	128.55	AO-Q10	1.50	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	172	R	114.44	AO-Q11	0.10	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	58	R	191.56	AO-Q12	0.28	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	28	R	200.28	AO-Q13	0.57	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	148.26	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	78	R	325.59	AO-Q15	3.08	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	16	R	107.14	AO-Q16	0.31	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.35	R	8,358.67	AO-Q17	11.59	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,098	R	23.85	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	5,284	R	43.78	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	627.50	AO-Q20	5.64	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.04	R	4,704.90	AO-Q21	59.41	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.28	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.80	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					22.57	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					101.09	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.24	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					5.84	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.59	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					10.00	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.44	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					8.18	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.43	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					350.47	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					190.92	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					13.32	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,553	R	42.79	AP-Q1	2.24	AP1.1	/	AP1.5				
AP1.2	Working space	m2	550	R	31.58	AP-Q2	2.82	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,592	R	91.77	AP-Q3	0.98	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	180	R	29.02	AP-Q4	3.85	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	693	R	863.10	AP-Q5	0.40	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,718	R	95.51									
AP1.7	Rough formwork	m2	438	R	101.01	AP-Q6	1.58	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,079	R	162.99	AP-Q7	0.64	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,258	R	7.43	AP-Q8	0.21	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	214	R	62.26	AP-Q9	3.24	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	56	R	53.28	AP-Q10	12.38	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	313	R	33.29	AP-Q11	2.21	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.42	R	4,891.35	AP-Q12	488.03	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,197	R	216.07	AP-Q13	0.58	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,191	R	-	AP-Q14	4.60	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,521	R	115.43	AP-Q15	2.10	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,403	R	115.46	AP-Q16	1.33	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,272	R	56.36	AP-Q17	0.75	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	1,040.15	AP-Q18	398.88	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,610	R	191.31	AP-Q19	0.88	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,042	R	105.56	AP-Q20	1.05	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	112.80	R	5,456.68	AP-Q21	6.14	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	26,140.00									
AP1.24	Structural steel	Item	1	R	67,686.86									
AP1.25	Plumbing and drainage	Item	1	R	43,098.86									
AP1.26	Small power and lighting	Item	1	R	367,172.00									
AP1.27	External works	Item	1	R	158,660.00									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.35	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.47	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					29.74	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					57.13	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					8.54	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.30	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					116.16	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					13.86	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					16.20	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					163.91	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.18	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					7.48	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					47.26	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					3.83	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.21	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					1.13	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.05	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.79	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.40	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.90	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					67.29	AP1.26	/	AP1.22
	External works / concrete					AP-R23					183.83	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	79	R	819.17	AQ-Q1	3.24	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	256	R	139.22									
AQ1.3	Reinforcement	t	9.12	R	5,212.93	AQ-Q2	8.66	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	971	R	116.01	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	200	R	141.43	AQ-Q4	0.40	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	198	R	153.95	AQ-Q5	5.34	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	959	R	79.83	AQ-Q6	1.10	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	51.78	R	15,615.90	AQ-Q7	20.43	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	473	R	76.78	AQ-Q8	2.24	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	10,660.13	AQ-Q9	529.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	39	R	867.13	AQ-Q10	27.13	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,011	R	47.81	AQ-Q11	1.05	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,058	R	-									
	Concrete / reinforcement					AQ-R1					0.16	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.88	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.06	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.79	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.32	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					195.61	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.96	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.68	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					10.86	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.67	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	160	R	106.57	AR-Q1	2.11	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	76	R	1,192.30	AR-Q2	12.86	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.91	R	5,229.84									
AR1.4	Mesh	m2	780	R	132.73	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	106	R	90.93	AR-Q4	0.72	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	78	R	146.46	AR-Q5	6.74	AR1.15	/	AR1.6				
AR1.7	Screed	m2	491	R	29.17	AR-Q6	1.07	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	34.45	R	22,723.96	AR-Q7	15.27	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	14	R	1,834.63	AR-Q8	2.46	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	73	R	687.04	AR-Q9	0.47	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	31	R	230.77	AR-Q10	1.11	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	535	R	81.82	AR-Q11	0.98	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	129	R	111.62	AR-Q12	4.08	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	33	R	1,396.03	AR-Q13	1.04	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	526	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.23	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					8.98	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					13.11	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					8.14	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					40.87	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					12.39	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					33.08	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.98	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					277.73	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.36	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					16.28	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	227	R	104.35	AS-Q1	2.58	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	136	R	43.23	AS-Q2	0.65	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	88	R	1,249.18	AS-Q3	8.06	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	10.92	R	4,989.15									
AS1.5	Mesh	m2	150	R	91.19	AS-Q4	0.59	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	229	R	105.35	AS-Q5	0.38	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	203	R	11.94	AS-Q6	0.43	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	21	R	37.65	AS-Q7	4.19	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	734	R	22.87	AS-Q8	0.12	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.27	R	6,546.55	AS-Q9	69.29	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	44	R	192.10	AS-Q10	0.20	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	1,716.44	AS-Q11	3.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	44	R	319.49	AS-Q12	3.32	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	812	R	40.28	AS-Q13	0.11	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.81	R	17,119.96	AS-Q14	4.97	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.16	R	26,843.94	AS-Q15	125.86	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	146	R	-									
AS1.18	Total control room area	m2	9	R	-									
	Concrete / earthworks					AS-R1					11.97	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					28.90	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					54.71	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					11.86	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					104.62	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					33.18	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					218.15	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.91	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.19	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.29	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.19	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.11	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0.00	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	512	R	139.27	AU-Q1	1.63	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	153	R	43.13	AU-Q2	2.05	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	314	R	1,318.53									
AU1.4	Reinforcement	t	45.64	R	5,471.49	AU-Q3	6.88	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,132	R	160.79	AU-Q4	0.28	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	200	R	41.18	AU-Q5	1.57	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,947	R	17.21	AU-Q6	0.16	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	888	R	26.20	AU-Q7	0.35	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	45	R	186.28	AU-Q8	6.98	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	3.24	R	14,781.50	AU-Q9	96.91	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	8	R	2,154.01	AU-Q10	39.25	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	29	R	204.60	AU-Q11	8.41	AU1.12	/	AU1.13				
AU1.13	Total area	m2	244	R	-									
	Concrete / earthworks					AU-R1					9.47	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					30.57	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					8.20	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.24	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					32.02	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					317.93	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.37	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					208.84	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					29.37	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.61	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					6.44	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	27	R	-									
BA1.2	Steel	t	4.12	R	22,310.58	BA-Q1	6.55	BA1.1	/	BA1.2				
BA1.3	Handrail	m	17	R	649.72	BA-Q2	1.59	BA1.1	/	BA1.3				
BA1.4	Grating	m2	10	R	713.45	BA-Q3	2.70	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	221.37	BA-Q4	1.93	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	236.01	BA-Q5	5.40	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					34.34	BA1.2	/	BA1.3
	Steel / grating					BA-R2					31.27	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					100.78	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					94.53	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2,097	R	-									
BB1.2	Steel	t	34.77	R	23,194.49	BB-Q1	60.31	BB1.1	/	BB1.2				
BB1.3	Handrail	m	100	R	616.68	BB-Q2	20.97	BB1.1	/	BB1.3				
BB1.4	Grating	m2	152	R	1,562.32	BB-Q3	13.80	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	104	R	214.67	BB-Q4	20.16	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	15	R	2,034.91	BB-Q5	139.80	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					37.61	BB1.2	/	BB1.3
	Steel / grating					BB-R2					14.85	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					108.05	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.40	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	13,512	R	-									
BC1.2	Steel	t	269.02	R	22,170.08	BC-Q1	50.23	BC1.1	/	BC1.2				
BC1.3	Handrail	m	494	R	611.19	BC-Q2	27.35	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,360	R	1,388.99	BC-Q3	2.52	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	436	R	180.76	BC-Q4	30.99	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	105	R	173.18	BC-Q5	128.69	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	45	R	3,006.64	BC-Q6	300.27	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					36.27	BC1.2	/	BC1.3
	Steel / grating					BC-R2					15.96	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					122.65	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					128.02	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.37	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	516	R	-									
BD1.2	Steel	t	26.21	R	22,310.58	BD-Q1	19.69	BD1.1	/	BD1.2				
BD1.3	Handrail	m	12	R	649.72	BD-Q2	43.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	10	R	1,202.52	BD-Q3	51.60	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	9	R	361.03	BD-Q4	57.33	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	25	R	3,132.48	BD-Q5	20.64	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					34.34	BD1.1	/	BD1.2
	Steel / grating					BD-R2					18.55	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					61.80	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.12	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	58	R	-									
BE1.2	Steel	t	2.35	R	12,488.39	BE-Q1	24.68	BE1.1	/	BE1.2				
BE1.3	Handrail	m	42	R	620.48	BE-Q2	1.38	BE1.1	/	BE1.3				
BE1.4	Grating	m2	21	R	914.90	BE-Q3	2.76	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	56	R	214.47	BE-Q4	1.04	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	11	R	236.01	BE-Q5	5.27	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					20.13	BE1.2	/	BE1.3
	Steel / grating					BE-R2					13.65	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					58.23	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					52.91	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	381	R	-									
BF1.2	Steel	t	27.96	R	22,310.58	BF-Q1	13.63	BF1.1	/	BF1.2				
BF1.3	Handrail	m	16	R	1,088.12	BF-Q2	23.81	BF1.1	/	BF1.3				
BF1.4	Grating	m2	35	R	1,056.53	BF-Q3	10.89	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	13	R	334.54	BF-Q4	29.31	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	21	R	2,000.69	BF-Q5	18.14	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.50	BF1.1	/	BF1.2
	Steel / grating					BF-R2					21.12	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					66.69	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					11.15	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	27,241	R	-	C-Q1	0.44	C1.1	/	C1.2				
C1.2	Total work units	WU	61,697	R	207.17									
C1.3	Pipe supports	kg	11,732	R	-	C-Q2	2.32	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	15,186	R	-	C-Q3	0.25	C1.4	/	C1.2				
C1.5	Number of welds	No	11,879	R	-	C-Q4	0.44	C1.5	/	C1.1				
C1.6	Total fittings	No	7,645	R	-	C-Q5	0.28	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,394	R	-	C-Q6	0.31	C1.7	/	C1.6				
C1.8	Support number	No	1,956	R	-	C-Q7	0.17	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	61,697	R	207.17	DA-Q1	54.17	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,139	R	41.69									
	Average cost per examination / WU					DA-R1					4.97	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	61,697	R	207.17	DB-Q1	191.01	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	323	R	54.15									
	Average cost per examination / WU					DB-R1					3.83	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	61,697	R	207.17	DC-Q1	281.72	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	219	R	119.87									
	Average cost per examination / WU					DC-R1					1.73	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	61,697	R	207.17	DD-Q1	37.28	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,655	R	29.51									
	Average cost per examination / WU					DD-R1					7.02	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	61,697	R	207.17	DE-Q1	70.92	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	870	R	86.84									
	Average cost per examination / WU					DE-R1					2.39	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	61,697	R	207.17	E-Q1	316.85	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	194.72	R	263.31	E-Q2	183.84	E1.1	/	E1.3				
E1.3	Structural steel	t	335.61	R	19,109.71									
	WU cost / install mechanical weight - receive					E-R1					0.79	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					72.57	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	61,697	R	207.17									
F1.2	Painting to piping	m2	3,482	R	104.30	F-Q1	17.72	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,219	R	270.99	F-Q2	50.61	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	381.93	R	418.06									
F1.5	Painting to mechanical equipment	m2	1,131	R	100.97	F-Q3	0.34	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	369	R	288.07	F-Q4	1.04	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.38	F1.2	/	F1.3
	Work unit / paint					F-R2					1.99	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.76	F1.1	/	F1.3
	Install plant / paint					F-R4					4.14	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.45	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	32,295	R	37.26									
G1.2	Electrical cable terminations	No	1,254	R	98.11	G-Q1	25.75	G1.1	/	G1.2				
G1.3	Electrical equipment	No	166	R	505.19	G-Q2	194.55	G1.1	/	G1.3				
G1.4	DB's	No	13	R	1,183.48	G-Q3	12.77	G1.3	/	G1.4				
G1.5	Rack	m	8,199	R	180.07	G-Q4	3.94	G1.1	/	G1.5				
G1.6	Support steel	kg	10,284	R	26.50	G-Q5	0.80	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	23,622	R	13.38	G-Q6	1.37	G1.1	/	G1.7				
G1.8	Instruments	No	1,411	R	160.11	G-Q7	16.74	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,604	R	93.94	G-Q8	0.88	G1.8	/	G1.9				
G1.10	Light fittings	No	318	R	162.22	G-Q9	1.92	G1.10	/	G1.3				
G1.11	Conduit	m	3,098	R	22.55	G-Q10	10.42	G1.1	/	G1.11				
G1.12	Instrument stands	No	324	R	823.37	G-Q11	4.35	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.38	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.43	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.65	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.41	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.21	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.23	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.14	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,538	R	15.21	AB-Q1	1.66	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	4,535	R	3.30									
AB1.3	Back fill and compact	m3	7,527	R	10.33	AB-Q2	1.00	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,692	R	2.00	AB-Q3	1.32	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,782	R	1.79	AB-Q4	1.58	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.61	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.47	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					7.61	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.50	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	63,418.04									
AC1.2	EO for raking equipment	Item	1	R	8,563.43									
AC1.3	Number of piles	No	302	R	-									
AC1.4	Move rig to new position	No	253	R	63.26	AC-Q1	1.19	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	20	R	-	AC-Q2	15.10	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	30	R	123.84	AC-Q3	0.67	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	81	R	24.61	AC-Q4	0.25	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,772	R	41.11	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	676	R	71.27	AC-Q6	0.45	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	207	R	172.93	AC-Q7	1.46	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	154	R	91.31	AC-Q8	1.96	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	796	R	148.53	AC-Q9	0.38	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	112	R	186.52	AC-Q10	0.18	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	22.10	R	1,998.13	AC-Q11	13.67	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	260.96	R	2,954.70	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,273	R	329.64	AC-Q13	0.13	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	265	R	333.83	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	45,164.66		1.00		/					
AC1.19	Load test to pile	No	2	R	7,031.23	AC-Q15	151.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	16,816.62	AC-Q16	302.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	253	R	80.18	AC-Q17	1.19	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					192.39	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.98	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.38	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.60	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.52	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.28	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.45	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.57	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.68	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.96	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.01	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					137.01	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					21.33	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					51.02	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	131	R	14.69	AD-Q1	0.11	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,178	R	21.01									
AD1.3	Kerbing	m	333	R	34.05	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	4,426	R	-									
AD1.5	Remove top soil	m3	911	R	8.14	AD-Q3	0.36	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	2,539	R	29.77	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,551	R	2.12									
AD1.8	Reduce levels	m3	1,741	R	7.92	AD-Q5	0.38	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	1,287	R	18.51	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	408	R	43.05	AD-Q7	3.15	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	406	R	46.51	AD-Q8	4.29	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,740	R	6.99	AD-Q9	6.72	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	270	R	1.97	AD-Q10	0.93	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	359	R	1.22	AD-Q11	0.81	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	308	R	145.60	AD-Q12	1.08	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	74	R	58.85	AD-Q13	0.92	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	58.33	AD-Q14	0.22	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	68.98	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	902	R	1.05	AD-Q16	2.71	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.70	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.84	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.74	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.43	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.43	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.17	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.61	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.16	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.26	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.79	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.06	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.73	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.71	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.03	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	228	R	301.33	AE-Q1	4.38	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	52	R	445.58	AE-Q2	0.10	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	519	R	-									
AE1.4	Rip and compact	m2	2,235	R	1.42									
AE1.5	Formwork to plinth	m2	438	R	52.06	AE-Q3	8.42	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	260	R	37.42	AE-Q4	1.14	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	5.55	R	1,894.72	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,979	R	50.99	AE-Q6	716.94	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	777	R	10.12	AE-Q7	3.41	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	689	R	19.62	AE-Q8	3.02	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.68	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.20	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.12	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.12	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					37.16	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	7,027	R	-	AF-Q1	15.62	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	450	R	12.12	AF-Q2	1.42	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	316	R	18.95	AF-Q3	0.64	AF1.2	/	AF1.4				
AF1.4	Working space	m2	707	R	9.01	AF-Q4	0.51	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	228	R	453.21	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	293	R	15.84	AF-Q6	0.58	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	311.38	AF-Q7	0.07	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	5	R	515.23	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	169	R	-	AF-Q9	0.54	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	311	R	1.96									
AF1.11	Formwork to bases	m2	318	R	34.10	AF-Q10	1.39	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	286	R	41.89	AF-Q11	16.82	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	24	R	60.66	AF-Q12	4.80	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.11	R	1,932.99	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	28.54	R	2,564.05	AF-Q14	5.92	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	579	R	14.99	AF-Q15	0.39	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	40	R	37.25	AF-Q16	0.43	AF1.7	/	AF1.17				
AF1.18	Manhole	No	7	R	927.91	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	116	R	146.23									
	Base excavation / backfill					AF-R1					0.64	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.35	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					37.39	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					28.61	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					25.69	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.14	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					231.23	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.08	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.13	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.12	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.75	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					30.23	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.36	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.10	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.16	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	268	R	11.48	AG-Q1	0.97	AG1.1	/	AG1.4				
AG1.2	Working space	m2	807	R	9.06	AG-Q2	0.33	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	78	R	16.89	AG-Q3	3.44	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	275	R	307.19	AG-Q4	1.01	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	135	R	410.19	AG-Q5	2.04	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	259	R	-									
AG1.7	Wood float	m2	252	R	2.56	AG-Q6	0.54	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	273	R	26.54	AG-Q7	1.01	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	372	R	29.69	AG-Q8	0.74	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	176	R	37.32	AG-Q9	0.77	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	38.86	R	2,626.87	AG-Q10	6.66	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,629	R	9.39	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,537	R	8.85	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.52	R	1,838.49	AG-Q13	38.35	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.79	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.47	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.09	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.10	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.09	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					8.55	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.98	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	446	R	16.78	AH-Q1	4.96	AH1.1	/	AH1.4				
AH1.2	Working space	m2	125	R	10.72	AH-Q2	3.57	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	247	R	18.87	AH-Q3	1.81	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	90	R	393.29	AH-Q4	1.01	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	26	R	329.62	AH-Q5	3.46	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	117	R	337.69	AH-Q6	0.77	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	17	R	364.81	AH-Q7	5.29	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	296.49	AH-Q8	30.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	177	R	-									
AH1.10	Blinding	m2	89	R	16.67	AH-Q9	1.99	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	878	R	2.15	AH-Q10	0.20	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	265	R	63.53	AH-Q11	0.34	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	36	R	26.59	AH-Q12	0.47	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	29	R	45.16	AH-Q13	0.10	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	281	R	54.69	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	28	R	37.74	AH-Q15	4.18	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	86	R	18.31	AH-Q16	1.36	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.24	R	2,148.96	AH-Q17	0.30	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.57	R	1,614.93	AH-Q18	23.38	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	791	R	33.38	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,478	R	13.63	AH-Q20	0.12	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,359	R	9.68	AH-Q21	0.08	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.69	R	2,470.51	AH-Q22	104.73	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	427	R	13.45	AH-Q23	0.27	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	440	R	29.86	AH-Q24	0.27	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.57	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.89	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					23.59	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					182.93	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.19	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.16	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.08	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.33	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					6.19	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					13.72	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.57	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					6.03	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.95	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					18.44	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.33	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					48.38	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					118.48	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					166.83	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.16	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					25.11	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					11.31	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	472	R	25.70	AI-Q1	4.33	AI1.1	/	AI1.5				
AI1.2	Working space	m2	608	R	6.36	AI-Q2	0.78	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	136	R	19.69	AI-Q3	3.47	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	241	R	16.63	AI-Q4	0.45	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	109	R	419.58	AI-Q5	6.06	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	18	R	298.65	AI-Q6	0.32	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	136	R	-									
AI1.8	Wood float	m2	336	R	2.98									
AI1.9	Formwork bases	m2	206	R	37.32	AI-Q7	0.53	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	126	R	50.53	AI-Q8	0.14	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	10.13	R	2,097.56	AI-Q9	13.43	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,813	R	11.87	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.47	R	2,778.82	AI-Q11	74.15	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.06	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					4.04	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.31	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					25.23	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.40	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					140.80	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.24	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.91	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					176.71	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.15	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	515	R	23.28	AJ-Q1	5.42	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	887	R	8.54	AJ-Q2	0.58	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	233	R	26.27	AJ-Q3	2.21	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	313	R	16.63	AJ-Q4	0.30	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	95	R	348.83	AJ-Q5	2.71	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	45	R	517.10	AJ-Q6	2.11	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	35	R	216.44									
AJ1.8	Total concrete	m3	175	R	-									
AJ1.9	Wood float	m2	313	R	2.05	AJ-Q7	0.56	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	327	R	51.77	AJ-Q8	0.29	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	263	R	43.39	AJ-Q9	0.17	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	13.60	R	2,321.52	AJ-Q10	12.87	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	6,072	R	8.85	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,950	R	8.84	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.95	R	2,411.43	AJ-Q13	48.72	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.73	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.89	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					20.98	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					170.16	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					6.74	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					11.92	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					262.32	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					262.62	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.14	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	679	R	20.39	AK-Q1	2.29	AK1.1	/	AK1.5				
AK1.2	Working space	m2	957	R	9.23	AK-Q2	0.71	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	311	R	29.55	AK-Q3	2.18	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	474	R	15.15	AK-Q4	0.63	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	297	R	297.74	AK-Q5	18.56	AK1.5		AK1.6				
AK1.6	Concrete column	m3	16	R	480.79									
AK1.7	Concrete plinth	m3	37	R	232.03	AK-Q6	8.03	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	330	R	-									
AK1.9	Wood float	m2	474	R	1.87	AK-Q7	0.63	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	609	R	38.26	AK-Q8	0.49	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	303	R	61.77	AK-Q9	0.12	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	48	R	66.13	AK-Q10	0.33	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	38.09	R	1,870.93	AK-Q11	8.66	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	9,086	R	9.92	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.70	R	1,834.26	AK-Q13	122.22	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.21	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.69	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					19.65	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					159.22	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					7.78	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					3.76	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.27	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					188.60	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.16	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	633	R	25.61	AL-Q1	2.62	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,502	R	6.79	AL-Q2	0.42	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	222	R	19.62	AL-Q3	2.85	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	264	R	13.67	AL-Q4	0.92	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	242	R	307.19	AL-Q5	1.05	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	230	R	410.19	AL-Q6	4.04	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	57	R	303.76	AL-Q7	4.25	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	503	R	-									
AL1.9	Wood float	m2	557	R	2.73	AL-Q8	0.43	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	342	R	39.38	AL-Q9	0.71	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,352	R	64.55	AL-Q10	0.17	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	188	R	49.57	AL-Q11	0.30	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	143	R	90.15	AL-Q12	0.40	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	47.06	AL-Q13	20.91	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	57.08	R	2,884.04	AL-Q14	8.81	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	14,631	R	8.94	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	311	R	10.38	AL-Q16	1.62	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.77	R	2,808.61	AL-Q17	653.25	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.08	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					3.77	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.31	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					22.47	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					112.52	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.80	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.13	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.35	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					3.37	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.13	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					6.45	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					322.60	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					277.85	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.11	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,247	R	16.78	AM-Q1	3.67	AM1.1	/	AM1.5				
AM1.2	Working space	m2	3,298	R	14.53	AM-Q2	0.38	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	781	R	13.17	AM-Q3	1.60	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	559	R	15.15	AM-Q4	0.61	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	340	R	290.45									
AM1.6	Concrete column	m3	219	R	393.29	AM-Q5	1.55	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	151	R	329.62	AM-Q6	1.45	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	211	R	356.09	AM-Q7	1.61	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	53	R	464.31	AM-Q8	4.13	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	140	R	412.79	AM-Q9	1.56	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,440	R	-									
AM1.12	Wood float	m2	1,824	R	2.22	AM-Q10	0.79	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	1,056	R	66.44	AM-Q11	0.32	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,218	R	58.42	AM-Q12	0.18	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	669	R	48.97	AM-Q13	0.23	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	330	R	73.75	AM-Q14	0.46	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	699	R	47.39	AM-Q15	0.30	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	9	R	91.21	AM-Q16	24.33	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	355	R	57.22	AM-Q17	0.15	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	191.29	R	2,670.05	AM-Q18	7.53	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,323	R	8.69	AM-Q19	0.27	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,783	R	15.16	AM-Q20	0.52	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	77	R	312.86	AM-Q21	2.48	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.70	R	2,799.02	AM-Q22	847.06	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.15	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.27	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					19.17	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.74	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.88	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.82	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.63	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.70	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					130.83	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					4.37	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.73	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.47	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					6.73	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.61	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					8.71	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.11	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					307.26	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					176.12	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.53	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.10	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	4,030	R	17.70	AN-Q1	1.19	AN1.1	/	AN1.5				
AN1.2	Working space	m2	433	R	13.37	AN-Q2	9.31	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	649	R	29.81	AN-Q3	6.21	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,904	R	14.96	AN-Q4	1.78	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	3,387	R	393.29	AN-Q5								
AN1.6	Concrete column	m3	90	R	453.21	AN-Q6	37.63	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	75	R	480.79	AN-Q7	1.20	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	174	R	314.78	AN-Q8	19.47	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	9	R	401.36	AN-Q9	10.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,139	R	-				/					
AN1.11	Wood float	m2	3,128	R	2.98	AN-Q10	1.08	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	335	R	48.21	AN-Q11	10.11	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	436	R	43.81	AN-Q12	0.21	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	324	R	66.55	AN-Q13	0.23	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	68	R	59.10	AN-Q14	1.10	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	36	R	63.85	AN-Q15	0.25	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	6	R	92.05	AN-Q16	564.50	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	2,118	R	56.81	AN-Q17	0.08	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	633.34	R	2,954.70	AN-Q18	3.38	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	15,316	R	8.55	AN-Q19	0.14	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	11,206	R	9.92	AN-Q20	0.19	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	165	R	427.34	AN-Q21	12.96	AN1.10	/	AN1.22				
AN1.23	Grout	m3	3.00	R	2,721.67	AN-Q22	1129.00	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.32	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.59	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					26.29	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					131.98	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					8.16	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.22	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.14	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					10.34	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					5.22	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					6.29	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.54	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					345.58	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					297.85	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.14	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.91	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	459	R	22.76	AO-Q1	2.37	AO1.1	/	AO1.5				
AO1.2	Working space	m2	534	R	7.46	AO-Q2	0.86	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	137	R	20.03	AO-Q3	3.35	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	53	R	23.35	AO-Q4	3.66	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	194	R	307.47									
AO1.6	Concrete column	m3	32	R	351.88	AO-Q5	6.06	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	18	R	419.74	AO-Q6	1.78	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	6	R	285.57	AO-Q7	32.33	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	2	R	465.90	AO-Q8	16.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	63	R	-									
AO1.11	Wood float	m2	61	R	2.05	AO-Q9	3.18	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	189	R	44.82	AO-Q10	1.03	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	199	R	64.55	AO-Q11	0.16	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	91	R	66.13	AO-Q12	0.20	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	21	R	55.60	AO-Q13	0.86	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	6	R	48.58	AO-Q14	0.33	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	98	R	97.85	AO-Q15	1.98	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	21	R	53.72	AO-Q16	0.29	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	10.00	R	1,848.32	AO-Q17	6.30	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,254	R	12.01	AO-Q18	0.03	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,854	R	10.13	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	18	R	480.67	AO-Q20	3.50	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.70	R	1,840.16	AO-Q21	41.28	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					3.05	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.14	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					13.17	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					149.99	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.86	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.35	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					7.55	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					5.45	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.29	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					9.59	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.32	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					153.90	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					182.46	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.17	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					3.85	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,547	R	15.60	AP-Q1	1.00	AP1.1	/	AP1.5				
AP1.2	Working space	m2	887	R	13.65	AP-Q2	1.74	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,212	R	21.20	AP-Q3	1.28	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	275	R	15.88	AP-Q4	5.61	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	1,542	R	469.29	AP-Q5	1.10	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,407	R	25.74									
AP1.7	Rough formwork	m2	347	R	41.43	AP-Q6	4.44	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,833	R	43.65	AP-Q7	0.84	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,465	R	2.41	AP-Q8	0.28	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	201	R	15.82	AP-Q9	7.67	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	99	R	19.00	AP-Q10	15.58	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	636	R	8.55	AP-Q11	2.42	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.81	R	1,745.64	AP-Q12	1903.70	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,872	R	57.73	AP-Q13	0.82	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,916	R	-	AP-Q14	2.54	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,983	R	32.06	AP-Q15	1.97	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,988	R	105.53	AP-Q16	1.31	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,090	R	13.83	AP-Q17	1.27	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	361.92	AP-Q18	435.11	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,916	R	78.80	AP-Q19	1.00	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	5,896	R	50.30	AP-Q20	0.66	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	111.54	R	1,956.63	AP-Q21	13.82	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	9,802.50									
AP1.24	Structural steel	Item	1	R	25,382.57									
AP1.25	Plumbing and drainage	Item	1	R	16,162.07									
AP1.26	Small power and lighting	Item	1	R	137,689.50									
AP1.27	External works	Item	1	R	59,497.50									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.14	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.74	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					29.55	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					76.02	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					11.33	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					10.75	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					194.73	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					29.66	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					24.70	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					228.85	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.27	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					14.64	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					18.54	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					4.17	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.16	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.73	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.15	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.01	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.97	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.26	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					70.37	AP1.26	/	AP1.22
	External works / concrete					AP-R23					126.78	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	99	R	286.44	AQ-Q1	3.24	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	321	R	64.01									
AQ1.3	Reinforcement	t	10.10	R	1,647.59	AQ-Q2	9.80	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	916	R	31.27	AQ-Q3	0.11	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	366	R	55.14	AQ-Q4	0.27	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	152	R	54.80	AQ-Q5	5.56	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,103	R	31.28	AQ-Q6	0.77	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	85.74	R	7,175.05	AQ-Q7	9.86	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	575	R	27.85	AQ-Q8	1.47	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	3,469.03	AQ-Q9	281.67	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	67	R	348.60	AQ-Q10	12.61	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,636	R	24.71	AQ-Q11	0.52	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	845	R	-									
	Concrete / reinforcement					AQ-R1					0.17	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					4.47	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.16	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.19	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.23	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					229.38	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.89	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.48	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					11.14	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.27	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	164	R	40.93	AR-Q1	2.60	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	63	R	410.35	AR-Q2	6.72	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	9.37	R	1,998.13									
AR1.4	Mesh	m2	558	R	32.51	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	227	R	37.77	AR-Q4	0.28	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	101	R	46.29	AR-Q5	5.81	AR1.15	/	AR1.6				
AR1.7	Screed	m2	896	R	8.03	AR-Q6	0.66	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	29.06	R	8,440.45	AR-Q7	20.20	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	15	R	714.20	AR-Q8	1.94	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	78	R	341.69	AR-Q9	0.37	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	59	R	91.21	AR-Q10	0.49	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	643	R	34.38	AR-Q11	0.91	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	199	R	46.45	AR-Q12	2.95	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	27	R	547.49	AR-Q13	1.08	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	587	R	-									
	Earthworks / concrete					AR-R1					0.10	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.21	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					12.62	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					10.86	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					8.86	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					51.10	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.82	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					24.70	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.75	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					245.50	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.35	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					15.42	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	451	R	28.12	AS-Q1	3.70	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	171	R	16.27	AS-Q2	0.71	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	122	R	402.92	AS-Q3	11.03	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	11.06	R	2,219.84									
AS1.5	Mesh	m2	177	R	31.96	AS-Q4	0.69	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	260	R	57.25	AS-Q5	0.47	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	270	R	3.73	AS-Q6	0.45	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	21	R	19.98	AS-Q7	5.81	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	910	R	14.38	AS-Q8	0.13	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.17	R	1,929.68	AS-Q9	104.27	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	40	R	83.90	AS-Q10	0.25	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	462.52	AS-Q11	2.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	55	R	120.47	AS-Q12	2.91	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	938	R	15.64	AS-Q13	0.13	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.46	R	5,066.72	AS-Q14	4.07	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.69	R	10,313.11	AS-Q15	94.67	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	160	R	-									
AS1.18	Total control room area	m2	10	R	-									
	Concrete / earthworks					AS-R1					14.33	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					24.76	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					69.46	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.04	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					108.02	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					20.17	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					154.37	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.34	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.21	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.44	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.22	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.18	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	147	R	32.30	AT-Q1	6.68	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	18	R	16.21	AT-Q2	1.22	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	22	R	468.44	AT-Q3	10.23	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.15	R	1,950.35									
AT1.5	Formwork	m2	244	R	58.23	AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	36	R	2.80	AT-Q5	0.61	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	34	R	19.61	AT-Q6	0.65	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.96	R	13.65	AT-Q7	22.92	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.40	R	1,452.28	AT-Q8	55.00	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.11	R	10.75	AT-Q9	200.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	1.03	R	6,742.19	AT-Q10	48.54	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.34	R	8,436.80	AT-Q11	37.31	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	54	R	65.22	AT-Q12	0.93	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	19	R	31.21	AT-Q13	2.63	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	50	R	-									
	Concrete / earthworks					AT-R1					14.50	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					28.90	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					8.04	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					167.30	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					23.89	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					142.88	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					1.27	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.32	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.29	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.23	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					7.18	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.09	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	281	R	30.88	AU-Q1	0.69	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	287	R	16.61	AU-Q2	1.41	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	405	R	315.92									
AU1.4	Reinforcement	t	56.53	R	1,682.80	AU-Q3	7.16	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,548	R	42.14	AU-Q4	0.26	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	302	R	20.09	AU-Q5	1.34	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,633	R	9.16	AU-Q6	0.25	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	859	R	15.61	AU-Q7	0.47	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	49	R	41.19	AU-Q8	8.27	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	4.68	R	7,702.57	AU-Q9	86.54	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	10	R	607.92	AU-Q10	40.50	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	41	R	52.71	AU-Q11	7.17	AU1.12	/	AU1.13				
AU1.13	Total area	m2	294	R	-									
	Concrete / earthworks					AU-R1					10.23	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					19.02	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.50	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.19	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.73	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					183.71	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.22	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					107.80	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					40.85	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.52	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.99	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	6,175	R	43.39	AV-Q1	0.57	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,855	R	19.68	AV-Q2	0.92	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,164	R	27.30	AV-Q3	0.85	AV1.10	/	AV1.3				
AV1.4	Pipework	m	122	R	158.99	AV-Q4	28.97	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	893.95	AV-Q5	30.50	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	38	R	479.16	AV-Q6	3.21	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	223	R	36.69	AV-Q7	0.17	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	28	R	49.41	AV-Q8	1.36	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	6.01	R	3,054.03	AV-Q9	6.32	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	3,534	R	-									
	Earthworks / lining					AV-R1					2.20	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.59	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.72	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.27	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.18	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					13.06	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					9.70	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.16	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,751	R	61.19	AW-Q1	14.24	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	134	R	11.95	AW-Q2	0.92	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	123	R	308.30	AW-Q3	4.28	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	28.72	R	1,868.51									
AW1.5	Mesh	m2	101	R	32.57	AW-Q4	1.22	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	709	R	56.07	AW-Q5	0.17	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,515	R	8.07	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	4.48	R	7,862.76	AW-Q7	16.29	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	73	R	-									
	Concrete / earthworks					AW-R1					5.04	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					25.80	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					57.37	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.50	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					231.54	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.24	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	32	R	-									
BA1.2	Steel	t	4.40	R	5,379.07	BA-Q1	7.27	BA1.1	/	BA1.2				
BA1.3	Handrail	m	25	R	231.79	BA-Q2	1.28	BA1.1	/	BA1.3				
BA1.4	Grating	m2	18	R	386.07	BA-Q3	1.78	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	26	R	119.06	BA-Q4	1.23	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	101.07	BA-Q5	5.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					23.21	BA1.2	/	BA1.3
	Steel / grating					BA-R2					13.93	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					45.18	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					53.22	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,610	R	-									
BB1.2	Steel	t	79.10	R	6,226.09	BB-Q1	20.35	BB1.1	/	BB1.2				
BB1.3	Handrail	m	127	R	309.51	BB-Q2	12.68	BB1.1	/	BB1.3				
BB1.4	Grating	m2	176	R	392.67	BB-Q3	9.15	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	141	R	105.49	BB-Q4	11.42	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	18	R	1,174.68	BB-Q5	89.44	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					20.12	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.86	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					59.02	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					5.30	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	25,130	R	-									
BC1.2	Steel	t	316.54	R	9,494.34	BC-Q1	79.39	BC1.1	/	BC1.2				
BC1.3	Handrail	m	623	R	219.16	BC-Q2	40.34	BC1.1	/	BC1.3				
BC1.4	Grating	m2	6,758	R	533.63	BC-Q3	3.72	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	464	R	117.06	BC-Q4	54.16	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	80	R	57.26	BC-Q5	314.13	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	101	R	824.94	BC-Q6	248.81	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					43.32	BC1.2	/	BC1.3
	Steel / grating					BC-R2					17.79	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					81.11	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					165.81	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					11.51	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	811	R	-									
BD1.2	Steel	t	33.04	R	9,217.01	BD-Q1	24.55	BD1.1	/	BD1.2				
BD1.3	Handrail	m	14	R	353.46	BD-Q2	57.93	BD1.1	/	BD1.3				
BD1.4	Grating	m2	11	R	375.47	BD-Q3	73.73	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	23	R	102.97	BD-Q4	35.26	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	52	R	1,203.46	BD-Q5	15.60	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					26.08	BD1.1	/	BD1.2
	Steel / grating					BD-R2					24.55	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					89.51	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.66	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	73	R	-									
BE1.2	Steel	t	2.77	R	6,311.03	BE-Q1	26.35	BE1.1	/	BE1.2				
BE1.3	Handrail	m	53	R	241.85	BE-Q2	1.38	BE1.1	/	BE1.3				
BE1.4	Grating	m2	34	R	313.69	BE-Q3	2.15	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	50	R	84.42	BE-Q4	1.46	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	10	R	66.34	BE-Q5	7.30	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					26.09	BE1.2	/	BE1.3
	Steel / grating					BE-R2					20.12	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					74.76	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					95.13	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	458	R	-									
BF1.2	Steel	t	46.17	R	6,211.77	BF-Q1	9.92	BF1.1	/	BF1.2				
BF1.3	Handrail	m	26	R	341.96	BF-Q2	17.62	BF1.1	/	BF1.3				
BF1.4	Grating	m2	52	R	397.48	BF-Q3	8.81	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	22	R	60.50	BF-Q4	20.82	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	21	R	810.17	BF-Q5	21.81	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					18.17	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.63	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					102.67	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.67	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	33,720	R	-	C-Q1	0.43	C1.1	/	C1.2				
C1.2	Total work units	WU	78,073	R	139.48									
C1.3	Pipe supports	kg	10,846	R	-	C-Q2	3.11	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	15,287	R	-	C-Q3	0.20	C1.4	/	C1.2				
C1.5	Number of welds	No	16,514	R	-	C-Q4	0.49	C1.5	/	C1.1				
C1.6	Total fittings	No	14,585	R	-	C-Q5	0.43	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,049	R	-	C-Q6	0.14	C1.7	/	C1.6				
C1.8	Support number	No	1,934	R	-	C-Q7	0.18	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	78,073	R	139.48	DA-Q1	42.73	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,827	R	21.76									
	Average cost per examination / WU					DA-R1					6.41	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	78,073	R	139.48	DB-Q1	114.98	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	679	R	35.41									
	Average cost per examination / WU					DB-R1					3.94	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	78,073	R	139.48	DC-Q1	276.85	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	282	R	46.05									
	Average cost per examination / WU					DC-R1					3.03	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	78,073	R	139.48	DD-Q1	71.36	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,094	R	10.58									
	Average cost per examination / WU					DD-R1					13.18	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	78,073	R	139.48	DE-Q1	109.04	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	716	R	34.91									
	Average cost per examination / WU					DE-R1					4.00	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	78,073	R	139.48	E-Q1	339.33	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	230.08	R	80.53	E-Q2	189.05	E1.1	/	E1.3				
E1.3	Structural steel	t	412.97	R	7,166.14									
	WU cost / install mechanical weight - receive					E-R1					1.73	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					88.99	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	78,073	R	139.48									
F1.2	Painting to piping	m2	4,481	R	40.90	F-Q1	17.42	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	2,297	R	180.92	F-Q2	33.99	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	251.64	R	82.20									
F1.5	Painting to mechanical equipment	m2	1,459	R	36.29	F-Q3	0.17	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	475	R	112.97	F-Q4	0.53	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.23	F1.2	/	F1.3
	Work unit / paint					F-R2					3.41	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.77	F1.1	/	F1.3
	Install plant / paint					F-R4					2.27	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.73	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	42,487	R	15.25									
G1.2	Electrical cable terminations	No	1,868	R	41.57	G-Q1	22.74	G1.1	/	G1.2				
G1.3	Electrical equipment	No	208	R	133.87	G-Q2	204.26	G1.1	/	G1.3				
G1.4	DB's	No	14	R	584.45	G-Q3	14.86	G1.3	/	G1.4				
G1.5	Rack	m	6,956	R	48.94	G-Q4	6.11	G1.1	/	G1.5				
G1.6	Support steel	kg	12,649	R	7.55	G-Q5	0.55	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	28,119	R	7.72	G-Q6	1.51	G1.1	/	G1.7				
G1.8	Instruments	No	1,507	R	38.60	G-Q7	18.66	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,267	R	33.51	G-Q8	0.66	G1.8	/	G1.9				
G1.10	Light fittings	No	532	R	87.78	G-Q9	2.56	G1.10	/	G1.3				
G1.11	Conduit	m	5,762	R	12.13	G-Q10	7.37	G1.1	/	G1.11				
G1.12	Instrument stands	No	381	R	352.61	G-Q11	3.96	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.37	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.11	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.26	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.02	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.31	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.17	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.23	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.20	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	4,788	R	77.03	AB-Q1	1.99	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,412	R	16.71									
AB1.3	Back fill and compact	m3	4,289	R	56.06	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,027	R	10.11	AB-Q3	1.58	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	2,543	R	9.09	AB-Q4	1.88	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.61	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					1.37	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					7.62	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					8.47	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	335,723.63									
AC1.2	EO for raking equipment	Item	1	R	43,872.00									
AC1.3	Number of piles	No	172	R	-									
AC1.4	Move rig to new position	No	135	R	384.77	AC-Q1	1.27	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	11	R	-	AC-Q2	15.64	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	16	R	404.44	AC-Q3	0.69	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	46	R	220.90	AC-Q4	0.24	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	3,601	R	232.75	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	359	R	457.16	AC-Q6	0.48	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	98	R	932.78	AC-Q7	1.76	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	124	R	425.91	AC-Q8	1.39	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	635	R	542.28	AC-Q9	0.27	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	71	R	987.42	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	11.76	R	10,236.80	AC-Q11	14.63	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	148.69	R	13,578.84	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,209	R	2,005.14	AC-Q13	0.14	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	141	R	2,166.16	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	147,500.91		1.00		/					
AC1.19	Load test to pile	No	2	R	63,114.83	AC-Q15	86.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	95,214.71	AC-Q16	172.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	135	R	514.30	AC-Q17	1.27	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					167.43	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.20	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.95	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.23	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.47	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.27	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.49	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.75	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					6.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					73.56	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					31.48	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					47.49	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	123	R	144.84	AD-Q1	0.18	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	700	R	121.39									
AD1.3	Kerbing	m	224	R	203.74	AD-Q2	0.09	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,507	R	-									
AD1.5	Remove top soil	m3	446	R	56.80	AD-Q3	0.46	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	973	R	114.26	AD-Q4	0.18	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,530	R	8.51									
AD1.8	Reduce levels	m3	937	R	64.58	AD-Q5	0.37	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	621	R	63.04	AD-Q6	1.51	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	260	R	216.91	AD-Q7	2.39	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	277	R	289.64	AD-Q8	3.38	AD1.8	/	AD1.11				
AD1.12	Prime	m2	940	R	21.76	AD-Q9	3.62	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	255	R	19.40	AD-Q10	1.04	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	213	R	7.05	AD-Q11	1.14	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	208	R	871.15	AD-Q12	0.95	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	42	R	319.30	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	2	R	295.37	AD-Q14	0.19	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	5	R	349.32	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	288	R	5.29	AD-Q16	1.29	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.19	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					6.67	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					7.59	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					1.02	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.29	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.22	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.81	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.25	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.94	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.57	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.45	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.71	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	183	R	1,405.51	AE-Q1	4.46	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	41	R	1,626.83	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	330	R	-									
AE1.4	Rip and compact	m2	1,188	R	7.26									
AE1.5	Formwork to plinth	m2	250	R	239.25	AE-Q3	6.10	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	139	R	227.61	AE-Q4	0.76	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	2.95	R	12,294.41	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,116	R	166.53	AE-Q6	717.29	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	443	R	90.89	AE-Q7	2.42	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	366	R	111.08	AE-Q8	2.00	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.86	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					193.60	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.15	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					73.83	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.06	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,004	R	-	AF-Q1	16.75	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	239	R	67.11	AF-Q2	1.42	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	168	R	104.94	AF-Q3	0.59	AF1.2	/	AF1.4				
AF1.4	Working space	m2	403	R	73.05	AF-Q4	0.54	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	130	R	1,285.09	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	167	R	87.96	AF-Q6	0.54	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	10	R	1,628.32	AF-Q7	0.08	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	2,608.55	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	90	R	-	AF-Q9	0.51	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	177	R	9.94									
AF1.11	Formwork to bases	m2	233	R	308.38	AF-Q10	1.79	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	115	R	222.04	AF-Q11	11.50	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	10	R	243.86	AF-Q12	3.33	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.81	R	17,363.67	AF-Q13	0.18	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	10.20	R	7,787.00	AF-Q14	8.82	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	330	R	75.88	AF-Q15	0.39	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	21	R	189.42	AF-Q16	0.48	AF1.7	/	AF1.17				
AF1.18	Manhole	No	4	R	4,697.85	AF-Q17	0.05	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	74	R	809.91									
	Base excavation / backfill					AF-R1					0.64	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.92	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					19.15	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					14.61	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					24.26	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					2.03	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					129.28	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.24	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.14	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.09	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.23	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					16.94	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.60	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.59	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.17	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	143	R	81.95	AG-Q1	1.29	AG1.1	/	AG1.4				
AG1.2	Working space	m2	460	R	73.05	AG-Q2	0.31	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	57	R	81.78	AG-Q3	2.51	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	111	R	1,707.52	AG-Q4	0.71	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	57	R	1,628.32	AG-Q5	1.95	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	222	R	-									
AG1.7	Wood float	m2	90	R	15.79	AG-Q6	0.63	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	156	R	79.24	AG-Q7	0.71	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	198	R	280.88	AG-Q8	0.56	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	96	R	206.69	AG-Q9	0.59	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	21.09	R	13,578.84	AG-Q10	10.53	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	1,529	R	52.03	AG-Q11	0.15	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	1,527	R	44.80	AG-Q12	0.15	AG1.6	/	AG1.13				
AG1.14	Grout	m3	1.50	R	9,974.89	AG-Q13	38.00	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.89	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.00	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.16	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					7.95	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.84	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	186	R	84.98	AH-Q1	3.65	AH1.1	/	AH1.4				
AH1.2	Working space	m2	45	R	54.30	AH-Q2	4.13	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	131	R	102.37	AH-Q3	1.42	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	51	R	2,133.82	AH-Q4	1.09	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	14	R	1,788.37	AH-Q5	3.64	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	62	R	1,710.04	AH-Q6	0.82	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	9	R	1,847.36	AH-Q7	5.67	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	2	R	1,608.64	AH-Q8	25.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	94	R	-									
AH1.10	Blinding	m2	47	R	84.43	AH-Q9	2.00	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	467	R	10.88	AH-Q10	0.20	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	131	R	285.50	AH-Q11	0.39	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	27	R	203.21	AH-Q12	0.33	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	24	R	343.01	AH-Q13	0.08	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	149	R	330.77	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	16	R	191.11	AH-Q15	3.88	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	49	R	99.37	AH-Q16	1.27	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.19	R	10,882.07	AH-Q17	0.29	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	4.04	R	6,974.74	AH-Q18	23.27	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	421	R	178.09	AH-Q19	0.15	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	860	R	63.20	AH-Q20	0.11	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,281	R	53.62	AH-Q21	0.07	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.92	R	12,770.58	AH-Q22	102.17	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	219	R	59.83	AH-Q23	0.28	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	228	R	101.44	AH-Q24	0.27	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.57	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.83	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					25.27	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					196.12	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.19	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.25	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.16	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.33	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.47	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					9.09	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.69	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.41	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.95	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					17.21	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.56	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					39.16	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					110.36	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					130.08	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.17	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					28.58	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					16.86	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	269	R	130.13	AI-Q1	4.64	AI1.1	/	AI1.5				
AI1.2	Working space	m2	323	R	32.22	AI-Q2	0.83	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	72	R	106.86	AI-Q3	3.74	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	160	R	83.61	AI-Q4	0.36	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	58	R	2,537.56	AI-Q5	5.80	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	10	R	1,512.31	AI-Q6	0.33	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	72	R	-									
AI1.8	Wood float	m2	175	R	16.17									
AI1.9	Formwork bases	m2	115	R	202.48	AI-Q7	0.50	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	130	R	315.93	AI-Q8	0.08	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	6.15	R	9,908.16	AI-Q9	11.71	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,396	R	52.56	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.84	R	12,770.58	AI-Q11	69.05	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					4.04	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.22	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					30.35	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.68	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					156.93	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.53	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.79	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					188.51	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.20	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	293	R	110.47	AJ-Q1	5.63	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	469	R	48.06	AJ-Q2	0.62	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	127	R	143.59	AJ-Q3	2.31	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	278	R	104.61	AJ-Q4	0.19	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	52	R	1,676.24	AJ-Q5	1.86	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	21	R	2,133.82	AJ-Q6	2.48	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	28	R	1,788.37									
AJ1.8	Total concrete	m3	112	R	-									
AJ1.9	Wood float	m2	275	R	13.91	AJ-Q7	0.41	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	165	R	280.88	AJ-Q8	0.32	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	154	R	219.71	AJ-Q9	0.14	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	8.47	R	11,755.92	AJ-Q10	13.22	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,334	R	91.28	AJ-Q11	0.01	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,669	R	79.38	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	0.70	R	7,323.49	AJ-Q13	74.29	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.30	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.77	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					16.02	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					120.51	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					5.97	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					9.71	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					128.79	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					148.10	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.23	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	431	R	107.96	AK-Q1	2.36	AK1.1	/	AK1.5				
AK1.2	Working space	m2	379	R	64.26	AK-Q2	1.14	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	133	R	108.82	AK-Q3	3.24	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	252	R	95.17	AK-Q4	0.73	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	183	R	2,738.47	AK-Q5	36.60	AK1.5		AK1.6				
AK1.6	Concrete column	m3	5	R	2,186.10									
AK1.7	Concrete plinth	m3	35	R	2,863.91	AK-Q6	5.23	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	150	R	-									
AK1.9	Wood float	m2	237	R	16.15	AK-Q7	0.77	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	374	R	194.31	AK-Q8	0.49	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	105	R	317.02	AK-Q9	0.33	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	20	R	361.98	AK-Q10	0.25	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	27.95	R	10,028.25	AK-Q11	5.37	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,684	R	81.96	AK-Q12	0.03	AK1.8	/	AK1.14				
AK1.15	Grout	m3	1.59	R	9,318.39	AK-Q13	94.34	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.68	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.99	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					28.77	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					169.56	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					14.09	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					9.03	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.04	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					122.36	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.29	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	310	R	106.04	AL-Q1	2.54	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,037	R	52.57	AL-Q2	0.30	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	143	R	122.94	AL-Q3	2.17	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	228	R	112.62	AL-Q4	0.54	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	122	R	2,186.10	AL-Q5	1.39	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	88	R	1,710.04	AL-Q6	2.32	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	38	R	1,847.36	AL-Q7	3.21	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	351	R	-									
AL1.9	Wood float	m2	271	R	17.36	AL-Q8	0.45	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	199	R	157.22	AL-Q9	0.61	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	734	R	232.59	AL-Q10	0.12	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	88	R	352.43	AL-Q11	0.43	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	51	R	312.99	AL-Q12	0.75	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	362.74	AL-Q13	8.00	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	32.26	R	14,140.19	AL-Q14	10.88	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	7,526	R	47.56	AL-Q15	0.05	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	225	R	75.21	AL-Q16	1.56	AL1.8	/	AL1.17				

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AL1.18	Grout	m3	0.66	R	12,153.55	AL-Q17	531.82	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.02	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.86	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.41	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					125.93	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.28	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.28	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					13.90	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.24	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.35	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.90	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.24	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					5.09	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					297.31	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					188.01	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.18	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,005	R	112.95	AM-Q1	3.64	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,528	R	47.71	AM-Q2	0.66	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	615	R	152.73	AM-Q3	1.63	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	408	R	82.87	AM-Q4	0.68	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	276	R	2,256.38									
AM1.6	Concrete column	m3	95	R	2,458.91	AM-Q5	2.91	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	123	R	1,557.00	AM-Q6	0.77	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	139	R	1,576.80	AM-Q7	1.99	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	46	R	2,133.82	AM-Q8	2.07	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	104	R	2,408.34	AM-Q9	0.91	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	631	R	-									
AM1.12	Wood float	m2	1,165	R	9.79	AM-Q10	0.54	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	753	R	267.61	AM-Q11	0.37	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	813	R	345.50	AM-Q12	0.12	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	281	R	216.66	AM-Q13	0.44	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	125	R	305.05	AM-Q14	0.98	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	522	R	439.29	AM-Q15	0.27	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	3	R	493.43	AM-Q16	31.67	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	288	R	248.47	AM-Q17	0.16	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	98.49	R	14,145.61	AM-Q18	6.41	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	2,972	R	43.99	AM-Q19	0.21	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,118	R	82.24	AM-Q20	0.30	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	35	R	1,697.47	AM-Q21	2.81	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.97	R	10,234.33	AM-Q22	650.52	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.37	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.74	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					27.23	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.92	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.45	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.43	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.06	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.94	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					230.48	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					8.43	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					7.19	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.10	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.12	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.16	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.48	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					8.59	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					321.56	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					172.00	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.33	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.22	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	0	R	-	AN-Q1		AN1.1	/	AN1.5				
AN1.2	Working space	m2	0	R	-	AN-Q2		AN1.1	/	AN1.2				
AN1.3	Backfill	m3	0	R	-	AN-Q3		AN1.1	/	AN1.3				
AN1.4	Blinding	m2	0	R	-	AN-Q4		AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	0	R	-	AN-Q5								
AN1.6	Concrete column	m3	0	R	-	AN-Q6		AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	0	R	-	AN-Q7		AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	0	R	-	AN-Q8		AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	0	R	-	AN-Q9		AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	0	R	-				/					
AN1.11	Wood float	m2	0	R	-	AN-Q10		AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	0	R	-	AN-Q11		AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	0	R	-	AN-Q12		AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	0	R	-	AN-Q13		AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	0	R	-	AN-Q14		AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	0	R	-	AN-Q15		AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	0	R	-	AN-Q16		AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	0	R	-	AN-Q17		AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	0	R	-	AN-Q18		AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	0	R	-	AN-Q19		AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	0	R	-	AN-Q20		AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	0	R	-	AN-Q21		AN1.10	/	AN1.22				
AN1.23	Grout	m3	0	R	-	AN-Q22		AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1						AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2						AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3						AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4						AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5						AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6						AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7						AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8						AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9						AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10						AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11						AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12						AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13						AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14						AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15						AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16						AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	152	R	91.81	AO-Q1	1.52	AO1.1	/	AO1.5				
AO1.2	Working space	m2	400	R	80.49	AO-Q2	0.38	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	116	R	173.64	AO-Q3	1.31	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	30	R	63.04	AO-Q4	3.33	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	100	R	1,633.07									
AO1.6	Concrete column	m3	17	R	1,405.51	AO-Q5	5.88	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	12	R	1,626.83	AO-Q6	1.42	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	3	R	2,172.33	AO-Q7	33.33	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	2,186.10	AO-Q8	17.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	34	R	-									
AO1.11	Wood float	m2	24	R	6.97	AO-Q9	4.17	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	83	R	279.11	AO-Q10	1.20	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	113	R	311.35	AO-Q11	0.15	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	48	R	275.68	AO-Q12	0.25	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	12	R	338.12	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	499.41	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	54	R	662.45	AO-Q15	1.85	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	14	R	291.48	AO-Q16	0.21	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	3.72	R	10,493.80	AO-Q17	9.14	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,239	R	62.07	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,196	R	51.27	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	1,896.76	AO-Q20	3.40	AO1.10	/	AO1.22				
AO1.23	Grout	m3	2.48	R	11,562.60	AO-Q21	40.32	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.06	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.14	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.53	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					25.91	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					234.30	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.85	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					5.90	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					4.81	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.51	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					2.46	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					4.38	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.45	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					169.06	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					204.68	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.14	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.53	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	629	R	88.88	AP-Q1	0.79	AP1.1	/	AP1.5				
AP1.2	Working space	m2	395	R	46.91	AP-Q2	1.59	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	780	R	150.17	AP-Q3	0.81	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	141	R	126.67	AP-Q4	5.67	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	800	R	1,557.00	AP-Q5	1.02	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	786	R	163.83									
AP1.7	Rough formwork	m2	180	R	219.71	AP-Q6	4.44	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	880	R	337.24	AP-Q7	0.91	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,471	R	14.76	AP-Q8	0.32	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	110	R	90.89	AP-Q9	7.27	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	54	R	177.89	AP-Q10	14.81	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	232	R	47.37	AP-Q11	3.45	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.69	R	9,436.90	AP-Q12	1159.42	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,086	R	285.31	AP-Q13	0.74	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,082	R	-	AP-Q14	2.60	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,054	R	147.31	AP-Q15	1.98	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,703	R	377.99	AP-Q16	1.22	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	1,643	R	121.98	AP-Q17	1.27	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	5	R	2,284.78	AP-Q18	416.40	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,082	R	608.66	AP-Q19	1.00	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,280	R	283.74	AP-Q20	0.91	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	63.55	R	10,866.06	AP-Q21	12.59	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	51,912.54									
AP1.24	Structural steel	Item	1	R	134,422.21									
AP1.25	Plumbing and drainage	Item	1	R	85,591.85									
AP1.26	Small power and lighting	Item	1	R	729,182.48									
AP1.27	External works	Item	1	R	315,089.64									
	Excavations / concrete					AP-R1					0.06	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.89	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.59	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					12.29	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					66.33	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.09	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					4.62	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					105.49	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					17.13	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					8.75	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					229.39	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.16	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.57	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					28.75	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.34	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.12	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.47	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.01	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.78	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.37	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.88	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					67.11	AP1.26	/	AP1.22
	External works / concrete					AP-R23					202.37	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	53	R	1,649.03	AQ-Q1	3.30	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	175	R	216.04									
AQ1.3	Reinforcement	t	6.52	R	14,908.17	AQ-Q2	8.13	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	498	R	180.61	AQ-Q3	0.11	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	214	R	172.68	AQ-Q4	0.25	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	65	R	297.98	AQ-Q5	7.75	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	573	R	252.59	AQ-Q6	0.88	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	41.69	R	32,159.73	AQ-Q7	12.09	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	332	R	177.79	AQ-Q8	1.52	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	23,097.02	AQ-Q9	252.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	27	R	1,159.14	AQ-Q10	18.67	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	597	R	102.97	AQ-Q11	0.84	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	504	R	-									
	Concrete / reinforcement					AQ-R1					0.11	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.63	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.13	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					9.55	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.53	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					127.32	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.70	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.72	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					4.59	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					2.45	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	111	R	212.12	AR-Q1	2.13	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	52	R	2,272.71	AR-Q2	14.73	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	3.53	R	10,328.75									
AR1.4	Mesh	m2	307	R	263.59	AR-Q3	0.17	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	87	R	209.21	AR-Q4	0.60	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	48	R	218.78	AR-Q5	9.56	AR1.15	/	AR1.6				
AR1.7	Screed	m2	311	R	43.55	AR-Q6	1.48	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	29.88	R	42,741.48	AR-Q7	15.36	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	9	R	3,874.96	AR-Q8	3.32	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	41	R	1,853.87	AR-Q9	0.73	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	30	R	497.24	AR-Q10	1.00	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	518	R	284.63	AR-Q11	0.89	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	92	R	109.92	AR-Q12	4.99	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	28	R	3,136.97	AR-Q13	1.07	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	459	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.22	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					8.62	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					10.86	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					10.39	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					52.19	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.03	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					23.06	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.73	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					150.17	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.39	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					13.63	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	148	R	149.54	AS-Q1	3.15	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	98	R	80.43	AS-Q2	0.48	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	47	R	2,172.33	AS-Q3	8.42	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	5.58	R	10,236.80									
AS1.5	Mesh	m2	101	R	251.13	AS-Q4	0.47	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	226	R	209.21	AS-Q5	0.21	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	67	R	14.99	AS-Q6	0.70	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	18	R	158.15	AS-Q7	2.61	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	530	R	37.38	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.65	R	10,219.27	AS-Q9	72.31	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	25	R	291.12	AS-Q10	0.28	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	4,686.83	AS-Q11	2.33	AS1.18	/	AS1.12				
AS1.13	Pipework	m	31	R	682.37	AS-Q12	3.32	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	531	R	72.41	AS-Q13	0.09	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.27	R	45,645.69	AS-Q14	5.51	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.94	R	42,723.01	AS-Q15	109.57	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	103	R	-									
AS1.18	Total control room area	m2	7	R	-									
	Concrete / earthworks					AS-R1					14.53	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					27.01	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					40.76	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					10.38	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					144.92	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					13.74	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					273.86	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.18	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.21	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.22	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.24	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	79	R	211.64	AT-Q1	6.08	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	10	R	126.67	AT-Q2	1.30	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	13	R	1,405.51	AT-Q3	10.57	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.23	R	10,236.80									
AT1.5	Formwork	m2	127	R	274.16	AT-Q4	0.10	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	22	R	24.81	AT-Q5	0.59	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	17	R	77.87	AT-Q6	0.76	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.50	R	44.75	AT-Q7	26.00	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.22	R	13,083.46	AT-Q8	59.09	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.06	R	54.24	AT-Q9	216.67	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.61	R	36,090.05	AT-Q10	42.62	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.78	R	39,004.96	AT-Q11	33.33	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	30	R	406.33	AT-Q12	0.87	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	11	R	165.26	AT-Q13	2.36	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	26	R	-									
	Concrete / earthworks					AT-R1					6.64	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					11.10	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					5.13	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					56.65	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					18.05	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					228.76	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.83	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.11	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.28	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.26	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					3.46	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.46	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	157	R	209.88	AU-Q1	0.72	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	149	R	140.56	AU-Q2	1.47	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	219	R	1,554.98									
AU1.4	Reinforcement	t	25.67	R	10,348.62	AU-Q3	8.53	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	783	R	296.95	AU-Q4	0.28	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	111	R	93.54	AU-Q5	1.97	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,293	R	48.85	AU-Q6	0.17	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	647	R	72.41	AU-Q7	0.34	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	28	R	228.13	AU-Q8	7.82	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	1.88	R	39,004.96	AU-Q9	116.49	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	4	R	4,372.47	AU-Q10	54.75	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	16	R	421.89	AU-Q11	13.00	AU1.12	/	AU1.13				
AU1.13	Total area	m2	208	R	-									
	Concrete / earthworks					AU-R1					7.41	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					11.06	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					5.24	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.15	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					16.62	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					211.84	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.27	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					142.92	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					45.36	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.36	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					3.69	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,518	R	165.11	AV-Q1	0.53	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,517	R	137.34	AV-Q2	0.53	AV1.10	/	AV1.2				
AV1.3	Paving	m2	1,993	R	129.32	AV-Q3	0.94	AV1.10	/	AV1.3				
AV1.4	Pipework	m	73	R	805.12	AV-Q4	25.64	AV1.10	/	AV1.4				
AV1.5	Manholes	No	2	R	4,850.23	AV-Q5	36.50	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	19	R	2,599.73	AV-Q6	3.84	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	154	R	199.07	AV-Q7	0.12	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	24	R	268.10	AV-Q8	0.79	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.04	R	15,465.28	AV-Q9	6.25	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	1,872	R	-									
	Earthworks / lining					AV-R1					1.20	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.28	AV1.1	/	AV1.3
	Lining / paving					AV-R3					1.06	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.21	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.17	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					13.06	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					9.70	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.17	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	896	R	227.61	AW-Q1	13.78	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	55	R	83.88	AW-Q2	1.18	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	65	R	2,608.55	AW-Q3	5.81	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	11.19	R	7,477.13									
AW1.5	Mesh	m2	52	R	165.58	AW-Q4	1.25	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	483	R	292.01	AW-Q5	0.13	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	1,648	R	49.67	AW-Q6	0.04	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	1.79	R	40,681.28	AW-Q7	15.64	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	28	R	-									
	Concrete / earthworks					AW-R1					11.46	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					31.10	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					45.16	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					8.93	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					150.54	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.18	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	30	R	-									
BA1.2	Steel	t	1.40	R	27,239.02	BA-Q1	21.43	BA1.1	/	BA1.2				
BA1.3	Handrail	m	12	R	1,257.59	BA-Q2	2.50	BA1.1	/	BA1.3				
BA1.4	Grating	m2	9	R	2,692.48	BA-Q3	3.33	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	10	R	457.03	BA-Q4	3.00	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	3	R	406.87	BA-Q5	10.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					21.66	BA1.2	/	BA1.3
	Steel / grating					BA-R2					10.12	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					59.60	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					66.95	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	673	R	-									
BB1.2	Steel	t	33.07	R	33,780.27	BB-Q1	20.35	BB1.1	/	BB1.2				
BB1.3	Handrail	m	95	R	1,871.88	BB-Q2	7.08	BB1.1	/	BB1.3				
BB1.4	Grating	m2	76	R	1,988.45	BB-Q3	8.86	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	108	R	572.36	BB-Q4	6.23	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	17	R	6,373.35	BB-Q5	39.59	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					18.05	BB1.2	/	BB1.3
	Steel / grating					BB-R2					16.99	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					59.02	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					5.30	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	9,635	R	-									
BC1.2	Steel	t	175.98	R	38,220.72	BC-Q1	54.75	BC1.1	/	BC1.2				
BC1.3	Handrail	m	335	R	1,786.64	BC-Q2	28.76	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,261	R	1,816.94	BC-Q3	2.95	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	500	R	635.13	BC-Q4	19.27	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	34	R	289.97	BC-Q5	283.38	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	40	R	4,264.30	BC-Q6	240.88	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					21.39	BC1.2	/	BC1.3
	Steel / grating					BC-R2					21.04	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					60.18	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					131.81	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.96	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	336	R	-									
BD1.2	Steel	t	18.26	R	44,045.37	BD-Q1	18.40	BD1.1	/	BD1.2				
BD1.3	Handrail	m	7	R	1,254.70	BD-Q2	48.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	7	R	3,178.70	BD-Q3	48.00	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	8	R	407.65	BD-Q4	42.00	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	21	R	4,142.68	BD-Q5	16.00	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					35.10	BD1.1	/	BD1.2
	Steel / grating					BD-R2					13.86	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					108.05	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					10.63	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	30	R	-									
BE1.2	Steel	t	2.21	R	31,958.36	BE-Q1	13.57	BE1.1	/	BE1.2				
BE1.3	Handrail	m	28	R	1,224.69	BE-Q2	1.07	BE1.1	/	BE1.3				
BE1.4	Grating	m2	10	R	1,588.50	BE-Q3	3.00	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	28	R	427.48	BE-Q4	1.07	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	5	R	335.93	BE-Q5	6.00	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					26.10	BE1.2	/	BE1.3
	Steel / grating					BE-R2					20.12	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					74.76	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					95.13	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	266	R	-									
BF1.2	Steel	t	17.21	R	33,702.54	BF-Q1	15.46	BF1.1	/	BF1.2				
BF1.3	Handrail	m	12	R	1,855.36	BF-Q2	22.17	BF1.1	/	BF1.3				
BF1.4	Grating	m2	31	R	2,012.77	BF-Q3	8.58	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	8	R	307.63	BF-Q4	33.25	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	11	R	4,101.75	BF-Q5	24.18	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					18.16	BF1.1	/	BF1.2
	Steel / grating					BF-R2					16.74	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					109.56	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.22	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	14,001	R	-	C-Q1	0.22	C1.1	/	C1.2				
C1.2	Total work units	WU	63,105	R	689.29									
C1.3	Pipe supports	kg	4,196	R	-	C-Q2	3.34	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	8,129	R	-	C-Q3	0.13	C1.4	/	C1.2				
C1.5	Number of welds	No	8,782	R	-	C-Q4	0.63	C1.5	/	C1.1				
C1.6	Total fittings	No	7,756	R	-	C-Q5	0.55	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,167	R	-	C-Q6	0.15	C1.7	/	C1.6				
C1.8	Support number	No	1,028	R	-	C-Q7	0.24	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	63,105	R	689.29	DA-Q1	54.40	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,160	R	107.69									
	Average cost per examination / WU					DA-R1					6.40	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	63,105	R	689.29	DB-Q1	163.06	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	387	R	192.11									
	Average cost per examination / WU					DB-R1					3.59	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	63,105	R	689.29	DC-Q1	420.70	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	150	R	231.97									
	Average cost per examination / WU					DC-R1					2.97	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	63,105	R	689.29	DD-Q1	101.29	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	623	R	79.61									
	Average cost per examination / WU					DD-R1					8.66	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	63,105	R	689.29	DE-Q1	133.13	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	474	R	207.13									
	Average cost per examination / WU					DE-R1					3.33	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	63,105	R	689.29	E-Q1	363.11	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	173.79	R	615.38	E-Q2	274.75	E1.1	/	E1.3				
E1.3	Structural steel	t	229.68	R	37,950.79									
	WU cost / install mechanical weight - receive					E-R1					1.12	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					61.67	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	63,105	R	689.29									
F1.2	Painting to piping	m2	2,383	R	239.25	F-Q1	26.48	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,309	R	598.29	F-Q2	48.21	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	133.82	R	751.72									
F1.5	Painting to mechanical equipment	m2	776	R	157.59	F-Q3	0.17	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	253	R	538.16	F-Q4	0.53	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.40	F1.2	/	F1.3
	Work unit / paint					F-R2					2.88	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.15	F1.1	/	F1.3
	Install plant / paint					F-R4					4.77	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.40	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	21,076	R	106.55									
G1.2	Electrical cable terminations	No	869	R	247.61	G-Q1	24.25	G1.1	/	G1.2				
G1.3	Electrical equipment	No	79	R	750.80	G-Q2	266.78	G1.1	/	G1.3				
G1.4	DB's	No	14	R	3,654.09	G-Q3	5.64	G1.3	/	G1.4				
G1.5	Rack	m	3,872	R	231.19	G-Q4	5.44	G1.1	/	G1.5				
G1.6	Support steel	kg	5,340	R	32.63	G-Q5	0.73	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	26,527	R	35.98	G-Q6	0.79	G1.1	/	G1.7				
G1.8	Instruments	No	481	R	253.91	G-Q7	55.15	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,151	R	205.72	G-Q8	0.42	G1.8	/	G1.9				
G1.10	Light fittings	No	260	R	722.77	G-Q9	3.29	G1.10	/	G1.3				
G1.11	Conduit	m	2,209	R	58.30	G-Q10	9.54	G1.1	/	G1.11				
G1.12	Instrument stands	No	212	R	1,287.19	G-Q11	2.27	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.43	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.14	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.21	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.83	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					3.27	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.46	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.17	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.14	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,797	R	65.34	AB-Q1	1.99	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,424	R	23.42									
AB1.3	Back fill and compact	m3	6,088	R	137.48	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,550	R	6.29	AB-Q3	1.22	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,610	R	14.28	AB-Q4	1.88	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					2.79	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.48	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					10.39	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.58	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	474,575.36									
AC1.2	EO for raking equipment	Item	1	R	51,927.02									
AC1.3	Number of piles	No	287	R	-									
AC1.4	Move rig to new position	No	182	R	455.42	AC-Q1	1.58	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	13	R	-	AC-Q2	22.08	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	14	R	512.89	AC-Q3	0.93	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	143	R	280.14	AC-Q4	0.09	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,311	R	295.16	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	514	R	579.74	AC-Q6	0.56	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	178	R	1,182.90	AC-Q7	1.61	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	142	R	504.11	AC-Q8	2.02	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	639	R	687.69	AC-Q9	0.45	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	92	R	1,395.81	AC-Q10	0.14	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.87	R	12,116.30	AC-Q11	15.21	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	248.29	R	17,219.95	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,634	R	2,373.29	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	179	R	2,563.87	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	187,052.63		1.00		/					
AC1.19	Load test to pile	No	4	R	80,038.80	AC-Q15	71.75	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	120,746.11	AC-Q16	287.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	193	R	652.21	AC-Q17	1.49	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.97	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.22	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.95	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.50	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.21	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.29	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.59	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.26	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					78.82	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					33.72	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					50.88	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.27	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	216	R	183.68	AD-Q1	0.23	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	927	R	143.68									
AD1.3	Kerbing	m	278	R	241.14	AD-Q2	0.11	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	2,551	R	-									
AD1.5	Remove top soil	m3	1,131	R	72.03	AD-Q3	0.78	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,447	R	144.90	AD-Q4	0.40	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	2,851	R	10.80									
AD1.8	Reduce levels	m3	2,359	R	81.89	AD-Q5	0.83	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	529	R	74.61	AD-Q6	4.46	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	353	R	275.07	AD-Q7	1.50	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	462	R	409.44	AD-Q8	5.11	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,477	R	25.76	AD-Q9	4.18	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	446	R	24.60	AD-Q10	0.98	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	283	R	8.34	AD-Q11	1.60	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	258	R	1,031.09	AD-Q12	1.02	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	54	R	290.84	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	456.22	AD-Q14	0.19	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	670.33	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	410	R	8.34	AD-Q16	1.47	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					1.28	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					6.67	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					7.58	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					1.10	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.27	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.94	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					5.63	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.88	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.21	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.89	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					2.78	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	210	R	1,663.57	AE-Q1	5.00	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	42	R	2,063.06	AE-Q2	0.11	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	429	R	-									
AE1.4	Rip and compact	m2	1,907	R	8.60									
AE1.5	Formwork to plinth	m2	417	R	303.40	AE-Q3	9.93	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	187	R	269.40	AE-Q4	0.89	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.74	R	14,551.70	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,862	R	211.19	AE-Q6	497.86	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,376	R	115.26	AE-Q7	6.55	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	540	R	140.87	AE-Q8	2.57	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.81	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					193.44	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.15	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.16	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					68.90	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.08	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,862	R	-	AF-Q1	12.12	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	401	R	80.44	AF-Q2	1.04	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	387	R	200.56	AF-Q3	0.96	AF1.2	/	AF1.4				
AF1.4	Working space	m2	416	R	44.71	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	155	R	2,021.03	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	248	R	99.28	AF-Q6	0.67	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	2,877.56	AF-Q7	0.12	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	1,975.30	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	167	R	-	AF-Q9	0.49	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	343	R	17.12									
AF1.11	Formwork to bases	m2	267	R	264.46	AF-Q10	1.72	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	121	R	193.48	AF-Q11	6.37	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	13	R	300.01	AF-Q12	6.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.77	R	13,470.03	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	25.87	R	16,808.15	AF-Q14	6.46	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	529	R	83.71	AF-Q15	0.29	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	25	R	318.44	AF-Q16	0.76	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	8,789.35	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	96	R	958.61									
	Base excavation / backfill					AF-R1					0.40	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.80	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					25.12	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					20.36	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					35.77	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.98	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					118.05	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.07	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.80	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					24.14	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					9.04	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					2.11	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.11	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	305	R	97.00	AG-Q1	1.89	AG1.1	/	AG1.4				
AG1.2	Working space	m2	1,173	R	92.64	AG-Q2	0.26	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	46	R	96.79	AG-Q3	6.63	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	161	R	2,021.03	AG-Q4	1.04	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	80	R	1,927.28	AG-Q5	2.01	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	217	R	-									
AG1.7	Wood float	m2	217	R	12.83	AG-Q6	0.37	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	155	R	105.15	AG-Q7	1.04	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	524	R	339.36	AG-Q8	0.31	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	145	R	244.63	AG-Q9	0.55	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	32.08	R	17,219.95	AG-Q10	6.76	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,171	R	61.58	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,176	R	45.22	AG-Q12	0.10	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.13	R	12,439.45	AG-Q13	37.56	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.96	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.00	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.17	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					8.52	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.16	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	288	R	110.01	AH-Q1	7.02	AH1.1	/	AH1.4				
AH1.2	Working space	m2	70	R	70.29	AH-Q2	4.11	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	299	R	225.59	AH-Q3	0.96	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	41	R	1,384.90	AH-Q4	0.55	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	21	R	2,121.72	AH-Q5	1.95	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	97	R	2,213.68	AH-Q6	0.42	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	14	R	2,391.44	AH-Q7	2.93	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	3,545.01	AH-Q8	10.25	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	237	R	-									
AH1.10	Blinding	m2	75	R	114.04	AH-Q9	3.16	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	840	R	15.22	AH-Q10	0.28	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	199	R	249.72	AH-Q11	0.21	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	35	R	331.25	AH-Q12	0.40	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	25	R	307.74	AH-Q13	0.16	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	222	R	311.23	AH-Q14	0.09	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	23	R	364.15	AH-Q15	4.22	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	63	R	79.08	AH-Q16	1.54	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.03	R	12,814.61	AH-Q17	0.25	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.15	R	12,458.19	AH-Q18	29.08	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	944	R	316.18	AH-Q19	0.10	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,220	R	89.33	AH-Q20	0.19	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,948	R	63.47	AH-Q21	0.12	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.39	R	16,194.95	AH-Q22	170.50	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	281	R	134.00	AH-Q23	0.35	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	211	R	121.16	AH-Q24	0.46	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.08	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.57	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.49	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					12.14	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					90.99	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.65	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.63	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.58	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.39	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					5.55	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.22	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					11.52	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					6.82	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.08	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					27.99	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.03	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					39.40	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					139.46	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					196.28	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.09	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					16.52	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					18.27	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	269	R	100.04	AI-Q1	3.28	AI1.1	/	AI1.5				
AI1.2	Working space	m2	1,062	R	84.09	AI-Q2	0.25	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	92	R	115.78	AI-Q3	2.92	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	213	R	108.49	AI-Q4	0.38	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	82	R	3,217.99	AI-Q5	5.47	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	15	R	1,917.83	AI-Q6	0.32	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	118	R	-									
AI1.8	Wood float	m2	254	R	19.14									
AI1.9	Formwork bases	m2	166	R	256.77	AI-Q7	0.49	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	198	R	381.72	AI-Q8	0.08	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	8.73	R	12,826.30	AI-Q9	13.52	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,401	R	68.04	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.91	R	18,411.31	AI-Q11	90.11	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.19	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.86	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					29.66	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.68	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					168.13	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.53	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					5.02	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					188.51	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.17	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	497	R	130.75	AJ-Q1	6.29	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	666	R	60.94	AJ-Q2	0.75	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	193	R	195.10	AJ-Q3	2.58	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	422	R	126.70	AJ-Q4	0.19	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	79	R	2,016.38	AJ-Q5	2.14	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	36	R	2,705.99	AJ-Q6	2.19	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	37	R	2,116.72									
AJ1.8	Total concrete	m3	140	R	-									
AJ1.9	Wood float	m2	355	R	12.67	AJ-Q7	0.39	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	271	R	358.86	AJ-Q8	0.29	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	331	R	322.97	AJ-Q9	0.11	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.47	R	13,203.83	AJ-Q10	13.37	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,894	R	88.04	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,539	R	58.63	AJ-Q12	0.03	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	0.99	R	12,216.25	AJ-Q13	79.80	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.06	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.15	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.67	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					15.91	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					159.15	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					5.62	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					8.38	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					149.98	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					225.21	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	487	R	100.17	AK-Q1	1.84	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,183	R	82.10	AK-Q2	0.41	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	298	R	159.96	AK-Q3	1.63	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	337	R	106.89	AK-Q4	0.79	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	265	R	2,641.28	AK-Q5	24.09	AK1.5		AK1.6				
AK1.6	Concrete column	m3	11	R	2,750.47									
AK1.7	Concrete plinth	m3	69	R	2,213.68	AK-Q6	3.84	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	265	R	-									
AK1.9	Wood float	m2	465	R	20.48	AK-Q7	0.57	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	436	R	246.41	AK-Q8	0.61	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	216	R	402.02	AK-Q9	0.32	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	37	R	428.44	AK-Q10	0.30	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	28.65	R	12,717.28	AK-Q11	9.25	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	8,489	R	99.03	AK-Q12	0.03	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.43	R	12,062.83	AK-Q13	109.05	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.22	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.63	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					24.71	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					128.97	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					10.72	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.51	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.42	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					128.42	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.22	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	543	R	134.48	AL-Q1	2.73	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,373	R	62.22	AL-Q2	0.40	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	178	R	145.52	AL-Q3	3.05	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	294	R	102.58	AL-Q4	0.68	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	199	R	2,793.00	AL-Q5	1.05	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	190	R	2,513.66	AL-Q6	4.04	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	47	R	2,074.89	AL-Q7	4.23	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	396	R	-									
AL1.9	Wood float	m2	450	R	12.83	AL-Q8	0.44	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	247	R	262.26	AL-Q9	0.81	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	851	R	438.14	AL-Q10	0.22	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	229	R	443.41	AL-Q11	0.21	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	78	R	358.32	AL-Q12	0.60	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	14	R	426.17	AL-Q13	13.57	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	47.92	R	19,988.43	AL-Q14	8.26	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	10,683	R	60.31	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	343	R	102.19	AL-Q16	1.15	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	1.01	R	14,719.73	AL-Q17	392.08	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.16	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.92	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					27.23	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					217.69	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.11	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.11	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					10.65	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					4.68	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					5.74	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.79	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					4.68	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.87	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					331.43	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					195.60	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.19	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,374	R	133.68	AM-Q1	3.27	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,679	R	60.50	AM-Q2	0.82	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,172	R	193.69	AM-Q3	1.17	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	705	R	158.19	AM-Q4	0.60	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	420	R	3,065.81									
AM1.6	Concrete column	m3	145	R	2,970.90	AM-Q5	2.90	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	175	R	2,015.56	AM-Q6	0.83	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	197	R	2,041.20	AM-Q7	2.13	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	50	R	3,076.32	AM-Q8	2.90	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	160	R	3,054.12	AM-Q9	0.91	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,112	R	-									
AM1.12	Wood float	m2	1,569	R	12.41	AM-Q10	0.71	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	872	R	391.07	AM-Q11	0.48	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	720	R	274.49	AM-Q12	0.20	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	561	R	322.17	AM-Q13	0.31	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	282	R	543.76	AM-Q14	0.62	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	788	R	503.61	AM-Q15	0.25	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	613.24	AM-Q16	36.25	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	405	R	275.13	AM-Q17	0.12	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	166.98	R	16,742.78	AM-Q18	6.66	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,521	R	59.88	AM-Q19	0.25	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,451	R	101.46	AM-Q20	0.32	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	51	R	1,287.19	AM-Q21	3.27	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.01	R	15,807.66	AM-Q22	1100.99	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.21	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.69	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					19.38	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.03	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.52	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.50	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.00	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.00	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					247.04	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.84	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.26	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					3.71	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					10.82	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.29	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					6.06	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					11.18	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					279.61	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					165.02	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					13.01	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.19	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,486	R	98.96	AN-Q1	0.93	AN1.1	/	AN1.5				
AN1.2	Working space	m2	392	R	77.64	AN-Q2	6.34	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	537	R	125.70	AN-Q3	4.63	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,522	R	150.47	AN-Q4	1.76	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,674	R	2,689.98	AN-Q5								
AN1.6	Concrete column	m3	77	R	2,688.95	AN-Q6	34.73	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	49	R	2,970.90	AN-Q7	1.57	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	144	R	2,015.56	AN-Q8	18.57	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	2,020.26	AN-Q9	15.40	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	3,265	R	-				/					
AN1.11	Wood float	m2	1,225	R	10.12	AN-Q10	2.18	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	182	R	271.57	AN-Q11	14.69	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	488	R	301.47	AN-Q12	0.16	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	177	R	356.87	AN-Q13	0.28	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	60	R	437.71	AN-Q14	0.82	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	51	R	549.59	AN-Q15	0.10	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	610.22	AN-Q16	668.50	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,159	R	261.03	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	578.28	R	18,970.54	AN-Q18	5.65	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	15,367	R	89.33	AN-Q19	0.21	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	7,963	R	63.47	AN-Q20	0.41	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	153	R	2,869.99	AN-Q21	21.34	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.59	R	17,541.26	AN-Q22	1681.76	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.27	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.79	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					17.88	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					265.81	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					9.91	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					8.32	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					6.79	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					8.92	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					4.87	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					3.68	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.72	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					212.36	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					298.89	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.15	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					6.61	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	170	R	82.67	AO-Q1	1.29	AO1.1	/	AO1.5				
AO1.2	Working space	m2	554	R	59.06	AO-Q2	0.31	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	151	R	189.06	AO-Q3	1.13	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	34	R	103.83	AO-Q4	3.88	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	132	R	1,514.68									
AO1.6	Concrete column	m3	25	R	2,021.45	AO-Q5	5.28	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	2,689.98	AO-Q6	1.67	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	2,058.31	AO-Q7	26.40	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	3,043.69	AO-Q8	25.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	46	R	-									
AO1.11	Wood float	m2	32	R	12.46	AO-Q9	4.13	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	121	R	265.07	AO-Q10	1.09	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	246	R	437.35	AO-Q11	0.10	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	82	R	306.95	AO-Q12	0.18	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	17	R	495.28	AO-Q13	0.88	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	536.45	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	53	R	888.17	AO-Q15	2.49	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	21	R	231.97	AO-Q16	0.24	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	6.58	R	14,551.70	AO-Q17	6.99	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,946	R	98.61	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,154	R	97.70	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	12	R	2,245.01	AO-Q20	3.83	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.19	R	13,685.53	AO-Q21	31.50	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.40	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.44	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					14.59	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					121.56	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.71	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.76	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.43	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.62	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.03	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.67	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					8.87	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					147.57	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					148.94	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.11	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.48	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,292	R	100.46	AP-Q1	1.66	AP1.1	/	AP1.5				
AP1.2	Working space	m2	543	R	51.14	AP-Q2	2.38	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,510	R	128.15	AP-Q3	0.86	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	282	R	153.05	AP-Q4	2.76	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	779	R	2,015.56	AP-Q5	0.43	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,797	R	207.01									
AP1.7	Rough formwork	m2	279	R	253.80	AP-Q6	2.79	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,401	R	400.67	AP-Q7	0.56	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,437	R	30.82	AP-Q8	0.14	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	159	R	109.04	AP-Q9	4.90	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	53	R	142.55	AP-Q10	14.70	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	321	R	91.38	AP-Q11	2.43	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.05	R	11,203.44	AP-Q12	741.90	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,770	R	522.23	AP-Q13	0.44	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	5,046	R	-	AP-Q14	6.48	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,564	R	177.20	AP-Q15	3.23	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,223	R	623.44	AP-Q16	2.27	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,247	R	115.34	AP-Q17	1.55	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	2,137.99	AP-Q18	560.67	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	5,199	R	507.76	AP-Q19	0.97	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,541	R	251.64	AP-Q20	1.43	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	84.19	R	12,264.51	AP-Q21	9.25	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	64,258.33									
AP1.24	Structural steel	Item	1	R	166,390.37									
AP1.25	Plumbing and drainage	Item	1	R	105,947.23									
AP1.26	Small power and lighting	Item	1	R	902,595.98									
AP1.27	External works	Item	1	R	390,023.96									
	Excavations / concrete					AP-R1					0.05	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.96	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.78	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					13.17	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					59.25	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					7.94	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.03	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					65.40	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					18.48	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					14.14	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					134.21	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.18	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					11.37	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					19.67	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					4.53	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.24	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					1.03	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					2.08	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.24	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					13.57	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.64	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					73.59	AP1.26	/	AP1.22
	External works / concrete					AP-R23					193.51	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	98	R	2,012.95	AQ-Q1	1.84	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	180	R	364.11									
AQ1.3	Reinforcement	t	11.82	R	11,578.39	AQ-Q2	8.29	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	792	R	220.45	AQ-Q3	0.12	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	143	R	345.49	AQ-Q4	0.69	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	137	R	356.00	AQ-Q5	6.12	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,106	R	196.76	AQ-Q6	0.76	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	46.49	R	38,849.95	AQ-Q7	18.03	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	375	R	274.39	AQ-Q8	2.23	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	23,727.26	AQ-Q9	419.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	54	R	2,843.77	AQ-Q10	15.52	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	931	R	114.65	AQ-Q11	0.90	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	838	R	-									
	Concrete / reinforcement					AQ-R1					0.17	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.53	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.13	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.83	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					5.65	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					197.45	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.39	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.61	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.45	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.72	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	169	R	334.86	AR-Q1	3.02	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	56	R	2,073.27	AR-Q2	10.55	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.31	R	20,478.14									
AR1.4	Mesh	m2	645	R	203.41	AR-Q3	0.09	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	122	R	402.02	AR-Q4	0.46	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	123	R	537.83	AR-Q5	3.71	AR1.15	/	AR1.6				
AR1.7	Screed	m2	472	R	53.29	AR-Q6	0.97	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	46.41	R	52,885.96	AR-Q7	9.83	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	11	R	4,640.11	AR-Q8	4.22	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	49	R	1,991.37	AR-Q9	0.95	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	61	R	623.85	AR-Q10	0.76	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	583	R	205.22	AR-Q11	0.78	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	122	R	303.32	AR-Q12	3.74	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	27	R	2,917.27	AR-Q13	1.72	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	456	R	-									
	Earthworks / concrete					AR-R1					0.16	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.10	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					10.19	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.16	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.85	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					38.91	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					11.40	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					26.56	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.19	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					257.70	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.48	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					18.13	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	0	R	-	AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-	AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-	AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0	R	-									
AS1.5	Mesh	m2	0	R	-	AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-	AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-	AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-	AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-	AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.00	R	-	AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-	AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-	AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-	AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-	AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0.00	R	-	AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.00	R	-	AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-									
AS1.18	Total control room area	m2	0	R	-									
	Concrete / earthworks					AS-R1						AS1.3	/	AS1.1
	Concrete / blinding					AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3						AS1.4	/	AS1.5
	Concrete / formwork					AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7						AS1.4	/	AS1.9
	Concrete / pipework					AS-R8						AS1.3	/	AS1.13
	Concrete / grout					AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	122	R	293.58	AT-Q1	9.38	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	15	R	130.29	AT-Q2	0.87	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	13	R	3,228.91	AT-Q3	4.92	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.64	R	9,255.33									
AT1.5	Formwork	m2	141	R	248.30	AT-Q4	0.09	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	43	R	20.97	AT-Q5	0.30	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	35	R	175.10	AT-Q6	0.37	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.47	R	58.87	AT-Q7	27.66	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.51	R	13,685.53	AT-Q8	25.49	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.11	R	66.37	AT-Q9	118.18	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.66	R	55,149.93	AT-Q10	65.15	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.67	R	55,305.75	AT-Q11	25.75	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	48	R	524.02	AT-Q12	0.90	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	19	R	215.52	AT-Q13	2.26	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	43	R	-									
	Concrete / earthworks					AT-R1					11.00	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					24.78	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					13.00	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					153.98	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					18.44	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					157.22	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.89	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.24	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.17	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.17	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.16	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					2.43	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,196	R	248.30	AV-Q1	0.68	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,261	R	151.74	AV-Q2	0.87	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,102	R	155.86	AV-Q3	0.92	AV1.10	/	AV1.3				
AV1.4	Pipework	m	111	R	768.48	AV-Q4	25.66	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	3,928.64	AV-Q5	27.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	32	R	2,078.49	AV-Q6	3.47	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	235	R	345.49	AV-Q7	0.14	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	36	R	298.37	AV-Q8	0.89	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	5.15	R	12,785.12	AV-Q9	6.21	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,848	R	-									
	Earthworks / lining					AV-R1					1.64	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.59	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.97	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.32	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.20	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.07	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					6.02	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					6.97	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.16	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	43	R	-									
BA1.2	Steel	t	2.00	R	42,126.58	BA-Q1	21.50	BA1.1	/	BA1.2				
BA1.3	Handrail	m	18	R	2,028.94	BA-Q2	2.39	BA1.1	/	BA1.3				
BA1.4	Grating	m2	22	R	2,574.09	BA-Q3	1.95	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	15	R	398.23	BA-Q4	2.87	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	436.05	BA-Q5	10.75	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					20.76	BA1.2	/	BA1.3
	Steel / grating					BA-R2					16.37	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					105.78	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					96.61	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	960	R	-									
BB1.2	Steel	t	46.94	R	42,126.58	BB-Q1	20.45	BB1.1	/	BB1.2				
BB1.3	Handrail	m	148	R	2,028.94	BB-Q2	6.49	BB1.1	/	BB1.3				
BB1.4	Grating	m2	110	R	2,574.09	BB-Q3	8.73	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	157	R	691.54	BB-Q4	6.11	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	15	R	5,815.94	BB-Q5	64.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					20.76	BB1.2	/	BB1.3
	Steel / grating					BB-R2					16.37	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					60.92	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					7.24	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	15,014	R	-									
BC1.2	Steel	t	195.83	R	44,866.57	BC-Q1	76.67	BC1.1	/	BC1.2				
BC1.3	Handrail	m	515	R	1,458.17	BC-Q2	29.15	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,629	R	3,636.70	BC-Q3	2.67	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	419	R	526.02	BC-Q4	35.83	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	89	R	640.99	BC-Q5	168.70	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	62	R	5,407.75	BC-Q6	242.16	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					30.77	BC1.2	/	BC1.3
	Steel / grating					BC-R2					12.34	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					85.29	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					70.00	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.30	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	511	R	-									
BD1.2	Steel	t	30.96	R	57,017.57	BD-Q1	16.51	BD1.1	/	BD1.2				
BD1.3	Handrail	m	10	R	1,515.95	BD-Q2	51.10	BD1.1	/	BD1.3				
BD1.4	Grating	m2	11	R	3,840.56	BD-Q3	46.45	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	527.71	BD-Q4	42.58	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	29	R	5,362.78	BD-Q5	17.62	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					37.61	BD1.1	/	BD1.2
	Steel / grating					BD-R2					14.85	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					108.05	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					10.63	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	43	R	-									
BE1.2	Steel	t	3.14	R	41,370.70	BE-Q1	13.69	BE1.1	/	BE1.2				
BE1.3	Handrail	m	42	R	2,321.22	BE-Q2	1.02	BE1.1	/	BE1.3				
BE1.4	Grating	m2	16	R	3,332.80	BE-Q3	2.69	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	39	R	565.72	BE-Q4	1.10	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	8	R	503.63	BE-Q5	5.38	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					17.82	BE1.2	/	BE1.3
	Steel / grating					BE-R2					12.41	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					73.13	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					82.15	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	450	R	-									
BF1.2	Steel	t	24.43	R	40,357.51	BF-Q1	18.42	BF1.1	/	BF1.2				
BF1.3	Handrail	m	19	R	1,992.97	BF-Q2	23.68	BF1.1	/	BF1.3				
BF1.4	Grating	m2	44	R	2,861.68	BF-Q3	10.23	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	9	R	517.17	BF-Q4	50.00	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	17	R	7,674.09	BF-Q5	26.47	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.25	BF1.1	/	BF1.2
	Steel / grating					BF-R2					14.10	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					78.04	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					5.26	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	17,462	R	-	C-Q1	0.29	C1.1	/	C1.2				
C1.2	Total work units	WU	60,087	R	532.11									
C1.3	Pipe supports	kg	11,017	R	-	C-Q2	1.59	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,540	R	-	C-Q3	0.19	C1.4	/	C1.2				
C1.5	Number of welds	No	13,357	R	-	C-Q4	0.76	C1.5	/	C1.1				
C1.6	Total fittings	No	11,010	R	-	C-Q5	0.63	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,657	R	-	C-Q6	0.15	C1.7	/	C1.6				
C1.8	Support number	No	1,564	R	-	C-Q7	0.14	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	60,087	R	532.11	DA-Q1	34.04	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,765	R	130.43									
	Average cost per examination / WU					DA-R1					4.08	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	60,087	R	532.11	DB-Q1	120.41	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	499	R	174.98									
	Average cost per examination / WU					DB-R1					3.04	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	60,087	R	532.11	DC-Q1	254.61	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	236	R	274.56									
	Average cost per examination / WU					DC-R1					1.94	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	60,087	R	532.11	DD-Q1	41.61	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,444	R	87.90									
	Average cost per examination / WU					DD-R1					6.05	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	60,087	R	532.11	DE-Q1	89.28	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	673	R	213.48									
	Average cost per examination / WU					DE-R1					2.49	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	60,087	R	532.11	E-Q1	264.43	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	227.23	R	1,003.12	E-Q2	176.22	E1.1	/	E1.3				
E1.3	Structural steel	t	340.97	R	46,976.22									
	WU cost / install mechanical weight - receive					E-R1					0.53	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					46.83	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	60,087	R	532.11									
F1.2	Painting to piping	m2	6,144	R	289.06	F-Q1	9.78	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,668	R	993.90	F-Q2	36.02	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	463.02	R	1,226.29									
F1.5	Painting to mechanical equipment	m2	1,145	R	231.36	F-Q3	0.40	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	612	R	880.19	F-Q4	0.76	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.29	F1.2	/	F1.3
	Work unit / paint					F-R2					1.84	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.54	F1.1	/	F1.3
	Install plant / paint					F-R4					5.30	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.39	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	31,668	R	91.04									
G1.2	Electrical cable terminations	No	2,011	R	308.32	G-Q1	15.75	G1.1	/	G1.2				
G1.3	Electrical equipment	No	113	R	955.73	G-Q2	280.25	G1.1	/	G1.3				
G1.4	DB's	No	13	R	3,398.17	G-Q3	8.69	G1.3	/	G1.4				
G1.5	Rack	m	7,533	R	295.66	G-Q4	4.20	G1.1	/	G1.5				
G1.6	Support steel	kg	11,578	R	59.25	G-Q5	0.65	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	30,797	R	52.57	G-Q6	1.03	G1.1	/	G1.7				
G1.8	Instruments	No	1,043	R	280.33	G-Q7	29.53	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,022	R	212.92	G-Q8	0.52	G1.8	/	G1.9				
G1.10	Light fittings	No	601	R	776.38	G-Q9	5.32	G1.10	/	G1.3				
G1.11	Conduit	m	4,407	R	79.50	G-Q10	7.19	G1.1	/	G1.11				
G1.12	Instrument stands	No	247	R	2,311.46	G-Q11	4.22	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.30	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.28	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.15	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.54	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.31	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.12	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.25	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.19	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	8,237	R	47.67	AB-Q1	2.13	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,873	R	18.31									
AB1.3	Back fill and compact	m3	7,378	R	100.30	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	6,277	R	4.92	AB-Q3	1.31	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	6,068	R	11.16	AB-Q4	1.36	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					2.60	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.48	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					9.69	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.27	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	317,065.58									
AC1.2	EO for raking equipment	Item	1	R	41,433.79									
AC1.3	Number of piles	No	332	R	-									
AC1.4	Move rig to new position	No	225	R	363.39	AC-Q1	1.48	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	17	R	-	AC-Q2	19.53	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	25	R	696.68	AC-Q3	0.68	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	91	R	112.07	AC-Q4	0.19	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	6,588	R	215.84	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	601	R	409.45	AC-Q6	0.55	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	201	R	974.21	AC-Q7	1.65	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	162	R	313.67	AC-Q8	2.05	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	723	R	528.61	AC-Q9	0.46	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	114	R	932.55	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	21.78	R	9,667.88	AC-Q11	15.24	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	286.68	R	12,824.19	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	2,021	R	1,893.71	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	221	R	2,045.77	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	254,082.60		1.00		/					
AC1.19	Load test to pile	No	2	R	32,019.57	AC-Q15	166.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	88,299.00	AC-Q16	332.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	225	R	460.63	AC-Q17	1.48	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					167.43	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.52	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.51	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.17	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.28	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.49	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.75	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					6.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					16.91	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.63	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	250	R	114.65	AD-Q1	0.22	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,147	R	123.85									
AD1.3	Kerbing	m	344	R	285.23	AD-Q2	0.07	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	4,621	R	-									
AD1.5	Remove top soil	m3	717	R	44.15	AD-Q3	0.40	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,794	R	110.55	AD-Q4	0.22	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,330	R	11.17									
AD1.8	Reduce levels	m3	2,668	R	28.23	AD-Q5	0.80	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	601	R	71.12	AD-Q6	4.44	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	399	R	273.55	AD-Q7	1.51	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	572	R	202.57	AD-Q8	4.66	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,706	R	27.26	AD-Q9	4.28	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	515	R	15.35	AD-Q10	1.05	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	350	R	7.19	AD-Q11	1.50	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	319	R	1,219.60	AD-Q12	1.02	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	75	R	154.33	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	279.61	AD-Q14	0.22	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	14	R	319.37	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	778	R	7.94	AD-Q16	2.26	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.95	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					2.53	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.26	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.14	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.55	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.06	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					1.04	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.54	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.98	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.12	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	239	R	1,035.12	AE-Q1	5.09	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	47	R	1,585.83	AE-Q2	0.11	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	531	R	-									
AE1.4	Rip and compact	m2	2,202	R	6.86									
AE1.5	Formwork to plinth	m2	482	R	225.95	AE-Q3	10.26	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	232	R	214.96	AE-Q4	0.97	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.63	R	11,611.15	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,372	R	286.87	AE-Q6	728.29	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	872	R	46.11	AE-Q7	3.65	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	670	R	103.02	AE-Q8	2.80	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.65	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					150.89	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.14	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.21	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.48	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.10	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,500	R	-	AF-Q1	12.11	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	454	R	79.53	AF-Q2	1.04	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	437	R	156.77	AF-Q3	0.90	AF1.2	/	AF1.4				
AF1.4	Working space	m2	504	R	32.62	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	175	R	1,474.45	AF-Q5	0.04	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	280	R	90.66	AF-Q6	1.01	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	19	R	2,099.34	AF-Q7	0.11	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,544.03	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	283	R	-	AF-Q9	0.61	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	463	R	12.20									
AF1.11	Formwork to bases	m2	302	R	203.40	AF-Q10	1.73	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	242	R	274.80	AF-Q11	12.74	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	16	R	249.76	AF-Q12	5.33	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.53	R	11,611.15	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	31.35	R	13,138.38	AF-Q14	9.03	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	531	R	46.98	AF-Q15	0.33	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	44	R	281.27	AF-Q16	0.43	AF1.7	/	AF1.17				
AF1.18	Manhole	No	10	R	4,859.69	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	130	R	747.84									
	Base excavation / backfill					AF-R1					0.51	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.44	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					18.54	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					16.26	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					26.40	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.05	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.04	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					120.86	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.14	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.13	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.16	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.88	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					31.38	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					7.46	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.97	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.15	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	345	R	72.19	AG-Q1	1.89	AG1.1	/	AG1.4				
AG1.2	Working space	m2	1,327	R	57.82	AG-Q2	0.26	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	55	R	104.91	AG-Q3	6.27	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	183	R	1,780.97	AG-Q4	0.84	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	91	R	2,322.26	AG-Q5	2.01	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	351	R	-									
AG1.7	Wood float	m2	202	R	10.28	AG-Q6	0.45	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	218	R	89.88	AG-Q7	0.84	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	363	R	332.30	AG-Q8	0.50	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	166	R	287.32	AG-Q9	0.55	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	32.93	R	8,447.09	AG-Q10	10.66	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,950	R	44.70	AG-Q11	0.12	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,496	R	49.79	AG-Q12	0.10	AG1.6	/	AG1.13				
AG1.14	Grout	m3	3.80	R	13,612.49	AG-Q13	23.95	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.80	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.45	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.19	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.12	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.74	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					7.64	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	326	R	80.26	AH-Q1	7.09	AH1.1	/	AH1.4				
AH1.2	Working space	m2	79	R	59.24	AH-Q2	4.13	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	362	R	107.48	AH-Q3	0.90	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	46	R	1,824.61	AH-Q4	0.58	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	24	R	1,327.40	AH-Q5	1.92	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	110	R	1,519.24	AH-Q6	0.42	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	16	R	2,015.23	AH-Q7	2.88	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	5	R	1,688.98	AH-Q8	9.20	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	332	R	-									
AH1.10	Blinding	m2	79	R	114.81	AH-Q9	4.20	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	831	R	13.06	AH-Q10	0.40	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	161	R	201.78	AH-Q11	0.29	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	71	R	298.37	AH-Q12	0.23	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	30	R	209.43	AH-Q13	0.17	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	199	R	193.69	AH-Q14	0.12	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	46	R	244.39	AH-Q15	2.39	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	43	R	74.94	AH-Q16	2.56	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.19	R	11,333.47	AH-Q17	0.26	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.49	R	14,777.99	AH-Q18	39.10	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	770	R	218.97	AH-Q19	0.14	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,443	R	46.98	AH-Q20	0.23	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,229	R	58.16	AH-Q21	0.15	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.43	R	15,478.51	AH-Q22	232.17	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	537	R	89.52	AH-Q23	0.20	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	249	R	96.68	AH-Q24	0.44	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.35	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.75	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					15.89	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					139.71	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.37	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.20	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.91	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.08	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					9.04	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					6.75	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					8.06	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					6.85	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.22	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					20.27	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.77	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					67.49	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					314.56	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					254.09	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.12	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					16.97	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					15.71	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	275	R	79.67	AI-Q1	2.48	AI1.1	/	AI1.5				
AI1.2	Working space	m2	1,287	R	65.03	AI-Q2	0.21	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	111	R	102.34	AI-Q3	2.48	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	241	R	78.31	AI-Q4	0.46	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	111	R	2,515.31	AI-Q5	6.17	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	18	R	1,294.93	AI-Q6	0.32	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	143	R	-									
AI1.8	Wood float	m2	343	R	13.66									
AI1.9	Formwork bases	m2	202	R	196.95	AI-Q7	0.55	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	192	R	269.73	AI-Q8	0.09	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	11.67	R	9,825.63	AI-Q9	12.25	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	6,236	R	71.03	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.75	R	11,478.11	AI-Q11	148.00	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.23	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.78	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					32.12	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.94	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					184.14	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.77	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.80	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					138.33	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.22	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	602	R	90.68	AJ-Q1	6.34	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	807	R	60.69	AJ-Q2	0.75	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	234	R	102.77	AJ-Q3	2.57	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	478	R	89.88	AJ-Q4	0.20	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	95	R	1,615.00	AJ-Q5	2.07	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	42	R	2,098.54	AJ-Q6	2.26	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	46	R	1,493.69									
AJ1.8	Total concrete	m3	173	R	-									
AJ1.9	Wood float	m2	489	R	14.91	AJ-Q7	0.35	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	328	R	300.54	AJ-Q8	0.29	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	401	R	241.11	AJ-Q9	0.10	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	12.69	R	9,790.11	AJ-Q10	13.63	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	6,834	R	68.82	AJ-Q11	0.01	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,928	R	46.98	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.41	R	9,665.55	AJ-Q13	67.38	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.06	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.49	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.88	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					17.97	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					108.32	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					5.37	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					8.70	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					142.26	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					208.39	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	759	R	116.44	AK-Q1	2.05	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,434	R	68.76	AK-Q2	0.53	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	362	R	119.42	AK-Q3	2.10	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	408	R	79.25	AK-Q4	0.91	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	370	R	2,064.60	AK-Q5	30.83	AK1.5		AK1.6				
AK1.6	Concrete column	m3	12	R	2,704.75									
AK1.7	Concrete plinth	m3	69	R	1,532.89	AK-Q6	5.36	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	336	R	-									
AK1.9	Wood float	m2	500	R	9.09	AK-Q7	0.74	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	673	R	299.40	AK-Q8	0.55	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	177	R	308.41	AK-Q9	0.39	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	41	R	211.97	AK-Q10	0.29	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	35.57	R	14,777.99	AK-Q11	9.45	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	10,206	R	49.02	AK-Q12	0.03	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.65	R	8,912.44	AK-Q13	126.79	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.69	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.98	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					26.05	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					227.13	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					6.90	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					4.97	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					12.76	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					301.47	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.23	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	627	R	104.29	AL-Q1	2.59	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,699	R	43.91	AL-Q2	0.37	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	220	R	144.74	AL-Q3	2.85	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	405	R	120.70	AL-Q4	0.60	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	242	R	2,339.14	AL-Q5	1.05	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	230	R	1,876.54	AL-Q6	4.04	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	57	R	1,538.45	AL-Q7	4.25	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	553	R	-									
AL1.9	Wood float	m2	342	R	10.28	AL-Q8	0.71	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	351	R	207.50	AL-Q9	0.69	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,450	R	298.88	AL-Q10	0.16	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	251	R	386.35	AL-Q11	0.23	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	92	R	261.42	AL-Q12	0.62	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	15	R	342.58	AL-Q13	15.33	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	54.20	R	10,277.29	AL-Q14	10.20	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	13,896	R	46.02	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	404	R	77.97	AL-Q16	1.37	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.73	R	11,230.78	AL-Q17	757.53	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.04	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.38	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.72	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.38	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					227.54	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					1.25	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					1.25	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					11.27	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					3.98	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					6.28	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.88	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					3.98	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.49	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					223.32	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					131.81	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.21	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,856	R	119.29	AM-Q1	5.40	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,899	R	43.75	AM-Q2	0.98	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,420	R	147.78	AM-Q3	1.31	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	808	R	109.78	AM-Q4	0.43	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	344	R	1,759.96									
AM1.6	Concrete column	m3	174	R	2,099.34	AM-Q5	1.98	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	191	R	1,544.03	AM-Q6	0.91	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	304	R	2,130.98	AM-Q7	1.13	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	92	R	1,917.86	AM-Q8	1.89	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	208	R	2,387.31	AM-Q9	0.84	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,287	R	-									
AM1.12	Wood float	m2	1,804	R	9.70	AM-Q10	0.71	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	1,056	R	291.24	AM-Q11	0.33	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	895	R	219.02	AM-Q12	0.19	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	689	R	283.73	AM-Q13	0.28	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	298	R	384.24	AM-Q14	0.64	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	1,064	R	367.41	AM-Q15	0.29	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	479.35	AM-Q16	34.80	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	505	R	205.04	AM-Q17	0.18	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	133.11	R	11,199.76	AM-Q18	9.67	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	5,348	R	44.36	AM-Q19	0.24	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	4,082	R	75.56	AM-Q20	0.32	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	60	R	1,027.08	AM-Q21	2.22	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.09	R	9,320.68	AM-Q22	1180.73	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.07	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.73	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.81	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					16.03	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.84	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.14	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.83	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.92	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.74	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					181.44	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					6.04	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.44	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.02	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					9.59	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.22	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					6.50	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					9.35	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					252.47	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					148.22	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					10.90	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.19	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	3,013	R	72.19	AN-Q1	2.13	AN1.1	/	AN1.5				
AN1.2	Working space	m2	475	R	60.69	AN-Q2	6.34	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	654	R	98.09	AN-Q3	4.61	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	2,814	R	120.91	AN-Q4	0.50	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,413	R	1,213.67	AN-Q5								
AN1.6	Concrete column	m3	99	R	2,015.23	AN-Q6	14.27	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	40	R	1,688.98	AN-Q7	2.48	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	179	R	1,618.82	AN-Q8	7.89	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	1,688.98	AN-Q9	19.80	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	3,604	R	-				/					
AN1.11	Wood float	m2	1,455	R	6.59	AN-Q10	0.97	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	201	R	203.76	AN-Q11	7.03	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	587	R	229.06	AN-Q12	0.17	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	207	R	245.06	AN-Q13	0.19	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	102	R	460.38	AN-Q14	0.39	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	40	R	269.14	AN-Q15	0.13	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	336.27	AN-Q16	353.25	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,432	R	196.59	AN-Q17	0.13	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	719.16	R	13,658.90	AN-Q18	5.01	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	12,866	R	44.59	AN-Q19	0.28	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	12,384	R	75.56	AN-Q20	0.29	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	120	R	1,631.02	AN-Q21	30.03	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.19	R	10,108.29	AN-Q22	645.21	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.06	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.19	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.74	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					10.04	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					184.17	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.96	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.89	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					3.67	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					8.80	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					5.02	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					6.28	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					8.23	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					306.32	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					180.77	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.12	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					8.37	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	359	R	112.65	AO-Q1	2.41	AO1.1	/	AO1.5				
AO1.2	Working space	m2	685	R	46.16	AO-Q2	0.52	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	175	R	147.78	AO-Q3	2.05	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	42	R	75.75	AO-Q4	3.55	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	149	R	1,109.68									
AO1.6	Concrete column	m3	30	R	1,474.45	AO-Q5	4.97	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	20	R	2,146.40	AO-Q6	1.50	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	5	R	1,532.89	AO-Q7	29.80	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	2,266.72	AO-Q8	30.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	52	R	-									
AO1.11	Wood float	m2	43	R	9.91	AO-Q9	3.47	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	89	R	275.78	AO-Q10	1.67	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	207	R	305.70	AO-Q11	0.14	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	72	R	247.12	AO-Q12	0.28	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	304.99	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	309.13	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	65	R	446.80	AO-Q15	2.29	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	28	R	286.19	AO-Q16	0.18	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.66	R	9,580.03	AO-Q17	9.19	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,665	R	62.44	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,668	R	51.10	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	19	R	2,404.10	AO-Q20	2.74	AO1.10	/	AO1.22				
AO1.23	Grout	m3	6.66	R	9,203.63	AO-Q21	22.37	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.10	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					2.44	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.76	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					14.65	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					111.98	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					4.02	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.69	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					7.04	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.82	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.80	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					7.33	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.36	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					153.43	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					187.48	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.12	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					3.98	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	2,005	R	51.44	AP-Q1	2.33	AP1.1	/	AP1.5				
AP1.2	Working space	m2	726	R	66.63	AP-Q2	2.76	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,433	R	97.86	AP-Q3	1.40	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	281	R	79.41	AP-Q4	3.06	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	860	R	2,347.15	AP-Q5	0.40	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,169	R	128.72									
AP1.7	Rough formwork	m2	362	R	207.20	AP-Q6	2.38	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	2,326	R	230.02	AP-Q7	0.37	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,692	R	12.07	AP-Q8	0.32	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	197	R	79.15	AP-Q9	4.37	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	63	R	171.23	AP-Q10	13.65	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	320	R	44.84	AP-Q11	2.69	AP1.5	/	AP1.12				
AP1.13	Grout	m3	1.12	R	6,613.54	AP-Q12	767.86	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,910	R	282.50	AP-Q13	0.30	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	5,708	R	-	AP-Q14	6.64	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,896	R	141.72	AP-Q15	3.01	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,695	R	225.53	AP-Q16	2.12	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,672	R	100.95	AP-Q17	1.55	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	10	R	2,500.52	AP-Q18	570.80	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,819	R	358.83	AP-Q19	1.49	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,737	R	210.87	AP-Q20	1.53	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	126.73	R	15,274.83	AP-Q21	6.79	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	49,027.47									
AP1.24	Structural steel	Item	1	R	126,951.61									
AP1.25	Plumbing and drainage	Item	1	R	80,835.03									
AP1.26	Small power and lighting	Item	1	R	688,657.71									
AP1.27	External works	Item	1	R	297,578.33									
	Excavations / concrete					AP-R1					0.02	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					0.77	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.53	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					29.56	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					118.67	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					11.33	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					10.20	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					194.46	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					29.65	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					13.71	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					340.65	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.35	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					16.56	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					67.73	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.80	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.11	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.79	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.34	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.21	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.31	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.29	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					45.08	AP1.26	/	AP1.22
	External works / concrete					AP-R23					126.78	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	70	R	1,632.39	AQ-Q1	3.03	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	212	R	187.66									
AQ1.3	Reinforcement	t	15.25	R	13,658.90	AQ-Q2	4.59	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	1,267	R	179.13	AQ-Q3	0.06	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	314	R	263.70	AQ-Q4	0.22	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	161	R	366.80	AQ-Q5	3.73	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,082	R	147.91	AQ-Q6	0.56	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	50.94	R	29,880.21	AQ-Q7	11.80	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	873	R	189.31	AQ-Q8	0.69	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	3	R	14,897.83	AQ-Q9	200.33	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	58	R	1,929.66	AQ-Q10	10.36	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,071	R	85.38	AQ-Q11	0.56	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	601	R	-									
	Concrete / reinforcement					AQ-R1					0.12	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					8.70	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.11	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					6.19	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.45	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					202.02	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.28	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.50	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					13.05	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.73	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	311	R	261.21	AR-Q1	5.46	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	57	R	1,570.44	AR-Q2	5.83	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	9.77	R	6,888.85									
AR1.4	Mesh	m2	576	R	164.17	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	226	R	207.50	AR-Q4	0.25	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	137	R	360.30	AR-Q5	5.78	AR1.15	/	AR1.6				
AR1.7	Screed	m2	560	R	58.55	AR-Q6	1.41	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	61.51	R	50,866.69	AR-Q7	12.88	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	12	R	2,522.63	AR-Q8	5.13	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	55	R	1,167.03	AR-Q9	1.12	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	52	R	455.14	AR-Q10	1.18	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	897	R	213.67	AR-Q11	0.88	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	119	R	140.32	AR-Q12	6.66	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	35	R	1,881.05	AR-Q13	1.76	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	792	R	-									
	Earthworks / concrete					AR-R1					0.17	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.23	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.57	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					7.57	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					4.36	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					26.82	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					20.16	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					43.59	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.56	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					238.06	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.66	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					27.04	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	288	R	201.83	AS-Q1	3.39	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	155	R	105.69	AS-Q2	0.55	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	85	R	2,146.40	AS-Q3	5.41	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	15.70	R	9,754.72									
AS1.5	Mesh	m2	135	R	240.41	AS-Q4	0.63	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	237	R	142.58	AS-Q5	0.36	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	214	R	21.86	AS-Q6	0.40	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	31	R	100.74	AS-Q7	2.74	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	835	R	75.24	AS-Q8	0.10	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.71	R	13,383.54	AS-Q9	49.71	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	30	R	288.74	AS-Q10	0.47	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	3	R	3,325.49	AS-Q11	4.67	AS1.18	/	AS1.12				
AS1.13	Pipework	m	52	R	1,011.00	AS-Q12	3.02	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	701	R	85.90	AS-Q13	0.12	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	3.50	R	26,502.14	AS-Q14	4.00	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.79	R	39,325.80	AS-Q15	198.73	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	157	R	-									
AS1.18	Total control room area	m2	14	R	-									
	Concrete / earthworks					AS-R1					10.63	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					20.31	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					40.58	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					15.05	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					98.19	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					21.31	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					129.65	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.12	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.16	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.37	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.25	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	534	R	261.11	AU-Q1	0.96	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	272	R	78.26	AU-Q2	2.06	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	559	R	2,236.24									
AU1.4	Reinforcement	t	52.57	R	9,786.14	AU-Q3	10.63	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	2,101	R	316.53	AU-Q4	0.27	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	145	R	70.62	AU-Q5	3.86	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,595	R	45.69	AU-Q6	0.35	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	587	R	34.50	AU-Q7	0.95	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	47	R	224.90	AU-Q8	11.89	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	5.25	R	37,611.18	AU-Q9	106.48	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	7	R	5,881.13	AU-Q10	79.86	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	27	R	275.75	AU-Q11	16.22	AU1.12	/	AU1.13				
AU1.13	Total area	m2	438	R	-									
	Concrete / earthworks					AU-R1					8.56	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					28.57	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.06	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.23	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					31.67	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					214.19	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.26	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					283.66	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					43.51	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.38	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					8.11	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	43	R	-									
BA1.2	Steel	t	4.40	R	40,844.43	BA-Q1	9.77	BA1.1	/	BA1.2				
BA1.3	Handrail	m	23	R	1,274.41	BA-Q2	1.87	BA1.1	/	BA1.3				
BA1.4	Grating	m2	20	R	2,358.72	BA-Q3	2.15	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	18	R	460.79	BA-Q4	2.39	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	452.95	BA-Q5	7.17	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					32.05	BA1.2	/	BA1.3
	Steel / grating					BA-R2					17.32	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					88.64	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					90.17	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2,180	R	-									
BB1.2	Steel	t	72.22	R	48,649.59	BB-Q1	30.19	BB1.1	/	BB1.2				
BB1.3	Handrail	m	190	R	1,122.98	BB-Q2	11.47	BB1.1	/	BB1.3				
BB1.4	Grating	m2	144	R	1,738.04	BB-Q3	15.14	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	149	R	381.95	BB-Q4	14.63	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	17	R	4,362.10	BB-Q5	128.24	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					43.32	BB1.2	/	BB1.3
	Steel / grating					BB-R2					27.99	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					127.37	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.15	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	24,628	R	-									
BC1.2	Steel	t	199.95	R	32,060.86	BC-Q1	123.17	BC1.1	/	BC1.2				
BC1.3	Handrail	m	595	R	1,123.64	BC-Q2	41.39	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,831	R	3,108.57	BC-Q3	4.22	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	518	R	303.84	BC-Q4	47.54	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	120	R	332.70	BC-Q5	205.23	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	81	R	3,863.31	BC-Q6	304.05	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					28.53	BC1.2	/	BC1.3
	Steel / grating					BC-R2					10.31	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					105.52	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					96.37	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					8.30	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	637	R	-									
BD1.2	Steel	t	25.30	R	30,055.39	BD-Q1	25.18	BD1.1	/	BD1.2				
BD1.3	Handrail	m	14	R	1,227.26	BD-Q2	45.50	BD1.1	/	BD1.3				
BD1.4	Grating	m2	16	R	1,923.95	BD-Q3	39.81	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	9	R	553.79	BD-Q4	70.78	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	31	R	4,057.21	BD-Q5	20.55	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					24.49	BD1.1	/	BD1.2
	Steel / grating					BD-R2					15.62	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					54.27	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.41	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	70	R	-									
BE1.2	Steel	t	2.83	R	49,931.41	BE-Q1	24.73	BE1.1	/	BE1.2				
BE1.3	Handrail	m	75	R	837.30	BE-Q2	0.93	BE1.1	/	BE1.3				
BE1.4	Grating	m2	22	R	1,906.07	BE-Q3	3.18	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	46	R	645.01	BE-Q4	1.52	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	12	R	239.42	BE-Q5	5.83	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					59.63	BE1.2	/	BE1.3
	Steel / grating					BE-R2					26.20	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					77.41	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					208.55	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	521	R	-									
BF1.2	Steel	t	25.25	R	49,931.41	BF-Q1	20.63	BF1.1	/	BF1.2				
BF1.3	Handrail	m	17	R	1,163.75	BF-Q2	30.65	BF1.1	/	BF1.3				
BF1.4	Grating	m2	69	R	1,715.97	BF-Q3	7.55	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	22	R	402.26	BF-Q4	23.68	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	21	R	5,390.11	BF-Q5	24.81	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					42.91	BF1.1	/	BF1.2
	Steel / grating					BF-R2					29.10	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					124.13	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					9.26	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	31,377	R	-	C-Q1	0.40	C1.1	/	C1.2				
C1.2	Total work units	WU	77,838	R	383.86									
C1.3	Pipe supports	kg	10,813	R	-	C-Q2	2.90	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	20,528	R	-	C-Q3	0.26	C1.4	/	C1.2				
C1.5	Number of welds	No	13,438	R	-	C-Q4	0.43	C1.5	/	C1.1				
C1.6	Total fittings	No	13,247	R	-	C-Q5	0.42	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,452	R	-	C-Q6	0.19	C1.7	/	C1.6				
C1.8	Support number	No	1,756	R	-	C-Q7	0.16	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	77,838	R	383.86	DA-Q1	55.28	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,408	R	113.82									
	Average cost per examination / WU					DA-R1					3.37	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	77,838	R	383.86	DB-Q1	165.26	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	471	R	217.32									
	Average cost per examination / WU					DB-R1					1.77	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	77,838	R	383.86	DC-Q1	265.66	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	293	R	226.07									
	Average cost per examination / WU					DC-R1					1.70	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	77,838	R	383.86	DD-Q1	47.87	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,626	R	99.55									
	Average cost per examination / WU					DD-R1					3.86	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	77,838	R	383.86	DE-Q1	161.49	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	482	R	176.08									
	Average cost per examination / WU					DE-R1					2.18	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	77,838	R	383.86	E-Q1	250.76	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	310.41	R	596.43	E-Q2	192.98	E1.1	/	E1.3				
E1.3	Structural steel	t	403.34	R	35,841.65									
	WU cost / install mechanical weight - receive					E-R1					0.64	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					60.09	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	77,838	R	383.86									
F1.2	Painting to piping	m2	4,903	R	162.88	F-Q1	15.88	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	2,472	R	658.06	F-Q2	31.49	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	521.83	R	891.42									
F1.5	Painting to mechanical equipment	m2	1,021	R	142.31	F-Q3	0.51	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	466	R	526.60	F-Q4	1.12	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.25	F1.2	/	F1.3
	Work unit / paint					F-R2					2.36	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.58	F1.1	/	F1.3
	Install plant / paint					F-R4					6.26	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.69	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	51,967	R	102.70									
G1.2	Electrical cable terminations	No	1,655	R	266.95	G-Q1	31.40	G1.1	/	G1.2				
G1.3	Electrical equipment	No	134	R	729.20	G-Q2	387.81	G1.1	/	G1.3				
G1.4	DB's	No	16	R	2,592.72	G-Q3	8.38	G1.3	/	G1.4				
G1.5	Rack	m	6,778	R	225.58	G-Q4	7.67	G1.1	/	G1.5				
G1.6	Support steel	kg	13,650	R	42.75	G-Q5	0.50	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	27,800	R	29.17	G-Q6	1.87	G1.1	/	G1.7				
G1.8	Instruments	No	1,138	R	265.40	G-Q7	24.43	G1.7	/	G1.8				
G1.9	Hook-ups	No	3,378	R	249.93	G-Q8	0.34	G1.8	/	G1.9				
G1.10	Light fittings	No	398	R	373.09	G-Q9	2.97	G1.10	/	G1.3				
G1.11	Conduit	m	3,895	R	41.97	G-Q10	13.34	G1.1	/	G1.11				
G1.12	Instrument stands	No	372	R	1,763.59	G-Q11	3.06	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.38	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.14	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.28	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.45	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.40	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.46	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.28	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.12	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.11	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,449	R	32.55	AB-Q1	1.98	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,249	R	11.67									
AB1.3	Back fill and compact	m3	5,776	R	33.64	AB-Q2	1.12	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,266	R	4.66	AB-Q3	1.22	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	5,090	R	7.11	AB-Q4	1.27	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					2.79	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.97	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					6.98	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.58	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	211,338.95									
AC1.2	EO for raking equipment	Item	1	R	27,617.55									
AC1.3	Number of piles	No	272	R	-									
AC1.4	Move rig to new position	No	184	R	242.21	AC-Q1	1.48	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	14	R	-	AC-Q2	19.43	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	20	R	464.37	AC-Q3	0.70	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	74	R	74.70	AC-Q4	0.19	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,395	R	143.87	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	492	R	272.92	AC-Q6	0.55	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	165	R	649.36	AC-Q7	1.65	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	132	R	209.08	AC-Q8	2.06	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	592	R	352.34	AC-Q9	0.46	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	94	R	621.59	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.84	R	6,444.09	AC-Q11	15.25	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	234.73	R	8,547.92	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,655	R	1,262.24	AC-Q13	0.16	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	181	R	1,363.60	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	169,357.86		1.00		/					
AC1.19	Load test to pile	No	2	R	21,342.53	AC-Q15	136.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	58,855.39	AC-Q16	272.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	184	R	307.03	AC-Q17	1.48	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					167.43	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.52	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.51	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.17	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.28	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.49	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.75	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					6.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					16.91	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.63	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	133	R	73.07	AD-Q1	0.15	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	910	R	78.94									
AD1.3	Kerbing	m	435	R	181.79	AD-Q2	0.23	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,871	R	-									
AD1.5	Remove top soil	m3	745	R	28.14	AD-Q3	0.56	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,340	R	70.46	AD-Q4	0.19	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,893	R	6.32									
AD1.8	Reduce levels	m3	1,336	R	27.15	AD-Q5	0.34	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	988	R	67.99	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	455	R	208.22	AD-Q7	2.17	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	343	R	129.11	AD-Q8	3.90	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,116	R	18.62	AD-Q9	4.65	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	274	R	9.79	AD-Q10	0.63	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	277	R	4.58	AD-Q11	0.63	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	403	R	777.31	AD-Q12	0.64	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	30	R	105.39	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	178.21	AD-Q14	0.07	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	203.55	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	831	R	5.42	AD-Q16	1.91	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.93	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					4.45	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					4.30	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.40	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.33	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.21	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.04	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.78	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.87	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.58	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					0.98	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.12	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	196	R	689.95	AE-Q1	5.03	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	39	R	1,057.03	AE-Q2	0.11	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	435	R	-									
AE1.4	Rip and compact	m2	1,803	R	4.57									
AE1.5	Formwork to plinth	m2	394	R	150.61	AE-Q3	10.10	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	190	R	143.28	AE-Q4	0.97	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.79	R	7,739.37	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,761	R	191.21	AE-Q6	728.50	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	714	R	30.73	AE-Q7	3.64	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	549	R	68.66	AE-Q8	2.80	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.65	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					150.97	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.14	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.21	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.48	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.04	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.10	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	4,306	R	-	AF-Q1	11.30	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	381	R	40.07	AF-Q2	1.11	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	342	R	70.42	AF-Q3	0.97	AF1.2	/	AF1.4				
AF1.4	Working space	m2	394	R	48.10	AF-Q4	0.39	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	147	R	842.49	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	218	R	54.06	AF-Q6	1.09	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	18	R	1,338.02	AF-Q7	0.12	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	1,054.38	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	237	R	-	AF-Q9	0.61	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	388	R	7.96									
AF1.11	Formwork to bases	m2	254	R	131.75	AF-Q10	1.73	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	234	R	187.66	AF-Q11	13.00	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	159.19	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.73	R	7,400.38	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	22.28	R	6,444.09	AF-Q14	10.64	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	350	R	39.08	AF-Q15	0.42	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	44	R	290.64	AF-Q16	0.41	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	3,074.51	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	95	R	569.26									
	Base excavation / backfill					AF-R1					0.57	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.83	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.03	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					15.58	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					33.39	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.25	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					105.84	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.16	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.14	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					1.15	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					21.56	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					4.60	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.48	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.19	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	256	R	49.30	AG-Q1	1.45	AG1.1	/	AG1.4				
AG1.2	Working space	m2	846	R	45.50	AG-Q2	0.30	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	71	R	62.37	AG-Q3	3.61	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	176	R	992.60	AG-Q4	1.03	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	95	R	1,343.24	AG-Q5	1.85	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	294	R	-									
AG1.7	Wood float	m2	158	R	9.94	AG-Q6	0.60	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	171	R	49.88	AG-Q7	1.03	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	579	R	168.46	AG-Q8	0.30	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	231	R	196.21	AG-Q9	0.41	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	15.46	R	5,383.77	AG-Q10	19.02	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,205	R	30.52	AG-Q11	0.13	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,521	R	43.70	AG-Q12	0.12	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.15	R	6,576.52	AG-Q13	44.19	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.92	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.27	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.17	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.15	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					5.42	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.04	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					6.63	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	317	R	48.12	AH-Q1	3.60	AH1.1	/	AH1.4				
AH1.2	Working space	m2	113	R	38.54	AH-Q2	2.81	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	255	R	96.15	AH-Q3	1.24	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	88	R	1,602.82	AH-Q4	1.33	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	20	R	1,049.40	AH-Q5	4.40	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	146	R	1,338.02	AH-Q6	0.60	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	12	R	1,054.38	AH-Q7	7.33	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	1,559.14	AH-Q8	22.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	281	R	-									
AH1.10	Blinding	m2	66	R	52.83	AH-Q9	4.26	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	1,061	R	8.76	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	127	R	138.31	AH-Q11	0.69	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	38	R	149.42	AH-Q12	0.32	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	32	R	144.22	AH-Q13	0.13	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	238	R	189.39	AH-Q14	0.08	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	29	R	192.31	AH-Q15	5.03	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	51	R	44.55	AH-Q16	2.86	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.12	R	6,316.54	AH-Q17	0.20	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	10.81	R	8,547.92	AH-Q18	25.99	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	847	R	160.79	AH-Q19	0.17	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	930	R	45.43	AH-Q20	0.30	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,096	R	32.28	AH-Q21	0.13	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.50	R	7,846.86	AH-Q22	187.33	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	528	R	66.64	AH-Q23	0.28	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	154	R	53.84	AH-Q24	0.95	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.03	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.25	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.50	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					30.34	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					182.97	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.53	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.20	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.52	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.03	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					11.59	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.06	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					10.81	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.54	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.96	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					30.03	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.74	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					53.16	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					188.16	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					264.81	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.20	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					20.08	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					24.85	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	233	R	50.78	AI-Q1	2.65	AI1.1	/	AI1.5				
AI1.2	Working space	m2	824	R	44.41	AI-Q2	0.28	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	116	R	65.23	AI-Q3	2.01	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	233	R	53.48	AI-Q4	0.38	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	88	R	1,717.65	AI-Q5	7.33	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	12	R	770.30	AI-Q6	0.33	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	75	R	-									
AI1.8	Wood float	m2	269	R	8.71									
AI1.9	Formwork bases	m2	159	R	134.49	AI-Q7	0.55	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	223	R	171.92	AI-Q8	0.05	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.48	R	6,709.69	AI-Q9	10.03	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	4,399	R	51.97	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.40	R	7,485.84	AI-Q11	62.86	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.14	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.78	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					32.12	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					2.23	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					197.20	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.77	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					4.48	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					129.11	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.23	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	299	R	57.79	AJ-Q1	3.32	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	910	R	29.77	AJ-Q2	0.33	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	136	R	85.48	AJ-Q3	2.20	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	311	R	92.87	AJ-Q4	0.29	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	90	R	1,021.74	AJ-Q5	2.37	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	32	R	1,597.40	AJ-Q6	2.81	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	38	R	952.00									
AJ1.8	Total concrete	m3	193	R	-									
AJ1.9	Wood float	m2	327	R	10.18	AJ-Q7	0.59	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	275	R	138.31	AJ-Q8	0.33	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	314	R	149.42	AJ-Q9	0.10	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.64	R	6,850.29	AJ-Q10	18.14	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	5,462	R	46.63	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,651	R	28.96	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.33	R	6,114.95	AJ-Q13	67.67	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.06	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.94	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.68	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					11.00	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					100.37	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.39	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					10.69	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					146.91	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					236.54	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.17	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	508	R	79.51	AK-Q1	1.72	AK1.1	/	AK1.5				
AK1.2	Working space	m2	1,203	R	31.64	AK-Q2	0.42	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	283	R	74.00	AK-Q3	1.80	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	342	R	55.45	AK-Q4	0.86	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	295	R	1,398.77	AK-Q5	26.82	AK1.5		AK1.6				
AK1.6	Concrete column	m3	11	R	1,125.78									
AK1.7	Concrete plinth	m3	44	R	1,071.01	AK-Q6	6.70	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	327	R	-									
AK1.9	Wood float	m2	355	R	6.21	AK-Q7	0.83	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	625	R	204.45	AK-Q8	0.47	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	168	R	196.56	AK-Q9	0.26	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	30	R	144.75	AK-Q10	0.37	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	37.23	R	9,614.66	AK-Q11	8.78	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,431	R	34.17	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.54	R	6,212.67	AK-Q13	128.74	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.06	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.51	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.07	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					25.23	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					225.24	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					6.84	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.45	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.78	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					281.38	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.23	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	475	R	79.39	AL-Q1	2.34	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,397	R	27.98	AL-Q2	0.34	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	247	R	98.84	AL-Q3	1.92	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	271	R	82.42	AL-Q4	0.75	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	203	R	1,076.47	AL-Q5	1.13	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	180	R	1,162.92	AL-Q6	3.75	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	48	R	1,076.47	AL-Q7	4.23	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	442	R	-									
AL1.9	Wood float	m2	293	R	6.34	AL-Q8	0.69	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	332	R	131.28	AL-Q9	0.61	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,099	R	227.51	AL-Q10	0.16	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	196	R	164.72	AL-Q11	0.24	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	77	R	292.37	AL-Q12	0.62	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	12	R	201.94	AL-Q13	15.00	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	38.91	R	9,883.99	AL-Q14	11.36	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,046	R	28.88	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	323	R	44.77	AL-Q16	1.37	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.63	R	9,073.36	AL-Q17	701.59	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.84	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.80	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					13.06	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					169.79	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.93	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.93	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.20	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.54	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					5.11	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					3.68	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.54	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					5.33	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					342.24	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					220.77	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.12	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,217	R	76.03	AM-Q1	4.54	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,647	R	29.87	AM-Q2	0.74	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,163	R	96.15	AM-Q3	1.05	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	678	R	80.32	AM-Q4	0.40	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	268	R	1,049.40									
AM1.6	Concrete column	m3	163	R	1,338.02	AM-Q5	1.64	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	150	R	1,054.38	AM-Q6	1.09	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	255	R	1,559.14	AM-Q7	1.05	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	77	R	1,250.80	AM-Q8	2.12	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	117	R	1,125.78	AM-Q9	1.39	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	979	R	-									
AM1.12	Wood float	m2	1,550	R	7.47	AM-Q10	0.63	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	879	R	179.79	AM-Q11	0.30	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	678	R	146.58	AM-Q12	0.24	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	535	R	169.18	AM-Q13	0.28	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	279	R	244.90	AM-Q14	0.54	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	557	R	277.48	AM-Q15	0.46	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	7	R	473.23	AM-Q16	23.29	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	366	R	207.89	AM-Q17	0.21	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	157.26	R	7,959.62	AM-Q18	6.23	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,122	R	33.83	AM-Q19	0.24	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,879	R	33.75	AM-Q20	0.34	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	60	R	948.66	AM-Q21	2.62	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.94	R	7,020.80	AM-Q22	1041.49	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.07	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.55	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.79	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					13.07	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.78	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.00	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.67	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.84	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.93	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					140.48	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.84	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.23	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.31	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					9.13	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.23	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					4.06	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					6.02	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					235.28	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					235.84	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.39	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.15	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,408	R	50.33	AN-Q1	2.07	AN1.1	/	AN1.5				
AN1.2	Working space	m2	380	R	39.48	AN-Q2	6.34	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	494	R	54.93	AN-Q3	4.87	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	2,150	R	51.69	AN-Q4	0.54	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,162	R	1,430.67	AN-Q5								
AN1.6	Concrete column	m3	56	R	1,430.67	AN-Q6	20.75	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	39	R	1,021.74	AN-Q7	1.44	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	137	R	1,110.69	AN-Q8	8.48	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	1,759.73	AN-Q9	9.33	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,458	R	-				/					
AN1.11	Wood float	m2	1,686	R	6.70	AN-Q10	0.69	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	259	R	172.59	AN-Q11	4.49	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	387	R	145.99	AN-Q12	0.14	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	199	R	167.35	AN-Q13	0.20	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	83	R	314.38	AN-Q14	0.47	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	31	R	206.05	AN-Q15	0.19	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	2	R	304.41	AN-Q16	581.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,181	R	198.06	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	515.62	R	8,705.53	AN-Q18	4.77	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	11,017	R	30.45	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	9,897	R	51.60	AN-Q20	0.25	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	83	R	938.40	AN-Q21	29.61	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.71	R	6,442.54	AN-Q22	679.53	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.27	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.92	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					27.68	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					213.53	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					8.29	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.11	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					3.25	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					9.80	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.36	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					8.54	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.61	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					285.90	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					168.71	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.22	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					9.28	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	287	R	43.97	AO-Q1	2.90	AO1.1	/	AO1.5				
AO1.2	Working space	m2	537	R	29.77	AO-Q2	0.53	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	147	R	85.48	AO-Q3	1.95	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	33	R	57.99	AO-Q4	3.00	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	99	R	1,004.55									
AO1.6	Concrete column	m3	25	R	1,485.46	AO-Q5	3.96	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	14	R	1,368.01	AO-Q6	1.79	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	1,046.77	AO-Q7	24.75	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,547.89	AO-Q8	25.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	44	R	-									
AO1.11	Wood float	m2	37	R	6.32	AO-Q9	2.68	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	135	R	198.88	AO-Q10	0.73	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	237	R	139.59	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	52	R	173.29	AO-Q12	0.27	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	17	R	187.61	AO-Q13	0.82	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	6	R	300.55	AO-Q14	0.17	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	52	R	224.14	AO-Q15	1.90	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	19	R	135.02	AO-Q16	0.21	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	7.81	R	6,444.09	AO-Q17	5.63	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,885	R	51.19	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,089	R	24.55	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	1,117.04	AO-Q20	4.40	AO1.10	/	AO1.22				
AO1.23	Grout	m3	5.29	R	10,531.71	AO-Q21	18.71	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.48	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.51	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					17.32	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					158.95	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.05	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					7.89	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					7.29	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					10.64	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					6.10	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.15	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.75	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					125.89	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					262.49	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.10	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.77	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	2,150	R	50.78	AP-Q1	2.99	AP1.1	/	AP1.5				
AP1.2	Working space	m2	389	R	38.54	AP-Q2	5.53	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,016	R	69.93	AP-Q3	2.12	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	266	R	61.15	AP-Q4	2.70	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	718	R	1,547.89	AP-Q5	0.35	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,052	R	145.96									
AP1.7	Rough formwork	m2	393	R	138.31	AP-Q6	1.83	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,115	R	165.63	AP-Q7	0.64	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,353	R	15.67	AP-Q8	0.31	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	162	R	76.79	AP-Q9	4.43	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	84	R	68.50	AP-Q10	8.55	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	353	R	33.83	AP-Q11	2.03	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.75	R	5,295.24	AP-Q12	957.33	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,528	R	183.10	AP-Q13	0.47	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	4,370	R	-	AP-Q14	6.09	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,130	R	125.73	AP-Q15	3.87	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,501	R	199.39	AP-Q16	2.91	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	4,370	R	98.89	AP-Q17	1.00	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	8	R	1,206.54	AP-Q18	546.25	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,131	R	262.68	AP-Q19	1.40	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,525	R	128.81	AP-Q20	0.97	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	101.53	R	6,850.29	AP-Q21	7.07	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	32,679.08									
AP1.24	Structural steel	Item	1	R	84,619.15									
AP1.25	Plumbing and drainage	Item	1	R	53,880.31									
AP1.26	Small power and lighting	Item	1	R	459,022.37									
AP1.27	External works	Item	1	R	198,349.79									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.32	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.73	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					25.31	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					46.93	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					11.19	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					9.35	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					98.78	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					20.16	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					22.60	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					202.49	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.29	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					12.31	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					34.36	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.85	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.70	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.42	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.77	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.35	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.87	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					67.01	AP1.26	/	AP1.22
	External works / concrete					AP-R23					128.14	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	72	R	1,376.15	AQ-Q1	2.58	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	186	R	137.01									
AQ1.3	Reinforcement	t	11.94	R	4,390.62	AQ-Q2	6.03	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	999	R	145.04	AQ-Q3	0.07	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	293	R	183.82	AQ-Q4	0.25	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	122	R	182.67	AQ-Q5	8.65	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	856	R	103.11	AQ-Q6	1.23	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	43.85	R	19,044.20	AQ-Q7	24.06	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	730	R	129.28	AQ-Q8	1.45	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	9,495.16	AQ-Q9	527.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	35	R	1,229.87	AQ-Q10	30.14	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	856	R	58.30	AQ-Q11	1.23	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,055	R	-									
	Concrete / reinforcement					AQ-R1					0.31	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					10.04	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.49	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.49	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					7.53	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					184.70	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.25	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.50	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					11.93	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.77	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	238	R	229.45	AR-Q1	4.86	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	49	R	704.30	AR-Q2	6.19	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	7.91	R	6,866.46									
AR1.4	Mesh	m2	447	R	119.40	AR-Q3	0.11	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	121	R	137.61	AR-Q4	0.40	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	123	R	292.59	AR-Q5	3.90	AR1.15	/	AR1.6				
AR1.7	Screed	m2	353	R	26.01	AR-Q6	1.36	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	51.60	R	21,140.82	AR-Q7	9.30	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	9	R	2,380.96	AR-Q8	5.73	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	43	R	667.07	AR-Q9	1.20	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	51	R	288.61	AR-Q10	1.01	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	702	R	101.37	AR-Q11	0.68	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	100	R	92.07	AR-Q12	4.80	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	39	R	1,436.23	AR-Q13	1.32	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	480	R	-									
	Earthworks / concrete					AR-R1					0.33	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.10	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					5.90	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.12	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					2.41	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					27.08	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.88	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					31.69	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.31	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					208.55	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.91	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					14.72	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	194	R	102.96	AS-Q1	1.75	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	138	R	55.37	AS-Q2	0.80	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	111	R	1,527.07	AS-Q3	16.37	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	6.78	R	7,164.08									
AS1.5	Mesh	m2	131	R	102.70	AS-Q4	0.85	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	265	R	133.38	AS-Q5	0.42	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	134	R	9.71	AS-Q6	0.83	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	32	R	62.54	AS-Q7	3.47	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	757	R	39.78	AS-Q8	0.15	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.04	R	6,442.54	AS-Q9	106.73	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	49	R	207.92	AS-Q10	0.16	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	3,285.81	AS-Q11	2.00	AS1.18	/	AS1.12				
AS1.13	Pipework	m	47	R	582.67	AS-Q12	4.21	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	650	R	29.49	AS-Q13	0.17	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.54	R	21,220.70	AS-Q14	5.19	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.89	R	36,086.64	AS-Q15	222.47	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	198	R	-									
AS1.18	Total control room area	m2	8	R	-									
	Concrete / earthworks					AS-R1					14.83	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					27.58	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					69.76	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					11.45	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					157.27	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					24.42	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					180.09	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.62	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.24	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.34	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.20	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	108	R	141.36	AT-Q1	7.20	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	15	R	90.65	AT-Q2	1.00	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	15	R	736.56	AT-Q3	8.72	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.72	R	6,702.26									
AT1.5	Formwork	m2	195	R	149.42	AT-Q4	0.08	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	29	R	13.01	AT-Q5	0.52	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	37	R	65.02	AT-Q6	0.41	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.46	R	43.95	AT-Q7	32.61	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.62	R	9,827.64	AT-Q8	24.19	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.09	R	24.66	AT-Q9	166.67	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.92	R	20,520.71	AT-Q10	32.61	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.07	R	25,608.97	AT-Q11	28.04	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	69	R	185.59	AT-Q12	0.43	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	12	R	159.29	AT-Q13	2.50	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	30	R	-									
	Concrete / earthworks					AT-R1					5.21	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					8.13	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					4.93	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					56.61	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					11.33	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					152.50	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					1.78	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.07	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.33	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.26	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					3.97	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.17	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,738	R	210.27	AV-Q1	0.74	AV1.10	/	AV1.1				
AV1.2	Lining	m2	2,866	R	52.61	AV-Q2	0.96	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,238	R	123.44	AV-Q3	0.65	AV1.10	/	AV1.3				
AV1.4	Pipework	m	67	R	579.49	AV-Q4	41.01	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	4,522.22	AV-Q5	16.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	34	R	968.29	AV-Q6	1.97	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	162	R	176.81	AV-Q7	0.21	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	22	R	128.99	AV-Q8	1.55	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	4.78	R	9,717.74	AV-Q9	7.11	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,748	R	-									
	Earthworks / lining					AV-R1					4.00	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.70	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.43	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.36	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.13	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.05	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.48	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					7.51	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.10	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	26	R	-									
BA1.2	Steel	t	2.65	R	19,919.12	BA-Q1	9.81	BA1.1	/	BA1.2				
BA1.3	Handrail	m	23	R	757.14	BA-Q2	1.13	BA1.1	/	BA1.3				
BA1.4	Grating	m2	25	R	1,503.34	BA-Q3	1.04	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	263.01	BA-Q4	1.86	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	320.50	BA-Q5	4.33	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					26.31	BA1.2	/	BA1.3
	Steel / grating					BA-R2					13.25	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					75.74	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					62.15	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,960	R	-									
BB1.2	Steel	t	57.86	R	20,117.87	BB-Q1	33.87	BB1.1	/	BB1.2				
BB1.3	Handrail	m	103	R	1,209.40	BB-Q2	19.03	BB1.1	/	BB1.3				
BB1.4	Grating	m2	103	R	1,267.05	BB-Q3	19.03	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	114	R	259.88	BB-Q4	17.19	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	14	R	4,211.04	BB-Q5	140.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					16.63	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.88	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					77.41	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					4.78	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	22,140	R	-									
BC1.2	Steel	t	180.47	R	20,360.18	BC-Q1	122.68	BC1.1	/	BC1.2				
BC1.3	Handrail	m	502	R	748.52	BC-Q2	44.10	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,257	R	1,822.58	BC-Q3	5.20	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	491	R	269.50	BC-Q4	45.09	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	81	R	257.06	BC-Q5	273.33	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	97	R	4,330.72	BC-Q6	228.25	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					27.20	BC1.2	/	BC1.3
	Steel / grating					BC-R2					11.17	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					75.55	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					79.20	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					4.70	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	473	R	-									
BD1.2	Steel	t	29.32	R	26,573.65	BD-Q1	16.13	BD1.1	/	BD1.2				
BD1.3	Handrail	m	9	R	829.14	BD-Q2	52.56	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	1,313.82	BD-Q3	59.13	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	17	R	378.17	BD-Q4	27.82	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	22	R	2,585.87	BD-Q5	21.50	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					32.05	BD1.1	/	BD1.2
	Steel / grating					BD-R2					20.23	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					70.27	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					10.28	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	43	R	-									
BE1.2	Steel	t	4.32	R	27,726.68	BE-Q1	9.95	BE1.1	/	BE1.2				
BE1.3	Handrail	m	28	R	789.84	BE-Q2	1.54	BE1.1	/	BE1.3				
BE1.4	Grating	m2	22	R	2,001.00	BE-Q3	1.95	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	37	R	268.13	BE-Q4	1.16	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	10	R	295.05	BE-Q5	4.30	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					35.10	BE1.2	/	BE1.3
	Steel / grating					BE-R2					13.86	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					103.41	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					93.97	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	314	R	-									
BF1.2	Steel	t	40.28	R	27,726.68	BF-Q1	7.80	BF1.1	/	BF1.2				
BF1.3	Handrail	m	14	R	1,180.48	BF-Q2	22.43	BF1.1	/	BF1.3				
BF1.4	Grating	m2	51	R	1,045.77	BF-Q3	6.16	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	14	R	281.43	BF-Q4	22.43	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	19	R	2,693.03	BF-Q5	16.53	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					23.49	BF1.1	/	BF1.2
	Steel / grating					BF-R2					26.51	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					98.52	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					10.30	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	16,577	R	-	C-Q1	0.28	C1.1	/	C1.2				
C1.2	Total work units	WU	59,259	R	267.58									
C1.3	Pipe supports	kg	10,264	R	-	C-Q2	1.62	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,689	R	-	C-Q3	0.20	C1.4	/	C1.2				
C1.5	Number of welds	No	12,370	R	-	C-Q4	0.75	C1.5	/	C1.1				
C1.6	Total fittings	No	6,623	R	-	C-Q5	0.40	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,337	R	-	C-Q6	0.35	C1.7	/	C1.6				
C1.8	Support number	No	2,129	R	-	C-Q7	0.21	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	59,259	R	267.58	DA-Q1	40.56	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,461	R	36.59									
	Average cost per examination / WU					DA-R1					7.31	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	59,259	R	267.58	DB-Q1	120.45	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	492	R	86.13									
	Average cost per examination / WU					DB-R1					3.11	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	59,259	R	267.58	DC-Q1	234.23	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	253	R	154.38									
	Average cost per examination / WU					DC-R1					1.73	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	59,259	R	267.58	DD-Q1	28.46	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	2,082	R	67.98									
	Average cost per examination / WU					DD-R1					3.94	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	59,259	R	267.58	DE-Q1	107.94	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	549	R	120.70									
	Average cost per examination / WU					DE-R1					2.22	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	59,259	R	267.58	E-Q1	243.05	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	243.81	R	394.01	E-Q2	179.44	E1.1	/	E1.3				
E1.3	Structural steel	t	330.24	R	23,890.13									
	WU cost / install mechanical weight - receive					E-R1					0.68	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					60.63	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	59,259	R	267.58									
F1.2	Painting to piping	m2	5,091	R	167.12	F-Q1	11.64	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,258	R	498.66	F-Q2	47.11	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	254.98	R	344.26									
F1.5	Painting to mechanical equipment	m2	1,127	R	171.22	F-Q3	0.23	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	396	R	283.03	F-Q4	0.64	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.34	F1.2	/	F1.3
	Work unit / paint					F-R2					1.60	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.54	F1.1	/	F1.3
	Install plant / paint					F-R4					2.01	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.22	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	50,772	R	34.78									
G1.2	Electrical cable terminations	No	931	R	117.13	G-Q1	54.53	G1.1	/	G1.2				
G1.3	Electrical equipment	No	115	R	508.31	G-Q2	441.50	G1.1	/	G1.3				
G1.4	DB's	No	14	R	1,807.33	G-Q3	8.21	G1.3	/	G1.4				
G1.5	Rack	m	8,498	R	267.69	G-Q4	5.97	G1.1	/	G1.5				
G1.6	Support steel	kg	5,984	R	14.94	G-Q5	1.42	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	23,869	R	18.64	G-Q6	2.13	G1.1	/	G1.7				
G1.8	Instruments	No	920	R	163.75	G-Q7	25.94	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,644	R	179.82	G-Q8	0.35	G1.8	/	G1.9				
G1.10	Light fittings	No	313	R	202.80	G-Q9	2.72	G1.10	/	G1.3				
G1.11	Conduit	m	3,049	R	28.19	G-Q10	16.65	G1.1	/	G1.11				
G1.12	Instrument stands	No	318	R	1,029.34	G-Q11	2.89	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.30	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.28	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.23	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.33	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.13	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.17	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.10	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.11	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,881	R	18.67	AB-Q1	2.37	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,902	R	4.80									
AB1.3	Back fill and compact	m3	5,529	R	20.67	AB-Q2	1.24	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,704	R	2.67	AB-Q3	1.46	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,547	R	4.37	AB-Q4	1.51	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.89	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.90	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					6.99	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.27	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	144,791.35									
AC1.2	EO for raking equipment	Item	1	R	15,842.76									
AC1.3	Number of piles	No	260	R	-									
AC1.4	Move rig to new position	No	165	R	138.95	AC-Q1	1.58	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	12	R	-	AC-Q2	21.67	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	20	R	266.38	AC-Q3	0.60	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	66	R	45.91	AC-Q4	0.18	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,819	R	82.53	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	440	R	156.56	AC-Q6	0.59	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	137	R	330.58	AC-Q7	1.90	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	168	R	181.00	AC-Q8	1.55	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	836	R	303.17	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	84	R	425.86	AC-Q10	0.14	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	17.07	R	3,696.64	AC-Q11	15.23	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	224.68	R	5,253.75	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,479	R	724.08	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	162	R	782.23	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	97,151.85		1.00		/					
AC1.19	Load test to pile	No	2	R	13,117.61	AC-Q15	130.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	33,762.29	AC-Q16	260.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	165	R	176.13	AC-Q17	1.58	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.97	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.56	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.46	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.42	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.59	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.26	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.12	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.63	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	148	R	41.92	AD-Q1	0.13	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,101	R	48.52									
AD1.3	Kerbing	m	416	R	104.28	AD-Q2	0.25	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	1,671	R	-									
AD1.5	Remove top soil	m3	666	R	17.29	AD-Q3	0.44	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,498	R	40.12	AD-Q4	0.19	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,478	R	4.33									
AD1.8	Reduce levels	m3	1,279	R	15.58	AD-Q5	0.37	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	883	R	41.79	AD-Q6	1.45	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	397	R	127.98	AD-Q7	2.22	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	323	R	79.35	AD-Q8	3.96	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,557	R	11.44	AD-Q9	3.92	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	306	R	5.61	AD-Q10	0.96	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	336	R	2.82	AD-Q11	0.74	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	386	R	445.90	AD-Q12	0.81	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	27	R	60.46	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	109.53	AD-Q14	0.06	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	8	R	159.94	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	611	R	3.33	AD-Q16	1.47	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.86	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.99	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.60	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.37	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.33	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.96	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.09	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.51	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.81	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.05	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.03	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					0.58	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.05	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.53	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.03	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	248	R	597.29	AE-Q1	4.51	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	55	R	909.52	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	388	R	-									
AE1.4	Rip and compact	m2	1,726	R	2.62									
AE1.5	Formwork to plinth	m2	377	R	92.57	AE-Q3	6.85	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	169	R	82.19	AE-Q4	0.68	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	3.38	R	4,439.68	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,643	R	109.69	AE-Q6	781.95	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	638	R	18.89	AE-Q7	2.57	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	490	R	39.39	AE-Q8	1.98	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.66	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					227.97	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.47	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,847	R	-	AF-Q1	11.31	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	340	R	24.63	AF-Q2	1.71	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	199	R	36.46	AF-Q3	0.44	AF1.2	/	AF1.4				
AF1.4	Working space	m2	777	R	29.56	AF-Q4	0.35	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	120	R	517.81	AF-Q5	0.05	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	213	R	31.01	AF-Q6	1.07	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	916.70	AF-Q7	0.14	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	648.05	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	227	R	-	AF-Q9	0.65	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	347	R	5.45									
AF1.11	Formwork to bases	m2	243	R	80.98	AF-Q10	2.03	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	213	R	92.10	AF-Q11	12.53	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	12	R	107.90	AF-Q12	6.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.69	R	6,882.72	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	24.24	R	2,688.82	AF-Q14	9.36	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	235	R	18.83	AF-Q15	0.51	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	54	R	108.88	AF-Q16	0.31	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	1,933.41	AF-Q17	0.06	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	85	R	349.88									
	Base excavation / backfill					AF-R1					0.68	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					0.83	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.02	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					16.70	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					37.22	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					1.25	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					95.01	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.16	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.17	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					2.56	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					27.50	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					8.42	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					1.48	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.18	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	232	R	30.30	AG-Q1	1.48	AG1.1	/	AG1.4				
AG1.2	Working space	m2	810	R	26.64	AG-Q2	0.29	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	63	R	39.13	AG-Q3	3.68	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	157	R	622.76	AG-Q4	1.08	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	65	R	938.58	AG-Q5	2.42	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	284	R	-									
AG1.7	Wood float	m2	175	R	6.11	AG-Q6	0.37	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	145	R	30.66	AG-Q7	1.08	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	422	R	119.31	AG-Q8	0.37	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	129	R	75.55	AG-Q9	0.50	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	19.47	R	3,880.00	AG-Q10	14.59	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	3,136	R	26.37	AG-Q11	0.09	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,154	R	20.50	AG-Q12	0.13	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.10	R	3,727.14	AG-Q13	30.95	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.88	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.29	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.05	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.19	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.08	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					6.23	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.04	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.98	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	268	R	29.58	AH-Q1	5.25	AH1.1	/	AH1.4				
AH1.2	Working space	m2	82	R	27.30	AH-Q2	3.27	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	242	R	53.42	AH-Q3	1.11	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	51	R	805.85	AH-Q4	0.81	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	19	R	675.39	AH-Q5	2.68	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	140	R	729.62	AH-Q6	0.36	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	12	R	825.59	AH-Q7	4.25	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	645.80	AH-Q8	12.75	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	251	R	-									
AH1.10	Blinding	m2	63	R	33.27	AH-Q9	3.98	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	967	R	5.34	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	124	R	76.74	AH-Q11	0.41	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	37	R	116.86	AH-Q12	0.32	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	34	R	133.44	AH-Q13	0.12	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	228	R	124.72	AH-Q14	0.08	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	28	R	112.61	AH-Q15	5.00	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	46	R	27.95	AH-Q16	3.04	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	1.90	R	3,963.03	AH-Q17	0.26	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.43	R	5,972.75	AH-Q18	33.78	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	817	R	98.83	AH-Q19	0.17	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,032	R	27.92	AH-Q20	0.24	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,777	R	19.84	AH-Q21	0.14	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.10	R	5,557.64	AH-Q22	228.18	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	294	R	25.66	AH-Q23	0.48	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	194	R	38.80	AH-Q24	0.72	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.04	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.08	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.55	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					24.22	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					150.91	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.19	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.10	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.98	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.25	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					10.50	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					7.06	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					4.84	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.42	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.48	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					26.10	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.66	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					60.43	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					213.92	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					301.05	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.14	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					28.43	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					18.80	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	190	R	26.38	AI-Q1	2.26	AI1.1	/	AI1.5				
AI1.2	Working space	m2	589	R	18.06	AI-Q2	0.32	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	141	R	52.21	AI-Q3	1.35	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	187	R	31.30	AI-Q4	0.45	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	84	R	805.85	AI-Q5	6.46	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	675.39	AI-Q6	0.43	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	71	R	-									
AI1.8	Wood float	m2	196	R	3.77									
AI1.9	Formwork bases	m2	216	R	101.06	AI-Q7	0.39	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	140	R	84.70	AI-Q8	0.09	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.44	R	4,532.01	AI-Q9	9.54	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,998	R	19.10	AI-Q10	0.02	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.25	R	4,911.79	AI-Q11	67.20	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.46	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.51	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					25.75	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.19	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					213.75	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.97	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.97	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					237.28	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.16	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	292	R	32.09	AJ-Q1	3.89	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	990	R	23.69	AJ-Q2	0.29	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	91	R	55.87	AJ-Q3	3.21	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	383	R	31.05	AJ-Q4	0.20	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	75	R	891.17	AJ-Q5	2.08	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	28	R	820.70	AJ-Q6	2.68	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	36	R	627.98									
AJ1.8	Total concrete	m3	198	R	-									
AJ1.9	Wood float	m2	299	R	3.74	AJ-Q7	0.66	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	182	R	103.54	AJ-Q8	0.41	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	233	R	138.97	AJ-Q9	0.12	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	11.48	R	3,900.70	AJ-Q10	17.25	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,726	R	31.94	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,548	R	16.61	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.11	R	3,865.04	AJ-Q13	67.57	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.04	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.35	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.57	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					28.70	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					238.28	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.61	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					5.91	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					122.13	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					234.84	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.23	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	464	R	45.20	AK-Q1	1.81	AK1.1	/	AK1.5				
AK1.2	Working space	m2	795	R	27.54	AK-Q2	0.58	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	210	R	59.52	AK-Q3	2.21	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	369	R	38.66	AK-Q4	0.69	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	256	R	615.19	AK-Q5	28.44	AK1.5		AK1.6				
AK1.6	Concrete column	m3	9	R	825.59									
AK1.7	Concrete plinth	m3	44	R	1,081.57	AK-Q6	5.82	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	278	R	-									
AK1.9	Wood float	m2	433	R	6.10	AK-Q7	0.59	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	403	R	73.38	AK-Q8	0.64	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	146	R	93.75	AK-Q9	0.30	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	29	R	100.23	AK-Q10	0.31	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	35.36	R	5,342.15	AK-Q11	7.86	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,557	R	20.58	AK-Q12	0.05	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.09	R	5,099.89	AK-Q13	89.97	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.64	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.76	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					15.91	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					100.85	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					8.38	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					11.54	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.24	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					259.58	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.12	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	424	R	40.79	AL-Q1	3.16	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,337	R	18.46	AL-Q2	0.32	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	253	R	59.09	AL-Q3	1.68	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	248	R	30.29	AL-Q4	0.54	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	134	R	805.85	AL-Q5	1.00	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	134	R	1,081.57	AL-Q6	2.58	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	52	R	612.97	AL-Q7	2.58	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	382	R	-									
AL1.9	Wood float	m2	274	R	3.63	AL-Q8	0.49	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	277	R	82.98	AL-Q9	0.48	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	982	R	91.98	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	208	R	120.97	AL-Q11	0.25	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	107	R	123.62	AL-Q12	0.49	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	17	R	154.77	AL-Q13	7.88	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	38.76	R	4,478.54	AL-Q14	9.86	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	11,809	R	18.12	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	202	R	31.29	AL-Q16	1.89	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.81	R	5,576.69	AL-Q17	471.60	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.21	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.69	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					26.60	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					222.00	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					9.71	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.07	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					11.76	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.96	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.07	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					3.96	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					247.16	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					143.13	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.14	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,057	R	36.26	AM-Q1	2.91	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,615	R	20.69	AM-Q2	0.65	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,104	R	53.42	AM-Q3	0.96	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	649	R	33.27	AM-Q4	0.56	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	363	R	839.16									
AM1.6	Concrete column	m3	131	R	802.71	AM-Q5	2.77	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	154	R	632.55	AM-Q6	0.85	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	237	R	935.37	AM-Q7	1.53	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	44	R	750.38	AM-Q8	2.98	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	137	R	615.19	AM-Q9	0.96	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,419	R	-									
AM1.12	Wood float	m2	1,375	R	4.01	AM-Q10	1.03	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	938	R	103.14	AM-Q11	0.39	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	606	R	90.09	AM-Q12	0.22	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	527	R	99.14	AM-Q13	0.29	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	176	R	128.81	AM-Q14	0.88	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	637	R	107.62	AM-Q15	0.37	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	5	R	244.20	AM-Q16	26.20	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	436	R	144.21	AM-Q17	0.10	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	110.97	R	3,900.70	AM-Q18	12.79	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,028	R	16.90	AM-Q19	0.35	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	3,133	R	22.51	AM-Q20	0.45	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	57	R	487.30	AM-Q21	1.95	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.83	R	3,176.74	AM-Q22	1709.64	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.04	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.75	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.68	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					25.22	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.05	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.33	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.90	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.12	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.36	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					209.27	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					8.14	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.38	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.91	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					8.91	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.59	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.72	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					5.20	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					230.81	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					173.29	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.00	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.26	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,305	R	32.44	AN-Q1	1.15	AN1.1	/	AN1.5				
AN1.2	Working space	m2	364	R	18.13	AN-Q2	6.33	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	398	R	52.23	AN-Q3	5.79	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,253	R	32.35	AN-Q4	1.60	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,007	R	894.22	AN-Q5								
AN1.6	Concrete column	m3	74	R	675.39	AN-Q6	27.12	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	32	R	729.62	AN-Q7	2.31	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	131	R	644.85	AN-Q8	15.32	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	614.94	AN-Q9	12.33	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,358	R	-				/					
AN1.11	Wood float	m2	1,617	R	5.96	AN-Q10	1.24	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	169	R	74.64	AN-Q11	11.88	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	370	R	117.58	AN-Q12	0.20	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	190	R	117.62	AN-Q13	0.17	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	80	R	167.68	AN-Q14	0.40	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	28	R	92.90	AN-Q15	0.21	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	190.74	AN-Q16	669.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,582	R	114.44	AN-Q17	0.08	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	550.14	R	3,900.70	AN-Q18	2.47	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	9,842	R	27.30	AN-Q19	0.14	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	9,474	R	20.50	AN-Q20	0.14	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	134	R	1,044.83	AN-Q21	10.13	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.52	R	2,655.69	AN-Q22	796.43	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.79	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.62	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					27.64	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					150.04	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					11.98	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.20	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					4.35	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					5.74	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.83	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					6.62	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					5.63	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					142.88	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					190.28	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.34	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					3.73	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	344	R	30.56	AO-Q1	2.57	AO1.1	/	AO1.5				
AO1.2	Working space	m2	772	R	28.96	AO-Q2	0.45	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	88	R	28.24	AO-Q3	3.91	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	29	R	33.27	AO-Q4	4.62	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	134	R	697.66									
AO1.6	Concrete column	m3	33	R	602.66	AO-Q5	4.06	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	15	R	891.17	AO-Q6	2.20	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	3	R	820.70	AO-Q7	44.67	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	627.98	AO-Q8	33.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	40	R	-									
AO1.11	Wood float	m2	38	R	4.20	AO-Q9	3.53	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	124	R	91.50	AO-Q10	1.08	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	165	R	127.36	AO-Q11	0.20	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	51	R	104.11	AO-Q12	0.29	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	17	R	75.76	AO-Q13	0.88	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	7	R	116.07	AO-Q14	0.14	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	33	R	248.60	AO-Q15	4.06	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	16	R	78.40	AO-Q16	0.19	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.95	R	3,789.45	AO-Q17	6.72	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,739	R	23.44	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,277	R	20.43	AO-Q19	0.01	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	10	R	666.04	AO-Q20	4.00	AO1.10	/	AO1.22				
AO1.23	Grout	m3	4.38	R	5,557.64	AO-Q21	30.59	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.04	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.06	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					1.08	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					20.97	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					166.11	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					7.62	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.56	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					11.76	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.73	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.58	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.41	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					10.47	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					161.67	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					185.48	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.13	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					5.69	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,783	R	42.65	AP-Q1	2.77	AP1.1	/	AP1.5				
AP1.2	Working space	m2	478	R	18.02	AP-Q2	3.73	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	926	R	39.39	AP-Q3	1.93	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	137	R	21.32	AP-Q4	4.70	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	644	R	634.14	AP-Q5	0.32	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,042	R	87.01									
AP1.7	Rough formwork	m2	385	R	110.28	AP-Q6	1.67	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,140	R	87.30	AP-Q7	0.56	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,928	R	8.24	AP-Q8	0.16	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	106	R	22.86	AP-Q9	6.08	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	50	R	61.19	AP-Q10	12.88	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	280	R	18.42	AP-Q11	2.30	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.63	R	6,189.51	AP-Q12	1022.22	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,463	R	159.88	AP-Q13	0.44	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,904	R	-	AP-Q14	6.06	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,951	R	61.31	AP-Q15	2.00	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,445	R	201.83	AP-Q16	2.70	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	3,834	R	67.45	AP-Q17	1.02	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	7	R	516.74	AP-Q18	557.71	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,240	R	143.91	AP-Q19	0.92	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,892	R	102.46	AP-Q20	1.00	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	76.80	R	3,996.27	AP-Q21	8.39	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	19,605.00									
AP1.24	Structural steel	Item	1	R	50,765.14									
AP1.25	Plumbing and drainage	Item	1	R	32,324.14									
AP1.26	Small power and lighting	Item	1	R	275,379.00									
AP1.27	External works	Item	1	R	118,995.00									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.37	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.08	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					29.74	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					45.93	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					5.75	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.26	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					76.96	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					27.74	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					10.36	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					216.95	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.10	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					10.34	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					19.80	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.37	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.31	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					1.11	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.56	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.91	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					12.70	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.09	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					68.91	AP1.26	/	AP1.22
	External works / concrete					AP-R23					187.65	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	75	R	645.80	AQ-Q1	1.52	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	114	R	88.79									
AQ1.3	Reinforcement	t	9	R	6,581.25	AQ-Q2	8.33	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	892	R	109.29	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	251	R	80.87	AQ-Q4	0.30	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	120	R	167.50	AQ-Q5	5.57	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	819	R	59.15	AQ-Q6	0.82	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	59.88	R	11,948.43	AQ-Q7	11.16	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	448	R	62.59	AQ-Q8	1.49	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	9,311.96	AQ-Q9	334.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	32	R	467.33	AQ-Q10	20.88	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	892	R	36.38	AQ-Q11	0.75	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	668	R	-									
	Concrete / reinforcement					AQ-R1					0.10	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					7.27	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					5.91	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.99	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					3.86	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					202.00	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.06	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.78	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.90	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.63	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	238	R	52.68	AR-Q1	5.41	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	44	R	634.14	AR-Q2	7.67	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.74	R	5,220.66									
AR1.4	Mesh	m2	524	R	64.43	AR-Q3	0.08	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	114	R	103.54	AR-Q4	0.39	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	114	R	184.23	AR-Q5	4.03	AR1.15	/	AR1.6				
AR1.7	Screed	m2	400	R	15.68	AR-Q6	1.15	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	44.35	R	11,711.92	AR-Q7	10.35	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	12	R	1,402.82	AR-Q8	3.70	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	42	R	647.10	AR-Q9	1.06	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	64	R	172.75	AR-Q10	0.69	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	728	R	92.29	AR-Q11	0.63	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	92	R	57.73	AR-Q12	4.99	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	30	R	786.64	AR-Q13	1.48	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	459	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.12	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					9.84	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					6.12	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					3.44	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					40.44	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.35	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					18.10	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					3.75	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					126.90	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.63	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					14.89	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	253	R	58.82	AS-Q1	2.46	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	120	R	31.77	AS-Q2	0.86	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	103	R	1,055.71	AS-Q3	14.33	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	7.19	R	2,811.99									
AS1.5	Mesh	m2	125	R	67.01	AS-Q4	0.82	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	179	R	103.54	AS-Q5	0.58	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	210	R	5.59	AS-Q6	0.49	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	24	R	39.63	AS-Q7	4.29	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	690	R	29.98	AS-Q8	0.15	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.88	R	4,042.08	AS-Q9	117.05	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	34	R	107.75	AS-Q10	0.32	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	1,698.62	AS-Q11	2.75	AS1.18	/	AS1.12				
AS1.13	Pipework	m	70	R	320.82	AS-Q12	2.07	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	402	R	20.93	AS-Q13	0.26	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.14	R	18,607.56	AS-Q14	5.14	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.90	R	20,504.17	AS-Q15	161.11	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	145	R	-									
AS1.18	Total control room area	m2	11	R	-									
	Concrete / earthworks					AS-R1					17.95	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					33.23	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					41.96	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					10.20	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					188.86	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					26.64	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					93.80	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.29	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.26	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.15	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.14	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.06	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	293	R	85.96	AU-Q1	0.62	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	212	R	37.59	AU-Q2	2.21	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	469	R	916.13									
AU1.4	Reinforcement	t	30.15	R	3,229.86	AU-Q3	15.56	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,056	R	80.87	AU-Q4	0.44	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	187	R	59.62	AU-Q5	2.51	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	1,737	R	17.83	AU-Q6	0.27	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	600	R	32.84	AU-Q7	0.78	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	40	R	62.93	AU-Q8	11.73	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.34	R	14,730.40	AU-Q9	200.43	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	12	R	2,351.74	AU-Q10	39.08	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	18	R	115.29	AU-Q11	11.11	AU1.12	/	AU1.13				
AU1.13	Total area	m2	200	R	-									
	Concrete / earthworks					AU-R1					10.66	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					24.37	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					11.33	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.28	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					15.37	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					181.15	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.22	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					98.35	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					51.32	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.39	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					7.95	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	863	R	82.19	AW-Q1	9.81	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	63	R	27.34	AW-Q2	1.40	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	88	R	614.38	AW-Q3	4.44	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	19.83	R	5,220.66									
AW1.5	Mesh	m2	75	R	64.43	AW-Q4	1.17	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	585	R	103.54	AW-Q5	0.15	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,767	R	17.53	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.75	R	22,264.58	AW-Q7	13.45	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	37	R	-									
	Concrete / earthworks					AW-R1					7.48	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					22.47	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					81.03	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					5.93	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					297.81	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.23	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	23	R	-									
BA1.2	Steel	t	2.63	R	12,463.55	BA-Q1	8.75	BA1.1	/	BA1.2				
BA1.3	Handrail	m	24	R	487.29	BA-Q2	0.96	BA1.1	/	BA1.3				
BA1.4	Grating	m2	13	R	1,336.93	BA-Q3	1.77	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	153.95	BA-Q4	1.64	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	6	R	125.86	BA-Q5	3.83	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					25.58	BA1.2	/	BA1.3
	Steel / grating					BA-R2					9.32	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					80.96	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					99.03	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,501	R	-									
BB1.2	Steel	t	45.61	R	12,062.09	BB-Q1	32.91	BB1.1	/	BB1.2				
BB1.3	Handrail	m	114	R	638.21	BB-Q2	13.17	BB1.1	/	BB1.3				
BB1.4	Grating	m2	105	R	909.78	BB-Q3	14.30	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	109	R	202.04	BB-Q4	13.77	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	22	R	2,588.20	BB-Q5	68.23	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					18.90	BB1.2	/	BB1.3
	Steel / grating					BB-R2					13.26	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					59.70	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					4.66	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	17,680	R	-									
BC1.2	Steel	t	172.12	R	12,513.84	BC-Q1	102.72	BC1.1	/	BC1.2				
BC1.3	Handrail	m	456	R	460.06	BC-Q2	38.77	BC1.1	/	BC1.3				
BC1.4	Grating	m2	5,299	R	1,120.20	BC-Q3	3.34	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	351	R	154.60	BC-Q4	50.37	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	57	R	147.46	BC-Q5	310.18	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	61	R	1,613.53	BC-Q6	289.84	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					27.20	BC1.2	/	BC1.3
	Steel / grating					BC-R2					11.17	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					80.94	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					84.86	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					7.76	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	591	R	-									
BD1.2	Steel	t	20.20	R	13,119.97	BD-Q1	29.26	BD1.1	/	BD1.2				
BD1.3	Handrail	m	15	R	509.61	BD-Q2	39.40	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	750.95	BD-Q3	73.88	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	15	R	216.15	BD-Q4	39.40	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	22	R	1,696.70	BD-Q5	26.86	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					25.75	BD1.1	/	BD1.2
	Steel / grating					BD-R2					17.47	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					60.70	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					7.73	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	63	R	-									
BE1.2	Steel	t	1.80	R	9,836.37	BE-Q1	35.00	BE1.1	/	BE1.2				
BE1.3	Handrail	m	40	R	486.57	BE-Q2	1.58	BE1.1	/	BE1.3				
BE1.4	Grating	m2	26	R	834.85	BE-Q3	2.42	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	56	R	214.88	BE-Q4	1.13	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	5	R	135.49	BE-Q5	12.60	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					20.22	BE1.2	/	BE1.3
	Steel / grating					BE-R2					11.78	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					45.78	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					72.60	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	437	R	-									
BF1.2	Steel	t	22.38	R	13,089.08	BF-Q1	19.53	BF1.1	/	BF1.2				
BF1.3	Handrail	m	9	R	312.32	BF-Q2	48.56	BF1.1	/	BF1.3				
BF1.4	Grating	m2	36	R	819.77	BF-Q3	12.14	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	17	R	214.79	BF-Q4	25.71	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	15	R	1,596.09	BF-Q5	29.13	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					41.91	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.97	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					60.94	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.20	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	13,541	R	-	C-Q1	0.23	C1.1	/	C1.2				
C1.2	Total work units	WU	58,331	R	226.80									
C1.3	Pipe supports	kg	8,103	R	-	C-Q2	1.67	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,191	R	-	C-Q3	0.17	C1.4	/	C1.2				
C1.5	Number of welds	No	11,798	R	-	C-Q4	0.87	C1.5	/	C1.1				
C1.6	Total fittings	No	10,419	R	-	C-Q5	0.77	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,233	R	-	C-Q6	0.21	C1.7	/	C1.6				
C1.8	Support number	No	2,095	R	-	C-Q7	0.26	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	58,331	R	226.80	DA-Q1	55.82	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,045	R	33.51									
	Average cost per examination / WU					DA-R1					6.77	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	58,331	R	226.80	DB-Q1	161.14	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	362	R	59.35									
	Average cost per examination / WU					DB-R1					3.82	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	58,331	R	226.80	DC-Q1	273.85	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	213	R	90.45									
	Average cost per examination / WU					DC-R1					2.51	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	58,331	R	226.80	DD-Q1	29.27	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,993	R	41.78									
	Average cost per examination / WU					DD-R1					5.43	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	58,331	R	226.80	DE-Q1	95.78	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	609	R	65.13									
	Average cost per examination / WU					DE-R1					3.48	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	58,331	R	226.80	E-Q1	157.12	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	371.25	R	312.33	E-Q2	189.05	E1.1	/	E1.3				
E1.3	Structural steel	t	308.55	R	14,332.29									
	WU cost / install mechanical weight - receive					E-R1					0.73	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					45.89	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	58,331	R	226.80									
F1.2	Painting to piping	m2	4,438	R	101.63	F-Q1	13.14	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,111	R	210.09	F-Q2	52.50	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	351.14	R	333.96									
F1.5	Painting to mechanical equipment	m2	876	R	59.51	F-Q3	0.40	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	340	R	216.05	F-Q4	1.03	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.48	F1.2	/	F1.3
	Work unit / paint					F-R2					2.23	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.08	F1.1	/	F1.3
	Install plant / paint					F-R4					5.61	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.55	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	38,803	R	23.97									
G1.2	Electrical cable terminations	No	1,139	R	69.22	G-Q1	34.07	G1.1	/	G1.2				
G1.3	Electrical equipment	No	144	R	363.85	G-Q2	269.47	G1.1	/	G1.3				
G1.4	DB's	No	13	R	1,003.66	G-Q3	11.08	G1.3	/	G1.4				
G1.5	Rack	m	3,501	R	89.49	G-Q4	11.08	G1.1	/	G1.5				
G1.6	Support steel	kg	7,305	R	18.90	G-Q5	0.48	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	28,371	R	14.18	G-Q6	1.37	G1.1	/	G1.7				
G1.8	Instruments	No	849	R	91.34	G-Q7	33.42	G1.7	/	G1.8				
G1.9	Hook-ups	No	2,021	R	101.30	G-Q8	0.42	G1.8	/	G1.9				
G1.10	Light fittings	No	400	R	275.88	G-Q9	2.78	G1.10	/	G1.3				
G1.11	Conduit	m	2,911	R	21.89	G-Q10	13.33	G1.1	/	G1.11				
G1.12	Instrument stands	No	309	R	472.70	G-Q11	2.75	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.35	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.07	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.36	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.10	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.27	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.27	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.09	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.14	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.16	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,433	R	8.94	AB-Q1	2.21	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,907	R	2.30									
AB1.3	Back fill and compact	m3	5,169	R	9.90	AB-Q2	1.24	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	4,712	R	1.65	AB-Q3	1.37	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,555	R	2.09	AB-Q4	1.41	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.89	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.90	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					5.42	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.28	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	74,304.85									
AC1.2	EO for raking equipment	Item	1	R	8,130.28									
AC1.3	Number of piles	No	200	R	-									
AC1.4	Move rig to new position	No	193	R	66.55	AC-Q1	1.04	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	13.33	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	20	R	127.59	AC-Q3	0.75	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	62	R	21.99	AC-Q4	0.24	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,506	R	42.35	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	514	R	74.43	AC-Q6	0.39	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	128	R	189.10	AC-Q7	1.56	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	168	R	86.69	AC-Q8	1.19	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	781	R	155.58	AC-Q9	0.26	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	76	R	218.54	AC-Q10	0.20	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	16.83	R	1,897.06	AC-Q11	11.88	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	173.04	R	2,696.15	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,730	R	346.82	AC-Q13	0.12	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	205	R	401.43	AC-Q14	0.07	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	46,533.14		1.00		/					
AC1.19	Load test to pile	No	2	R	6,282.99	AC-Q15	100.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	17,326.33	AC-Q16	200.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	193	R	115.55	AC-Q17	1.04	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					214.25	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					23.44	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.52	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.55	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.45	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.63	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.12	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					49.96	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.33	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	111	R	20.08	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	814	R	23.24									
AD1.3	Kerbing	m	274	R	32.44	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,616	R	-									
AD1.5	Remove top soil	m3	558	R	7.58	AD-Q3	0.43	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,310	R	21.07	AD-Q4	0.17	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,252	R	2.22									
AD1.8	Reduce levels	m3	1,281	R	7.99	AD-Q5	0.39	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	947	R	21.45	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	380	R	61.30	AD-Q7	2.49	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	307	R	40.72	AD-Q8	4.17	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,029	R	5.87	AD-Q9	5.34	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	229	R	2.69	AD-Q10	0.65	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	248	R	1.35	AD-Q11	0.84	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	254	R	138.71	AD-Q12	0.91	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	59	R	63.86	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	3	R	48.03	AD-Q14	0.22	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	7	R	60.86	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	797	R	1.71	AD-Q16	2.91	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.86	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.41	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.60	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.37	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.35	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.20	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					0.98	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.10	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.59	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.53	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.97	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.48	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.88	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.05	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	249	R	286.09	AE-Q1	4.88	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	51	R	466.75	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	355	R	-									
AE1.4	Rip and compact	m2	1,701	R	1.35									
AE1.5	Formwork to plinth	m2	291	R	47.50	AE-Q3	5.71	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	198	R	39.37	AE-Q4	0.80	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.29	R	2,278.38	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,647	R	52.54	AE-Q6	617.02	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	596	R	9.05	AE-Q7	2.39	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	458	R	20.21	AE-Q8	1.84	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.61	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					211.92	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					43.36	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,917	R	-	AF-Q1	12.93	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	303	R	15.06	AF-Q2	1.49	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	203	R	18.90	AF-Q3	0.39	AF1.2	/	AF1.4				
AF1.4	Working space	m2	770	R	11.58	AF-Q4	0.45	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	136	R	330.22	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	197	R	18.38	AF-Q6	0.71	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	447.93	AF-Q7	0.13	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	265.88	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	140	R	-	AF-Q9	0.44	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	317	R	2.62									
AF1.11	Formwork to bases	m2	239	R	39.10	AF-Q10	1.76	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	193	R	65.46	AF-Q11	11.35	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	11	R	42.31	AF-Q12	5.50	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.26	R	2,970.24	AF-Q13	0.12	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	19.37	R	3,059.61	AF-Q14	7.23	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	300	R	8.67	AF-Q15	0.45	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	44	R	74.99	AF-Q16	0.39	AF1.7	/	AF1.17				
AF1.18	Manhole	No	5	R	886.30	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	76	R	106.30									
	Base excavation / backfill					AF-R1					0.80	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					1.30	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					21.93	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					17.97	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					29.74	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.81	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.03	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					126.04	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.12	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.15	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.16	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.97	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					38.09	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.97	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.11	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	239	R	17.52	AG-Q1	1.19	AG1.1	/	AG1.4				
AG1.2	Working space	m2	805	R	12.36	AG-Q2	0.30	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	57	R	19.68	AG-Q3	4.19	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	201	R	426.85	AG-Q4	1.47	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	98	R	384.16	AG-Q5	2.05	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	305	R	-									
AG1.7	Wood float	m2	168	R	2.93	AG-Q6	0.58	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	137	R	15.73	AG-Q7	1.47	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	422	R	58.34	AG-Q8	0.48	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	132	R	39.58	AG-Q9	0.74	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	19.74	R	2,243.36	AG-Q10	15.45	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,741	R	12.23	AG-Q11	0.11	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,592	R	10.31	AG-Q12	0.12	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.90	R	2,554.60	AG-Q13	33.79	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.04	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.71	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.12	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.14	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.10	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					5.26	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.98	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	255	R	15.18	AH-Q1	5.54	AH1.1	/	AH1.4				
AH1.2	Working space	m2	82	R	13.35	AH-Q2	3.11	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	305	R	30.65	AH-Q3	0.84	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	46	R	315.36	AH-Q4	0.49	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	28	R	402.09	AH-Q5	1.64	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	80	R	316.85	AH-Q6	0.58	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	19	R	468.54	AH-Q7	2.42	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	375.88	AH-Q8	11.50	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	159	R	-									
AH1.10	Blinding	m2	94	R	21.30	AH-Q9	1.69	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	613	R	2.06	AH-Q10	0.26	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	117	R	44.90	AH-Q11	0.39	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	47	R	39.10	AH-Q12	0.40	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	33	R	60.79	AH-Q13	0.12	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	154	R	47.00	AH-Q14	0.18	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	28	R	52.24	AH-Q15	2.86	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	41	R	14.06	AH-Q16	1.95	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.42	R	2,716.29	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	11.21	R	2,444.63	AH-Q18	14.18	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	876	R	50.72	AH-Q19	0.09	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	987	R	13.37	AH-Q20	0.16	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,688	R	10.18	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.10	R	2,717.32	AH-Q22	144.55	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	302	R	13.44	AH-Q23	0.26	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	197	R	22.43	AH-Q24	0.41	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.14	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.50	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					14.81	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					153.09	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.78	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.00	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.67	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.84	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					7.02	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					11.98	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.18	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.56	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					6.07	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					22.54	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.11	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					48.20	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					182.84	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					240.14	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.12	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					23.58	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					14.13	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	166	R	12.63	AI-Q1	1.98	AI1.1	/	AI1.5				
AI1.2	Working space	m2	590	R	9.27	AI-Q2	0.28	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	132	R	29.86	AI-Q3	1.26	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	188	R	14.99	AI-Q4	0.45	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	84	R	413.55	AI-Q5	6.46	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	13	R	323.49	AI-Q6	0.46	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	66	R	-									
AI1.8	Wood float	m2	183	R	1.94									
AI1.9	Formwork bases	m2	217	R	51.86	AI-Q7	0.39	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	131	R	43.47	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	7.45	R	2,325.76	AI-Q9	8.86	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,765	R	13.70	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.22	R	3,242.43	AI-Q11	68.85	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.03	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.36	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					0.42	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					27.59	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.28	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					213.17	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					7.97	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					7.44	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					169.76	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.13	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	286	R	15.99	AJ-Q1	3.86	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	968	R	14.46	AJ-Q2	0.30	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	89	R	18.65	AJ-Q3	3.21	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	374	R	24.63	AJ-Q4	0.20	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	74	R	459.74	AJ-Q5	2.11	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	28	R	305.41	AJ-Q6	2.64	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	35	R	454.03									
AJ1.8	Total concrete	m3	194	R	-									
AJ1.9	Wood float	m2	292	R	1.99	AJ-Q7	0.66	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	162	R	53.13	AJ-Q8	0.46	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	300	R	41.56	AJ-Q9	0.09	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.04	R	2,223.89	AJ-Q10	19.32	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,419	R	17.27	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,551	R	6.31	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.06	R	1,897.79	AJ-Q13	69.81	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.03	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.11	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.86	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					18.67	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					231.03	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					8.65	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					7.35	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					128.77	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					352.44	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.24	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	515	R	20.55	AK-Q1	2.83	AK1.1	/	AK1.5				
AK1.2	Working space	m2	883	R	12.16	AK-Q2	0.58	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	269	R	20.59	AK-Q3	1.91	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	471	R	18.00	AK-Q4	0.39	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	182	R	426.85	AK-Q5	18.20	AK1.5		AK1.6				
AK1.6	Concrete column	m3	10	R	384.16									
AK1.7	Concrete plinth	m3	61	R	317.10	AK-Q6	2.98	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	234	R	-									
AK1.9	Wood float	m2	412	R	2.15	AK-Q7	0.44	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	386	R	39.59	AK-Q8	0.47	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	122	R	53.13	AK-Q9	0.50	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	41	R	46.07	AK-Q10	0.24	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	24.23	R	2,223.89	AK-Q11	9.66	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	5,417	R	10.14	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.68	R	2,554.60	AK-Q13	87.31	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.05	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.69	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					1.00	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					23.71	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					198.53	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					10.78	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					5.97	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					8.34	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					219.32	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.17	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	415	R	22.85	AL-Q1	3.49	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,307	R	8.98	AL-Q2	0.32	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	247	R	28.89	AL-Q3	1.68	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	242	R	15.87	AL-Q4	0.49	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	119	R	311.95	AL-Q5	0.69	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	173	R	470.14	AL-Q6	3.84	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	45	R	466.75	AL-Q7	2.64	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	357	R	-									
AL1.9	Wood float	m2	275	R	3.05	AL-Q8	0.43	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	265	R	36.76	AL-Q9	0.45	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	842	R	66.48	AL-Q10	0.21	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	131	R	60.60	AL-Q11	0.34	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	90	R	56.40	AL-Q12	0.50	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	19	R	102.17	AL-Q13	9.11	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	30.96	R	2,006.82	AL-Q14	11.53	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	12,419	R	13.37	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	200	R	10.18	AL-Q16	1.79	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.77	R	2,717.32	AL-Q17	463.64	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.54	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.79	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.66	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					102.28	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.66	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.66	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					8.49	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					7.70	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.07	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					8.28	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					7.70	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					4.57	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					150.10	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					197.13	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.11	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,603	R	23.94	AM-Q1	4.21	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,499	R	9.27	AM-Q2	1.07	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	1,233	R	25.59	AM-Q3	1.30	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	389	R	15.36	AM-Q4	0.98	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	381	R	465.16									
AM1.6	Concrete column	m3	143	R	294.54	AM-Q5	2.66	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	146	R	298.29	AM-Q6	0.98	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	226	R	403.66	AM-Q7	1.69	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	45	R	455.59	AM-Q8	3.18	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	103	R	323.49	AM-Q9	1.39	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,204	R	-									
AM1.12	Wood float	m2	2,043	R	1.90	AM-Q10	0.59	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	587	R	58.54	AM-Q11	0.65	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	993	R	66.84	AM-Q12	0.14	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	455	R	75.53	AM-Q13	0.32	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	248	R	68.80	AM-Q14	0.59	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	623	R	56.38	AM-Q15	0.36	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	4	R	94.53	AM-Q16	35.75	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	562	R	62.69	AM-Q17	0.08	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	97.06	R	2,970.24	AM-Q18	12.40	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	3,842	R	8.96	AM-Q19	0.31	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,108	R	10.40	AM-Q20	0.57	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	42	R	344.74	AM-Q21	2.31	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.37	R	1,385.40	AM-Q22	878.83	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.58	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.94	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					30.28	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					1.58	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					1.56	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					1.15	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					1.02	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.44	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					244.82	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.95	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					3.95	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.34	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					4.41	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					3.16	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					5.74	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					7.27	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					331.50	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					285.60	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					8.62	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.34	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	1,992	R	12.89	AN-Q1	1.32	AN1.1	/	AN1.5				
AN1.2	Working space	m2	241	R	8.68	AN-Q2	8.27	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	687	R	27.36	AN-Q3	2.90	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,158	R	15.82	AN-Q4	1.30	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,511	R	307.75	AN-Q5								
AN1.6	Concrete column	m3	78	R	365.48	AN-Q6	19.37	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	30	R	297.03	AN-Q7	2.60	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	134	R	308.87	AN-Q8	11.28	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	294.54	AN-Q9	19.50	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,613	R	-				/					
AN1.11	Wood float	m2	2,105	R	1.96	AN-Q10	0.72	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	156	R	40.08	AN-Q11	9.69	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	485	R	57.49	AN-Q12	0.16	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	164	R	83.21	AN-Q13	0.18	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	75	R	42.37	AN-Q14	0.40	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	28	R	56.54	AN-Q15	0.14	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	142.21	AN-Q16	377.75	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,068	R	38.80	AN-Q17	0.13	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	351.92	R	1,936.52	AN-Q18	4.58	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	9,741	R	9.41	AN-Q19	0.17	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	5,810	R	8.86	AN-Q20	0.28	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	88	R	326.40	AN-Q21	18.33	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.28	R	2,459.44	AN-Q22	662.72	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.04	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.49	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.47	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					19.45	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					157.02	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					7.68	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					3.57	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					7.01	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.36	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					2.09	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					5.21	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.96	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					205.79	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					218.57	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.13	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					5.93	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	220	R	22.18	AO-Q1	1.64	AO1.1	/	AO1.5				
AO1.2	Working space	m2	835	R	12.08	AO-Q2	0.26	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	139	R	26.15	AO-Q3	1.58	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	40	R	23.39	AO-Q4	3.35	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	134	R	308.03									
AO1.6	Concrete column	m3	24	R	308.75	AO-Q5	5.58	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	17	R	470.14	AO-Q6	1.41	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	3	R	243.10	AO-Q7	44.67	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	323.02	AO-Q8	24.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	48	R	-									
AO1.11	Wood float	m2	29	R	2.15	AO-Q9	4.62	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	94	R	46.96	AO-Q10	1.43	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	247	R	65.36	AO-Q11	0.10	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	52	R	49.61	AO-Q12	0.33	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	15	R	54.76	AO-Q13	1.13	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	6	R	83.39	AO-Q14	0.17	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	63	R	142.21	AO-Q15	2.13	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	15	R	43.13	AO-Q16	0.20	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.56	R	2,850.45	AO-Q17	8.63	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	1,971	R	8.93	AO-Q18	0.02	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,824	R	10.30	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	16	R	436.02	AO-Q20	3.00	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.28	R	1,882.63	AO-Q21	40.85	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.84	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.85	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					13.17	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					143.27	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					6.56	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					9.48	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					8.59	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.72	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.31	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					3.87	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					5.64	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					319.20	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					276.74	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.16	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.54	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,193	R	14.76	AP-Q1	1.11	AP1.1	/	AP1.5				
AP1.2	Working space	m2	711	R	11.58	AP-Q2	1.68	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	944	R	21.01	AP-Q3	1.26	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	183	R	18.38	AP-Q4	5.86	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	1,073	R	447.93	AP-Q5	0.89	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,204	R	28.20									
AP1.7	Rough formwork	m2	242	R	39.54	AP-Q6	4.43	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,647	R	58.53	AP-Q7	0.65	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,851	R	2.77	AP-Q8	0.38	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	148	R	24.22	AP-Q9	7.25	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	48	R	21.24	AP-Q10	22.35	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	432	R	15.38	AP-Q11	2.48	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.84	R	1,611.74	AP-Q12	1277.38	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	2,173	R	52.24	AP-Q13	0.49	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	2,702	R	-	AP-Q14	2.52	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,469	R	28.50	AP-Q15	1.84	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	2,283	R	66.02	AP-Q16	1.18	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,722	R	32.42	AP-Q17	0.99	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	10	R	231.84	AP-Q18	270.20	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	4,269	R	73.57	AP-Q19	0.63	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	4,569	R	50.40	AP-Q20	0.59	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	54.84	R	2,152.88	AP-Q21	19.57	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	9,820.41									
AP1.24	Structural steel	Item	1	R	25,428.94									
AP1.25	Plumbing and drainage	Item	1	R	16,191.59									
AP1.26	Small power and lighting	Item	1	R	137,941.01									
AP1.27	External works	Item	1	R	59,606.18									
	Excavations / concrete					AP-R1					0.03	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.27	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.70	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					24.37	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					76.34	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					11.33	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.65	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					161.71	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					18.49	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					21.09	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					139.98	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.28	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					15.72	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					32.61	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.61	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.23	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.71	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.04	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					4.56	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					11.81	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					7.52	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					64.07	AP1.26	/	AP1.22
	External works / concrete					AP-R23					133.07	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	122	R	458.90	AQ-Q1	1.02	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	124	R	32.36									
AQ1.3	Reinforcement	t	7.72	R	1,953.91	AQ-Q2	15.80	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	878	R	48.16	AQ-Q3	0.14	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	168	R	40.81	AQ-Q4	0.73	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	164	R	73.47	AQ-Q5	4.19	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	782	R	30.98	AQ-Q6	0.88	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	59.87	R	8,809.78	AQ-Q7	11.47	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	442	R	28.94	AQ-Q8	1.55	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	4,352.65	AQ-Q9	343.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	26	R	235.07	AQ-Q10	26.42	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	823	R	17.00	AQ-Q11	0.83	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	687	R	-									
	Concrete / reinforcement					AQ-R1					0.23	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					14.18	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					9.53	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					11.24	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					6.25	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					284.37	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.93	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.49	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.59	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.82	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	143	R	38.08	AR-Q1	2.20	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	65	R	455.59	AR-Q2	9.94	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.54	R	2,986.44									
AR1.4	Mesh	m2	417	R	30.86	AR-Q3	0.16	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	164	R	53.13	AR-Q4	0.40	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	63	R	80.08	AR-Q5	7.29	AR1.15	/	AR1.6				
AR1.7	Screed	m2	388	R	12.80	AR-Q6	1.18	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	30.90	R	5,626.73	AR-Q7	14.85	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	9	R	517.96	AR-Q8	3.43	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	43	R	222.67	AR-Q9	0.72	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	43	R	121.16	AR-Q10	0.72	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	533	R	47.78	AR-Q11	0.86	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	122	R	27.33	AR-Q12	3.76	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	35	R	456.76	AR-Q13	0.88	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	459	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.15	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					14.76	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					8.58	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					5.69	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					35.59	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					10.86	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					25.27	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.84	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					117.76	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.57	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					12.32	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	0	R	-	AS-Q1		AS1.1	/	AS1.3				
AS1.2	Blinding	m2	0	R	-	AS-Q2		AS1.3	/	AS1.2				
AS1.3	Concrete	m3	0	R	-	AS-Q3		AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	0.00	R	-									
AS1.5	Mesh	m2	0	R	-	AS-Q4		AS1.3	/	AS1.5				
AS1.6	Formwork	m2	0	R	-	AS-Q5		AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	0	R	-	AS-Q6		AS1.3	/	AS1.7				
AS1.8	Movement joints	m	0	R	-	AS-Q7		AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	0	R	-	AS-Q8		AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.00	R	-	AS-Q9		AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	0	R	-	AS-Q10		AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	0	R	-	AS-Q11		AS1.18	/	AS1.12				
AS1.13	Pipework	m	0	R	-	AS-Q12		AS1.17	/	AS1.13				
AS1.14	Bolts	kg	0	R	-	AS-Q13		AS1.3	/	AS1.14				
AS1.15	Structural steel	t	0.00	R	-	AS-Q14		AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.00	R	-	AS-Q15		AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	0	R	-									
AS1.18	Total control room area	m2	0	R	-									
	Concrete / earthworks					AS-R1						AS1.3	/	AS1.1
	Concrete / blinding					AS-R2						AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3						AS1.4	/	AS1.5
	Concrete / formwork					AS-R4						AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5						AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6						AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7						AS1.4	/	AS1.9
	Concrete / pipework					AS-R8						AS1.3	/	AS1.13
	Concrete / grout					AS-R9						AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10						AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11						AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12						AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	216	R	52.63	AT-Q1	18.00	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	13	R	16.66	AT-Q2	0.92	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	342.35	AT-Q3	6.98	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.72	R	1,960.20									
AT1.5	Formwork	m2	185	R	41.56	AT-Q4	0.06	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	26	R	4.71	AT-Q5	0.46	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	25	R	18.74	AT-Q6	0.48	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.70	R	8.50	AT-Q7	17.14	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.41	R	1,806.70	AT-Q8	29.27	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.08	R	11.65	AT-Q9	150.00	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.56	R	7,063.91	AT-Q10	53.57	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.22	R	12,012.03	AT-Q11	24.59	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	40	R	53.30	AT-Q12	0.75	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	17	R	43.14	AT-Q13	1.76	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	30	R	-									
	Concrete / earthworks					AT-R1					6.50	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					20.55	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					8.24	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					72.69	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					18.27	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					230.61	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.73	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.19	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.28	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.16	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.42	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.24	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	3,541	R	41.50	AV-Q1	0.71	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,053	R	12.49	AV-Q2	0.82	AV1.10	/	AV1.2				
AV1.3	Paving	m2	4,224	R	23.97	AV-Q3	0.60	AV1.10	/	AV1.3				
AV1.4	Pipework	m	41	R	169.67	AV-Q4	61.37	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	936.75	AV-Q5	10.25	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	22	R	349.47	AV-Q6	1.86	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	170	R	66.56	AV-Q7	0.13	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	30	R	33.45	AV-Q8	0.73	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	2.70	R	2,558.75	AV-Q9	8.15	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,516	R	-									
	Earthworks / lining					AV-R1					3.32	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.73	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.52	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.24	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.18	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.25	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					10.45	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.14	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	23	R	-									
BA1.2	Steel	t	2.40	R	8,181.31	BA-Q1	9.58	BA1.1	/	BA1.2				
BA1.3	Handrail	m	23	R	231.68	BA-Q2	1.00	BA1.1	/	BA1.3				
BA1.4	Grating	m2	22	R	406.65	BA-Q3	1.05	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	14	R	121.79	BA-Q4	1.64	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	63.55	BA-Q5	5.75	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					35.31	BA1.2	/	BA1.3
	Steel / grating					BA-R2					20.12	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					67.18	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					128.74	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,436	R	-									
BB1.2	Steel	t	43.33	R	6,284.12	BB-Q1	33.14	BB1.1	/	BB1.2				
BB1.3	Handrail	m	149	R	156.45	BB-Q2	9.64	BB1.1	/	BB1.3				
BB1.4	Grating	m2	98	R	442.05	BB-Q3	14.65	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	143	R	141.85	BB-Q4	10.04	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	10	R	556.06	BB-Q5	143.60	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					40.17	BB1.2	/	BB1.3
	Steel / grating					BB-R2					14.22	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					44.30	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					11.30	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	11,435	R	-									
BC1.2	Steel	t	181.03	R	6,111.67	BC-Q1	63.17	BC1.1	/	BC1.2				
BC1.3	Handrail	m	455	R	219.56	BC-Q2	25.13	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,937	R	534.61	BC-Q3	2.32	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	375	R	84.70	BC-Q4	30.49	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	57	R	75.40	BC-Q5	200.61	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	87	R	1,361.04	BC-Q6	131.44	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					27.84	BC1.2	/	BC1.3
	Steel / grating					BC-R2					11.43	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					72.16	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					81.06	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					4.49	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	333	R	-									
BD1.2	Steel	t	18.03	R	7,834.27	BD-Q1	18.47	BD1.1	/	BD1.2				
BD1.3	Handrail	m	9	R	372.34	BD-Q2	37.00	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	431.48	BD-Q3	41.63	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	138.45	BD-Q4	27.75	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	26	R	581.53	BD-Q5	12.81	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					21.04	BD1.1	/	BD1.2
	Steel / grating					BD-R2					18.16	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					56.59	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					13.47	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	58	R	-									
BE1.2	Steel	t	1.77	R	8,713.82	BE-Q1	32.77	BE1.1	/	BE1.2				
BE1.3	Handrail	m	36	R	231.68	BE-Q2	1.61	BE1.1	/	BE1.3				
BE1.4	Grating	m2	27	R	586.94	BE-Q3	2.15	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	25	R	63.65	BE-Q4	2.32	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	7	R	69.69	BE-Q5	8.29	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					37.61	BE1.2	/	BE1.3
	Steel / grating					BE-R2					14.85	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					136.90	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					125.04	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	438	R	-									
BF1.2	Steel	t	25.13	R	6,237.47	BF-Q1	17.43	BF1.1	/	BF1.2				
BF1.3	Handrail	m	12	R	225.75	BF-Q2	36.50	BF1.1	/	BF1.3				
BF1.4	Grating	m2	53	R	588.95	BF-Q3	8.26	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	16	R	122.87	BF-Q4	27.38	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	15	R	764.49	BF-Q5	29.20	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					27.63	BF1.1	/	BF1.2
	Steel / grating					BF-R2					10.59	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					50.76	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.16	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	24,477	R	-	C-Q1	0.31	C1.1	/	C1.2				
C1.2	Total work units	WU	80,048	R	106.66									
C1.3	Pipe supports	kg	6,984	R	-	C-Q2	3.50	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	10,191	R	-	C-Q3	0.13	C1.4	/	C1.2				
C1.5	Number of welds	No	10,447	R	-	C-Q4	0.43	C1.5	/	C1.1				
C1.6	Total fittings	No	10,399	R	-	C-Q5	0.42	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,834	R	-	C-Q6	0.18	C1.7	/	C1.6				
C1.8	Support number	No	1,314	R	-	C-Q7	0.19	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	80,048	R	106.66	DA-Q1	76.31	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,049	R	15.66									
	Average cost per examination / WU					DA-R1					6.81	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	80,048	R	106.66	DB-Q1	238.24	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	336	R	27.15									
	Average cost per examination / WU					DB-R1					3.93	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	80,048	R	106.66	DC-Q1	375.81	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	213	R	43.32									
	Average cost per examination / WU					DC-R1					2.46	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	80,048	R	106.66	DD-Q1	40.08	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,997	R	21.44									
	Average cost per examination / WU					DD-R1					4.97	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	80,048	R	106.66	DE-Q1	113.70	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	704	R	33.85									
	Average cost per examination / WU					DE-R1					3.15	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	80,048	R	106.66	E-Q1	455.41	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	175.77	R	128.49	E-Q2	265.34	E1.1	/	E1.3				
E1.3	Structural steel	t	301.68	R	7,179.23									
	WU cost / install mechanical weight - receive					E-R1					0.83	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					55.87	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	80,048	R	106.66									
F1.2	Painting to piping	m2	4,236	R	46.08	F-Q1	18.90	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,038	R	101.81	F-Q2	77.12	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	255.81	R	157.06									
F1.5	Painting to mechanical equipment	m2	1,478	R	57.87	F-Q3	0.17	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	525	R	138.35	F-Q4	0.49	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.45	F1.2	/	F1.3
	Work unit / paint					F-R2					2.31	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.05	F1.1	/	F1.3
	Install plant / paint					F-R4					2.71	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.14	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	48,690	R	23.39									
G1.2	Electrical cable terminations	No	1,714	R	58.81	G-Q1	28.41	G1.1	/	G1.2				
G1.3	Electrical equipment	No	90	R	104.52	G-Q2	541.00	G1.1	/	G1.3				
G1.4	DB's	No	12	R	459.09	G-Q3	7.50	G1.3	/	G1.4				
G1.5	Rack	m	4,940	R	39.48	G-Q4	9.86	G1.1	/	G1.5				
G1.6	Support steel	kg	10,244	R	6.53	G-Q5	0.48	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	31,679	R	7.10	G-Q6	1.54	G1.1	/	G1.7				
G1.8	Instruments	No	591	R	60.15	G-Q7	53.60	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,518	R	35.29	G-Q8	0.39	G1.8	/	G1.9				
G1.10	Light fittings	No	697	R	60.94	G-Q9	7.74	G1.10	/	G1.3				
G1.11	Conduit	m	4,425	R	10.96	G-Q10	11.00	G1.1	/	G1.11				
G1.12	Instrument stands	No	147	R	311.29	G-Q11	4.02	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.40	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.22	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.23	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.13	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					3.58	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.59	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.38	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.20	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.12	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	6,046	R	21.34	AB-Q1	2.64	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	2,288	R	5.48									
AB1.3	Back fill and compact	m3	4,359	R	32.77	AB-Q2	1.39	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	3,709	R	3.06	AB-Q3	1.63	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	3,585	R	4.37	AB-Q4	1.69	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					3.89	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.65	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					6.97	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.88	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	165,481.75									
AC1.2	EO for raking equipment	Item	1	R	19,399.99									
AC1.3	Number of piles	No	220	R	-									
AC1.4	Move rig to new position	No	121	R	148.21	AC-Q1	1.82	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	10	R	-	AC-Q2	22.00	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	11	R	184.55	AC-Q3	0.91	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	113	R	108.00	AC-Q4	0.09	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	3,179	R	86.35	AC-Q5	0.07	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	379	R	181.72	AC-Q6	0.58	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	101	R	451.23	AC-Q7	2.18	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	142	R	206.86	AC-Q8	1.55	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	706	R	371.25	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	62	R	486.71	AC-Q10	0.16	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	13.46	R	4,526.66	AC-Q11	16.34	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	189.77	R	6,433.39	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,088	R	772.38	AC-Q13	0.20	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	128	R	894.01	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	67,307.90		1.00		/					
AC1.19	Load test to pile	No	3	R	30,857.87	AC-Q15	73.33	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	35,325.29	AC-Q16	220.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	142	R	204.44	AC-Q17	1.55	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					214.25	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					25.12	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.24	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					1.25	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.24	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.58	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.27	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.48	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.63	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					8.33	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					87.14	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					39.95	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					45.74	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.26	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	93	R	48.70	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	686	R	49.32									
AD1.3	Kerbing	m	195	R	78.87	AD-Q2	0.06	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,049	R	-									
AD1.5	Remove top soil	m3	471	R	20.46	AD-Q3	0.46	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,031	R	46.42	AD-Q4	0.15	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,056	R	5.30									
AD1.8	Reduce levels	m3	1,080	R	16.48	AD-Q5	0.35	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	799	R	31.50	AD-Q6	1.35	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	357	R	133.51	AD-Q7	2.24	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	259	R	95.35	AD-Q8	4.17	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,596	R	14.30	AD-Q9	4.47	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	193	R	6.52	AD-Q10	0.65	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	209	R	2.86	AD-Q11	0.99	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	180	R	337.23	AD-Q12	1.07	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	50	R	150.76	AD-Q13	0.92	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	2	R	129.60	AD-Q14	0.26	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	5	R	134.10	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	627	R	4.17	AD-Q16	3.22	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.99	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.86	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					3.11	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.52	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.24	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.17	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.47	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.25	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.59	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					1.91	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.64	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.70	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.05	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	210	R	682.64	AE-Q1	4.57	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	46	R	1,113.74	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	286	R	-									
AE1.4	Rip and compact	m2	1,361	R	3.21									
AE1.5	Formwork to plinth	m2	319	R	113.35	AE-Q3	6.93	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	125	R	87.68	AE-Q4	0.60	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	2.67	R	5,074.10	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	1,468	R	75.99	AE-Q6	549.81	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	1,086	R	44.44	AE-Q7	5.17	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	323	R	41.21	AE-Q8	1.54	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.61	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.66	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.13	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					66.77	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.07	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.06	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	3,083	R	-	AF-Q1	12.95	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	238	R	48.36	AF-Q2	1.49	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	160	R	38.44	AF-Q3	0.37	AF1.2	/	AF1.4				
AF1.4	Working space	m2	649	R	20.64	AF-Q4	0.45	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	107	R	1,001.35	AF-Q5	0.06	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	166	R	36.84	AF-Q6	0.71	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	15	R	1,057.48	AF-Q7	0.14	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	2	R	717.43	AF-Q8	0.02	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	118	R	-	AF-Q9	0.47	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	250	R	4.76									
AF1.11	Formwork to bases	m2	201	R	132.62	AF-Q10	1.88	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	152	R	102.31	AF-Q11	10.13	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	10	R	104.87	AF-Q12	5.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.05	R	6,729.42	AF-Q13	0.13	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	15.60	R	6,813.95	AF-Q14	7.56	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	240	R	20.69	AF-Q15	0.45	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	37	R	170.48	AF-Q16	0.41	AF1.7	/	AF1.17				
AF1.18	Manhole	No	4	R	2,158.82	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	60	R	258.92									
	Base excavation / backfill					AF-R1					1.26	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.34	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					20.71	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					27.18	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					21.87	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.72	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.05	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					210.37	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.10	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.15	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.99	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					48.40	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					6.20	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.87	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	186	R	36.50	AG-Q1	1.10	AG1.1	/	AG1.4				
AG1.2	Working space	m2	757	R	27.53	AG-Q2	0.25	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	45	R	46.96	AG-Q3	4.13	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	169	R	1,091.26	AG-Q4	1.42	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	83	R	875.45	AG-Q5	2.04	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	173	R	-									
AG1.7	Wood float	m2	128	R	5.42	AG-Q6	0.65	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	119	R	42.30	AG-Q7	1.42	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	353	R	125.84	AG-Q8	0.48	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	101	R	92.55	AG-Q9	0.82	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	15.42	R	4,674.04	AG-Q10	11.22	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,577	R	27.24	AG-Q11	0.07	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	2,040	R	24.60	AG-Q12	0.08	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.45	R	6,531.05	AG-Q13	33.88	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.03	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.75	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.29	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.00	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.12	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.11	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.28	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					5.98	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	220	R	40.80	AH-Q1	5.64	AH1.1	/	AH1.4				
AH1.2	Working space	m2	69	R	28.79	AH-Q2	3.19	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	157	R	59.83	AH-Q3	1.40	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	39	R	787.95	AH-Q4	0.52	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	24	R	851.22	AH-Q5	1.63	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	67	R	963.19	AH-Q6	0.58	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	16	R	753.44	AH-Q7	2.44	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	3	R	813.94	AH-Q8	13.00	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	134	R	-									
AH1.10	Blinding	m2	75	R	50.43	AH-Q9	1.79	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	528	R	4.43	AH-Q10	0.25	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	101	R	136.34	AH-Q11	0.39	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	45	R	140.44	AH-Q12	0.36	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	28	R	155.42	AH-Q13	0.11	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	121	R	97.93	AH-Q14	0.20	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	26	R	116.35	AH-Q15	2.58	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	32	R	33.54	AH-Q16	2.09	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.04	R	6,944.40	AH-Q17	0.22	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	9.45	R	5,571.04	AH-Q18	14.18	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	498	R	83.57	AH-Q19	0.13	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	755	R	24.76	AH-Q20	0.18	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	1,459	R	27.37	AH-Q21	0.09	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.92	R	5,861.53	AH-Q22	145.65	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	230	R	31.43	AH-Q23	0.29	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	154	R	46.74	AH-Q24	0.44	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.42	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.68	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					15.62	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					177.87	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.93	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					0.82	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.05	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.97	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					5.78	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					5.36	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					5.24	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					8.69	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.28	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					28.72	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.25	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					66.66	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					225.00	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					203.55	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.13	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					30.65	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					20.61	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	271	R	54.23	AI-Q1	5.31	AI1.1	/	AI1.5				
AI1.2	Working space	m2	480	R	25.73	AI-Q2	0.56	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	115	R	51.80	AI-Q3	2.36	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	145	R	36.51	AI-Q4	0.35	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	51	R	994.16	AI-Q5	4.64	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	11	R	821.06	AI-Q6	0.22	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	80	R	-									
AI1.8	Wood float	m2	236	R	5.42									
AI1.9	Formwork bases	m2	169	R	88.89	AI-Q7	0.30	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	110	R	117.91	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.17	R	4,894.32	AI-Q9	8.72	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	1,955	R	27.70	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	0.64	R	6,243.74	AI-Q11	79.69	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.05	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.11	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.05	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					27.23	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.21	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					183.42	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					11.18	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.96	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					176.69	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.16	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	275	R	35.22	AJ-Q1	3.35	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	597	R	32.86	AJ-Q2	0.46	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	127	R	42.40	AJ-Q3	2.17	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	198	R	56.00	AJ-Q4	0.41	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	82	R	1,119.81	AJ-Q5	2.83	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	22	R	694.32	AJ-Q6	3.73	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	29	R	1,083.39									
AJ1.8	Total concrete	m3	138	R	-									
AJ1.9	Wood float	m2	216	R	4.42	AJ-Q7	0.64	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	197	R	120.80	AJ-Q8	0.42	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	241	R	101.24	AJ-Q9	0.09	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	7.62	R	5,416.88	AJ-Q10	18.11	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,564	R	25.08	AJ-Q11	0.02	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	1,330	R	21.92	AJ-Q12	0.06	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	0.85	R	4,715.76	AJ-Q13	96.47	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.03	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					1.07	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.83	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					20.00	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					253.35	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					9.27	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					6.86	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					215.98	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					247.12	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.24	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	401	R	34.63	AK-Q1	1.76	AK1.1	/	AK1.5				
AK1.2	Working space	m2	862	R	31.19	AK-Q2	0.47	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	217	R	69.56	AK-Q3	1.85	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	245	R	34.91	AK-Q4	0.93	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	228	R	963.19	AK-Q5	28.50	AK1.5		AK1.6				
AK1.6	Concrete column	m3	8	R	1,043.26									
AK1.7	Concrete plinth	m3	31	R	619.26	AK-Q6	7.35	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	284	R	-									
AK1.9	Wood float	m2	248	R	5.98	AK-Q7	0.92	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	306	R	101.24	AK-Q8	0.75	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	153	R	92.18	AK-Q9	0.20	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	22	R	163.69	AK-Q10	0.36	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	21.12	R	3,294.40	AK-Q11	13.45	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	7,027	R	22.93	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	2.55	R	5,992.91	AK-Q13	111.37	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.04	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.11	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.50	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					27.59	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					161.07	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					9.51	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					6.72	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					6.37	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					143.67	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.16	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	250	R	35.76	AL-Q1	2.43	AL1.1	/	AL1.5				
AL1.2	Working space	m2	1,013	R	18.20	AL-Q2	0.25	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	175	R	45.61	AL-Q3	1.43	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	242	R	49.31	AL-Q4	0.43	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	103	R	708.76	AL-Q5	0.83	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	124	R	940.15	AL-Q6	3.54	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	35	R	1,202.20	AL-Q7	2.94	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	333	R	-									
AL1.9	Wood float	m2	335	R	6.13	AL-Q8	0.31	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	331	R	96.81	AL-Q9	0.31	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	739	R	115.92	AL-Q10	0.17	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	113	R	194.51	AL-Q11	0.31	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	57	R	220.04	AL-Q12	0.61	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	13	R	114.36	AL-Q13	9.54	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	38.73	R	4,578.81	AL-Q14	8.60	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	9,503	R	18.01	AL-Q15	0.04	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	173	R	23.89	AL-Q16	1.92	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.64	R	5,728.23	AL-Q17	520.31	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.05	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					1.96	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.78	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					14.37	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					115.62	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.75	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.75	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					7.32	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.18	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					8.11	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					5.46	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.18	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					10.51	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					254.24	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					191.66	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.12	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	728	R	59.96	AM-Q1	2.96	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,831	R	28.31	AM-Q2	0.40	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	992	R	32.14	AM-Q3	0.73	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	512	R	37.20	AM-Q4	0.48	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	246	R	482.91									
AM1.6	Concrete column	m3	79	R	739.83	AM-Q5	3.11	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	163	R	957.12	AM-Q6	0.48	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	133	R	708.76	AM-Q7	1.85	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	39	R	1,043.26	AM-Q8	2.03	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	115	R	717.43	AM-Q9	0.69	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	1,012	R	-									
AM1.12	Wood float	m2	1,031	R	3.29	AM-Q10	0.98	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	509	R	88.38	AM-Q11	0.48	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	551	R	101.85	AM-Q12	0.14	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	415	R	113.16	AM-Q13	0.39	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	205	R	195.63	AM-Q14	0.80	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	363	R	108.38	AM-Q15	0.37	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	3	R	373.23	AM-Q16	26.33	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	395	R	98.40	AM-Q17	0.10	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	77.08	R	5,014.23	AM-Q18	13.13	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	4,194	R	31.52	AM-Q19	0.24	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	1,619	R	25.91	AM-Q20	0.63	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	44	R	822.60	AM-Q21	1.75	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.90	R	3,085.38	AM-Q22	1124.44	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.12	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					2.12	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					1.87	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					12.98	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.65	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.50	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.68	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.46	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					0.67	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					146.78	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					5.46	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					8.46	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.89	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					7.26	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.56	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					6.62	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					10.60	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					159.08	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					193.52	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					6.10	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.16	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	1,777	R	45.61	AN-Q1	1.29	AN1.1	/	AN1.5				
AN1.2	Working space	m2	289	R	31.42	AN-Q2	6.15	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	306	R	37.68	AN-Q3	5.81	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,033	R	37.83	AN-Q4	1.33	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,374	R	917.67	AN-Q5								
AN1.6	Concrete column	m3	40	R	769.11	AN-Q6	34.35	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	33	R	830.87	AN-Q7	1.21	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	106	R	830.87	AN-Q8	12.96	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	4	R	1,083.39	AN-Q9	10.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	1,815	R	-				/					
AN1.11	Wood float	m2	1,363	R	4.79	AN-Q10	1.01	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	153	R	104.58	AN-Q11	8.98	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	234	R	171.84	AN-Q12	0.17	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	192	R	118.41	AN-Q13	0.17	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	36	R	171.41	AN-Q14	0.92	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	23	R	135.07	AN-Q15	0.17	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	238.77	AN-Q16	343.50	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	858	R	91.72	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	443.51	R	6,372.21	AN-Q18	4.09	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	8,385	R	20.80	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	4,267	R	35.25	AN-Q20	0.43	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	74	R	777.05	AN-Q21	24.53	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.80	R	5,992.91	AN-Q22	763.33	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.45	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					1.21	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					24.26	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					191.58	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					8.77	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.02	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					4.85	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					4.48	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.48	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					8.02	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					9.06	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					306.36	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					180.77	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.15	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					8.20	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	283	R	39.16	AO-Q1	2.44	AO1.1	/	AO1.5				
AO1.2	Working space	m2	307	R	25.02	AO-Q2	0.92	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	124	R	39.41	AO-Q3	2.28	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	23	R	36.51	AO-Q4	5.04	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	116	R	787.95									
AO1.6	Concrete column	m3	18	R	851.22	AO-Q5	6.44	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	13	R	1,261.83	AO-Q6	1.38	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	2	R	492.95	AO-Q7	58.00	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	755.22	AO-Q8	18.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	40	R	-									
AO1.11	Wood float	m2	23	R	7.34	AO-Q9	5.04	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	111	R	62.05	AO-Q10	1.05	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	133	R	105.37	AO-Q11	0.14	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	32	R	154.30	AO-Q12	0.41	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	13	R	144.22	AO-Q13	1.00	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	155.80	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	37	R	323.88	AO-Q15	3.14	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	11	R	82.22	AO-Q16	0.18	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	4.24	R	4,562.26	AO-Q17	9.43	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,761	R	22.15	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,323	R	23.98	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	1,015.52	AO-Q20	3.64	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.61	R	4,384.79	AO-Q21	32.13	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.05	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.57	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.99	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					21.58	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					107.35	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					12.70	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.18	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					8.75	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					8.08	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					3.90	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					4.85	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					6.00	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					205.97	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					190.25	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.18	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					4.49	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	939	R	37.39	AP-Q1	1.04	AP1.1	/	AP1.5				
AP1.2	Working space	m2	600	R	21.09	AP-Q2	1.57	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	743	R	46.73	AP-Q3	1.26	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	155	R	56.31	AP-Q4	5.84	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	905	R	677.72	AP-Q5	1.02	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	885	R	102.16									
AP1.7	Rough formwork	m2	204	R	109.37	AP-Q6	4.44	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,296	R	152.23	AP-Q7	0.70	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	2,404	R	5.38	AP-Q8	0.38	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	176	R	37.83	AP-Q9	5.14	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	40	R	63.72	AP-Q10	22.63	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	364	R	20.80	AP-Q11	2.49	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.58	R	6,553.43	AP-Q12	1560.34	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,173	R	128.27	AP-Q13	0.77	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,141	R	-	AP-Q14	3.47	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,659	R	45.49	AP-Q15	1.89	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,130	R	134.24	AP-Q16	2.78	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,617	R	65.54	AP-Q17	1.20	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	5	R	841.24	AP-Q18	628.20	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	2,307	R	167.40	AP-Q19	1.36	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	2,026	R	67.31	AP-Q20	1.55	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	65.60	R	4,377.35	AP-Q21	13.80	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	22,872.50									
AP1.24	Structural steel	Item	1	R	59,226.00									
AP1.25	Plumbing and drainage	Item	1	R	37,711.50									
AP1.26	Small power and lighting	Item	1	R	321,275.50									
AP1.27	External works	Item	1	R	138,827.50									
	Excavations / concrete					AP-R1					0.06	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					1.77	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					0.80	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					12.04	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					42.85	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					6.20	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					4.45	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					125.97	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					17.91	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					10.64	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					210.45	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.10	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					14.90	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					32.61	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					1.96	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.15	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.77	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.91	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.23	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					13.53	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					8.62	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					73.39	AP1.26	/	AP1.22
	External works / concrete					AP-R23					204.84	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	47	R	517.69	AQ-Q1	3.02	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	142	R	87.55									
AQ1.3	Reinforcement	t	6.91	R	4,787.55	AQ-Q2	6.80	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	463	R	65.41	AQ-Q3	0.10	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	154	R	92.11	AQ-Q4	0.31	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	99	R	136.16	AQ-Q5	7.59	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	661	R	70.04	AQ-Q6	1.14	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	49.19	R	19,694.37	AQ-Q7	15.27	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	343	R	67.18	AQ-Q8	2.19	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	1	R	6,369.69	AQ-Q9	751.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	19	R	510.71	AQ-Q10	39.53	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	619	R	42.60	AQ-Q11	1.21	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	751	R	-									
	Concrete / reinforcement					AQ-R1					0.11	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.91	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					7.91	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					5.62	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					3.80	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					281.19	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.96	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.32	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.29	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.64	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	131	R	119.66	AR-Q1	2.98	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	44	R	1,261.83	AR-Q2	9.52	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	4.62	R	4,550.81									
AR1.4	Mesh	m2	459	R	118.58	AR-Q3	0.10	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	90	R	85.61	AR-Q4	0.49	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	94	R	167.43	AR-Q5	3.86	AR1.15	/	AR1.6				
AR1.7	Screed	m2	312	R	19.68	AR-Q6	1.16	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	36.69	R	21,462.84	AR-Q7	9.89	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	15	R	2,040.06	AR-Q8	2.45	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	33	R	541.12	AR-Q9	1.11	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	51	R	282.20	AR-Q10	0.72	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	365	R	72.81	AR-Q11	0.99	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	77	R	67.33	AR-Q12	4.71	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	22	R	657.69	AR-Q13	1.67	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	363	R	-									
	Earthworks / concrete					AR-R1					0.09	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.28	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					10.64	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					14.74	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					7.54	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					64.12	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					10.52	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					39.66	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.92	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					294.78	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.92	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					32.63	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	137	R	93.46	AS-Q1	2.91	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	104	R	56.31	AS-Q2	0.45	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	47	R	677.72	AS-Q3	5.56	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	8.45	R	4,577.86									
AS1.5	Mesh	m2	101	R	54.91	AS-Q4	0.47	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	210	R	88.38	AS-Q5	0.22	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	106	R	9.10	AS-Q6	0.44	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	21	R	69.56	AS-Q7	2.24	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	853	R	19.72	AS-Q8	0.06	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.69	R	5,626.68	AS-Q9	68.12	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	31	R	140.88	AS-Q10	0.29	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	2	R	1,622.48	AS-Q11	4.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	39	R	320.96	AS-Q12	2.64	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	626	R	32.65	AS-Q13	0.08	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	1.30	R	26,211.23	AS-Q14	6.92	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	0.56	R	17,965.80	AS-Q15	183.93	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	103	R	-									
AS1.18	Total control room area	m2	9	R	-									
	Concrete / earthworks					AS-R1					7.25	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					12.04	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					83.37	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					7.67	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					74.47	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					9.74	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					232.14	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					2.11	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.12	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.17	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.25	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.09	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	174	R	103.59	AT-Q1	17.40	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	11	R	36.22	AT-Q2	0.91	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	10	R	813.94	AT-Q3	7.58	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	1.32	R	5,014.23									
AT1.5	Formwork	m2	146	R	135.87	AT-Q4	0.07	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	36	R	4.59	AT-Q5	0.28	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	20	R	45.65	AT-Q6	0.50	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.37	R	20.21	AT-Q7	27.03	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.52	R	3,543.87	AT-Q8	19.23	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.06	R	24.48	AT-Q9	166.67	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.68	R	22,863.69	AT-Q10	27.94	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.98	R	26,751.58	AT-Q11	19.39	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	32	R	127.18	AT-Q12	0.59	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	19	R	102.93	AT-Q13	1.00	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	19	R	-									
	Concrete / earthworks					AT-R1					7.86	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					22.47	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					5.99	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					177.33	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					17.83	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					248.11	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.83	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.23	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.22	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.19	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					6.40	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.24	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	225	R	113.87	AU-Q1	0.64	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	163	R	38.05	AU-Q2	2.16	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	352	R	853.40									
AU1.4	Reinforcement	t	24.37	R	5,224.96	AU-Q3	14.44	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	850	R	115.67	AU-Q4	0.41	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	108	R	73.14	AU-Q5	3.26	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,082	R	15.06	AU-Q6	0.17	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	344	R	17.26	AU-Q7	1.02	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	29	R	162.99	AU-Q8	12.14	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.02	R	12,933.81	AU-Q9	174.26	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	9	R	1,884.76	AU-Q10	39.11	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	15	R	179.03	AU-Q11	11.53	AU1.12	/	AU1.13				
AU1.13	Total area	m2	173	R	-									
	Concrete / earthworks					AU-R1					7.49	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					22.43	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.38	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.16	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					11.67	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					346.94	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.40	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					302.72	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					32.06	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.45	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					4.77	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	2,844	R	89.53	AV-Q1	0.93	AV1.10	/	AV1.1				
AV1.2	Lining	m2	3,133	R	57.24	AV-Q2	0.84	AV1.10	/	AV1.2				
AV1.3	Paving	m2	2,885	R	84.79	AV-Q3	0.92	AV1.10	/	AV1.3				
AV1.4	Pipework	m	67	R	362.68	AV-Q4	39.42	AV1.10	/	AV1.4				
AV1.5	Manholes	No	3	R	2,121.57	AV-Q5	22.33	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	24	R	492.95	AV-Q6	2.79	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	128	R	97.03	AV-Q7	0.19	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	26	R	83.57	AV-Q8	0.92	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	2.75	R	4,770.25	AV-Q9	8.73	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	2,641	R	-									
	Earthworks / lining					AV-R1					1.56	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.06	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.68	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.25	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.17	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.12	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					5.08	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					5.90	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.10	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,128	R	142.29	AW-Q1	15.67	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	90	R	51.50	AW-Q2	0.80	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	72	R	735.31	AW-Q3	4.72	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	15.26	R	7,138.93									
AW1.5	Mesh	m2	60	R	57.42	AW-Q4	1.20	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	419	R	92.43	AW-Q5	0.17	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	2,323	R	19.96	AW-Q6	0.03	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	2.02	R	25,589.66	AW-Q7	22.28	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	45	R	-									
	Concrete / earthworks					AW-R1					5.17	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					14.28	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					124.33	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					7.96	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					357.66	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.28	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	15	R	-									
BA1.2	Steel	t	2.12	R	16,160.75	BA-Q1	7.08	BA1.1	/	BA1.2				
BA1.3	Handrail	m	14	R	541.33	BA-Q2	1.07	BA1.1	/	BA1.3				
BA1.4	Grating	m2	9	R	973.99	BA-Q3	1.67	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	11	R	315.90	BA-Q4	1.36	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	148.01	BA-Q5	3.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					29.85	BA1.2	/	BA1.3
	Steel / grating					BA-R2					16.59	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					51.16	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					109.19	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	1,208	R	-									
BB1.2	Steel	t	37.38	R	22,696.21	BB-Q1	32.32	BB1.1	/	BB1.2				
BB1.3	Handrail	m	58	R	523.90	BB-Q2	20.83	BB1.1	/	BB1.3				
BB1.4	Grating	m2	83	R	1,275.64	BB-Q3	14.55	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	121	R	214.97	BB-Q4	9.98	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	8	R	2,365.26	BB-Q5	151.00	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					43.32	BB1.2	/	BB1.3
	Steel / grating					BB-R2					17.79	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					105.58	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					9.60	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	8,999	R	-									
BC1.2	Steel	t	142.47	R	19,850.25	BC-Q1	63.16	BC1.1	/	BC1.2				
BC1.3	Handrail	m	377	R	543.52	BC-Q2	23.87	BC1.1	/	BC1.3				
BC1.4	Grating	m2	3,200	R	919.56	BC-Q3	2.81	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	370	R	264.69	BC-Q4	24.32	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	61	R	148.63	BC-Q5	147.52	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	73	R	2,094.88	BC-Q6	123.27	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					36.52	BC1.2	/	BC1.3
	Steel / grating					BC-R2					21.59	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					74.99	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					133.55	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					9.48	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	365	R	-									
BD1.2	Steel	t	17.20	R	9,991.07	BD-Q1	21.22	BD1.1	/	BD1.2				
BD1.3	Handrail	m	13	R	569.85	BD-Q2	28.08	BD1.1	/	BD1.3				
BD1.4	Grating	m2	6	R	1,018.60	BD-Q3	60.83	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	12	R	177.44	BD-Q4	30.42	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	15	R	2,530.56	BD-Q5	24.33	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					17.53	BD1.1	/	BD1.2
	Steel / grating					BD-R2					9.81	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					56.31	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					3.95	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	28	R	-									
BE1.2	Steel	t	2.04	R	22,193.41	BE-Q1	13.73	BE1.1	/	BE1.2				
BE1.3	Handrail	m	32	R	427.23	BE-Q2	0.88	BE1.1	/	BE1.3				
BE1.4	Grating	m2	23	R	972.56	BE-Q3	1.22	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	20	R	197.26	BE-Q4	1.40	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	5	R	206.59	BE-Q5	5.60	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					51.95	BE1.2	/	BE1.3
	Steel / grating					BE-R2					22.82	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					112.51	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					107.43	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	345	R	-									
BF1.2	Steel	t	18.89	R	21,144.63	BF-Q1	18.26	BF1.1	/	BF1.2				
BF1.3	Handrail	m	9	R	568.50	BF-Q2	38.33	BF1.1	/	BF1.3				
BF1.4	Grating	m2	30	R	624.27	BF-Q3	11.50	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	13	R	193.70	BF-Q4	26.54	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	12	R	2,514.62	BF-Q5	28.75	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					37.19	BF1.1	/	BF1.2
	Steel / grating					BF-R2					33.87	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					109.16	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					8.41	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	14,265	R	-	C-Q1	0.21	C1.1	/	C1.2				
C1.2	Total work units	WU	67,497	R	264.60									
C1.3	Pipe supports	kg	5,496	R	-	C-Q2	2.60	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	7,047	R	-	C-Q3	0.10	C1.4	/	C1.2				
C1.5	Number of welds	No	7,992	R	-	C-Q4	0.56	C1.5	/	C1.1				
C1.6	Total fittings	No	8,559	R	-	C-Q5	0.60	C1.6	/	C1.1				
C1.7	Stud bolts	No	1,714	R	-	C-Q6	0.20	C1.7	/	C1.6				
C1.8	Support number	No	1,104	R	-	C-Q7	0.20	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	67,497	R	264.60	DA-Q1	55.60	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	1,214	R	27.34									
	Average cost per examination / WU					DA-R1					9.68	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	67,497	R	264.60	DB-Q1	238.51	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	283	R	105.65									
	Average cost per examination / WU					DB-R1					2.50	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	67,497	R	264.60	DC-Q1	381.34	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	177	R	79.07									
	Average cost per examination / WU					DC-R1					3.35	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	67,497	R	264.60	DD-Q1	44.03	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,533	R	32.01									
	Average cost per examination / WU					DD-R1					8.27	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	67,497	R	264.60	DE-Q1	144.22	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	468	R	80.63									
	Average cost per examination / WU					DE-R1					3.28	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	67,497	R	264.60	E-Q1	352.10	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	191.70	R	306.58	E-Q2	271.85	E1.1	/	E1.3				
E1.3	Structural steel	t	248.29	R	16,721.00									
	WU cost / install mechanical weight - receive					E-R1					0.86	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					54.54	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	67,497	R	264.60									
F1.2	Painting to piping	m2	3,550	R	122.55	F-Q1	19.01	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	924	R	226.73	F-Q2	73.05	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	289.49	R	374.77									
F1.5	Painting to mechanical equipment	m2	722	R	116.97	F-Q3	0.40	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	282	R	349.02	F-Q4	1.03	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.54	F1.2	/	F1.3
	Work unit / paint					F-R2					2.16	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.17	F1.1	/	F1.3
	Install plant / paint					F-R4					3.20	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.07	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	22,509	R	32.29									
G1.2	Electrical cable terminations	No	1,302	R	120.49	G-Q1	17.29	G1.1	/	G1.2				
G1.3	Electrical equipment	No	90	R	323.93	G-Q2	250.10	G1.1	/	G1.3				
G1.4	DB's	No	9	R	801.20	G-Q3	10.00	G1.3	/	G1.4				
G1.5	Rack	m	4,182	R	106.84	G-Q4	5.38	G1.1	/	G1.5				
G1.6	Support steel	kg	7,605	R	20.31	G-Q5	0.55	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	16,907	R	12.65	G-Q6	1.33	G1.1	/	G1.7				
G1.8	Instruments	No	906	R	157.58	G-Q7	18.66	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,363	R	74.84	G-Q8	0.66	G1.8	/	G1.9				
G1.10	Light fittings	No	320	R	204.83	G-Q9	3.56	G1.10	/	G1.3				
G1.11	Conduit	m	2,769	R	19.58	G-Q10	8.13	G1.1	/	G1.11				
G1.12	Instrument stands	No	254	R	822.76	G-Q11	3.57	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.27	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.40	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.65	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.59	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.30	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.16	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.17	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.02	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.08	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	8,786	R	15.62	AB-Q1	2.47	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,562	R	3.74									
AB1.3	Back fill and compact	m3	6,334	R	28.91	AB-Q2	1.39	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,774	R	2.09	AB-Q3	1.52	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	5,209	R	3.47	AB-Q4	1.69	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.18	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.54	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					7.47	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.50	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	120,659.46									
AC1.2	EO for raking equipment	Item	1	R	13,202.30									
AC1.3	Number of piles	No	318	R	-									
AC1.4	Move rig to new position	No	201	R	115.79	AC-Q1	1.58	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	15	R	-	AC-Q2	21.20	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	24	R	221.99	AC-Q3	0.63	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	81	R	38.26	AC-Q4	0.19	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	5,894	R	68.78	AC-Q5	0.05	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	538	R	130.47	AC-Q6	0.59	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	168	R	275.48	AC-Q7	1.89	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	205	R	150.83	AC-Q8	1.55	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	1,022	R	252.64	AC-Q9	0.31	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	102	R	354.88	AC-Q10	0.15	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	20.88	R	3,080.54	AC-Q11	15.23	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	274.77	R	4,378.12	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,808	R	603.40	AC-Q13	0.18	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	198	R	651.86	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	80,959.87		1.00		/					
AC1.19	Load test to pile	No	2	R	10,931.34	AC-Q15	159.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	28,135.24	AC-Q16	318.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	201	R	146.77	AC-Q17	1.58	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					199.97	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					21.88	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.56	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.22	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.46	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.42	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.59	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.26	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.08	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.12	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					46.63	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.24	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	174	R	33.26	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,274	R	33.68									
AD1.3	Kerbing	m	307	R	53.87	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,623	R	-									
AD1.5	Remove top soil	m3	911	R	13.98	AD-Q3	0.49	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,854	R	33.97	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	4,531	R	3.88									
AD1.8	Reduce levels	m3	1,345	R	10.50	AD-Q5	0.30	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	778	R	23.05	AD-Q6	1.73	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	520	R	91.19	AD-Q7	1.50	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	379	R	69.78	AD-Q8	3.55	AD1.8	/	AD1.11				
AD1.12	Prime	m2	2,098	R	10.47	AD-Q9	4.03	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	359	R	4.45	AD-Q10	0.88	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	388	R	1.95	AD-Q11	1.17	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	284	R	230.33	AD-Q12	1.26	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	59	R	110.33	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	88.51	AD-Q14	0.19	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	9	R	98.13	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	586	R	2.10	AD-Q16	1.91	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.99	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					3.60	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					2.71	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.46	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.25	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.15	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.47	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.11	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					3.24	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.59	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.08	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.04	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					4.28	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.05	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.64	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					1.82	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	304	R	497.74	AE-Q1	4.54	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	67	R	757.93	AE-Q2	0.14	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	475	R	-									
AE1.4	Rip and compact	m2	2,111	R	2.19									
AE1.5	Formwork to plinth	m2	462	R	77.14	AE-Q3	6.90	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	207	R	68.49	AE-Q4	0.68	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.14	R	3,699.73	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	3,232	R	91.41	AE-Q6	780.68	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	780	R	15.74	AE-Q7	2.57	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	600	R	32.82	AE-Q8	1.97	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.66	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					227.28	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					40.47	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,674	R	-	AF-Q1	10.43	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	544	R	35.39	AF-Q2	2.59	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	210	R	24.51	AF-Q3	0.81	AF1.2	/	AF1.4				
AF1.4	Working space	m2	669	R	15.11	AF-Q4	0.40	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	217	R	683.92	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	246	R	26.96	AF-Q6	0.86	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	17	R	773.85	AF-Q7	0.08	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	490.01	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	212	R	-	AF-Q9	0.77	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	274	R	3.25									
AF1.11	Formwork to bases	m2	383	R	97.05	AF-Q10	1.76	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	190	R	69.88	AF-Q11	11.18	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	17	R	76.74	AF-Q12	5.67	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	1.90	R	3,399.48	AF-Q13	0.07	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	25.92	R	4,867.11	AF-Q14	8.18	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	372	R	14.78	AF-Q15	0.58	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	30	R	121.77	AF-Q16	0.57	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	1,542.01	AF-Q17	0.07	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	84	R	184.94									
	Base excavation / backfill					AF-R1					1.44	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.34	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					19.33	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					25.37	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					21.87	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.72	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.05	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					210.44	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.14	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.09	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.16	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.70	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					46.27	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					6.36	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.70	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.12	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	412	R	26.07	AG-Q1	1.61	AG1.1	/	AG1.4				
AG1.2	Working space	m2	985	R	19.66	AG-Q2	0.42	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	75	R	33.54	AG-Q3	5.49	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	256	R	779.47	AG-Q4	1.50	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	77	R	625.32	AG-Q5	3.32	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	328	R	-									
AG1.7	Wood float	m2	302	R	5.10	AG-Q6	0.25	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	171	R	27.03	AG-Q7	1.50	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	613	R	85.95	AG-Q8	0.42	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	146	R	67.73	AG-Q9	0.53	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	24.69	R	3,261.05	AG-Q10	13.28	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,639	R	17.06	AG-Q11	0.12	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	4,555	R	23.32	AG-Q12	0.07	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.38	R	3,079.32	AG-Q13	32.35	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.03	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.75	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					1.29	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.03	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.11	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.11	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.18	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.02	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.03	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					3.95	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	389	R	38.01	AH-Q1	3.85	AH1.1	/	AH1.4				
AH1.2	Working space	m2	77	R	14.93	AH-Q2	5.05	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	291	R	48.07	AH-Q3	1.34	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	101	R	801.31	AH-Q4	0.95	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	22	R	524.64	AH-Q5	4.59	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	167	R	668.93	AH-Q6	0.60	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	14	R	527.12	AH-Q7	7.21	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	495.94	AH-Q8	25.25	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	235	R	-									
AH1.10	Blinding	m2	106	R	25.24	AH-Q9	2.22	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	806	R	3.16	AH-Q10	0.29	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	210	R	86.28	AH-Q11	0.48	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	56	R	97.38	AH-Q12	0.25	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	43	R	76.65	AH-Q13	0.09	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	267	R	93.24	AH-Q14	0.08	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	34	R	83.11	AH-Q15	4.91	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	54	R	23.96	AH-Q16	3.09	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	3.09	R	4,960.29	AH-Q17	0.35	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	8.80	R	3,979.31	AH-Q18	26.70	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	944	R	54.37	AH-Q19	0.18	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,780	R	23.31	AH-Q20	0.13	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,104	R	17.49	AH-Q21	0.11	AH1.9	/	AH1.22				
AH1.23	Grout	m3	1.59	R	4,003.42	AH-Q22	147.80	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	334	R	23.00	AH-Q23	0.50	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	246	R	32.61	AH-Q24	0.68	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					2.55	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.79	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					31.75	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					253.58	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					1.53	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.20	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					1.52	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					1.62	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					9.29	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					5.41	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					6.47	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					5.63	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.05	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					27.92	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					1.25	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					73.19	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					170.71	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					227.52	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.20	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					29.08	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					20.51	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	327	R	44.79	AI-Q1	3.11	AI1.1	/	AI1.5				
AI1.2	Working space	m2	842	R	15.01	AI-Q2	0.39	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	125	R	39.79	AI-Q3	2.62	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	351	R	26.41	AI-Q4	0.30	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	105	R	687.99	AI-Q5	6.56	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	16	R	538.17	AI-Q6	0.47	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	134	R	-									
AI1.8	Wood float	m2	223	R	5.33									
AI1.9	Formwork bases	m2	183	R	55.44	AI-Q7	0.57	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	241	R	64.46	AI-Q8	0.07	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	9.20	R	4,551.58	AI-Q9	14.57	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	3,359	R	17.03	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.71	R	4,520.61	AI-Q11	61.40	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.07	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					2.98	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.13	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					26.05	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.28	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					129.08	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					12.41	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					8.35	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					267.27	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.15	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	360	R	36.64	AJ-Q1	3.27	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	1,035	R	15.75	AJ-Q2	0.35	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	145	R	32.24	AJ-Q3	2.48	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	456	R	38.91	AJ-Q4	0.24	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	110	R	764.83	AJ-Q5	1.90	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	27	R	508.09	AJ-Q6	4.07	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	58	R	755.34									
AJ1.8	Total concrete	m3	167	R	-									
AJ1.9	Wood float	m2	340	R	3.30	AJ-Q7	0.49	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	200	R	100.49	AJ-Q8	0.55	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	315	R	51.96	AJ-Q9	0.09	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	21.58	R	5,099.24	AJ-Q10	7.74	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	4,060	R	17.03	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,632	R	21.97	AJ-Q12	0.04	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.39	R	3,228.47	AJ-Q13	79.14	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.05	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.33	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					1.14	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					19.66	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					231.77	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					7.61	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					9.78	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					299.43	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					232.10	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.24	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	401	R	32.58	AK-Q1	1.34	AK1.1	/	AK1.5				
AK1.2	Working space	m2	884	R	16.15	AK-Q2	0.45	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	289	R	37.77	AK-Q3	1.39	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	390	R	38.39	AK-Q4	0.77	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	300	R	442.33	AK-Q5	21.43	AK1.5		AK1.6				
AK1.6	Concrete column	m3	14	R	763.44									
AK1.7	Concrete plinth	m3	37	R	422.96	AK-Q6	8.11	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	270	R	-									
AK1.9	Wood float	m2	596	R	4.38	AK-Q7	0.50	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	449	R	69.15	AK-Q8	0.67	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	133	R	56.83	AK-Q9	0.28	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	33	R	72.92	AK-Q10	0.42	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	44.23	R	4,350.55	AK-Q11	6.10	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,975	R	16.88	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.77	R	4,019.05	AK-Q13	71.62	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.07	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					2.02	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.86	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					11.52	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					100.99	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					6.40	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.44	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					10.47	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					257.73	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.11	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	407	R	38.87	AL-Q1	1.88	AL1.1	/	AL1.5				
AL1.2	Working space	m2	2,033	R	11.89	AL-Q2	0.20	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	218	R	34.20	AL-Q3	1.87	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	288	R	26.40	AL-Q4	0.75	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	217	R	524.53	AL-Q5	1.82	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	119	R	780.74	AL-Q6	1.45	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	82	R	484.08	AL-Q7	2.65	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	449	R	-									
AL1.9	Wood float	m2	494	R	3.20	AL-Q8	0.44	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	505	R	95.42	AL-Q9	0.43	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	869	R	97.41	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	220	R	84.37	AL-Q11	0.37	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	128	R	141.64	AL-Q12	0.64	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	11	R	93.83	AL-Q13	10.82	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	39.76	R	3,424.72	AL-Q14	11.29	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	16,283	R	19.54	AL-Q15	0.03	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	268	R	18.76	AL-Q16	1.68	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.83	R	3,638.89	AL-Q17	540.96	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.07	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					3.27	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					1.14	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					19.87	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					163.92	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.67	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.67	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					5.50	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					5.74	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					8.01	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					3.42	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					5.74	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					5.16	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					175.27	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					182.55	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.14	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	1,458	R	27.97	AM-Q1	4.56	AM1.1	/	AM1.5				
AM1.2	Working space	m2	2,772	R	14.76	AM-Q2	0.53	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	990	R	35.82	AM-Q3	1.47	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	518	R	31.32	AM-Q4	0.62	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	320	R	494.15									
AM1.6	Concrete column	m3	172	R	655.48	AM-Q5	1.86	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	192	R	549.36	AM-Q6	0.90	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	190	R	593.48	AM-Q7	1.68	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	92	R	745.18	AM-Q8	1.87	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	108	R	442.33	AM-Q9	1.59	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	966	R	-									
AM1.12	Wood float	m2	2,354	R	4.35	AM-Q10	0.41	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	734	R	65.05	AM-Q11	0.44	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	946	R	72.10	AM-Q12	0.18	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	591	R	108.26	AM-Q13	0.32	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	262	R	103.01	AM-Q14	0.73	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	685	R	136.39	AM-Q15	0.28	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	8	R	225.81	AM-Q16	21.50	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	428	R	72.01	AM-Q17	0.21	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	184.08	R	5,081.82	AM-Q18	5.25	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	6,530	R	20.81	AM-Q19	0.15	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,516	R	17.03	AM-Q20	0.38	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	70	R	370.86	AM-Q21	2.63	AM1.20	/	AM1.23				
AM1.24	Grout	m3	0.81	R	5,265.20	AM-Q22	1192.59	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.06	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.89	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.78	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					15.78	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.75	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.90	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.83	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.66	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.12	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					113.60	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					7.60	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					5.07	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					5.33	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					9.09	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.43	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					3.24	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					10.35	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					244.20	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					298.40	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					13.70	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.09	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,178	R	25.47	AN-Q1	1.00	AN1.1	/	AN1.5				
AN1.2	Working space	m2	309	R	15.25	AN-Q2	7.05	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	593	R	54.65	AN-Q3	3.67	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,684	R	28.99	AN-Q4	1.30	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	2,183	R	502.21	AN-Q5								
AN1.6	Concrete column	m3	91	R	742.64	AN-Q6	23.99	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	40	R	683.92	AN-Q7	2.28	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	243	R	523.32	AN-Q8	8.98	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	5	R	773.85	AN-Q9	18.20	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,826	R	-				/					
AN1.11	Wood float	m2	1,890	R	3.42	AN-Q10	1.16	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	300	R	86.28	AN-Q11	7.28	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	325	R	80.16	AN-Q12	0.28	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	307	R	98.02	AN-Q13	0.13	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	49	R	80.96	AN-Q14	0.82	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	34	R	92.66	AN-Q15	0.15	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	4	R	203.50	AN-Q16	545.75	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,929	R	75.04	AN-Q17	0.13	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	441.60	R	3,195.91	AN-Q18	6.40	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	12,904	R	21.60	AN-Q19	0.22	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	11,309	R	22.80	AN-Q20	0.25	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	106	R	555.04	AN-Q21	26.66	AN1.10	/	AN1.22				
AN1.23	Grout	m3	2.25	R	4,631.37	AN-Q22	970.22	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.05	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.67	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.47	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					17.32	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					146.85	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.82	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					6.98	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					8.45	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					9.26	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					3.36	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					8.35	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					6.97	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					147.96	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					140.17	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.11	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					5.76	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	263	R	24.35	AO-Q1	2.07	AO1.1	/	AO1.5				
AO1.2	Working space	m2	736	R	15.80	AO-Q2	0.36	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	210	R	32.61	AO-Q3	1.25	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	52	R	42.29	AO-Q4	2.44	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	127	R	369.78									
AO1.6	Concrete column	m3	28	R	491.33	AO-Q5	4.54	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	12	R	683.66	AO-Q6	2.33	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	7	R	506.26	AO-Q7	18.14	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	745.18	AO-Q8	28.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	67	R	-									
AO1.11	Wood float	m2	48	R	2.69	AO-Q9	2.65	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	118	R	67.39	AO-Q10	1.08	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	278	R	111.20	AO-Q11	0.10	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	57	R	78.04	AO-Q12	0.21	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	20	R	125.92	AO-Q13	0.60	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	5	R	94.01	AO-Q14	0.20	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	95	R	155.29	AO-Q15	1.34	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	17	R	71.76	AO-Q16	0.41	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	8.71	R	3,699.73	AO-Q17	7.69	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	2,252	R	14.73	AO-Q18	0.03	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	3,616	R	22.38	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	19	R	596.93	AO-Q20	3.53	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.86	R	3,638.89	AO-Q21	32.90	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.07	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.54	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.75	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					8.74	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					137.46	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					5.49	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					8.76	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					5.43	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					4.42	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.40	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					7.93	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					7.05	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					251.17	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					165.31	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.10	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.20	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,506	R	38.80	AP-Q1	1.84	AP1.1	/	AP1.5				
AP1.2	Working space	m2	679	R	14.23	AP-Q2	2.22	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	1,083	R	33.49	AP-Q3	1.39	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	324	R	41.28	AP-Q4	2.52	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	818	R	386.72	AP-Q5	0.31	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	2,637	R	54.50									
AP1.7	Rough formwork	m2	322	R	62.88	AP-Q6	2.54	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	2,124	R	72.89	AP-Q7	0.39	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	3,742	R	6.61	AP-Q8	0.22	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	246	R	23.83	AP-Q9	3.33	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	63	R	33.38	AP-Q10	12.98	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	362	R	22.71	AP-Q11	2.26	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.98	R	2,897.17	AP-Q12	834.69	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,502	R	94.08	AP-Q13	0.54	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,502	R	-	AP-Q14	4.28	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	2,497	R	42.85	AP-Q15	1.40	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,783	R	105.27	AP-Q16	1.96	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	5,274	R	36.84	AP-Q17	0.66	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	9	R	549.40	AP-Q18	389.11	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,929	R	166.89	AP-Q19	0.89	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	5,737	R	63.77	AP-Q20	0.61	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	95.00	R	4,806.73	AP-Q21	8.61	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	16,337.50									
AP1.24	Structural steel	Item	1	R	42,304.29									
AP1.25	Plumbing and drainage	Item	1	R	26,936.79									
AP1.26	Small power and lighting	Item	1	R	229,482.50									
AP1.27	External works	Item	1	R	99,162.50									
	Excavations / concrete					AP-R1					0.10	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.73	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.16	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					9.37	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					88.20	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					6.15	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					5.31	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					58.51	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					16.23	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					11.59	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					211.66	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.13	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					9.02	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					45.66	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.55	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.17	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.56	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.48	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					3.40	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					8.80	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					5.60	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					47.74	AP1.26	/	AP1.22
	External works / concrete					AP-R23					256.42	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	92	R	501.66	AQ-Q1	3.76	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	346	R	91.03									
AQ1.3	Reinforcement	t	9.76	R	3,250.58	AQ-Q2	9.43	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	817	R	80.11	AQ-Q3	0.11	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	312	R	69.31	AQ-Q4	0.29	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	133	R	100.63	AQ-Q5	8.20	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,012	R	83.91	AQ-Q6	1.08	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	65.46	R	14,067.41	AQ-Q7	16.67	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	545	R	67.19	AQ-Q8	2.00	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	4,505.62	AQ-Q9	545.50	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	40	R	587.25	AQ-Q10	27.28	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,422	R	50.65	AQ-Q11	0.77	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	1,091	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.51	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					6.26	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.24	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					4.99	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					167.65	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					0.80	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.32	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					7.00	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					1.66	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	144	R	66.05	AR-Q1	1.64	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	88	R	858.72	AR-Q2	14.01	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	6.28	R	3,581.59									
AR1.4	Mesh	m2	667	R	53.27	AR-Q3	0.13	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	140	R	95.42	AR-Q4	0.63	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	147	R	122.28	AR-Q5	3.65	AR1.15	/	AR1.6				
AR1.7	Screed	m2	486	R	13.96	AR-Q6	1.10	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	57.13	R	15,219.97	AR-Q7	9.38	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	21	R	1,030.77	AR-Q8	2.72	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	51	R	381.69	AR-Q9	1.12	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	68	R	189.25	AR-Q10	0.84	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	581	R	87.43	AR-Q11	0.92	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	149	R	36.18	AR-Q12	3.60	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	27	R	617.57	AR-Q13	2.12	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	536	R	-									
	Earthworks / concrete					AR-R1					0.08	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.24	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					16.12	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					9.00	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					7.02	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					61.51	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					14.77	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					39.88	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					2.02	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					174.08	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					0.41	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					24.64	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	296	R	99.55	AS-Q1	4.05	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	214	R	26.46	AS-Q2	0.34	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	73	R	782.15	AS-Q3	7.88	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	9.26	R	2,573.66									
AS1.5	Mesh	m2	103	R	56.99	AS-Q4	0.71	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	223	R	69.15	AS-Q5	0.33	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	205	R	4.72	AS-Q6	0.36	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	40	R	54.65	AS-Q7	1.83	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	804	R	16.37	AS-Q8	0.09	AS1.3	/	AS1.9				
AS1.10	Grout	m3	1.01	R	3,005.68	AS-Q9	72.28	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	48	R	132.77	AS-Q10	0.19	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	5	R	1,303.59	AS-Q11	1.80	AS1.18	/	AS1.12				
AS1.13	Pipework	m	51	R	204.57	AS-Q12	2.53	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	1,020	R	25.79	AS-Q13	0.07	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	3.21	R	9,235.88	AS-Q14	2.80	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.13	R	12,145.23	AS-Q15	114.16	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	129	R	-									
AS1.18	Total control room area	m2	9	R	-									
	Concrete / earthworks					AS-R1					7.86	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					29.56	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					45.16	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					11.31	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					165.71	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					14.31	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					157.22	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					3.82	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.26	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.28	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.21	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.10	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	179	R	87.56	AT-Q1	14.92	AT1.1	/	AT1.3				
AT1.2	Blinding	m2	25	R	35.44	AT-Q2	0.48	AT1.3	/	AT1.2				
AT1.3	Concrete	m3	12	R	538.17	AT-Q3	5.61	AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	2.14	R	3,699.73									
AT1.5	Formwork	m2	167	R	69.15	AT-Q4	0.07	AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	28	R	6.36	AT-Q5	0.43	AT1.3	/	AT1.6				
AT1.7	Movement joints	m	29	R	31.67	AT-Q6	0.41	AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.89	R	20.35	AT-Q7	13.48	AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.51	R	3,079.32	AT-Q8	23.53	AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.07	R	23.67	AT-Q9	171.43	AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.74	R	13,344.24	AT-Q10	44.59	AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	1.53	R	13,179.73	AT-Q11	21.57	AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	51	R	120.06	AT-Q12	0.65	AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	14	R	83.59	AT-Q13	2.36	AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	33	R	-									
	Concrete / earthworks					AT-R1					6.15	AT1.3	/	AT1.1
	Concrete / blinding					AT-R2					15.19	AT1.3	/	AT1.2
	Concrete / formwork					AT-R3					7.78	AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4					84.62	AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5					16.99	AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6					181.80	AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7					0.86	AT1.8	/	AT1.10
	Concrete / grout					AT-R8					0.17	AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9					0.28	AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10					0.28	AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11					4.48	AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12					1.44	AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	0	R	-	AU-Q1		AU1.1	/	AU1.3				
AU1.2	Blinding	m2	0	R	-	AU-Q2		AU1.3	/	AU1.2				
AU1.3	Concrete	m3	0	R	-									
AU1.4	Reinforcement	t	0.00	R	-	AU-Q3		AU1.3	/	AU1.4				
AU1.5	Formwork	m2	0	R	-	AU-Q4		AU1.3	/	AU1.5				
AU1.6	Movement joint	m	0	R	-	AU-Q5		AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	0	R	-	AU-Q6		AU1.3	/	AU1.7				
AU1.8	Bolts	kg	0	R	-	AU-Q7		AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	0	R	-	AU-Q8		AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	0.00	R	-	AU-Q9		AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	0	R	-	AU-Q10		AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	0	R	-	AU-Q11		AU1.12	/	AU1.13				
AU1.13	Total area	m2	0	R	-									
	Concrete / earthworks					AU-R1						AU1.3	/	AU1.1
	Concrete / blinding					AU-R2						AU1.3	/	AU1.2
	Concrete / formwork					AU-R3						AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4						AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5						AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6						AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7						AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8						AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9						AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10						AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11						AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	4,358	R	68.86	AV-Q1	0.94	AV1.10	/	AV1.1				
AV1.2	Lining	m2	4,305	R	27.32	AV-Q2	0.95	AV1.10	/	AV1.2				
AV1.3	Paving	m2	3,608	R	65.02	AV-Q3	1.14	AV1.10	/	AV1.3				
AV1.4	Pipework	m	91	R	163.45	AV-Q4	45.10	AV1.10	/	AV1.4				
AV1.5	Manholes	No	4	R	1,452.68	AV-Q5	22.75	AV1.4	/	AV1.5				
AV1.6	Concrete	m3	30	R	715.25	AV-Q6	3.03	AV1.4	/	AV1.6				
AV1.7	Formwork	m2	264	R	65.63	AV-Q7	0.11	AV1.6	/	AV1.7				
AV1.8	Mesh	m2	30	R	80.11	AV-Q8	1.00	AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	3.81	R	3,261.05	AV-Q9	7.87	AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	4,104	R	-									
	Earthworks / lining					AV-R1					2.52	AV1.1	/	AV1.2
	Earthworks / paving					AV-R2					1.06	AV1.1	/	AV1.3
	Lining / paving					AV-R3					0.42	AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4					0.42	AV1.1	/	AV1.4
	Pipework / manholes					AV-R5					0.11	AV1.4	/	AV1.5
	Lining / concrete					AV-R6					0.04	AV1.2	/	AV1.6
	Concrete / formwork					AV-R7					10.90	AV1.6	/	AV1.7
	Concrete / mesh					AV-R8					8.93	AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9					0.22	AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	1,159	R	65.01	AW-Q1	7.34	AW1.1	/	AW1.3				
AW1.2	Blinding	m2	121	R	26.57	AW-Q2	1.31	AW1.3	/	AW1.2				
AW1.3	Concrete	m3	158	R	344.93	AW-Q3	5.41	AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	29.23	R	3,533.58									
AW1.5	Mesh	m2	65	R	93.31	AW-Q4	2.43	AW1.3	/	AW1.5				
AW1.6	Formwork	m2	489	R	47.31	AW-Q5	0.32	AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	3,376	R	15.32	AW-Q6	0.05	AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	4.18	R	11,011.10	AW-Q7	11.00	AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	46	R	-									
	Concrete / earthworks					AW-R1					5.31	AW1.3	/	AW1.1
	Concrete / blinding					AW-R2					12.98	AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3					37.87	AW1.4	/	AW1.5
	Concrete / formwork					AW-R4					7.29	AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5					230.65	AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6					0.32	AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	30	R	-									
BA1.2	Steel	t	2.97	R	10,057.68	BA-Q1	10.10	BA1.1	/	BA1.2				
BA1.3	Handrail	m	20	R	506.71	BA-Q2	1.50	BA1.1	/	BA1.3				
BA1.4	Grating	m2	23	R	660.33	BA-Q3	1.30	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	28	R	137.01	BA-Q4	1.07	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	4	R	166.96	BA-Q5	7.50	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					19.85	BA1.2	/	BA1.3
	Steel / grating					BA-R2					15.23	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					73.41	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					60.24	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2,133	R	-									
BB1.2	Steel	t	66.11	R	10,352.95	BB-Q1	32.26	BB1.1	/	BB1.2				
BB1.3	Handrail	m	118	R	389.20	BB-Q2	18.08	BB1.1	/	BB1.3				
BB1.4	Grating	m2	194	R	445.91	BB-Q3	10.99	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	118	R	148.94	BB-Q4	18.08	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	25	R	2,367.98	BB-Q5	85.32	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					26.60	BB1.2	/	BB1.3
	Steel / grating					BB-R2					23.22	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					69.51	BB1.2	/	BB1.5

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	Steel / cat ladder					BB-R4					4.37	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	22,490	R	-									
BC1.2	Steel	t	195.63	R	8,745.83	BC-Q1	114.96	BC1.1	/	BC1.2				
BC1.3	Handrail	m	582	R	378.52	BC-Q2	38.64	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,176	R	625.79	BC-Q3	5.39	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	741	R	180.13	BC-Q4	30.35	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	70	R	116.11	BC-Q5	321.29	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	67	R	1,527.46	BC-Q6	335.67	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					23.11	BC1.2	/	BC1.3
	Steel / grating					BC-R2					13.98	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					48.55	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					75.32	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					5.73	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	863	R	-									
BD1.2	Steel	t	16.97	R	11,886.60	BD-Q1	50.85	BD1.1	/	BD1.2				
BD1.3	Handrail	m	12	R	485.21	BD-Q2	71.92	BD1.1	/	BD1.3				
BD1.4	Grating	m2	9	R	1,061.25	BD-Q3	95.89	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	13	R	145.38	BD-Q4	66.38	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	34	R	2,311.35	BD-Q5	25.38	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					24.50	BD1.1	/	BD1.2
	Steel / grating					BD-R2					11.20	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					81.76	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					5.14	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	45	R	-									
BE1.2	Steel	t	4.91	R	10,167.54	BE-Q1	9.16	BE1.1	/	BE1.2				
BE1.3	Handrail	m	34	R	539.69	BE-Q2	1.32	BE1.1	/	BE1.3				
BE1.4	Grating	m2	24	R	660.33	BE-Q3	1.88	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	60	R	197.76	BE-Q4	0.75	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	6	R	87.26	BE-Q5	7.50	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					18.84	BE1.2	/	BE1.3
	Steel / grating					BE-R2					15.40	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					51.41	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					116.52	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	331	R	-									
BF1.2	Steel	t	47.96	R	15,473.34	BF-Q1	6.90	BF1.1	/	BF1.2				
BF1.3	Handrail	m	17	R	386.31	BF-Q2	19.47	BF1.1	/	BF1.3				
BF1.4	Grating	m2	45	R	643.45	BF-Q3	7.36	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	22	R	198.44	BF-Q4	15.05	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	25	R	2,051.21	BF-Q5	13.24	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					40.05	BF1.1	/	BF1.2
	Steel / grating					BF-R2					24.05	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					77.97	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.54	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	22,928	R	-	C-Q1	0.25	C1.1	/	C1.2				
C1.2	Total work units	WU	90,621	R	138.28									
C1.3	Pipe supports	kg	12,875	R	-	C-Q2	1.78	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	12,718	R	-	C-Q3	0.14	C1.4	/	C1.2				
C1.5	Number of welds	No	12,747	R	-	C-Q4	0.56	C1.5	/	C1.1				
C1.6	Total fittings	No	7,785	R	-	C-Q5	0.34	C1.6	/	C1.1				
C1.7	Stud bolts	No	4,677	R	-	C-Q6	0.60	C1.7	/	C1.6				
C1.8	Support number	No	1,413	R	-	C-Q7	0.11	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	90,621	R	138.28	DA-Q1	91.81	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	987	R	19.61									
	Average cost per examination / WU					DA-R1					7.05	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	90,621	R	138.28	DB-Q1	144.53	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	627	R	72.14									
	Average cost per examination / WU					DB-R1					1.92	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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DC1.1	Total work units	WU	90,621	R	138.28	DC-Q1	421.49	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	215	R	54.23									
	Average cost per examination / WU					DC-R1					2.55	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	90,621	R	138.28	DD-Q1	57.50	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,576	R	23.43									
	Average cost per examination / WU					DD-R1					5.90	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	90,621	R	138.28	DE-Q1	183.07	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	495	R	56.76									
	Average cost per examination / WU					DE-R1					2.44	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	90,621	R	138.28	E-Q1	224.47	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	403.71	R	302.13	E-Q2	240.16	E1.1	/	E1.3				
E1.3	Structural steel	t	377.34	R	11,943.57									
	WU cost / install mechanical weight - receive					E-R1					0.46	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					39.53	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	90,621	R	138.28									
F1.2	Painting to piping	m2	3,191	R	41.46	F-Q1	28.40	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	925	R	175.07	F-Q2	97.97	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	300.43	R	301.10									
F1.5	Painting to mechanical equipment	m2	1,697	R	54.94	F-Q3	0.18	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	477	R	179.78	F-Q4	0.63	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.24	F1.2	/	F1.3
	Work unit / paint					F-R2					3.34	F1.1	/	F1.2
	Work unit / insulation					F-R3					0.79	F1.1	/	F1.3
	Install plant / paint					F-R4					5.48	F1.4	/	F1.5
	Install plant / insulation					F-R5					1.67	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	37,066	R	22.18									
G1.2	Electrical cable terminations	No	2,057	R	77.90	G-Q1	18.02	G1.1	/	G1.2				
G1.3	Electrical equipment	No	144	R	242.99	G-Q2	257.40	G1.1	/	G1.3				
G1.4	DB's	No	18	R	863.97	G-Q3	8.00	G1.3	/	G1.4				
G1.5	Rack	m	5,491	R	127.97	G-Q4	6.75	G1.1	/	G1.5				
G1.6	Support steel	kg	8,559	R	15.81	G-Q5	0.64	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	34,081	R	7.64	G-Q6	1.09	G1.1	/	G1.7				
G1.8	Instruments	No	1,154	R	74.47	G-Q7	29.53	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,848	R	54.30	G-Q8	0.62	G1.8	/	G1.9				
G1.10	Light fittings	No	718	R	222.79	G-Q9	4.99	G1.10	/	G1.3				
G1.11	Conduit	m	4,849	R	20.82	G-Q10	7.64	G1.1	/	G1.11				
G1.12	Instrument stands	No	266	R	271.53	G-Q11	4.34	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.28	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.09	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.28	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					1.07	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					1.40	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.17	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.10	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.14	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.03	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.10	G1.7	/	G1.8

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AB	**BULK EARTHWORKS**													
AB1.1	Bulk excavation	m3	7,234	R	31.19	AB-Q1	2.30	AB1.1	/	AB1.2				
AB1.2	Trimming of sides	m2	3,142	R	7.48									
AB1.3	Back fill and compact	m3	5,215	R	47.89	AB-Q2	1.39	AB1.1	/	AB1.3				
AB1.4	Overhaul	m3/km	5,094	R	4.47	AB-Q3	1.42	AB1.1	/	AB1.4				
AB1.5	Rip bed	m2	4,595	R	6.38	AB-Q4	1.57	AB1.1	/	AB1.5				
	Bulk excavation / trimming of sides					AB-R1					4.17	AB1.1	/	AB1.2
	Bulk excavation / back fill and compact					AB-R2					0.65	AB1.1	/	AB1.3
	Bulk excavation / Overhaul					AB-R3					6.98	AB1.1	/	AB1.4
	Bulk excavation / rip and compact					AB-R4					4.89	AB1.1	/	AB1.5
AC	**PILING**													
AC1.1	Site establishment of rig	Item	1	R	258,162.65									
AC1.2	EO for raking equipment	Item	1	R	28,247.60									
AC1.3	Number of piles	No	216	R	-									
AC1.4	Move rig to new position	No	208	R	231.22	AC-Q1	1.04	AC1.3	/	AC1.4				
AC1.5	Number of raking piles	No	17	R	-	AC-Q2	12.71	AC1.3	/	AC1.5				
AC1.6	EO for setting up raking piles	No	21	R	443.30	AC-Q3	0.81	AC1.5	/	AC1.6				
AC1.7	EO for raking drilling	m	67	R	76.40	AC-Q4	0.25	AC1.5	/	AC1.7				
AC1.8	Auger quantity	m	4,853	R	147.15	AC-Q5	0.04	AC1.3	/	AC1.8				
AC1.9	EO for drilling in coarse gravel	m	554	R	258.61	AC-Q6	0.39	AC1.3	/	AC1.9				
AC1.10	EO for drilling in boulders	m	138	R	657.02	AC-Q7	1.57	AC1.3	/	AC1.10				
AC1.11	EO for drilling in soft rock	m	181	R	301.20	AC-Q8	1.19	AC1.3	/	AC1.11				
AC1.12	Temporary casings	m	842	R	540.56	AC-Q9	0.26	AC1.3	/	AC1.12				
AC1.13	EO casing to raking pile	m	82	R	759.30	AC-Q10	0.21	AC1.5	/	AC1.13				
AC1.14	Mild steel rod reinforcement	t	18.12	R	6,591.11	AC-Q11	11.92	AC1.3	/	AC1.14				
AC1.15	High tensile rod reinforcement	t	186.37	R	9,367.42	AC-Q12	1.16	AC1.3	/	AC1.15				
AC1.16	Concrete to piles and bases	m3	1,864	R	1,204.97	AC-Q13	0.12	AC1.3	/	AC1.16				
AC1.17	Concrete to raking piles	m3	221	R	1,394.71	AC-Q14	0.08	AC1.5	/	AC1.17				
AC1.18	Site establishment of test equipment	Item	1	R	161,673.43		1.00		/					
AC1.19	Load test to pile	No	2	R	21,829.43	AC-Q15	108.00	AC1.3	/	AC1.19				
AC1.20	Site establishment of intergity testing	No	1	R	60,198.09	AC-Q16	216.00	AC1.3	/	AC1.20				
AC1.21	Integrity testing of piles	No	208	R	401.46	AC-Q17	1.04	AC1.3	/	AC1.21				
	Site establishment / concrete					AC-R1					214.25	AC1.1	/	AC1.16
	EO site est for raking pile / concrete					AC-R2					23.44	AC1.2	/	AC1.16
	Move pile rig / concrete					AC-R3					0.19	AC1.4	/	AC1.16
	EO for setting up raking pile / concrete					AC-R4					0.37	AC1.6	/	AC1.16
	EO for drilling raking pile / auger					AC-R5					0.52	AC1.7	/	AC1.8
	EO for drilling coarse mat / concrete					AC-R6					0.21	AC1.9	/	AC1.16
	EO for drilling boulders / concrete					AC-R7					0.55	AC1.10	/	AC1.16
	EO for drilling soft rock / concrete					AC-R8					0.25	AC1.11	/	AC1.16
	Temp casing / concrete					AC-R9					0.45	AC1.12	/	AC1.16
	EO for installing casing to raking pile / concrete					AC-R10					0.63	AC1.13	/	AC1.16
	Mild steel / high tensile steel					AC-R11					0.70	AC1.14	/	AC1.15
	High tensile steel / concrete					AC-R12					7.77	AC1.15	/	AC1.16
	Concrete to raking pile / concrete					AC-R13					1.16	AC1.17	/	AC1.16
	Site establishment for test rig / concrete					AC-R14					134.17	AC1.18	/	AC1.16
	Load test pile / concrete					AC-R15					18.12	AC1.19	/	AC1.16
	Est of integrity test rig / concrete					AC-R16					49.96	AC1.20	/	AC1.16
	Integrity test / concrete					AC-R17					0.33	AC1.21	/	AC1.16
AD	**ROAD WORKS**													
AD1.1	Red paving	m2	143	R	72.55	AD-Q1	0.14	AD1.1	/	AD1.2				
AD1.2	Grey paving	m2	1,049	R	103.11									
AD1.3	Kerbing	m	270	R	101.88	AD-Q2	0.08	AD1.3	/	AD1.4				
AD1.4	Total paving and asphalt	m2	3,196	R	-									
AD1.5	Remove top soil	m3	803	R	46.60	AD-Q3	0.49	AD1.5	/	AD1.6				
AD1.6	Asphalt	m2	1,635	R	66.65	AD-Q4	0.20	AD1.5	/	AD1.7				
AD1.7	Rip bed	m2	3,997	R	7.50									
AD1.8	Reduce levels	m3	1,107	R	43.56	AD-Q5	0.28	AD1.8	/	AD1.7				
AD1.9	Selected fill	m3	687	R	47.59	AD-Q6	1.61	AD1.8	/	AD1.9				
AD1.10	Imported fill	m3	511	R	201.08	AD-Q7	1.34	AD1.9	/	AD1.10				
AD1.11	Wearing course	m3	312	R	137.02	AD-Q8	3.55	AD1.8	/	AD1.11				
AD1.12	Prime	m2	1,851	R	16.09	AD-Q9	3.62	AD1.12	/	AD1.10				
AD1.13	Three line road marking	m	296	R	9.72	AD-Q10	0.88	AD1.6	/	AD1.12				
AD1.14	One line road marking	m	320	R	5.98	AD-Q11	1.10	AD1.13	/	AD1.3				
AD1.15	1m Wide concrete V-drain	m	250	R	752.01	AD-Q12	1.19	AD1.14	/	AD1.3				
AD1.16	200mm Diameter PVC pipe	m	52	R	217.83	AD-Q13	0.93	AD1.15	/	AD1.3				
AD1.17	Road marking - STOP	No	4	R	189.46	AD-Q14	0.19	AD1.16	/	AD1.3				
AD1.18	Standard signage	No	8	R	306.70	AD-Q15	0.01	AD1.17	/	AD1.3				
AD1.19	100mm Painted line	m	722	R	3.78	AD-Q16	2.67	AD1.18	/	AD1.3				
	Red / grey paving					AD-R1					0.70	AD1.1	/	AD1.2
	Remove top soil / rip bed					AD-R2					6.21	AD1.5	/	AD1.7
	Reduce levels / rip bed					AD-R3					5.81	AD1.8	/	AD1.7
	Reduce levels / selected fill					AD-R4					0.92	AD1.8	/	AD1.9
	Selected fill / imported fill					AD-R5					0.24	AD1.9	/	AD1.10
	Reduce levels / wearing course					AD-R6					0.32	AD1.8	/	AD1.11
	Asphalt / selected fill					AD-R7					1.40	AD1.6	/	AD1.9

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Prime / imported fill					AD-R8					0.08	AD1.12	/	AD1.10
	Asphalt / prime					AD-R9					4.14	AD1.6	/	AD1.12
	Kerbing / imported fill					AD-R10					0.51	AD1.3	/	AD1.10
	Three line road marking / kerbing					AD-R11					0.10	AD1.13	/	AD1.3
	One line road marking / kerbing					AD-R12					0.06	AD1.14	/	AD1.3
	1m Wide concrete V-drain / kerbing					AD-R13					7.38	AD1.15	/	AD1.3
	200mm Dia PVC pipe / kerbing					AD-R14					2.14	AD1.16	/	AD1.3
	Road marking - STOP / kerbing					AD-R15					1.86	AD1.17	/	AD1.3
	Standard signage / kerbing					AD-R16					3.01	AD1.18	/	AD1.3
	100mm Painted line / kerbing					AD-R17					0.04	AD1.19	/	AD1.3
AE	**GENERAL PAVING AND BUNDING**													
AE1.1	Concrete in slabs	m3	268	R	993.97	AE-Q1	4.87	AE1.1	/	AE1.2				
AE1.2	Concrete in plinths	m3	55	R	1,621.67	AE-Q2	0.15	AE1.1	/	AE1.4				
AE1.3	Total concrete	m3	382	R	-									
AE1.4	Rip and compact	m2	1,832	R	4.68									
AE1.5	Formwork to plinth	m2	313	R	165.05	AE-Q3	5.69	AE1.5	/	AE1.2				
AE1.6	Formwork to slab	m2	214	R	136.78	AE-Q4	0.80	AE1.6	/	AE1.1				
AE1.7	High tensile steel	t	4.62	R	7,915.93	AE-Q5	0.01	AE1.7	/	AE1.3				
AE1.8	Mesh	m2	2,851	R	182.53	AE-Q6	617.10	AE1.8	/	AE1.7				
AE1.9	Construction joint	m	642	R	31.43	AE-Q7	2.40	AE1.9	/	AE1.1				
AE1.10	Expansion joint	m	494	R	70.23	AE-Q8	1.84	AE1.10	/	AE1.1				
	Concrete slab / concrete plinth					AE-R1					0.61	AE1.1	/	AE1.2
	Concrete slab / rip and compact					AE-R2					212.39	AE1.1	/	AE1.4
	Formwork plinth / concrete plinth					AE-R3					0.10	AE1.1	/	AE1.4
	Formwork slab / concrete slab					AE-R4					0.14	AE1.6	/	AE1.1
	High tensile steel / mesh					AE-R5					43.37	AE1.7	/	AE1.8
	Construction joint / concrete slab					AE-R6					0.03	AE1.9	/	AE1.1
	Expansion joint / concrete slab					AE-R7					0.07	AE1.10	/	AE1.1
AF	**MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**													
AF1.1	Total area finish and roads	m2	5,006	R	-	AF-Q1	10.43	AF1.1	/	AF1.2				
AF1.2	Base excavation	m3	480	R	68.47	AF-Q2	2.77	AF1.2	/	AF1.3				
AF1.3	Backfill	m3	173	R	101.65	AF-Q3	0.81	AF1.2	/	AF1.4				
AF1.4	Working space	m2	590	R	31.19	AF-Q4	0.44	AF1.5	/	AF1.2				
AF1.5	Concrete in bases	m3	213	R	1,508.09	AF-Q5	0.03	AF1.7	/	AF1.2				
AF1.6	Blinding	m2	203	R	52.94	AF-Q6	0.86	AF1.9	/	AF1.6				
AF1.7	Concrete in sump walls	m3	15	R	1,189.45	AF-Q7	0.07	AF1.7	/	AF1.5				
AF1.8	Concrete in slabs	m3	3	R	1,068.83	AF-Q8	0.01	AF1.8	/	AF1.5				
AF1.9	Total concrete	m3	175	R	-	AF-Q9	0.72	AF1.9	/	AF1.10				
AF1.10	Wood float	m2	242	R	10.61									
AF1.11	Formwork to bases	m2	338	R	191.62	AF-Q10	1.59	AF1.11	/	AF1.5				
AF1.12	Formwork to sump walls	m2	167	R	149.58	AF-Q11	11.13	AF1.12	/	AF1.7				
AF1.13	Formwork to sides of slab	m2	15	R	239.86	AF-Q12	5.00	AF1.13	/	AF1.8				
AF1.14	Mild steel reinforcement	t	2.35	R	6,100.08	AF-Q13	0.08	AF1.14	/	AF1.15				
AF1.15	High tensile reinforcement	t	29.41	R	6,512.18	AF-Q14	5.95	AF1.9	/	AF1.15				
AF1.16	Cast in steel	kg	215	R	30.15	AF-Q15	0.99	AF1.5	/	AF1.16				
AF1.17	Waterstop	m	38	R	226.09	AF-Q16	0.39	AF1.7	/	AF1.17				
AF1.18	Manhole	No	6	R	3,536.93	AF-Q17	0.08	AF1.18	/	AF1.19				
AF1.19	Stormwater pipe	m	72	R	452.51									
	Base excavation / backfill					AF-R1					0.67	AF1.2	/	AF1.3
	Base excavation / working space					AF-R2					2.20	AF1.2	/	AF1.4
	Concrete bases / base excavation					AF-R3					22.03	AF1.5	/	AF1.2
	Concrete bases / concrete blinding					AF-R4					28.49	AF1.5	/	AF1.6
	Concrete sump wall / base excavation					AF-R5					17.37	AF1.7	/	AF1.2
	Concrete slab / concrete bases					AF-R6					0.71	AF1.8	/	AF1.5
	Base excavation / concrete sump walls					AF-R7					0.06	AF1.2	/	AF1.7
	Concrete bases / wood float					AF-R8					142.14	AF1.5	/	AF1.10
	Formwork bases / concrete bases					AF-R9					0.13	AF1.11	/	AF1.5
	Formwork sumps / concrete sump walls					AF-R10					0.13	AF1.12	/	AF1.7
	Formwork to sides of slab / concrete slabs					AF-R11					0.22	AF1.13	/	AF1.8
	Mild steel reinforcement / high tensile reinforcement					AF-R12					0.94	AF1.14	/	AF1.15
	Concrete bases / cast in steel					AF-R13					50.02	AF1.5	/	AF1.16
	Concrete sumps / waterstop					AF-R14					5.26	AF1.7	/	AF1.17
	Concrete bases / pipe					AF-R15					3.33	AF1.5	/	AF1.19
	Pipe / manhole					AF-R16					0.13	AF1.19	/	AF1.18
AG	**PUMP AND PIPE SUPPORT BASES AND PLINTHS**													
AG1.1	Restricted base excavation	m3	365	R	73.70	AG-Q1	2.50	AG1.1	/	AG1.4				
AG1.2	Working space	m2	630	R	39.23	AG-Q2	0.58	AG1.1	/	AG1.2				
AG1.3	Backfill	m3	93	R	70.11	AG-Q3	3.92	AG1.1	/	AG1.3				
AG1.4	Concrete bases	m3	146	R	1,402.46	AG-Q4	0.87	AG1.4	/	AG1.8				
AG1.5	Concrete plinth	m3	70	R	1,175.41	AG-Q5	2.09	AG1.4	/	AG1.5				
AG1.6	Total concrete	m3	290	R	-									
AG1.7	Wood float	m2	155	R	10.38	AG-Q6	0.45	AG1.5	/	AG1.7				
AG1.8	Blinding	m2	168	R	52.08	AG-Q7	0.87	AG1.4	/	AG1.8				
AG1.9	Formwork bases	m2	570	R	175.89	AG-Q8	0.26	AG1.4	/	AG1.9				
AG1.10	Formwork plinth	m2	95	R	147.41	AG-Q9	0.74	AG1.5	/	AG1.10				
AG1.11	High tensile reinforcement	t	20.84	R	6,591.11	AG-Q10	13.92	AG1.6	/	AG1.11				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AG1.12	Cast in steel	kg	2,835	R	47.01	AG-Q11	0.10	AG1.6	/	AG1.12				
AG1.13	HD Bolts	kg	3,156	R	34.11	AG-Q12	0.09	AG1.6	/	AG1.13				
AG1.14	Grout	m3	2.51	R	6,202.44	AG-Q13	27.89	AG1.5	/	AG1.14				
	Restricted base excavation / concrete bases					AG-R1					0.05	AG1.1	/	AG1.4
	Working space / restricted excavations					AG-R2					0.53	AG1.2	/	AG1.1
	Backfill / restricted excavations					AG-R3					0.95	AG1.3	/	AG1.1
	Mass concrete blinding / concrete bases					AG-R4					0.04	AG1.8	/	AG1.4
	Wood float / concrete bases					AG-R5					0.01	AG1.7	/	AG1.4
	Formwork bases / concrete bases					AG-R6					0.13	AG1.9	/	AG1.4
	Formwork plinths / concrete plinths					AG-R7					0.13	AG1.10	/	AG1.5
	High tensile steel reinforcement / concrete bases					AG-R8					4.70	AG1.11	/	AG1.4
	Cast in items / concrete bases					AG-R9					0.03	AG1.12	/	AG1.4
	HD bolts / concrete bases					AG-R10					0.02	AG1.13	/	AG1.4
	Grout / concrete bases					AG-R11					4.42	AG1.14	/	AG1.4
AH	**TANK BASES AND BUNDING**													
AH1.1	Restricted excavation	m3	312	R	50.24	AH-Q1	6.12	AH1.1	/	AH1.4				
AH1.2	Working space	m2	91	R	47.67	AH-Q2	3.43	AH1.1	/	AH1.2				
AH1.3	Backfill	m3	233	R	106.30	AH-Q3	1.34	AH1.1	/	AH1.3				
AH1.4	Concrete bases	m3	51	R	1,035.75	AH-Q4	0.67	AH1.4	/	AH1.10				
AH1.5	Concrete sump wall	m3	25	R	1,616.13	AH-Q5	2.04	AH1.4	/	AH1.5				
AH1.6	Concrete slab	m3	102	R	1,023.34	AH-Q6	0.50	AH1.4	/	AH1.6				
AH1.7	Concrete plinth	m3	13	R	1,061.12	AH-Q7	3.92	AH1.4	/	AH1.7				
AH1.8	Concrete column	m3	4	R	1,577.48	AH-Q8	12.75	AH1.4	/	AH1.8				
AH1.9	Total concrete	m3	186	R	-									
AH1.10	Blinding	m2	76	R	55.83	AH-Q9	2.45	AH1.9	/	AH1.10				
AH1.11	Wood float	m2	683	R	10.39	AH-Q10	0.27	AH1.9	/	AH1.11				
AH1.12	Formwork to bases	m2	181	R	208.36	AH-Q11	0.28	AH1.4	/	AH1.12				
AH1.13	Formwork to plinths	m2	48	R	214.63	AH-Q12	0.27	AH1.7	/	AH1.13				
AH1.14	Formwork to columns	m2	23	R	147.52	AH-Q13	0.17	AH1.8	/	AH1.14				
AH1.15	Formwork to sumps	m2	246	R	215.48	AH-Q14	0.10	AH1.5	/	AH1.15				
AH1.16	Formwork to slabs	m2	33	R	127.14	AH-Q15	3.09	AH1.6	/	AH1.16				
AH1.17	Formwork to slabs n/e 300mm	m	45	R	47.11	AH-Q16	2.27	AH1.6	/	AH1.17				
AH1.18	Mild steel reinforcement	t	2.59	R	8,924.75	AH-Q17	0.33	AH1.18	/	AH1.19				
AH1.19	High tensile reinforcement	t	7.92	R	10,072.93	AH-Q18	23.48	AH1.9	/	AH1.19				
AH1.20	Mesh	m2	628	R	119.20	AH-Q19	0.16	AH1.6	/	AH1.20				
AH1.21	Cast in items	kg	1,330	R	42.49	AH-Q20	0.14	AH1.9	/	AH1.21				
AH1.22	HD Bolts	kg	2,754	R	34.65	AH-Q21	0.07	AH1.9	/	AH1.22				
AH1.23	Grout	m3	0.88	R	9,473.35	AH-Q22	211.36	AH1.9	/	AH1.23				
AH1.24	Construction joint	m	483	R	71.15	AH-Q23	0.21	AH1.6	/	AH1.24				
AH1.25	Expansion joint	m	187	R	103.59	AH-Q24	0.55	AH1.6	/	AH1.25				
	Restricted excavation / concrete in bases					AH-R1					0.05	AH1.1	/	AH1.4
	Restricted excavation / working space					AH-R2					1.05	AH1.1	/	AH1.2
	Restricted excavation / backfill					AH-R3					0.47	AH1.1	/	AH1.3
	Concrete bases / blinding					AH-R4					18.55	AH1.4	/	AH1.10
	Concrete bases / wood float					AH-R5					99.69	AH1.4	/	AH1.11
	Concrete bases / concrete sump wall					AH-R6					0.64	AH1.4	/	AH1.5
	Concrete bases / concrete slab					AH-R7					1.01	AH1.4	/	AH1.6
	Concrete bases / concrete plinth					AH-R8					0.98	AH1.4	/	AH1.7
	Concrete bases / concrete column					AH-R9					0.66	AH1.4	/	AH1.8
	Concrete bases / formwork to bases					AH-R10					4.97	AH1.4	/	AH1.12
	Concrete plinths / formwork to plinths					AH-R11					4.94	AH1.7	/	AH1.13
	Concrete columns / formwork to columns					AH-R12					10.69	AH1.8	/	AH1.14
	Concrete sumps / formwork to sumps					AH-R13					7.50	AH1.5	/	AH1.15
	Concrete slab / formwork to slabs					AH-R14					8.05	AH1.6	/	AH1.16
	Concrete slab / formwork to slabs n/e 300mm					AH-R15					21.72	AH1.6	/	AH1.17
	Mild steel reinforcement / High tensile reinforcement					AH-R16					0.89	AH1.18	/	AH1.19
	High tensile reinforcement / mesh					AH-R17					84.50	AH1.19	/	AH1.20
	High tensile reinforcement / cast in items					AH-R18					237.07	AH1.19	/	AH1.21
	High tensile reinforcement / HD bolts					AH-R19					290.71	AH1.19	/	AH1.22
	Concrete bases / grout					AH-R20					0.11	AH1.4	/	AH1.23
	Concrete slabs / construction joints					AH-R21					14.38	AH1.6	/	AH1.24
	Concrete slabs / expension joints					AH-R22					9.88	AH1.6	/	AH1.25
AI	**PIPE AND CABLE RACK FOUNDATIONS**													
AI1.1	Restricted excavation	m3	372	R	81.18	AI-Q1	4.23	AI1.1	/	AI1.5				
AI1.2	Working space	m2	649	R	47.67	AI-Q2	0.57	AI1.1	/	AI1.2				
AI1.3	Backfill	m3	159	R	77.27	AI-Q3	2.34	AI1.1	/	AI1.3				
AI1.4	Blinding	m2	196	R	57.90	AI-Q4	0.45	AI1.5	/	AI1.4				
AI1.5	Concrete bases	m3	88	R	1,460.44	AI-Q5	6.29	AI1.5	/	AI1.6				
AI1.6	Concrete plinth	m3	14	R	1,039.50	AI-Q6	0.31	AI1.5	/	AI1.8				
AI1.7	Total concrete	m3	85	R	-									
AI1.8	Wood float	m2	288	R	10.36									
AI1.9	Formwork bases	m2	137	R	167.79	AI-Q7	0.64	AI1.5	/	AI1.9				
AI1.10	Formwork plinths	m2	141	R	156.00	AI-Q8	0.10	AI1.6	/	AI1.10				
AI1.11	High tensile reinforcement	t	10.57	R	6,595.00	AI-Q9	8.04	AI1.7	/	AI1.11				
AI1.12	HD Bolts	kg	2,822	R	35.56	AI-Q10	0.03	AI1.5	/	AI1.12				
AI1.13	Grout	m3	1.15	R	9,440.99	AI-Q11	76.52	AI1.5	/	AI1.13				
	Restricted excavation / concrete bases					AI-R1					0.06	AI1.1	/	AI1.5
	Restricted excavation / working space					AI-R2					1.70	AI1.1	/	AI1.2

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Restricted excavation / backfill					AI-R3					1.05	AI1.1	/	AI1.3
	Concrete bases / blinding					AI-R4					25.22	AI1.5	/	AI1.4
	Concrete bases / concrete plinth					AI-R5					1.40	AI1.5	/	AI1.6
	Concrete bases / wood float					AI-R6					140.97	AI1.5	/	AI1.8
	Concrete bases / formwork bases					AI-R7					8.70	AI1.5	/	AI1.9
	Concrete plinths / formwork plinths					AI-R8					6.66	AI1.6	/	AI1.10
	High tensile reinforcement / HD bolts					AI-R9					185.46	AI1.11	/	AI1.12
	Concrete bases / grout					AI-R10					0.15	AI1.5	/	AI1.13
AJ	**SIMPLE STRUCTURAL FOUNDATIONS**													
AJ1.1	Restricted excavation	m3	388	R	79.38	AJ-Q1	3.77	AJ1.1	/	AJ1.5				
AJ1.2	Working space	m2	732	R	31.19	AJ-Q2	0.53	AJ1.1	/	AJ1.2				
AJ1.3	Backfill	m3	141	R	100.39	AJ-Q3	2.75	AJ1.1	/	AJ1.3				
AJ1.4	Blinding	m2	240	R	55.13	AJ-Q4	0.43	AJ1.5	/	AJ1.4				
AJ1.5	Concrete bases	m3	103	R	1,083.83	AJ-Q5	3.96	AJ1.5	/	AJ1.7				
AJ1.6	Concrete plinth	m3	23	R	1,633.46	AJ-Q6	4.48	AJ1.5	/	AJ1.6				
AJ1.7	Concrete slab	m3	26	R	844.63									
AJ1.8	Total concrete	m3	138	R	-									
AJ1.9	Wood float	m2	271	R	6.97	AJ-Q7	0.51	AJ1.8	/	AJ1.9				
AJ1.10	Formwork bases	m2	228	R	179.49	AJ-Q8	0.45	AJ1.5	/	AJ1.10				
AJ1.11	Formwork plinths	m2	295	R	141.44	AJ-Q9	0.08	AJ1.6	/	AJ1.11				
AJ1.12	High tensile reinforcement	t	10.35	R	10,359.22	AJ-Q10	13.33	AJ1.8	/	AJ1.12				
AJ1.13	HD Bolts	kg	3,602	R	36.43	AJ-Q11	0.03	AJ1.5	/	AJ1.13				
AJ1.14	Cast in items	kg	2,128	R	47.01	AJ-Q12	0.05	AJ1.5	/	AJ1.14				
AJ1.15	Grout	m3	1.12	R	6,940.37	AJ-Q13	91.96	AJ1.5	/	AJ1.15				
	Restricted excavation / concrete bases					AJ-R1					0.07	AJ1.1	/	AJ1.5
	Restricted excavation / working space					AJ-R2					2.55	AJ1.1	/	AJ1.2
	Restricted excavation / backfill					AJ-R3					0.79	AJ1.1	/	AJ1.3
	Concrete bases / blinding					AJ-R4					19.66	AJ1.5	/	AJ1.4
	Concrete bases / wood float					AJ-R5					155.50	AJ1.5	/	AJ1.8
	Concrete bases / formwork bases					AJ-R6					6.04	AJ1.5	/	AJ1.9
	Concrete plinths / formwork plinths					AJ-R7					11.55	AJ1.6	/	AJ1.10
	High tensile reinforcement / HD bolts					AJ-R8					284.36	AJ1.11	/	AJ1.12
	High tensile reinforcement / Cast in items					AJ-R9					220.36	AJ1.11	/	AJ1.13
	Concrete bases / grout					AJ-R10					0.16	AJ1.5	/	AJ1.14
AK	**COMPLEX STRUCTURAL FOUNDATIONS**													
AK1.1	Restricted excavation	m3	316	R	36.54	AK-Q1	1.05	AK1.1	/	AK1.5				
AK1.2	Working space	m2	799	R	33.11	AK-Q2	0.40	AK1.1	/	AK1.2				
AK1.3	Backfill	m3	187	R	74.80	AK-Q3	1.69	AK1.1	/	AK1.3				
AK1.4	Blinding	m2	348	R	52.86	AK-Q4	0.86	AK1.5	/	AK1.4				
AK1.5	Concrete bases	m3	300	R	1,493.75	AK-Q5	42.86	AK1.5		AK1.6				
AK1.6	Concrete column	m3	7	R	1,066.78									
AK1.7	Concrete plinth	m3	57	R	1,577.48	AK-Q6	5.26	AK1.5	/	AK1.7				
AK1.8	Total concrete	m3	243	R	-									
AK1.9	Wood float	m2	501	R	9.51	AK-Q7	0.60	AK1.5	/	AK1.9				
AK1.10	Formwork bases	m2	404	R	137.07	AK-Q8	0.74	AK1.5	/	AK1.10				
AK1.11	Formwork plinths	m2	102	R	202.68	AK-Q9	0.56	AK1.7	/	AK1.11				
AK1.12	Formwork to columns	m2	29	R	152.43	AK-Q10	0.24	AK1.6	/	AK1.12				
AK1.13	High tensile reinforcement	t	36.42	R	10,910.31	AK-Q11	6.67	AK1.8	/	AK1.13				
AK1.14	HD bolts	kg	6,153	R	25.74	AK-Q12	0.04	AK1.8	/	AK1.14				
AK1.15	Grout	m3	3.32	R	6,726.56	AK-Q13	73.19	AK1.8	/	AK1.15				
	Restricted excavation / concrete bases					AK-R1					0.02	AK1.1	/	AK1.5
	Restricted excavation / working space					AK-R2					1.10	AK1.1	/	AK1.2
	Restricted excavation / backfill					AK-R3					0.49	AK1.1	/	AK1.3
	Concrete bases / blinding					AK-R4					28.26	AK1.5	/	AK1.4
	Concrete bases / wood float					AK-R5					157.07	AK1.5	/	AK1.9
	Concrete bases / formwork bases					AK-R6					10.90	AK1.5	/	AK1.10
	Concrete plinths / formwork plinths					AK-R7					7.78	AK1.7	/	AK1.11
	Concrete columns / formwork columns					AK-R8					7.00	AK1.6	/	AK1.12
	High tensile reinforcement / HD bolts					AK-R9					423.87	AK1.13	/	AK1.14
	Concrete bases / grout					AK-R10					0.22	AK1.15	/	AK1.15
AL	**CONCRETE PIPE RACKS AND FOUNDATIONS**													
AL1.1	Restricted excavation	m3	602	R	70.98	AL-Q1	4.89	AL1.1	/	AL1.5				
AL1.2	Working space	m2	940	R	32.13	AL-Q2	0.64	AL1.1	/	AL1.2				
AL1.3	Backfill	m3	184	R	102.84	AL-Q3	3.27	AL1.1	/	AL1.3				
AL1.4	Blinding	m2	235	R	59.10	AL-Q4	0.52	AL1.5	/	AL1.4				
AL1.5	Concrete bases	m3	123	R	1,239.44	AL-Q5	0.74	AL1.5	/	AL1.6				
AL1.6	Concrete column	m3	166	R	1,556.27	AL-Q6	3.53	AL1.6	/	AL1.7				
AL1.7	Concrete beam	m3	47	R	1,066.78	AL-Q7	2.62	AL1.5	/	AL1.17				
AL1.8	Total concrete	m3	295	R	-									
AL1.9	Wood float	m2	280	R	5.88	AL-Q8	0.44	AL1.5	/	AL1.9				
AL1.10	Formwork bases	m2	422	R	137.38	AL-Q9	0.29	AL1.5	/	AL1.10				
AL1.11	Formwork to columns	m2	1,207	R	203.35	AL-Q10	0.14	AL1.6	/	AL1.11				
AL1.12	Formwork to sides beams	m2	140	R	170.45	AL-Q11	0.34	AL1.7	/	AL1.12				
AL1.13	Formwork to soffits beams	m2	99	R	256.69	AL-Q12	0.47	AL1.7	/	AL1.13				
AL1.14	Formwork corbels	m2	17	R	380.41	AL-Q13	9.76	AL1.6	/	AL1.14				
AL1.15	High tensile reinforcement	t	50.51	R	9,143.41	AL-Q14	5.84	AL1.8	/	AL1.15				
AL1.16	Cast in steel	kg	14,716	R	41.80	AL-Q15	0.02	AL1.8	/	AL1.16				
AL1.17	HD bolts	kg	226	R	37.46	AL-Q16	1.31	AL1.8	/	AL1.17				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AL1.18	Grout	m3	0.70	R	7,266.71	AL-Q17	421.43	AL1.8	/	AL1.18				
	Restricted excavation / concrete bases					AL-R1					0.06	AL1.1	/	AL1.5
	Restricted excavation / working space					AL-R2					2.21	AL1.1	/	AL1.2
	Restricted excavation / backfill					AL-R3					0.69	AL1.1	/	AL1.3
	Concrete bases / blinding					AL-R4					20.97	AL1.5	/	AL1.4
	Concrete bases / wood float					AL-R5					210.79	AL1.5	/	AL1.9
	Concrete bases / concrete beams					AL-R6					0.80	AL1.5	/	AL1.7
	Concrete bases / concrete columns					AL-R7					0.80	AL1.5	/	AL1.6
	Concrete bases / formwork bases					AL-R8					9.02	AL1.5	/	AL1.10
	Concrete beams / formwork beams					AL-R9					6.26	AL1.7	/	AL1.12
	Concrete columns / formwork columns					AL-R10					7.65	AL1.6	/	AL1.11
	Concrete beams / formwork beam soffits					AL-R11					4.16	AL1.7	/	AL1.13
	Concrete beams / formwork beam sides					AL-R12					6.26	AL1.7	/	AL1.12
	Concrete beams / formwork corbels					AL-R13					2.80	AL1.7	/	AL1.14
	High tensile reinforcement / cast in steel					AL-R14					218.74	AL1.15	/	AL1.16
	High tensile reinforcement / HD bolts					AL-R15					244.08	AL1.15	/	AL1.17
	Concrete beams / grout					AL-R16					0.17	AL1.5	/	AL1.18
AM	**CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**													
AM1.1	Restricted excavation	m3	981	R	53.34	AM-Q1	3.73	AM1.1	/	AM1.5				
AM1.2	Working space	m2	1,573	R	27.15	AM-Q2	0.62	AM1.1	/	AM1.2				
AM1.3	Backfill	m3	815	R	71.52	AM-Q3	1.20	AM1.1	/	AM1.3				
AM1.4	Blinding	m2	426	R	62.55	AM-Q4	0.62	AM1.5	/	AM1.4				
AM1.5	Concrete bases	m3	263	R	1,057.29									
AM1.6	Concrete column	m3	152	R	1,402.46	AM-Q5	1.73	AM1.5	/	AM1.6				
AM1.7	Concrete beam	m3	158	R	1,175.41	AM-Q6	0.96	AM1.6	/	AM1.7				
AM1.8	Concrete surface slab	m3	168	R	1,269.80	AM-Q7	1.57	AM1.5	/	AM1.8				
AM1.9	Concrete wall	m3	81	R	1,594.39	AM-Q8	1.88	AM1.6	/	AM1.9				
AM1.10	Concrete elevated slab	m3	83	R	883.32	AM-Q9	1.83	AM1.6	/	AM1.10				
AM1.11	Total concrete	m3	852	R	-									
AM1.12	Wood float	m2	1,938	R	10.38	AM-Q10	0.44	AM1.11	/	AM1.12				
AM1.13	Formwork bases	m2	647	R	129.90	AM-Q11	0.41	AM1.5	/	AM1.13				
AM1.14	Formwork to columns	m2	1,012	R	154.36	AM-Q12	0.15	AM1.6	/	AM1.14				
AM1.15	Formwork to sides beams	m2	612	R	179.86	AM-Q13	0.26	AM1.7	/	AM1.15				
AM1.16	Formwork to soffits beams	m2	256	R	281.82	AM-Q14	0.62	AM1.7	/	AM1.16				
AM1.17	Formwork to soffts of slabs	m2	475	R	204.86	AM-Q15	0.35	AM1.8	/	AM1.17				
AM1.18	Formwork to pockets	m2	6	R	432.82	AM-Q16	25.33	AM1.6	/	AM1.18				
AM1.19	Formwork wall	m2	383	R	145.72	AM-Q17	0.21	AM1.9	/	AM1.19				
AM1.20	High tensile reinforcement	t	98.46	R	6,788.62	AM-Q18	8.65	AM1.11	/	AM1.20				
AM1.21	Cast in steel	kg	6,173	R	40.80	AM-Q19	0.14	AM1.11	/	AM1.21				
AM1.22	HD bolts	kg	2,162	R	39.18	AM-Q20	0.39	AM1.11	/	AM1.22				
AM1.23	Steel handrailing	m	40	R	714.78	AM-Q21	2.46	AM1.20	/	AM1.23				
AM1.24	Grout	m3	1.34	R	10,260.89	AM-Q22	635.82	AM1.11	/	AM1.24				
	Restricted excavation / concrete bases					AM-R1					0.05	AM1.1	/	AM1.5
	Restricted excavation / working space					AM-R2					1.96	AM1.1	/	AM1.2
	Restricted excavation / backfill					AM-R3					0.75	AM1.1	/	AM1.3
	Concrete base / blinding					AM-R4					16.90	AM1.5	/	AM1.4
	Concrete base / concrete columns					AM-R5					0.75	AM1.5	/	AM1.6
	Concrete base / concrete beams					AM-R6					0.90	AM1.5	/	AM1.7
	Concrete base / concrete surface slabs					AM-R7					0.83	AM1.5	/	AM1.8
	Concrete base / wall					AM-R8					0.66	AM1.5	/	AM1.9
	Concrete base / elevated slab					AM-R9					1.20	AM1.5	/	AM1.10
	Concrete base / wood float					AM-R10					101.86	AM1.5	/	AM1.12
	Concrete base / formwork base					AM-R11					8.14	AM1.5	/	AM1.13
	Concrete beam / formwork beam sides					AM-R12					6.54	AM1.7	/	AM1.15
	Concrete beam / formwork beam sofits					AM-R13					4.17	AM1.7	/	AM1.16
	Concrete column / formwork column					AM-R14					9.09	AM1.6	/	AM1.14
	Concrete beam / formwork pocket					AM-R15					2.72	AM1.7	/	AM1.18
	Concrete slab / formwork to soffit of slab					AM-R16					4.31	AM1.10	/	AM1.17
	Concrete wall / formwork wall					AM-R17					10.94	AM1.9	/	AM1.19
	High tensile reinforcement / cast in steel					AM-R18					166.39	AM1.20	/	AM1.21
	High tensile reinforcement / HD bolts					AM-R19					173.27	AM1.20	/	AM1.22
	High tensile reinforcement / steel handrailing					AM-R20					9.50	AM1.20	/	AM1.23
	Concrete beams / grout					AM-R21					0.10	AM1.5	/	AM1.24
AN	**MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**													
AN1.1	Restricted excavation	m3	2,610	R	55.77	AN-Q1	1.70	AN1.1	/	AN1.5				
AN1.2	Working space	m2	301	R	31.46	AN-Q2	8.67	AN1.1	/	AN1.2				
AN1.3	Backfill	m3	724	R	109.10	AN-Q3	3.60	AN1.1	/	AN1.3				
AN1.4	Blinding	m2	1,319	R	55.29	AN-Q4	1.17	AN1.5	/	AN1.4				
AN1.5	Concrete bases	m3	1,539	R	923.78	AN-Q5								
AN1.6	Concrete column	m3	78	R	1,069.24	AN-Q6	19.73	AN1.5	/	AN1.6				
AN1.7	Concrete beam	m3	51	R	1,427.77	AN-Q7	1.53	AN1.6	/	AN1.7				
AN1.8	Concrete wall	m3	130	R	1,057.29	AN-Q8	11.84	AN1.5	/	AN1.8				
AN1.9	Concrete elevated slabs	m3	6	R	1,402.46	AN-Q9	13.00	AN1.6	/	AN1.9				
AN1.10	Total concrete	m3	2,635	R	-				/					
AN1.11	Wood float	m2	2,452	R	9.14	AN-Q10	0.63	AN1.5	/	AN1.11				
AN1.12	Formwork bases	m2	227	R	184.61	AN-Q11	6.78	AN1.5	/	AN1.12				
AN1.13	Formwork to columns	m2	373	R	160.08	AN-Q12	0.21	AN1.6	/	AN1.13				
AN1.14	Formwork to sides beams	m2	192	R	195.74	AN-Q13	0.27	AN1.7	/	AN1.14				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AN1.15	Formwork to soffits beams	m2	95	R	329.43	AN-Q14	0.54	AN1.7	/	AN1.15				
AN1.16	Formwork to soffts of slabs	m2	42	R	328.24	AN-Q15	0.14	AN1.9	/	AN1.16				
AN1.17	Formwork to pockets	m2	3	R	243.72	AN-Q16	513.00	AN1.5	/	AN1.17				
AN1.18	Formwork wall	m2	1,126	R	143.11	AN-Q17	0.12	AN1.8	/	AN1.18				
AN1.19	High tensile reinforcement	t	369.34	R	5,878.59	AN-Q18	7.13	AN1.10	/	AN1.19				
AN1.20	Cast in steel	kg	16,228	R	31.11	AN-Q19	0.16	AN1.10	/	AN1.20				
AN1.21	HD bolts	kg	11,321	R	47.59	AN-Q20	0.23	AN1.10	/	AN1.21				
AN1.22	Galvanised grating	m2	68	R	1,523.90	AN-Q21	38.75	AN1.10	/	AN1.22				
AN1.23	Grout	m3	1.77	R	6,726.56	AN-Q22	869.49	AN1.5	/	AN1.23				
	Restricted excavation / concrete bases					AN-R1					0.06	AN1.1	/	AN1.5
	Restricted excavation / working space					AN-R2					1.77	AN1.1	/	AN1.2
	Restricted excavation / backfill					AN-R3					0.51	AN1.1	/	AN1.3
	Concrete base / blinding					AN-R4					16.71	AN1.5	/	AN1.4
	Concrete base / wood float					AN-R5					101.07	AN1.5	/	AN1.11
	Concrete base / formwork base					AN-R6					5.00	AN1.5	/	AN1.12
	Concrete beam / formwork beam sides					AN-R7					7.29	AN1.7	/	AN1.14
	Concrete beam / formwork beam soffit					AN-R8					4.33	AN1.7	/	AN1.15
	Concrete column / formwork column					AN-R9					6.68	AN1.6	/	AN1.13
	Concrete beam / formwork pocket					AN-R10					5.86	AN1.7	/	AN1.17
	Concrete slab / formwork to soffit of slab					AN-R11					4.27	AN1.9	/	AN1.16
	Concrete wall / formwork wall					AN-R12					7.39	AN1.8	/	AN1.18
	High tensile reinforcement / cast in steel					AN-R13					188.96	AN1.19	/	AN1.20
	High tensile reinforcement / HD bolts					AN-R14					123.53	AN1.19	/	AN1.21
	Concrete bases / grout					AN-R15					0.14	AN1.5	/	AN1.23
	High tensile reinforcement / galvanised grating					AN-R16					3.86	AN1.19	/	AN1.22
AO	**MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**													
AO1.1	Restricted excavation	m3	237	R	37.44	AO-Q1	2.42	AO1.1	/	AO1.5				
AO1.2	Working space	m2	588	R	31.66	AO-Q2	0.40	AO1.1	/	AO1.2				
AO1.3	Backfill	m3	118	R	45.84	AO-Q3	2.01	AO1.1	/	AO1.3				
AO1.4	Blinding	m2	50	R	56.85	AO-Q4	1.96	AO1.5	/	AO1.4				
AO1.5	Concrete bases	m3	98	R	1,427.77									
AO1.6	Concrete column	m3	25	R	1,057.29	AO-Q5	3.92	AO1.5	/	AO1.6				
AO1.7	Concrete beam	m3	11	R	1,556.27	AO-Q6	2.27	AO1.6	/	AO1.7				
AO1.8	Concrete wall	m3	4	R	1,070.22	AO-Q7	24.50	AO1.5	/	AO1.8				
AO1.9	Concrete elevated slabs	m3	1	R	1,714.48	AO-Q8	25.00	AO1.6	/	AO1.9				
AO1.10	Total concrete	m3	38	R	-									
AO1.11	Wood float	m2	22	R	6.53	AO-Q9	4.45	AO1.5	/	AO1.11				
AO1.12	Formwork bases	m2	95	R	137.07	AO-Q10	1.03	AO1.5	/	AO1.12				
AO1.13	Formwork to columns	m2	221	R	149.13	AO-Q11	0.11	AO1.6	/	AO1.13				
AO1.14	Formwork to sides beams	m2	51	R	257.04	AO-Q12	0.22	AO1.7	/	AO1.14				
AO1.15	Formwork to soffits beams	m2	25	R	161.67	AO-Q13	0.44	AO1.7	/	AO1.15				
AO1.16	Formwork to soffts of slabs	m2	4	R	336.28	AO-Q14	0.25	AO1.9	/	AO1.16				
AO1.17	Formwork to pockets	m2	56	R	333.59	AO-Q15	1.75	AO1.5	/	AO1.17				
AO1.18	Formwork wall	m2	15	R	156.72	AO-Q16	0.27	AO1.8	/	AO1.18				
AO1.19	High tensile reinforcement	t	5.35	R	8,080.56	AO-Q17	7.10	AO1.10	/	AO1.19				
AO1.20	Cast in steel	kg	3,279	R	54.76	AO-Q18	0.01	AO1.10	/	AO1.20				
AO1.21	HD bolts	kg	2,401	R	24.51	AO-Q19	0.02	AO1.10	/	AO1.21				
AO1.22	Galvanised grating	m2	11	R	1,194.86	AO-Q20	3.45	AO1.10	/	AO1.22				
AO1.23	Grout	m3	3.52	R	7,034.67	AO-Q21	27.84	AO1.5	/	AO1.23				
	Restricted excavation / concrete bases					AO-R1					0.03	AO1.1	/	AO1.5
	Restricted excavation / working space					AO-R2					1.18	AO1.1	/	AO1.2
	Restricted excavation / backfill					AO-R3					0.82	AO1.1	/	AO1.3
	Concrete base / blinding					AO-R4					25.11	AO1.5	/	AO1.4
	Concrete base / wood float					AO-R5					218.65	AO1.5	/	AO1.11
	Concrete base / formwork base					AO-R6					10.42	AO1.5	/	AO1.12
	Concrete beam / formwork beam sides					AO-R7					6.05	AO1.7	/	AO1.14
	Concrete beam / formwork beam soffit					AO-R8					9.63	AO1.7	/	AO1.15
	Concrete column / formwork column					AO-R9					7.09	AO1.6	/	AO1.13
	Concrete beam / formwork pocket					AO-R10					4.67	AO1.7	/	AO1.17
	Concrete slab / formwork to soffit of slab					AO-R11					5.10	AO1.9	/	AO1.16
	Concrete wall / formwork wall					AO-R12					6.83	AO1.8	/	AO1.18
	High tensile reinforcement / cast in steel					AO-R13					147.56	AO1.19	/	AO1.20
	High tensile reinforcement / HD bolts					AO-R14					329.68	AO1.19	/	AO1.21
	Concrete bases / grout					AO-R15					0.20	AO1.5	/	AO1.23
	High tensile reinforcement / galvanised grating					AO-R16					6.76	AO1.19	/	AO1.22
AP	**BUILDINGS - CONCRETE FRAME**													
AP1.1	Excavations	m3	1,720	R	70.96	AP-Q1	2.46	AP1.1	/	AP1.5				
AP1.2	Working space	m2	531	R	31.08	AP-Q2	3.24	AP1.1	/	AP1.2				
AP1.3	Backfill	m3	972	R	69.55	AP-Q3	1.77	AP1.1	/	AP1.3				
AP1.4	Blinding	m2	267	R	54.96	AP-Q4	2.61	AP1.5	/	AP1.4				
AP1.5	Concrete	m3	698	R	1,047.06	AP-Q5	0.47	AP1.5	/	AP1.6				
AP1.6	Mesh reinforcement	m2	1,485	R	169.10									
AP1.7	Rough formwork	m2	281	R	113.49	AP-Q6	2.48	AP1.5	/	AP1.7				
AP1.8	Smooth formwork	m2	1,184	R	145.56	AP-Q7	0.59	AP1.5	/	AP1.8				
AP1.9	Finish to concrete	m2	5,039	R	14.15	AP-Q8	0.14	AP1.5	/	AP1.9				
AP1.10	Construction joints	m	133	R	53.94	AP-Q9	5.25	AP1.5	/	AP1.10				
AP1.11	Movement joints	m	51	R	101.46	AP-Q10	13.69	AP1.5	/	AP1.11				
AP1.12	Cast in steel	kg	436	R	25.70	AP-Q11	1.60	AP1.5	/	AP1.12				
AP1.13	Grout	m3	0.88	R	6,556.04	AP-Q12	793.18	AP1.5	/	AP1.13				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AP1.14	Brick walls	m2	1,535	R	217.08	AP-Q13	0.45	AP1.5	/	AP1.14				
AP1.15	Total building area	m2	3,655	R	-	AP-Q14	5.24	AP1.15	/	AP1.5				
AP1.16	Waterproofing membrane	m2	1,485	R	123.25	AP-Q15	2.46	AP1.15	/	AP1.16				
AP1.17	Roof construction	m2	1,545	R	210.22	AP-Q16	2.37	AP1.15	/	AP1.17				
AP1.18	Ceiling	m2	2,946	R	73.57	AP-Q17	1.24	AP1.15	/	AP1.18				
AP1.19	Doors and windows	No	10	R	1,568.21	AP-Q18	365.50	AP1.15	/	AP1.19				
AP1.20	Floor finish	m2	3,081	R	274.26	AP-Q19	1.19	AP1.15	/	AP1.20				
AP1.21	Wall finsih	m2	3,111	R	158.53	AP-Q20	1.17	AP1.15	/	AP1.21				
AP1.22	Rod reinforcement	t	107.27	R	5,878.59	AP-Q21	6.51	AP1.5	/	AP1.22				
AP1.23	Metalwork	Item	1	R	34,119.74									
AP1.24	Structural steel	Item	1	R	88,349.57									
AP1.25	Plumbing and drainage	Item	1	R	56,255.61									
AP1.26	Small power and lighting	Item	1	R	479,258.32									
AP1.27	External works	Item	1	R	207,094.02									
	Excavations / concrete					AP-R1					0.07	AP1.1	/	AP1.5
	Excavations / working space					AP-R2					2.28	AP1.1	/	AP1.2
	Excavations / backfilling					AP-R3					1.02	AP1.1	/	AP1.3
	Concrete / blinding					AP-R4					19.05	AP1.5	/	AP1.4
	Rod reinforcement / mesh reinforcement					AP-R5					34.76	AP1.22	/	AP1.6
	Concrete / rough formwork					AP-R6					9.23	AP1.5	/	AP1.7
	Concrete / smooth formwork					AP-R7					7.19	AP1.5	/	AP1.8
	Concrete / finish to concrete					AP-R8					74.00	AP1.5	/	AP1.9
	Concrete / construction joints					AP-R9					19.41	AP1.5	/	AP1.10
	Concrete / movement joints					AP-R10					10.32	AP1.5	/	AP1.11
	Rod reinforcement / cast in steel					AP-R11					228.74	AP1.22	/	AP1.12
	Concrete / grout					AP-R12					0.16	AP1.5	/	AP1.13
	Concrete / waterproofing membrane					AP-R13					8.50	AP1.5	/	AP1.16
	Rod reinforcement / roof construction					AP-R14					27.96	AP1.22	/	AP1.17
	Brickwork / ceiling					AP-R15					2.95	AP1.14	/	AP1.18
	Brickwork / doors and windows					AP-R16					0.14	AP1.14	/	AP1.19
	Brickwork / floor finishes					AP-R17					0.79	AP1.14	/	AP1.20
	Brickwork / wall finishes					AP-R18					1.37	AP1.14	/	AP1.21
	Metalwork / rod reinforcement					AP-R19					5.80	AP1.23	/	AP1.22
	Structural steel / rod reinforcement					AP-R20					15.03	AP1.24	/	AP1.22
	Plumbing and drainage / rod reinforcement					AP-R21					9.57	AP1.25	/	AP1.22
	Small power and lighting / rod reinforcement					AP-R22					81.53	AP1.26	/	AP1.22
	External works / concrete					AP-R23					197.79	AP1.27	/	AP1.5
AQ	**BUILDINGS - STEEL**													
AQ1.1	Concrete	m3	78	R	1,073.35	AQ-Q1	3.04	AQ1.2	/	AQ1.1				
AQ1.2	Earthworks	m3	237	R	181.79									
AQ1.3	Reinforcement	t	8.70	R	6,954.94	AQ-Q2	8.97	AQ1.1	/	AQ1.3				
AQ1.4	Mesh	m2	923	R	171.41	AQ-Q3	0.08	AQ1.1	/	AQ1.4				
AQ1.5	Formwork	m2	185	R	149.00	AQ-Q4	0.42	AQ1.1	/	AQ1.5				
AQ1.6	Brickwork	m2	184	R	328.49	AQ-Q5	3.02	AQ1.13	/	AQ1.6				
AQ1.7	Roof covering	m2	1,128	R	78.30	AQ-Q6	0.49	AQ1.13	/	AQ1.7				
AQ1.8	Structural steel	t	56.37	R	31,785.85	AQ-Q7	9.86	AQ1.13	/	AQ1.8				
AQ1.9	Side cladding	m2	701	R	96.13	AQ-Q8	0.79	AQ1.13	/	AQ1.9				
AQ1.10	Doors	No	2	R	9,899.17	AQ-Q9	278.00	AQ1.13	/	AQ1.10				
AQ1.11	Ridge ventilator	m	35	R	1,131.84	AQ-Q10	15.89	AQ1.13	/	AQ1.11				
AQ1.12	Aluminium insulation	m2	1,290	R	98.71	AQ-Q11	0.43	AQ1.13	/	AQ1.12				
AQ1.13	Total building area	m2	556	R	-									
	Concrete / reinforcement					AQ-R1					0.15	AQ1.1	/	AQ1.3
	Concrete / earthworks					AQ-R2					5.90	AQ1.1	/	AQ1.2
	Concrete / mesh					AQ-R3					6.26	AQ1.1	/	AQ1.4
	Concrete / formwork					AQ-R4					7.20	AQ1.1	/	AQ1.5
	Concrete / brickwork					AQ-R5					3.27	AQ1.1	/	AQ1.6
	Structural steel / roof covering					AQ-R6					405.95	AQ1.8	/	AQ1.7
	Side cladding / roof covering					AQ-R7					1.23	AQ1.9	/	AQ1.7
	Doors / structural steel					AQ-R8					0.31	AQ1.10	/	AQ1.8
	Ridge ventilator / roof covering					AQ-R9					14.46	AQ1.11	/	AQ1.7
	Roof covering / aluminium insulation					AQ-R10					0.79	AQ1.7	/	AQ1.12
AR	**CANOPIES - STEEL**													
AR1.1	Earthworks	m3	186	R	198.07	AR-Q1	2.58	AR1.1	/	AR1.2				
AR1.2	Concrete	m3	72	R	1,175.41	AR-Q2	13.64	AR1.2	/	AR1.3				
AR1.3	Reinforcement	t	5.28	R	5,621.11									
AR1.4	Mesh	m2	427	R	116.18	AR-Q3	0.17	AR1.2	/	AR1.4				
AR1.5	Formwork	m2	173	R	209.50	AR-Q4	0.42	AR1.2	/	AR1.5				
AR1.6	Brickwork	m2	121	R	180.75	AR-Q5	5.36	AR1.15	/	AR1.6				
AR1.7	Screed	m2	416	R	38.32	AR-Q6	1.56	AR1.15	/	AR1.7				
AR1.8	Structural steel	t	42.54	R	21,097.96	AR-Q7	15.26	AR1.15	/	AR1.8				
AR1.9	Cat ladders	m	18	R	2,493.93	AR-Q8	2.36	AR1.8	/	AR1.9				
AR1.10	Hand rail	m	64	R	825.89	AR-Q9	0.66	AR1.8	/	AR1.10				
AR1.11	Kick plates	m	38	R	459.51	AR-Q10	1.12	AR1.8	/	AR1.11				
AR1.12	Roof covering	m2	754	R	102.94	AR-Q11	0.86	AR1.15	/	AR1.12				
AR1.13	Side cladding	m2	81	R	134.97	AR-Q12	8.01	AR1.15	/	AR1.13				
AR1.14	Floor grating	m2	30	R	1,348.84	AR-Q13	1.42	AR1.8	/	AR1.14				
AR1.15	Total buiding area	m2	649	R	-									
	Earthworks / concrete					AR-R1					0.17	AR1.1	/	AR1.2
	Concrete / reinforcement					AR-R2					0.21	AR1.2	/	AR1.3

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Concrete / mesh					AR-R3					10.12	AR1.2	/	AR1.4
	Concrete / formwork					AR-R4					5.61	AR1.2	/	AR1.5
	Concrete / brickwork					AR-R5					6.50	AR1.2	/	AR1.6
	Concrete / screed					AR-R6					30.67	AR1.2	/	AR1.7
	Structural steel / cat ladders					AR-R7					8.46	AR1.8	/	AR1.9
	Structural steel / hand rail					AR-R8					25.55	AR1.8	/	AR1.10
	Hand rail / kick plates					AR-R9					1.80	AR1.10	/	AR1.11
	Structural steel / roof covering					AR-R10					204.95	AR1.8	/	AR1.12
	Side cladding / roof covering					AR-R11					1.31	AR1.13	/	AR1.12
	Structural steel / floor grating					AR-R12					15.64	AR1.8	/	AR1.14
AS	**WEIGHBRIDGE**													
AS1.1	Earthworks	m3	387	R	222.79	AS-Q1	3.79	AS1.1	/	AS1.3				
AS1.2	Blinding	m2	132	R	46.42	AS-Q2	0.77	AS1.3	/	AS1.2				
AS1.3	Concrete	m3	102	R	1,047.68	AS-Q3	17.83	AS1.3	/	AS1.4				
AS1.4	Reinforcement	t	5.72	R	9,505.66									
AS1.5	Mesh	m2	127	R	113.14	AS-Q4	0.80	AS1.3	/	AS1.5				
AS1.6	Formwork	m2	260	R	202.68	AS-Q5	0.39	AS1.3	/	AS1.6				
AS1.7	Finish to concrete	m2	157	R	14.15	AS-Q6	0.65	AS1.3	/	AS1.7				
AS1.8	Movement joints	m	37	R	74.80	AS-Q7	2.76	AS1.3	/	AS1.8				
AS1.9	Cast in steel	kg	694	R	25.70	AS-Q8	0.15	AS1.3	/	AS1.9				
AS1.10	Grout	m3	0.85	R	6,556.04	AS-Q9	120.00	AS1.3	/	AS1.10				
AS1.11	Brickwork	m2	47	R	291.52	AS-Q10	0.13	AS1.18	/	AS1.11				
AS1.12	Doors and windows	No	4	R	1,926.98	AS-Q11	1.50	AS1.18	/	AS1.12				
AS1.13	Pipework	m	42	R	561.67	AS-Q12	2.93	AS1.17	/	AS1.13				
AS1.14	Bolts	kg	756	R	35.76	AS-Q13	0.13	AS1.3	/	AS1.14				
AS1.15	Structural steel	t	2.56	R	22,346.16	AS-Q14	2.34	AS1.18	/	AS1.15				
AS1.16	Miscellaneous steel	t	1.37	R	27,503.55	AS-Q15	89.78	AS1.17	/	AS1.16				
AS1.17	Total bridge area	m2	123	R	-									
AS1.18	Total control room area	m2	6	R	-									
	Concrete / earthworks					AS-R1					4.70	AS1.3	/	AS1.1
	Concrete / blinding					AS-R2					22.57	AS1.3	/	AS1.2
	Rod reinforcement / mesh reinforcement					AS-R3					84.02	AS1.4	/	AS1.5
	Concrete / formwork					AS-R4					5.17	AS1.3	/	AS1.6
	Concrete / finish to concrete					AS-R5					74.04	AS1.3	/	AS1.7
	Concrete / movement joints					AS-R6					14.01	AS1.3	/	AS1.8
	Rod reinforcement / cast in steel					AS-R7					369.87	AS1.4	/	AS1.9
	Concrete / pipework					AS-R8					1.87	AS1.3	/	AS1.13
	Concrete / grout					AS-R9					0.16	AS1.3	/	AS1.10
	Rod reinforcement / structural steelwork					AS-R10					0.43	AS1.4	/	AS1.15
	Rod reinforcement / miscellaneous steelwork					AS-R11					0.35	AS1.4	/	AS1.16
	Brickwork / doors and windows					AS-R12					0.15	AS1.11	/	AS1.12
AT	**PUMP HOUSE**													
AT1.1	Earthworks	m3	0	R	-	AT-Q1		AT1.1	/	AT1.3				
AT1.2	Blinding	m2	0	R	-	AT-Q2		AT1.3	/	AT1.2				
AT1.3	Concrete	m3	0	R	-	AT-Q3		AT1.3	/	AT1.4				
AT1.4	Reinforcement	t	0.00	R	-									
AT1.5	Formwork	m2	0	R	-	AT-Q4		AT1.3	/	AT1.5				
AT1.6	Finish to concrete	m2	0	R	-	AT-Q5		AT1.3	/	AT1.6				
AT1.7	Movement joints	m	0	R	-	AT-Q6		AT1.3	/	AT1.7				
AT1.8	Cast in steel	kg	0.00	R	-	AT-Q7		AT1.3	/	AT1.8				
AT1.9	Grout	m3	0.00	R	-	AT-Q8		AT1.3	/	AT1.9				
AT1.10	Bolts	kg	0.00	R	-	AT-Q9		AT1.3	/	AT1.10				
AT1.11	Structural steel	t	0.00	R	-	AT-Q10		AT1.15	/	AT1.11				
AT1.12	Miscellaneous steel	t	0.00	R	-	AT-Q11		AT1.15	/	AT1.12				
AT1.13	Brickwork	m2	0	R	-	AT-Q12		AT1.15	/	AT1.13				
AT1.14	Roof covering	m2	0	R	-	AT-Q13		AT1.15	/	AT1.14				
AT1.15	Total pump house area	m2	0	R	-									
	Concrete / earthworks					AT-R1						AT1.3	/	AT1.1
	Concrete / blinding					AT-R2						AT1.3	/	AT1.2
	Concrete / formwork					AT-R3						AT1.3	/	AT1.5
	Concrete / finish to concrete					AT-R4						AT1.3	/	AT1.6
	Concrete / movement joints					AT-R5						AT1.3	/	AT1.7
	Rod reinforcement / cast in steel					AT-R6						AT1.4	/	AT1.8
	Cast in steel / bolts					AT-R7						AT1.8	/	AT1.10
	Concrete / grout					AT-R8						AT1.3	/	AT1.9
	Rod reinforcement / structural steelwork					AT-R9						AT1.4	/	AT1.11
	Rod reinforcement / miscellaneous steelwork					AT-R10						AT1.4	/	AT1.12
	Concrete / brickwork					AT-R11						AT1.3	/	AT1.13
	Brickwork / roof covering					AT-R12						AT1.13	/	AT1.14
AU	**COOLING TOWER**													
AU1.1	Earthworks	m3	504	R	130.60	AU-Q1	2.37	AU1.1	/	AU1.3				
AU1.2	Blinding	m2	210	R	76.95	AU-Q2	1.01	AU1.3	/	AU1.2				
AU1.3	Concrete	m3	213	R	1,066.78									
AU1.4	Reinforcement	t	40.51	R	10,038.52	AU-Q3	5.26	AU1.3	/	AU1.4				
AU1.5	Formwork	m2	1,548	R	137.51	AU-Q4	0.14	AU1.3	/	AU1.5				
AU1.6	Movement joint	m	147	R	109.10	AU-Q5	1.45	AU1.3	/	AU1.6				
AU1.7	Cast in steel	kg	2,813	R	22.47	AU-Q6	0.08	AU1.3	/	AU1.7				
AU1.8	Bolts	kg	656	R	34.20	AU-Q7	0.32	AU1.3	/	AU1.8				

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
AU1.9	Chemical anchors	No	44	R	211.84	AU-Q8	4.84	AU1.3	/	AU1.9				
AU1.10	Miscellaneous steelwork	t	2.53	R	26,652.10	AU-Q9	84.19	AU1.3	/	AU1.10				
AU1.11	Pre-cast concrete	m3	11	R	3,750.85	AU-Q10	19.36	AU1.3	/	AU1.11				
AU1.12	Brickwork	m2	22	R	205.12	AU-Q11	14.73	AU1.12	/	AU1.13				
AU1.13	Total area	m2	324	R	-									
	Concrete / earthworks					AU-R1					8.17	AU1.3	/	AU1.1
	Concrete / blinding					AU-R2					13.86	AU1.3	/	AU1.2
	Concrete / formwork					AU-R3					7.76	AU1.3	/	AU1.5
	Concrete / reinforcement					AU-R4					0.11	AU1.3	/	AU1.4
	Concrete / movement joints					AU-R5					9.78	AU1.3	/	AU1.6
	Rod reinforcement / cast in steel					AU-R6					446.75	AU1.4	/	AU1.7
	Rod reinforcement / miscellaneous steelwork					AU-R7					0.38	AU1.4	/	AU1.10
	Rod reinforcement / bolts					AU-R8					293.52	AU1.4	/	AU1.8
	Rod reinforcement / chemical anchors					AU-R9					47.39	AU1.4	/	AU1.9
	Concrete / pre-cast concrete					AU-R10					0.28	AU1.3	/	AU1.11
	Concrete / brickwork					AU-R11					5.20	AU1.3	/	AU1.12
AV	**EMERGENCY DAM**													
AV1.1	Earthworks	m3	0	R	-	AV-Q1		AV1.10	/	AV1.1				
AV1.2	Lining	m2	0	R	-	AV-Q2		AV1.10	/	AV1.2				
AV1.3	Paving	m2	0	R	-	AV-Q3		AV1.10	/	AV1.3				
AV1.4	Pipework	m	0	R	-	AV-Q4		AV1.10	/	AV1.4				
AV1.5	Manholes	No	0	R	-	AV-Q5		AV1.4	/	AV1.5				
AV1.6	Concrete	m3	0	R	-	AV-Q6		AV1.4	/	AV1.6				
AV1.7	Formwork	m2	0	R	-	AV-Q7		AV1.6	/	AV1.7				
AV1.8	Mesh	m2	0	R	-	AV-Q8		AV1.6	/	AV1.8				
AV1.9	Reinforcement	t	0.00	R	-	AV-Q9		AV1.6	/	AV1.9				
AV1.10	Dam area (to top of berm)	m2	0	R	-									
	Earthworks / lining					AV-R1						AV1.1	/	AV1.2
	Earthworks / paving					AV-R2						AV1.1	/	AV1.3
	Lining / paving					AV-R3						AV1.2	/	AV1.3
	Earthworks / pipework					AV-R4						AV1.1	/	AV1.4
	Pipework / manholes					AV-R5						AV1.4	/	AV1.5
	Lining / concrete					AV-R6						AV1.2	/	AV1.6
	Concrete / formwork					AV-R7						AV1.6	/	AV1.7
	Concrete / mesh					AV-R8						AV1.6	/	AV1.8
	Concrete / rod reinforcement					AV-R9						AV1.6	/	AV1.9
AW	**HEAVY DUTY CABLE TUNNEL**													
AW1.1	Earthworks	m3	0	R	-	AW-Q1		AW1.1	/	AW1.3				
AW1.2	Blinding	m2	0	R	-	AW-Q2		AW1.3	/	AW1.2				
AW1.3	Concrete	m3	0	R	-	AW-Q3		AW1.3	/	AW1.4				
AW1.4	Reinforcement	t	0.00	R	-									
AW1.5	Mesh	m2	0	R	-	AW-Q4		AW1.3	/	AW1.5				
AW1.6	Formwork	m2	0	R	-	AW-Q5		AW1.3	/	AW1.6				
AW1.7	Cast in steel	kg	0	R	-	AW-Q6		AW1.3	/	AW1.7				
AW1.8	Miscellaneous steelwork	t	0.00	R	-	AW-Q7		AW1.9	/	AW1.8				
AW1.9	Total tunnel length	m	0	R	-									
	Concrete / earthworks					AW-R1						AW1.3	/	AW1.1
	Concrete / blinding					AW-R2						AW1.3	/	AW1.2
	Reinforcement / mesh					AW-R3						AW1.4	/	AW1.5
	Concrete / formwork					AW-R4						AW1.3	/	AW1.6
	Reinforcement / cast in steel					AW-R5						AW1.3	/	AW1.7
	Reinforcement / miscellaneous steelwork					AW-R6						AW1.3	/	AW1.8
BA	**STRUCTURAL STEEL - BASIC PLATFORM**													
BA1.1	Total volume	m3	25	R	-									
BA1.2	Steel	t	2.66	R	20,797.25	BA-Q1	9.40	BA1.1	/	BA1.2				
BA1.3	Handrail	m	12	R	791.40	BA-Q2	2.08	BA1.1	/	BA1.3				
BA1.4	Grating	m2	15	R	2,004.96	BA-Q3	1.67	BA1.1	/	BA1.4				
BA1.5	Kick flats	m	19	R	373.96	BA-Q4	1.32	BA1.1	/	BA1.5				
BA1.6	Stair treads	No	5	R	308.05	BA-Q5	5.00	BA1.1	/	BA1.6				
	Steel / handrail					BA-R1					26.28	BA1.2	/	BA1.3
	Steel / grating					BA-R2					10.37	BA1.2	/	BA1.4
	Steel / kick flat					BA-R3					55.61	BA1.2	/	BA1.5
	Steel / stair stread					BA-R4					67.51	BA1.2	/	BA1.6
BB	**STRUCTURAL STEEL - PIPERACK**													
BB1.1	Total volume	m3	2,229	R	-									
BB1.2	Steel	t	46.50	R	22,206.86	BB-Q1	47.94	BB1.1	/	BB1.2				
BB1.3	Handrail	m	158	R	1,054.10	BB-Q2	14.11	BB1.1	/	BB1.3				
BB1.4	Grating	m2	98	R	1,423.12	BB-Q3	22.74	BB1.1	/	BB1.4				
BB1.5	Kick flats	m	132	R	447.36	BB-Q4	16.89	BB1.1	/	BB1.5				
BB1.6	Cat ladder	m	14	R	2,675.42	BB-Q5	159.21	BB1.1	/	BB1.6				
	Steel / handrail					BB-R1					21.07	BB1.2	/	BB1.3
	Steel / grating					BB-R2					15.60	BB1.2	/	BB1.4
	Steel / kick flat					BB-R3					49.64	BB1.2	/	BB1.5

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
	Steel / cat ladder					BB-R4					8.30	BB1.2	/	BB1.6
BC	**STRUCTURAL STEEL - COMPLEX STRUCTURES**													
BC1.1	Total volume	m3	19,043	R	-									
BC1.2	Steel	t	186.01	R	21,428.94	BC-Q1	102.38	BC1.1	/	BC1.2				
BC1.3	Handrail	m	479	R	1,058.22	BC-Q2	39.76	BC1.1	/	BC1.3				
BC1.4	Grating	m2	4,697	R	1,519.49	BC-Q3	4.05	BC1.1	/	BC1.4				
BC1.5	Kick flats	m	417	R	280.20	BC-Q4	45.67	BC1.1	/	BC1.5				
BC1.6	Stair treads	No	61	R	369.91	BC-Q5	312.18	BC1.1	/	BC1.6				
BC1.7	Cat ladder	m	63	R	2,028.93	BC-Q6	302.27	BC1.1	/	BC1.7				
	Steel / handrail					BC-R1					20.25	BC1.2	/	BC1.3
	Steel / grating					BC-R2					14.10	BC1.2	/	BC1.4
	Steel / kick flat					BC-R3					76.48	BC1.2	/	BC1.5
	Steel / stair stread					BC-R4					57.93	BC1.2	/	BC1.6
	Steel / cat ladder					BC-R5					10.56	BC1.2	/	BC1.7
BD	**STRUCTURAL STEEL - STACK**													
BD1.1	Total volume	m3	456	R	-									
BD1.2	Steel	t	27.03	R	34,748.82	BD-Q1	16.87	BD1.1	/	BD1.2				
BD1.3	Handrail	m	11	R	582.70	BD-Q2	41.45	BD1.1	/	BD1.3				
BD1.4	Grating	m2	8	R	1,326.49	BD-Q3	57.00	BD1.1	/	BD1.4				
BD1.5	Kick flats	m	13	R	391.09	BD-Q4	35.08	BD1.1	/	BD1.5				
BD1.6	Cat ladder	m	24	R	2,777.78	BD-Q5	19.00	BD1.1	/	BD1.6				
	Steel / handrail					BD-R1					59.63	BD1.1	/	BD1.2
	Steel / grating					BD-R2					26.20	BD1.1	/	BD1.3
	Steel / kick flat					BD-R3					88.85	BD1.1	/	BD1.4
	Steel / cat ladder					BD-R4					12.51	BD1.1	/	BD1.5
BE	**STRUCTURAL STEEL - WALKWAY**													
BE1.1	Total volume	m3	39	R	-									
BE1.2	Steel	t	3.89	R	28,424.91	BE-Q1	10.03	BE1.1	/	BE1.2				
BE1.3	Handrail	m	42	R	1,353.18	BE-Q2	0.93	BE1.1	/	BE1.3				
BE1.4	Grating	m2	30	R	1,039.69	BE-Q3	1.30	BE1.1	/	BE1.4				
BE1.5	Kick flats	m	39	R	281.02	BE-Q4	1.00	BE1.1	/	BE1.5				
BE1.6	Stair treads	No	9	R	351.80	BE-Q5	4.33	BE1.1	/	BE1.6				
	Steel / handrail					BE-R1					21.01	BE1.2	/	BE1.3
	Steel / grating					BE-R2					27.34	BE1.2	/	BE1.4
	Steel / kick flat					BE-R3					101.15	BE1.2	/	BE1.5
	Steel / stair stread					BE-R4					80.80	BE1.2	/	BE1.6
BF	**STRUCTURAL STEEL - CABLE GANTRY**													
BF1.1	Total volume	m3	237	R	-									
BF1.2	Steel	t	24.13	R	21,671.28	BF-Q1	9.82	BF1.1	/	BF1.2				
BF1.3	Handrail	m	18	R	1,077.32	BF-Q2	13.17	BF1.1	/	BF1.3				
BF1.4	Grating	m2	39	R	1,366.78	BF-Q3	6.08	BF1.1	/	BF1.4				
BF1.5	Kick flats	m	17	R	221.14	BF-Q4	13.94	BF1.1	/	BF1.5				
BF1.6	Cat ladder	m	17	R	2,948.53	BF-Q5	13.94	BF1.1	/	BF1.6				
	Steel / handrail					BF-R1					20.12	BF1.1	/	BF1.2
	Steel / grating					BF-R2					15.86	BF1.1	/	BF1.3
	Steel / kick flat					BF-R3					98.00	BF1.1	/	BF1.4
	Steel / cat ladder					BF-R4					7.35	BF1.1	/	BF1.5
C	**PIPING INSTALLATION**													
C1.1	Pipe length	m	20,227	R	-	C-Q1	0.23	C1.1	/	C1.2				
C1.2	Total work units	WU	89,113	R	394.71									
C1.3	Pipe supports	kg	7,105	R	-	C-Q2	2.85	C1.1	/	C1.3				
C1.4	WU for pipe supports	WU	11,090	R	-	C-Q3	0.12	C1.4	/	C1.2				
C1.5	Number of welds	No	11,416	R	-	C-Q4	0.56	C1.5	/	C1.1				
C1.6	Total fittings	No	9,387	R	-	C-Q5	0.46	C1.6	/	C1.1				
C1.7	Stud bolts	No	2,453	R	-	C-Q6	0.26	C1.7	/	C1.6				
C1.8	Support number	No	1,929	R	-	C-Q7	0.27	C1.8	/	C1.3				
DA	**RADIOGRAPHIC EXAMINATION (RT)**													
DA1.1	Total work units	WU	89,113	R	394.71	DA-Q1	100.24	DA1.1	/	DA1.2				
DA1.2	Number of examinations	No	889	R	40.78									
	Average cost per examination / WU					DA-R1					9.68	DA1.1	/	DA1.2
DB	**DYE PENETRATION TESTING (DP)**													
DB1.1	Total work units	WU	89,113	R	394.71	DB-Q1	242.81	DB1.1	/	DB1.2				
DB1.2	Number of examinations	No	367	R	95.25									
	Average cost per examination / WU					DB-R1					4.14	DB1.1	/	DB1.2
DC	**MAGNETIC PARTICLE TESTING (MPI)**													

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	Trade / Item description	Unit	Quantity		Rate	Ratio No	Quantity ratio	Quantities used			Rate ratio	Rates used		
DC1.1	Total work units	WU	89,113	R	394.71	DC-Q1	389.14	DC1.1	/	DC1.2				
DC1.2	Number of examinations	No	229	R	148.28									
	Average cost per examination / WU					DC-R1					2.66	DC1.1	/	DC1.2
DD	**POST WELD HEAT TREATMENT**													
DD1.1	Total work units	WU	89,113	R	394.71	DD-Q1	50.98	DD1.1	/	DD1.2				
DD1.2	Number of examinations	No	1,748	R	65.12									
	Average cost per examination / WU					DD-R1					6.06	DD1.1	/	DD1.2
DE	**MATERIAL HARDNESS TESTING (HT)**													
DE1.1	Total work units	WU	89,113	R	394.71	DE-Q1	98.03	DE1.1	/	DE1.2				
DE1.2	Number of examinations	No	909	R	160.14									
	Average cost per examination / WU					DE-R1					2.46	DE1.1	/	DE1.2
E	**MECHANICAL INSTALLATION**													
E1.1	Total work units	WU	89,113	R	394.71	E-Q1	206.92	E1.1	/	E1.2				
E1.2	Mechanical equipment	t	430.67	R	635.56	E-Q2	274.26	E1.1	/	E1.3				
E1.3	Structural steel	t	324.92	R	24,943.32									
	WU cost / install mechanical weight - receive					E-R1					0.62	E1.1	/	E1.2
	Steel cost / install mechanical weight - receive					E-R2					39.25	E1.3	/	E1.2
F	**PAINTING & INSULATION**													
F1.1	Total work units	WU	89,113	R	394.71									
F1.2	Painting to piping	m2	5,834	R	178.77	F-Q1	15.27	F1.1	/	F1.2				
F1.3	Insulation to piping	m2	1,300	R	357.71	F-Q2	68.55	F1.1	/	F1.3				
F1.4	Mechanical equipment received	t	245.85	R	404.46									
F1.5	Painting to mechanical equipment	m2	1,587	R	177.48	F-Q3	0.15	F1.4	/	F1.5				
F1.6	Insulation to mechanical equipment	m2	499	R	545.48	F-Q4	0.49	F1.4	/	F1.6				
	Paint / insulation					F-R1					0.50	F1.2	/	F1.3
	Work unit / paint					F-R2					2.21	F1.1	/	F1.2
	Work unit / insulation					F-R3					1.10	F1.1	/	F1.3
	Install plant / paint					F-R4					2.28	F1.4	/	F1.5
	Install plant / insulation					F-R5					0.74	F1.4	/	F1.6
G	**ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY**													
G1.1	Electrical cable	m	30,805	R	70.27									
G1.2	Electrical cable terminations	No	1,663	R	105.25	G-Q1	18.52	G1.1	/	G1.2				
G1.3	Electrical equipment	No	189	R	719.89	G-Q2	162.99	G1.1	/	G1.3				
G1.4	DB's	No	10	R	1,312.66	G-Q3	18.90	G1.3	/	G1.4				
G1.5	Rack	m	5,174	R	158.40	G-Q4	5.95	G1.1	/	G1.5				
G1.6	Support steel	kg	10,015	R	33.46	G-Q5	0.52	G1.5	/	G1.6				
G1.7	Instrumentation cable	m	21,472	R	19.06	G-Q6	1.43	G1.1	/	G1.7				
G1.8	Instruments	No	1,263	R	207.68	G-Q7	17.00	G1.7	/	G1.8				
G1.9	Hook-ups	No	1,619	R	115.34	G-Q8	0.78	G1.8	/	G1.9				
G1.10	Light fittings	No	652	R	457.45	G-Q9	3.45	G1.10	/	G1.3				
G1.11	Conduit	m	3,136	R	28.54	G-Q10	9.82	G1.1	/	G1.11				
G1.12	Instrument stands	No	343	R	1,290.53	G-Q11	3.68	G1.8	/	G1.12				
	Electrical cable / electrical cable terminations					G-R1					0.67	G1.1	/	G1.2
	Electrical cable / electrical equipment					G-R2					0.10	G1.1	/	G1.3
	Electrical equipment / DB's					G-R3					0.55	G1.3	/	G1.4
	Electrical cable / conduit					G-R4					2.46	G1.1	/	G1.11
	Electrical cable / support steel					G-R5					2.10	G1.1	/	G1.6
	Electrical cable / rack					G-R6					0.44	G1.1	/	G1.5
	Electrical cable / light fittings					G-R7					0.15	G1.1	/	G1.10
	Instrumentation cable / hook-ups					G-R8					0.17	G1.7	/	G1.9
	Instrument cable / instrument stands					G-R9					0.01	G1.7	/	G1.12
	Instrument cable / instruments					G-R10					0.09	G1.7	/	G1.8

Addendum E - Typical financial forecast summary - showing measured work, extra's and contingencies

Contractor: XYZ Civil construction
Contract Number: 123

MEASURED WORK	ORIGINAL CONTRACT VALUE	DESCRIPTION	EFC - MW VALUE	Prev EFC - MW	Movement
TOTALS	R 161,958,333.94		R 122,680,241.66	R 118,180,241.66	R 4,500,000.00

COMPENSATION EVENT REGISTER & BACK CHARGES

EW NO	DATE	PMI NO	DATE	NCE NO	DATE	SHORT DESC	FULL DESCRIPTION	STATUS	CE NO	DATE	VALUE	Previous Value	Movement	CLIENT B/C	VENDOR B/C
SS-001	16/03/2009			001		Labour rate increase		APPROVED	003	02/12/2009	R 108,224.00	R 90,000.00	R 18,224.00	YES	NO
SS-010	19/05/2009	003				Supply diesel	Contractor to supply diesel storage facility - other contractors	PENDING			R 2,000,000.00	R 2,000,000.00	R -	YES	NO
SS-011	19/05/2009					Cable openings not detailed	Cable openings not indicated on drawings - delays	PENDING			R 85,000.00	R 85,000.00	R -	YES	NO
N/A	N/A	001		004	09-09-2009	WI for Topographical Survey		PENDING			R 103,672.80	R 103,672.80	R -	YES	NO
N/A	N/A	002	18-04-2009	003	09-10-2009	Drill of borehole at T8	Drill test hole at T8 to determine if fill material will be sufficient for Site	PENDING			R 17,307.70	R 17,307.70	R -	YES	NO
		004				Drill 2nd hole at T8	Drill 2nd hole at T8	PENDING			R 25,000.00	R 25,000.00	R -	NO	NO
		005				Testing - T8	Testing and sampling at T8	PENDING			R 100,000.00	R 100,000.00	R -	NO	NO
	18/06/2009	006				Supply of raw water	Supply of raw water from T9 to Site	APPROVED	002	12/10/2009	R 3,496,611.33	R 3,496,611.33	R -	YES	NO
	06/07/2009	007				Upgrade roads	Upgrade existing access roads into Site	PENDING			R 310,000.00	R 310,000.00	R -	NO	NO
		N/A	N/A	002	14-09-2009	EOT		APPROVED	001	08/10/2009	R 12,277,531.12	R 12,277,531.12	R -	YES	NO
SS-019	26/09/2009	N/A	N/A			Delay on Road Works	Delay on Road Works drawings might influenece P&G cost	PENDING			R 280,000.00	R 280,000.00	R -	NO	NO
SS-020	27/09/2009	N/A	N/A			Disruptions - rainy season	Disruptions to the works due to the effect of the rainy season. Contractor should have been finished 17-11-2009, but now they will continue into the rainy season	PENDING			R -	R -	R -	YES	NO
SS-021	27/09/2009	N/A	N/A			Escalation from 15-01-2010	Escalation will apply from 15-01-2010	PENDING			R 1,000,000.00	R 1,000,000.00	R -	YES	NO
SS-022	27/09/2009	N/A	N/A			Non-provision - tax docs	Client did not provide Contractor with the relevant statutory tax directive documents resulting	PENDING			R -	R -	R -	YES	NO
N/A	N/A	N/A	N/A	N/A	N/A	Work done for RS	Earthworks and civil works undertaken on behalf of HHP contractor - originally part of other contractor's scope				R -	R -	R -	YES	NO
N/A	N/A	009	13-11-2009	N/A	N/A	Stabilize road into Landfill	Stabilize road into Landfill	PENDING			R 300,000.00	R 300,000.00	R -	YES	NO
N/A	N/A	008	12-11-2009	N/A	N/A	Surface road - Cont est	Surface road at Contractor's Establsihemnt area	PENDING			R 310,000.00	R 310,000.00	R -	YES	NO
N/A	N/A			007	15-11-2009	Public holiday - 28-10-2009	Cost effect of public holiday on 28-10-2009	PENDING			R 14,541.99	R 14,541.99	R -	YES	NO
N/A	N/A			008	26-11-2009	Accommodation - workers	Accommodation of skilled workers	PENDING			R 367,000.00	R 367,000.00	R -	YES	NO
		N/A	N/A	010	12-01-2010	Change in PLA leave days	Change in PLA leave days from one day per month to two days per month	PENDING			R 118,031.76		R 118,031.76	YES	NO
N/A	N/A	011	14-01-2010			Remove vegetation	Remove vegetation to allow installation of sprinklers (by others)	PENDING			R 5,000.00	R 5,000.00	R -	YES	NO
SS-039	22-12-2009	N/A	N/A	011	25-01-2010	Public holiday - 28-10-2009	Cost effect of public holiday on 25-01-2010	PENDING			R 18,540.67	R -	R 18,540.67	YES	NO
SS-040	23-12-2009	N/A	N/A			Late access - building work	Late access of building work	PENDING			R 250,000.00	R -	R 250,000.00	YES	NO
SS-041	23-12-2009	N/A	N/A			Roads - EOT	Roads - EOT	PENDING			R 250,000.00	R -	R 250,000.00	YES	NO
SS-042	23-12-2009	N/A	N/A			Flare drum - EOT	Flare drum - EOT	PENDING			R 250,000.00	R -	R 250,000.00	YES	NO
SS-043	23-12-2009	N/A	N/A			Sub 1 - EOT	Sub 1 - EOT	PENDING			R 250,000.00	R -	R 250,000.00	YES	NO
SS-044	23-12-2009	N/A	N/A			DEW PC - EOT	DEW PC - EOT	PENDING			R 250,000.00	R -	R 250,000.00	YES	NO
SS-045	23-12-2009	N/A	N/A			Condensate tank - EOT	Condensate tank - EOT	PENDING			R 250,000.00	R -	R 250,000.00	YES	NO
TOTALS											R 22,436,461.37	R 20,781,664.94	R 1,654,796.43		

KNOWN COMMITTED COSTS (KCC)

KCC NO	DATE	DISCIPLINE	SHORT DESC	FULL DESCRIPTION	VALUE	Previous Value	Movement
001	20/05/2009	Batch plant	Raise level of batch plant	Raise level of batch plant - As per MOM 008.	R -	R -	R -
002	20/05/2009	Site power	Site power cable	Supply and install temp site power cable - 200m	R 30,000.00	R 30,000.00	R -
003	28/07/2009	Hand excavation	Hand excavation	Increased hand excavation - client can not indicate where services are	R -	R 1,000,000.00	R -1,000,000.00
004	28/07/2009		Sewerage plant		R 2,500,000.00	R 2,500,000.00	R -
005	26/08/2009		PVC pipe trench	PVC pipe trench	R -	R 80,000.00	R -80,000.00
006	31/08/2009		New PLA rates	New PLA rates	R 1,500,000.00	R 1,500,000.00	R -
007	21/09/2009		Work done for RS		R -	R -	R -
008	29/09/2009		Negative for fuel supplied by Client		R -300,000.00	R -300,000.00	R -
009	10/11/2009		12 man crew - commis	12 man crew - commissioning	R 2,000,000.00	R 2,000,000.00	R -
TOTALS					R 5,730,000.00	R 6,810,000.00	R -1,080,000.00

CONTINGENCY

Cont No	DATE	DISCIPLINE	SHORT DESC	FULL DESCRIPTION	VALUE	Previous Value	Movement
001			Risk allowance		R 14,000,000.00	R 14,000,000.00	R -
002			Risk allowance		R -7,000,000.00	R -7,000,000.00	R -
003			12 man crew - commissioning		R -2,000,000.00	R -2,000,000.00	R -
004			Accommodation - workers		R -367,000.00	R -367,000.00	R -
005			Additional EOT		R -1,500,000.00	R -	-R 1,500,000.00
006							
TOTALS					R 3,133,000.00	R 4,633,000.00	R -1,500,000.00

Contractor: XYZ Civil construction
Contract Number: 123

MEASURED WORK	DESCRIPTION	ORIGINAL CONTRACT VALUE	EFC - MW VALUE	Prev EFC - MW	Movement
TOTALS		R 161,958,333.94	R 122,680,241.66	R 118,180,241.66	R 4,500,000.00

COMPENSATION EVENT REGISTER & BACK CHARGES

EW NO	DATE	PMI NO	DATE	NCE NO	DATE	SHORT DESC	FULL DESCRIPTION	STATUS	CE NO	DATE	VALUE	Previous Value	Movement	CLIENT B/C	VENDOR B/C

INVOICING

INV No	DATE	SHORT DESC	FULL DESCRIPTION	% Original	% Extended	VALUE
001	01/04/2009	Assessment 1		13.20%	11.16%	R 16,195,833.39
002		Assessment 1a		0.00%	0.00%	R - cancelled
003	01/04/2009	Assessment 2		0.00%	0.00%	R - cancelled
004	04/05/2009	Assessment 3		5.17%	4.37%	R 4,337,425.29
005	30/06/2009	Assessment 4		7.66%	6.47%	R 6,344,918.23
006	27/07/2009	Assessment 5		6.85%	5.79%	R 9,394,982.68
007	31/08/2009	Assessment 6		8.13%	6.87%	R 8,402,086.76
008	29/09/2009	Assessment 7		7.47%	6.32%	R 9,972,929.56
009	27/10/2009	Assessment 8		9.05%	7.65%	R 9,166,542.04
010	30/11/2009	Assessment 9		7.53%	6.36%	R 11,100,126.10
011	11/12/2009	Assessment 10		4.32%	3.65%	R 9,233,722.54
012	27/01/2010	Assessment 11		0.00%	0.00%	R 5,299,848.38
				0.00%	0.00%	
TOTALS				72.91%	61.64%	R 89,448,414.97

CONTRACT STATUS

		VALUE	Previous Value	Movement
EFC - Measured work		R 122,680,241.66	R 120,924,314.42	R 1,755,927.24
Compensation Events		R 22,436,461.37	R 20,409,664.94	R 2,026,796.43
Known Committed Costs (KCC)		R 5,730,000.00	R 6,810,000.00	R -1,080,000.00
Contingency		R 3,133,000.00	R 5,000,000.00	R -1,867,000.00
TOTALS	as at 05 February 2010	R 153,979,703.03	R 150,404,906.60	R 3,574,796.43

Addendum F - Summary of Ratio Conceptual Estimate (RCE) for civil works on a typical petrochemical project

RATIO CONCEPTUAL ESTIMATE FOR:			
Project name:	XYZ Project - civil works only		
Location:	Gauteng - South Africa		
Client:	ABC Chemicals	Date of estimate:	06/02/2010

Project detail:

Site clearance	16500	m2
Demolish concrete	20	m3
Bulk excavations	8500	m3
Number of piles	200	No
Asphalt road surfaces	2000	m2
Paved roads - interlocking concrete blocks	1050	m2
Paved area finishing - concrete	4500	m2
Concrete in pump bases and support bases	90	m3
Concrete in tank bases only	435	m3
Concrete in bunding area finish only	370	m3
Concrete in rack foundations	80	m3
Concrete in simple structural foundations	477	m3
Concrete in complex structural foundations	358	m3
Concrete in columns to pipe racks - concrete columns and beams	560	m3
Concrete in columns to complex structures - concrete columns and beams	105	m3
Concrete in bases - major bases only	2020	m3
Concrete in blast proof walls - major bases	780	m3
Concrete in major bases only - concrete top structures	2992	m3
Building area (including all floors)	3456	m2
Concrete in building	1506	m3
Waterproofing to flat roofs	0	m2

	CIVIL CONSTRUCTION COST			
			R	105,418,743.19
A	SITE CLEARANCE AND DEMOLITIONS		R	106,500.00
B	BULK EARTHWORKS		R	3,261,876.80
C	PILING		R	10,369,403.26
D	ROAD WORKS		R	2,691,010.71
E	GENERAL PAVING AND BUNDED AREAS		R	2,324,866.94
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	2,228,307.47
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	622,124.83
H	TANK BASES AND BUNDING		R	4,092,218.70
I	RACK FOUNDATIONS		R	517,319.77
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,335,085.03
K	COMPLEX STRUCTURAL FOUNDATIONS		R	2,202,676.66
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	10,174,448.82
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,089,703.67
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	12,271,331.73
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	12,963,606.30
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	8,837,477.24
	Preliminaries and General	35.00%	R	27,330,785.27

Description	Unit	Quantity	Rate	Cost	Total

A **SITE CLEARANCE AND DEMOLITIONS**

Clear and strip site	m2	16500	R	5.00	R	82,500.00	R	106,500.00
Demolish and haul concrete	m3	20	R	1,200.00	R	24,000.00		

Description	Unit	Quantity	Rate	Cost	Total

B **BULK EARTHWORKS**

Bulk excavations to spoil	m3	8500	R	70.00	R	595,000.00	R	3,261,876.80
Trim excavations to slope	m2	6004	R	5.15	R	30,934.16		
Backfill and compact	m3	7520	R	300.00	R	2,255,940.65		
Overhaul of excavated material - 5km	m3/5km	8500	R	36.40	R	309,374.12		
Rip & compact bed	m2	16500	R	4.28	R	70,627.87		

Description	Unit	Quantity	Rate	Cost	Total

C **PILING**

Total number of piles	No	200	N/A		R	-	R	10,369,403.26
Raking piles	No	48	N/A		R	-		
Site establishment of piling rig and equipment	Sum	1	R	294,342.41	R	294,342.41		
Extra over for establishment of raking equipment	Sum	1	R	5,970.28	R	5,970.28		
Move equipment to and set up at each pile position - 600mm diameter 1300kN pile	No	200	R	1,079.18	R	215,836.63		
Extra over for setting up raking piles	No	48	R	205.82	R	9,907.92		
Auger quantity	m	3523	R	1,750.00	R	6,164,533.76		
Extra over for drilling raking pile	m	847	R	262.36	R	222,222.59		
Extra over piling irrespective of depth for augering and boring holes through obstructions consisting of - coarse gravel material	m	107	R	181.55	R	19,427.61		
Extra over piling irrespective of depth for augering and boring holes trough obstructions consisting of - boulders	m	222	R	507.95	R	112,983.35		
Extra over piling for socketing piles into very soft rock formation	m	1682	R	507.95	R	854,564.58		
Install and remove temporaty casings into augered holes as directed	m	1541	R	392.28	R	604,315.57		
Extra over for installing casing for raking pile	m	403	R	71.58	R	28,868.16		
Mild steel reinforcement	t	9	R	9,022.97	R	78,641.97		
High tensile reinforcement	t	46	R	8,650.00	R	401,818.48		
35MPa concrete for cast-in situ piles, underreams, bulous bases and sockets	m^3	888	R	1,150.00	R	1,020,951.70		
Extra over for installing concrete to raking pile	m	192	R	80.20	R	15,391.03		
Site establishment for load testing of piles on site	No	1	R	80,909.50	R	80,909.50		
Load test pile 1300kN	No	2	R	83,750.23	R	164,476.84		
Establishment to and from site for integrity testing	No	5	R	5,435.26	R	26,685.74		
Carry out integrity testing of piles	No	200	R	237.78	R	47,555.15		

Description	Unit	Quantity	Rate	Cost	Total

D **ROAD WORKS**

Remove top soil	m3	357		70.00	R	24,993.97	R	2,691,010.71
Rip bed and compact	m2	3545	R	3.86	R	13,668.92		
Reduce levels	m3	2270	R	70.00	R	158,906.08		
Filling - selected material	m3	2266	R	130.00	R	294,522.24		
Filling - imported material	m3	2210	R	300.00	R	662,873.91		
Wearing course and compacted	m3	520	R	454.55	R	236,441.65		
EO filling for blending in ash	m3	2266	R	221.00	R	500,687.81		
Prime MSP 1	m2	2000	R	19.60	R	39,200.00		
30mm Graded asphalt	m2	2000	R	106.04	R	212,072.00		
Three line of 450mm Class 75D concrete pipe	m	33	R	3,081.61	R	102,031.97		
One line of 450mm Class 75D concrete pipe	m	18	R	1,083.50	R	19,397.42		
200mm Diameter PVC pipe	m	305	R	184.23	R	56,105.57		
Road marking - STOP	No	4	R	2,163.77	R	8,276.41		
Standard signage	No	5	R	2,055.97	R	10,759.60		
80mm Thick interlocking paving - red	m2	263	R	230.00	R	60,375.00		
80mm Thick interlocking paving - grey	m2	788	R	200.00	R	157,500.00		
Standard kerbing	m	578	R	218.98	R	126,459.85		
100mm Painted line / kerbing	m	932	R	7.23	R	6,738.29		

Description	Unit	Quantity	Rate	Cost	Total

E **GENERAL PAVING AND BUNDED AREAS**

Paved area finishing - concrete	m2	4500	N/A		R -	R	2,324,866.94
Rip & compact	m2	4500	R	8.72	R 39,237.16		
Concrete to slab	m3	723	R	1,150.00	R 831,478.47		
Concrete to plinth	m3	30	R	1,150.00	R 34,863.53		
Wood float - power float	m2	4500	R	31.13	R 140,106.43		
Formwork plinth	m2	129	R	350.05	R 45,075.89		
Formwork slab	m2	265	R	351.00	R 92,853.12		
High tensile steel reinforcement	t	1.10	R	8,650.00	R 9,476.68		
Mesh reinforcement	m2	4500	R	117.77	R 529,943.94		
Construction joints	m	1582	R	170.27	R 269,363.84		
Expansion joint	m	998	R	332.98	R 332,467.88		

Description	Unit	Quantity	Rate	Cost	Total

F **MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS**

Restricted base excavation	m3	2059	R	100.00	R 205,928.12	R	2,228,307.47
Working space	m2	867	R	103.98	R 90,182.67		
Backfill	m3	300	R	325.04	R 97,626.80		
Mass concrete blinding	m2	808	R	50.58	R 40,888.21		
Concrete bases	m3	209	R	1,150.00	R 240,266.53		
Concrete sump wall	m3	365	R	1,150.00	R 419,485.54		
Concrete slab	m3	5	R	1,150.00	R 5,849.52		
Wood float	m2	728	R	13.57	R 9,875.66		
Formwork bases	m2	82	R	255.77	R 20,969.17		
Forwork sumps	m2	1287	R	322.29	R 414,751.22		
Formwork sides of slab	m2	12	R	335.88	R 4,108.79		
Mild steel reinforcement	t	0.16	R	9,312.94	R 1,450.90		
High tensile steel reinforcement	t	46	R	8,650.00	R 401,653.35		
Cast in items	kg	2276	R	91.86	R 209,088.28		
Multi PVC waterstop	m	136	R	486.92	R 66,182.72		

Description	Unit	Quantity	Rate	Cost	Total

G **PUMP AND PIPE SUPPORT BASES AND PLINTHS**

Restricted base excavation	m3	174	R	100.00	R 17,426.59	R	622,124.83
Working space	m3	351	R	127.20	R 44,646.30		
Backfill	m3	74	R	175.79	R 13,046.06		
Blinding	m2	178	R	78.50	R 14,011.96		
Concrete in bases	m3	90	R	1,150.00	R 103,500.00		
Concrete plinths	m3	32	R	1,150.00	R 36,661.01		
Wood float	m2	183	R	18.82	R 3,435.78		
Formwork to bases	0	175	R	347.56	R 60,757.37		
Formwork to plinths	0	164	R	348.89	R 57,252.05		
High tensile steel reinforcement	t	10.39	R	8,650.00	R 89,830.89		
Cast in items	kg	227.17	R	138.29	R 31,414.19		
HD bolts	kg	557.34	R	187.55	R 104,526.00		
Grout	m3	1.88	R	24,319.58	R 45,616.64		

Description	Unit	Quantity	Rate	Cost	Total

H **TANK BASES AND BUNDING**

Restricted base excavation	m3	984	R	100.00	R	98,402.67	R 4,092,218.70
Working space	m2	1032	R	122.42	R	126,318.24	
Backfill	m3	483	R	170.38	R	82,266.23	
Mass concrete blinding	m2	748	R	73.42	R	54,900.63	
Concrete bases	m3	435	R	1,150.00	R	500,250.00	
Concrete sump wall	m3	241	R	1,150.00	R	276,615.13	
Concrete slab	m3	370	R	1,150.00	R	425,500.00	
Concrete plinth	m3	33	R	1,150.00	R	38,430.35	
Concrete column	m3	6	R	1,150.00	R	6,689.08	
Wood float	m2	2512	R	21.16	R	53,152.32	
Formwork bases	m2	526	R	360.77	R	189,705.51	
Formwork plinths	m2	490	R	324.80	R	159,061.58	
Formwork columns	m2	46	R	340.67	R	15,713.89	
Forwork sumps	m2	1356	R	310.18	R	420,568.82	
Formwork sides of slab	m2	20	R	412.13	R	8,367.83	
Formwork to sides n/e 300mm	m2	55	R	373.42	R	20,564.67	
Mild steel reinforcement	t	0.04	R	9,898.33	R	427.28	
High tensile steel reinforcement	t	122	R	8,650.00	R	1,055,933.51	
Mesh 395	m2	2504	R	72.62	R	181,822.94	
Cast in items	kg	982	R	107.62	R	105,735.00	
HD bolts	kg	631	R	132.64	R	83,662.21	
Grout	m3	1.08	R	19,744.55	R	21,279.85	
Construction joint	m	371	R	168.23	R	62,344.42	
Expansion joint	m	641	R	162.96	R	104,506.53	

Description	Unit	Quantity	Rate	Cost	Total

I **RACK FOUNDATIONS**

Restricted base excavation	m3	175	R	100.00	R	17,547.03	R 517,319.77
Working space	m2	465	R	139.58	R	64,862.36	
Backfill	m3	75	R	163.15	R	12,288.29	
Mass concrete blinding	m2	130	R	68.19	R	8,896.16	
Concrete bases	m3	80	R	1,150.00	R	92,000.00	
Concrete plinth	m3	16	R	1,150.00	R	18,973.80	
Wood float	m2	140	R	19.76	R	2,765.50	
Formwork bases	m2	214	R	305.98	R	65,590.88	
Formwork plinths	m2	16	R	308.99	R	4,973.21	
High tensile steel reinforcement	t	11.34	R	8,650.00	R	98,132.94	
HD bolts	kg	883	R	133.75	R	118,048.19	
Grout	m3	0.592	R	22,382.43	R	13,241.40	

Description	Unit	Quantity	Rate	Cost	Total

J **SIMPLE STRUCTURAL FOUNDATIONS**

Restricted base excavation	m3	657	R	100.00	R	65,743.70	R 2,335,085.03
Working space	m2	795	R	122.42	R	97,347.50	
Backfill	m3	141	R	169.41	R	23,888.78	
Mass concrete blinding	m2	463	R	70.23	R	32,535.76	
Concrete bases	m3	477	R	1,150.00	R	548,550.00	
Concrete slab	m3	4	R	1,150.00	R	4,115.21	
Concrete plinth	m3	207	R	1,150.00	R	238,579.78	
Wood float	m2	479	R	20.65	R	9,889.06	
Formwork bases	m2	504	R	322.43	R	162,439.83	
Formwork plinths	m2	541	R	303.04	R	164,061.79	
High tensile steel reinforcement	t	66.52	R	8,650.00	R	575,422.61	
Cast in items	kg	95	R	102.21	R	9,688.47	
HD bolts	kg	1894	R	148.96	R	282,193.16	
Grout	m3	5.61	R	21,509.94	R	120,629.39	

Description	Unit	Quantity	Rate	Cost	Total

K **COMPLEX STRUCTURAL FOUNDATIONS**

Restricted base excavation	m3	716	R	100.00	R	71,594.81	R 2,202,676.66
Working space	m2	1491	R	133.61	R	199,176.68	
Backfill	m3	308	R	165.85	R	51,125.55	
Mass concrete blinding	m2	539	R	70.93	R	38,256.14	
Concrete bases	m3	358	R	1,150.00	R	411,700.00	
Concrete plinth	m3	58	R	1,150.00	R	66,180.02	
Concrete column	m3	23	R	1,150.00	R	26,306.57	
Wood float	m2	58	R	19.77	R	1,137.71	
Formwork bases	m2	788	R	298.23	R	235,060.00	
Formwork plinths	m2	291	R	367.67	R	106,835.61	
Formwork columns	m2	167	R	336.51	R	56,247.26	
High tensile steel reinforcement	t	63.34	R	8,650.00	R	547,862.82	
HD bolts	kg	2365	R	133.05	R	314,632.38	
Grout	m3	3.45	R	22,171.57	R	76,561.10	

Description	Unit	Quantity	Rate	Cost	Total

L **CONCRETE PIPE RACKS AND FOUNDATIONS**

Restricted base excavation	m3	1303	R	100.00	R	130,286.42	R 10,174,448.82
Working space	m2	3079	R	142.75	R	439,573.35	
Backfill	m3	651	R	350.75	R	228,245.17	
Mass concrete blinding	m2	1319	R	75.07	R	99,008.99	
Concrete bases	m3	598	R	1,150.00	R	687,945.24	
Concrete column	m3	560	R	1,150.00	R	644,000.00	
Concrete beam	m3	662	R	1,150.00	R	760,800.13	
Wood float	m2	1596	R	9.59	R	15,311.71	
Formwork bases	m2	1521	R	180.18	R	274,077.39	
Formwork columns	m2	3893	R	202.52	R	788,326.47	
Formwork beams	m2	4349	R	162.29	R	705,758.38	
Formwork beam soffits	m2	1125	R	385.46	R	433,784.40	
Formwork to corbels	m2	32	R	679.53	R	21,621.15	
High tensile steel reinforcement	t	227	R	8,650.00	R	1,967,857.71	
Supply and cast in steel	kg	16168	R	156.43	R	2,529,058.77	
HD bolts	kg	2365	R	187.43	R	443,293.99	
Grout	m3	0.49	R	11,174.31	R	5,499.56	

Description	Unit	Quantity	Rate	Cost	Total

M **CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS**

Restricted base excavation	m3	53	R	100.00	R	5,287.43	R 3,089,703.67
Working space	m2	55	R	128.98	R	7,144.44	
Backfill	m3	15	R	359.62	R	5,255.53	
Mass concrete blinding	m2	195	R	78.40	R	15,253.16	
Concrete bases	m3	81	R	1,150.00	R	92,605.70	
Concrete walls - sumps, retaining walls, etc	m3	34	R	1,150.00	R	38,957.51	
Concrete column	m3	105	R	1,150.00	R	120,750.00	
Concrete beam	m3	38	R	1,150.00	R	44,139.25	
Concrete elevated slabs	m3	60	R	1,150.00	R	69,331.14	
Wood float	m2	163	R	10.46	R	1,702.61	
Formwork bases	m2	202	R	199.03	R	40,258.00	
Formwork columns	m2	378	R	204.77	R	77,438.54	
Formwork beams	m2	106	R	147.89	R	15,692.30	
Formwork beam soffits	m2	99	R	352.78	R	34,814.33	
Formwork to elevated slab soffits	m2	40	R	509.21	R	20,294.10	
Formwork to walls - sumps, retaining walls, etc	m2	236		198.91	R	46,875.65	
Formwork to pockets	m2	2	R	417.83	R	994.87	
High tensile steel reinforcement	t	36.98	R	8,650.00	R	319,846.98	
Supply and cast in steel	kg	12208	R	162.00	R	1,977,656.70	
Steel handrailing	m	36	R	660.45	R	23,485.35	
HD bolts	kg	513	R	199.70	R	102,490.65	
Grout	m3	2.49	R	11,818.19	R	29,429.42	

Description	Unit	Quantity	Rate	Cost	Total

N **MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS**

Restricted base excavation	m3	1715	R	100.00	R	171,525.32	R 12,271,331.73
Working space	m2	1215	R	129.89	R	157,825.86	
Backfill	m3	574	R	361.53	R	207,478.81	
Mass concrete blinding	m2	1785	R	78.31	R	139,811.75	
Concrete bases	m3	2020	R	1,150.00	R	2,323,000.00	
Concrete walls	m3	780	R	1,150.00	R	897,000.00	
Concrete column	m3	90	R	1,150.00	R	104,004.05	
Concrete beam	m3	9	R	1,150.00	R	10,486.66	
Concrete elevated slabs	m3	12	R	1,150.00	R	13,857.60	
Wood float	m2	1814	R	10.38	R	18,822.88	
Formwork bases	m2	525	R	199.46	R	104,773.98	
Formwork columns	m2	487	R	205.06	R	99,914.77	
Formwork beams	m2	29	R	149.41	R	4,404.71	
Formwork beam soffits	m2	15	R	356.43	R	5,420.98	
Formwork to elevated slab soffits	m2	6	R	418.12	R	2,435.12	
Formwork to walls	m2	3616		212.94	R	770,067.02	
Formwork to pockets	m2	139.27	R	428.13	R	59,626.80	
High tensile steel reinforcement	t	712	R	8,650.00	R	6,157,778.95	
Supply and cast in steel	kg	3234	R	162.24	R	524,644.16	
Galvanised rectagrid	m2	75	R	542.12	R	40,639.20	
HD bolts	kg	1973.26	R	198.75	R	392,185.77	
Grout	m3	5.50	R	11,938.15	R	65,627.35	

Description	Unit	Quantity	Rate	Cost	Total

O **MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE**

Restricted base excavation	m3	2541	R	100.00	R	254,062.24	R 12,963,606.30
Working space	m2	1777	R	115.22	R	204,788.84	
Backfill	m3	830	R	300.96	R	249,873.86	
Mass concrete blinding	m2	1410	R	78.41	R	110,546.76	
Concrete bases	m3	2992	R	1,150.00	R	3,440,800.00	
Concrete column	m3	517	R	1,150.00	R	594,056.71	
Concrete beam	m3	104	R	1,150.00	R	119,675.72	
Concrete elevated slabs	m3	75	R	1,150.00	R	86,310.59	
Wood float	m2	2248	R	10.37	R	23,308.91	
Formwork bases	m2	764	R	196.25	R	149,990.64	
Formwork columns	m2	3728	R	208.37	R	776,707.02	
Formwork beams	m2	444	R	148.35	R	65,873.52	
Formwork beam soffits	m2	185	R	355.13	R	65,604.64	
Formwork to elevated slab soffits	m2	166	R	425.21	R	70,424.38	
Formwork to pockets	m2	156	R	451.24	R	70,172.86	
High tensile steel reinforcement	t	380.71	R	8,650.00	R	3,293,171.41	
Supply and cast in steel	kg	17868	R	158.31	R	2,828,750.26	
Galvanised rectagrid	m2	104	R	539.13	R	56,272.38	
HD bolts	kg	2150	R	207.22	R	445,576.04	
Grout	m3	4.62	R	12,482.98	R	57,639.51	

Description	Unit	Quantity	Rate	Cost	Total

P **BUILDINGS - CONCRETE WITH BRICK IN-FILL**

Earthworks	m3	962	R	100.00	R	96,193.24	R 8,837,477.24
Blinding	m2	1740	R	47.97	R	83,450.53	
Concrete	m3	1506	R	1,150.00	R	1,731,900.00	
Rod reinforcement	t	98	R	8,650.00	R	844,148.52	
Mesh reinforcement	m2	1973	R	45.56	R	89,912.75	
Rough formwork	m2	76	R	169.52	R	12,934.82	
Smooth formwork	m2	4364	R	216.69	R	945,606.73	
Finish to concrete	m2	3699	R	12.03	R	44,503.35	
Construction joint	m	1776	R	63.10	R	112,077.62	
Movement joint	m	611	R	152.39	R	93,174.03	
Cast in steel	kg	476	R	24.95	R	11,866.69	
Grout	m3	4	R	9,870.68	R	35,381.67	
Brick wall	m2	2337	R	550.00	R	1,285,476.62	
Waterproofing membrane	m2	1819	R	14.35	R	26,100.98	
Waterproofing to flat roofs	m2	0	R	197.26	R	-	
Roof construction and covering	m2	1619.94	R	460.84	R	746,527.96	
Ceilings	m2	363	R	383.83	R	139,283.72	
Metalwork	Item	1	R	317,592.32	R	317,592.32	
Doors and windows	No	24	R	9,789.19	R	231,232.59	
Floor finishes	m2	842	R	268.68	R	226,135.17	
Wall finishes	m2	874	R	207.09	R	180,943.98	
Structural steel (excl roof)	Item	1	R	743,899.83	R	743,899.83	
Plumbing and drainage	Item	1	R	207,649.54	R	207,649.54	
Small power and lighting	Item	1	R	595,131.53	R	595,131.53	
External works	Item	1	R	36,353.03	R	36,353.03	

THE USE OF RATIO CONCEPTUAL COST ESTIMATION FOR PETROCHEMICAL CONSTRUCTION PROJECTS IN SOUTH AFRICA

by

WILLEM PETRUS SMITH

submitted in accordance with the requirements for the degree of

PHILOSOPHIAE DOCTOR

in the

FACULTY OF NATURAL SCIENCES

DEPARTMENT OF QUANTITY SURVEYING AND CONSTRUCTION MANAGEMENT

at the

UNIVERSITY OF THE FREE STATE

2011

PROMOTER: PROF. H. J. MARX

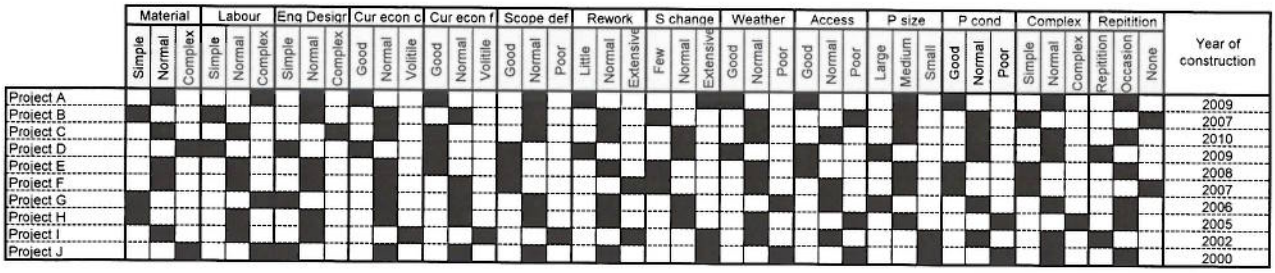
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ADDENDUM G - COST SUMMARY OF SAMPLE PROJECTS

	Ratio utilised	Project A	Project B	Project C	Project D	Project E	Project F	Project G	Project H	Project I	Project J
1	Mean	R 209,261,437.98	R 166,384,928.67	R 206,501,522.65	R 370,075,439.40	R 162,559,754.50	R 142,637,260.46	R 282,528,735.75	R 117,210,275.72	R 43,413,887.39	R 41,947,031.65
2	Median	R 222,404,719.07	R 179,383,034.79	R 226,907,113.97	R 406,406,821.43	R 178,465,292.26	R 157,059,770.84	R 309,703,045.40	R 128,211,866.55	R 47,630,424.05	R 45,935,662.27
3	Variable - mean	R 209,118,300.59	R 166,520,280.54	R 206,061,111.64	R 357,414,565.30	R 162,062,162.10	R 144,502,633.52	R 278,242,496.63	R 115,705,770.68	R 43,261,594.10	R 41,738,717.34
4	Variable - median	R 217,324,800.09	R 178,195,671.30	R 224,539,545.19	R 373,500,543.51	R 176,461,519.33	R 155,809,290.54	R 301,254,229.72	R 126,432,596.88	R 46,629,028.35	R 44,757,894.11
	Actual cost	192,445,336.00	182,445,332.00	189,445,223.00	323,552,665.00	222,458,774.00	138,442,665.00	345,885,442.00	147,225,124.00	55,425,112.00	39,445,221.00
	Variance between actual cost and estimated cost when specific ratio is applied										
1	Mean	8.74%	-8.80%	9.00%	14.38%	-26.93%	3.03%	-18.32%	-20.39%	-21.67%	6.34%
2	Median	15.57%	-1.68%	19.77%	25.61%	-19.78%	13.45%	-10.46%	-12.91%	-14.06%	16.45%
3	Variable - mean	8.66%	-8.73%	8.77%	10.47%	-27.15%	4.38%	-19.56%	-21.41%	-21.95%	5.81%
4	Variable - median	12.93%	-2.33%	18.52%	15.44%	-20.68%	12.54%	-12.90%	-14.12%	-15.87%	13.47%

Average accuracy findings

1	Mean	-5.46%	calculated over all ten projects
2	Median	3.20%	calculated over all ten projects
3	Variable - mean	-6.07%	calculated over all ten projects
4	Variable - median	0.70%	calculated over all ten projects



	Material			Labour			Eng Design			Cur econ c			Cur econ f			Scope def			Rework			S change			Weather			Access			P size			P cond			Complex			Repitition			Year of construction
	Simple	Normal	Complex	Simple	Normal	Complex	Simple	Normal	Complex	Good	Normal	Volitile	Good	Normal	Volitile	Good	Normal	Poor	Little	Normal	Extensive	Few	Normal	Extensive	Good	Normal	Poor	Good	Normal	Poor	Large	Medium	Small	Good	Normal	Poor	Simple	Normal	Complex	Repitition	Occasion	None	
Project A		■				■			■	■				■				■			■			■	■		■			■			■			■			■			2009
Project B	■			■				■			■			■				■		■		■			■						■			■			■			■	2007
Project C		■			■				■			■						■			■		■			■			■			■			■			■			2010
Project D			■	■				■			■				■		■		■					■		■		■			■			■			■			■		2009
Project E		■			■				■			■			■		■			■			■			■		■			■			■			■			■		2008
Project F																																									2007
Project G	■				■			■				■		■			■			■			■				■			■			■			■			■		2006
Project H		■			■				■			■			■		■			■			■			■			■			■			■			■			2005
Project I		■			■			■				■			■		■			■			■			■			■			■			■			■			2002
Project J			■			■			■			■		■			■			■			■			■			■			■			■			■			2000

Key:

1	Material	Type of material used
2	Labour	Availibility of labour and skills at the time of construction
3	Eng design	Complexity of the engineering design
4	Cur econ c	Current economic conditions - at the time of construction
5	Cur econ f	Current economic factors - at the time of construction
6	Scope def	Level of scope definition at the time of construction
7	Rework	Amount of rework that was done on the project
8	S change	Level of scope changes that occurred
9	Weather	General weather conditions at the time of construction
10	Access	Access to the site when project was excecuted
11	P size	Size of the project
12	P cond	General conditions at the time of construction
13	Complex	Complexity of the project in general
14	Repitition	Level of repitition work that occurred

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
QUANTITY RATIOS																										
AB-Q1	2.18	2.20	2.25	2.21	2.14	2.16	2.27	2.20	2.07	2.02	2.20	2.21	2.27	2.20	2.17	2.20	2.19	2.19	2.15	2.20	2.35	2.29	2.11	2.14	2.28	2.24
AB-Q2	1.15	1.12	1.16	1.16	1.14	1.12	1.17	1.16	1.10	1.13	1.16	1.12	1.16	1.12	1.22	1.19	1.14	1.12	1.12	1.12	1.21	1.24	1.13	1.12	1.16	1.13
AB-Q3	1.73	1.62	1.91	1.98	1.67	1.55	1.80	1.69	1.63	1.65	1.75	1.60	1.78	1.63	1.62	1.53	1.75	1.67	1.71	1.46	1.96	1.93	1.68	1.55	1.68	1.54
AB-Q4	1.78	1.71	1.93	2.04	1.72	1.69	1.86	1.71	1.82	1.83	1.79	1.73	1.70	1.69	1.76	1.61	1.81	1.76	1.70	1.58	1.95	1.92	1.75	1.69	1.75	1.70
AC-Q1	1.50	1.48	1.39	1.47	1.55	1.57	1.49	1.58	1.63	1.37	1.45	1.48	1.54	1.57	1.30	1.24	1.51	1.48	1.53	1.57	1.42	1.57	1.50	1.47	1.59	1.52
AC-Q2	18.41	19.43	18.12	19.08	18.62	19.55	18.34	20.44	18.32	18.19	18.39	19.45	18.61	19.40	16.11	15.89	18.59	19.45	18.80	20.53	17.62	18.58	18.45	19.43	19.05	19.69
AC-Q3	0.93	0.93	0.85	0.70	0.98	1.00	0.81	0.80	1.02	0.97	0.92	0.96	0.88	0.68	1.05	1.12	0.94	0.96	0.84	0.67	0.78	0.72	0.97	1.00	0.95	0.84
AC-Q4	0.15	0.14	0.16	0.15	0.15	0.14	0.15	0.14	0.17	0.14	0.15	0.13	0.15	0.15	0.15	0.13	0.15	0.14	0.17	0.15	0.18	0.17	0.15	0.13	0.15	0.14
AC-Q5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
AC-Q6	0.53	0.55	0.52	0.55	0.53	0.56	0.55	0.56	0.53	0.54	0.52	0.55	0.57	0.56	0.44	0.42	0.53	0.55	0.57	0.59	0.54	0.55	0.52	0.55	0.56	0.56
AC-Q7	1.84	1.65	1.72	1.62	1.86	1.81	1.94	1.61	1.87	1.62	1.77	1.63	2.08	2.18	1.67	1.62	1.85	1.65	1.86	1.89	1.91	1.82	1.81	1.62	1.85	1.76
AC-Q8	1.63	1.57	1.78	1.76	1.58	1.56	1.63	1.56	1.62	1.64	1.63	1.56	1.62	1.56	1.50	1.58	1.64	1.57	1.64	1.66	1.50	1.51	1.64	1.63	1.69	1.63
AC-Q9	0.36	0.38	0.41	0.40	0.35	0.31	0.34	0.31	0.35	0.35	0.37	0.39	0.34	0.31	0.37	0.39	0.36	0.38	0.34	0.31	0.33	0.31	0.36	0.38	0.37	0.38
AC-Q10	0.18	0.17	0.16	0.15	0.19	0.17	0.18	0.18	0.20	0.19	0.17	0.16	0.19	0.20	0.19	0.19	0.18	0.16	0.19	0.18	0.19	0.20	0.18	0.16	0.19	0.18
AC-Q11	14.29	14.65	14.11	14.66	14.31	14.93	14.49	14.61	14.58	14.64	14.30	14.92	13.88	14.66	12.74	12.80	14.51	15.21	14.19	14.65	12.91	13.12	14.17	14.65	16.08	15.29
AC-Q12	1.32	1.16	1.29	1.16	1.36	1.16	1.23	1.16	1.38	1.23	1.30	1.16	1.32	1.16	1.38	1.16	1.31	1.16	1.31	1.16	1.37	1.16	1.30	1.16	1.33	1.23
AC-Q13	0.15	0.16	0.15	0.15	0.16	0.16	0.15	0.14	0.15	0.15	0.15	0.16	0.15	0.16	0.14	0.14	0.16	0.16	0.15	0.15	0.14	0.15	0.16	0.16	0.16	0.16
AC-Q14	0.07	0.08	0.07	0.07	0.07	0.08	0.07	0.08	0.07	0.07	0.07	0.08	0.07	0.08	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.07	0.08	0.07	0.07
AC-Q15	99.34	93.50	102.91	98.50	97.76	89.75	104.77	109.00	95.28	87.75	99.01	93.08	105.40	114.50	103.96	91.50	95.08	89.33	112.44	130.00	112.35	120.50	92.24	76.33	112.07	101.25
AC-Q16	258.87	255.00	241.89	241.00	264.32	263.00	264.43	255.00	278.38	274.50	254.13	253.00	256.86	252.00	245.00	222.50	257.59	253.00	269.56	269.00	234.25	241.00	260.66	253.00	277.00	283.50
AC-Q17	1.25	1.19	1.22	1.19	1.29	1.30	1.16	1.13	1.21	1.14	1.29	1.30	1.16	1.22	1.16	1.13	1.28	1.28	1.22	1.19	1.21	1.16	1.26	1.19	1.30	1.32
AD-Q1	0.15	0.14	0.15	0.15	0.15	0.14	0.13	0.14	0.14	0.12	0.15	0.14	0.15	0.15	0.15	0.14	0.15	0.14	0.15	0.15	0.14	0.14	0.15	0.14	0.16	0.15
AD-Q2	0.13	0.09	0.14	0.12	0.13	0.09	0.11	0.08	0.13	0.08	0.13	0.11	0.11	0.08	0.17	0.17	0.13	0.09	0.13	0.08	0.14	0.09	0.14	0.11	0.10	0.08
AD-Q3	0.55	0.49	0.58	0.56	0.56	0.49	0.49	0.47	0.50	0.50	0.57	0.49	0.53	0.52	0.49	0.50	0.56	0.50	0.54	0.46	0.59	0.52	0.55	0.49	0.51	0.49
AD-Q4	0.26	0.20	0.29	0.20	0.25	0.20	0.19	0.16	0.25	0.23	0.26	0.20	0.24	0.19	0.26	0.20	0.26	0.20	0.25	0.20	0.23	0.18	0.27	0.20	0.25	0.20
AD-Q5	0.42	0.36	0.43	0.38	0.43	0.36	0.33	0.35	0.43	0.37	0.41	0.36	0.46	0.35	0.38	0.32	0.42	0.36	0.42	0.37	0.33	0.31	0.44	0.37	0.41	0.33
AD-Q6	1.65	1.50	1.52	1.50	1.75	1.48	1.43	1.35	1.51	1.35	1.61	1.50	1.96	1.50	1.53	1.56	1.69	1.45	1.57	1.45	1.45	1.43	1.64	1.41	1.87	1.56
AD-Q7	2.23	1.94	2.31	1.68	2.20	1.94	2.34	2.24	2.58	2.44	2.16	1.81	2.14	1.51	1.58	1.53	2.26	1.97	2.41	2.22	2.24	1.98	2.30	2.00	1.97	1.50
AD-Q8	3.86	3.89	3.75	3.89	3.95	3.90	3.65	3.89	3.96	4.08	3.82	3.88	3.94	4.16	3.64	3.72	3.88	3.89	3.90	4.00	3.47	3.41	4.02	4.00	3.68	3.71
AD-Q9	4.74	4.34	5.29	4.65	4.42	4.17	5.41	4.79	5.31	4.54	4.56	4.24	4.87	4.47	3.94	3.90	4.77	4.40	5.01	4.34	4.79	4.72	4.84	4.34	4.35	4.28
AD-Q10	0.83	0.78	0.79	0.68	0.86	0.88	0.72	0.68	0.87	0.85	0.83	0.86	0.78	0.67	0.87	0.83	0.82	0.75	0.86	0.93	0.76	0.72	0.85	0.88	0.86	0.88
AD-Q11	1.02	0.99	0.96	0.99	1.06	1.06	0.92	0.81	1.07	1.02	1.00	0.99	1.05	0.99	0.87	0.88	1.05	1.01	1.00	0.91	0.93	0.91	1.02	0.99	1.12	1.09
AD-Q12	0.97	1.00	0.90	0.89	1.00	0.98	0.99	1.07	1.18	1.08	0.92	0.93	0.99	1.00	0.86	0.79	0.96	1.00	1.06	1.00	0.94	0.96	0.98	1.00	0.97	1.01
AD-Q13	0.96	0.93	0.94	0.93	0.97	0.93	0.97	0.93	1.10	0.93	0.93	0.93	0.95	0.93	0.93	0.93	0.97	0.93	0.94	0.93	0.90	0.93	0.99	0.93	0.92	0.93
AD-Q14	0.15	0.15	0.14	0.14	0.15	0.17	0.18	0.21	0.18	0.20	0.14	0.14	0.18	0.21	0.12	0.11	0.15	0.16	0.17	0.20	0.17	0.19	0.15	0.14	0.17	0.19
AD-Q15	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AD-Q16	1.83	1.61	1.46	1.43	1.89	1.85	2.13	1.99	2.23	2.02	1.73	1.47	1.78	1.60	1.76	1.57	1.82	1.91	1.90	1.49	1.65	1.55	1.92	1.78	1.69	1.67
AE-Q1	5.02	4.88	5.17	5.06	5.00	4.80	4.78	4.74	4.81	4.63	5.13	5.04	4.76	4.72	5.48	5.62	5.06	5.01	4.67	4.59	4.99	4.88	5.03	5.00	5.02	4.81
AE-Q2	0.13	0.13	0.12	0.11	0.13	0.14	0.13	0.14	0.13	0.14	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.13	0.13	0.14	0.13	0.14	0.13	0.13	0.14	0.14
AE-Q3	7.26	6.92	8.44	8.84	6.81	6.26	7.35	6.96	6.64	5.91	7.50	6.95	6.93	6.93	7.13	7.16	7.39	6.91	6.86	6.96	6.45	5.90	7.42	6.93	7.47	7.68
AE-Q4	0.83	0.80	0.92	0.89	0.79	0.76	0.87	0.89	0.83	0.78	0.82	0.81	0.86	0.82	0.83	0.84	0.82	0.80	0.87	0.82	0.82	0.80	0.83	0.81	0.84	0.82
AE-Q5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AE-Q6	585.35	607.27	619.54	716.44	591.78	612.09	543.19	549.81	544.49	578.73	586.35	612.14	627.73	716.44	511.95	519.04	575.97	550.37	651.29	716.94	692.82	741.35	559.63	549.81	571.08	662.38
AE-Q7	4.00	3.64	4.01	3.64	3.94	3.57	4.10	3.50	3.93	3.72	4.00	3.57	4.09	3.65	3.82	3.78	4.16	3.66	3.52	2.92	3.03	2.49	4.38	4.94	3.60	3.45
AE-Q8	2.22	2.10	2.53	2.56	2.11	2.01	2.21	1.99	2.15	2.03	2.26	2.22	2.11	2.00	2.21	2.20	2.22	2.06	2.22	2.14	2.06	1.99	2.25	2.34	2.27	2.18
AF-Q1	12.72	12.12	11.79	11.30	12.85	12.13	13.71	12.95	13.18	12.49	12.59	12.12	12.79	12.12	10.46	10.49	12.81	12.13	13.41	12.12	13.08	12.11	12.39	12.12	13.58	12.54
AF-Q2	1.50	1.42	1.54	1.49	1.52	1.45	1.45	1.42	1.74	1.55	1.50	1.42	1.24	1.04	1.89	1.92	1.48	1.45	1.42	1.42	1.53	1.46	1.51	1.48	1.45	1.21
AF-Q3	0.59	0.56	0.65	0.57	0.58	0.56	0.56	0.50	0.50	0.46	0.61	0.57	0.62	0.56	0.64	0.69	0.59	0.55	0.55	0.54	0.63	0.56	0.55	0.52	0.68	0.65
AF-Q4	0.45	0.43	0.45	0.42	0.44	0.42	0.48	0.51	0.40	0.36	0.47	0.45	0.45	0.42	0.45	0.41	0.45	0.43	0.47	0.45	0.48	0.49	0.45	0.42	0.45	0.42
AF-Q5	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.05	0.04	0.04	0.05	0.05	0.03	0.03	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.05
AF-Q6	0.83	0.71	0.88	0.71	0.84	0.86	0.68	0.65	0.81	0.83	0.84	0.73	0.81	0.71	0.96	0.96	0.81	0.71	0.85	0.71	0.79	0.69	0.84	0.71	0.87	0.90
AF-Q7	0.10	0.11	0.09	0.10	0.10	0.11	0.09	0.09	0.10	0.11	0.09	0.10	0.12	0.13	0.08	0.06	0.10	0.11	0.10	0.11	0.09	0.10	0.10	0.11	0.10	0.11
AF-Q8	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.01
AF-Q9	0.70	0.61	0.74	0.61	0.68	0.64	0.67	0.53	0.77	0.75	0.71	0.62	0.56	0.49	0.83	0.77	0.68	0.57	0.70	0.54	0.74	0.50	0.69	0.63	0.69	0.65
AF-Q10	1.69	1.73	1.64	1.73	1.77	1.76	1.52	1.47	1.84	1.90	1.65	1.70	1.71	1.73	1.70	1.69	1.71	1.74	1.61	1.58	1.62	1.66	1.71	1.73	1.70	1.75
AF-Q11	12.63	11.18	14.22	11.55	11.86	11.15	13.44	10.13	14.93	12.50	12.65	11.43	9.91	9.27	13.89	12.61	12.39	10.91	12.93	12.53	12.55	10.58	12.98	12.53	11.43	10.18
AF-Q12	5.81	5.67	6.91	7.00	5.55	5.50	5.30	5.00	5.25	4.67	5.78	5.67	6.60	6.00	5.58	5.50	5.83	5.67	5.87	6.00	5.31	5.50	5.78	6.00	6.44	5.58
AF-Q13	0.12	0.08	0.08	0.08	0.13	0.09	0.11	0.08	0.13	0.08	0.13	0.09	0.08	0.08	0.16	0.14	0.12	0.09	0.09	0.08	0.11	0.10	0.12	0.08	0.13	0.08
AF-Q14	10.68	9.37	10.20	9.81	10.88	9.29	9.20	7.56	11.82	10.77	10.93	9.33	8.30	9.03	13.45	14.17	10.68	9.25	9.44	9.37	10.22	8.41	10.60	9.45	11.42	9.36
AF-Q15	0.46	0.45	0.45	0.46	0.46	0.45	0.45	0.45	0.42	0.40	0.46	0.46	0.49	0.51	0.62	0.56	0.43	0.45	0.48	0.51	0.46	0.46	0.46	0.45	0.45	0.43
AF-Q16	0.43	0.44	0.42	0.47	0.43	0.44	0.41	0.43	0.38	0.38	0.43	0.44	0.47	0.47	0.37	0.39	0.44	0.46	0.40	0.40	0.43	0.46	0.42	0.42	0.46	0.49
AF-Q17	0.08	0.08	0.10	0.07	0.08	0.08	0.09	0.09	0.11	0.10	0.07	0.07	0.09	0.08	0.09	0.09	0.08	0.07	0.08	0.08	0.09	0.08	0.08	0.07	0.09	0.08
AG-Q1	1.69	1.61	1.74	1.69	1.66	1.51	1.75	1.61	1.57	1.37	1.72	1.61	1.70	1.73	1.84	1.88	1.65	1.51	1.77	1.73	1.69	1.27	1.71	1.67	1.64	1.61
AG-Q2	0.38	0.33	0.45	0.30	0.37	0.33	0.37	0.33	0.40	0.41	0.38	0.32	0.38	0.27	0.43	0.45	0.37	0.31	0.40	0.36	0.41	0.35	0.39	0.33	0.33	0.31
AG-Q3	4.42	3.97	4.56	4.77	4.32	3.93	4.39	3.68	4.18	4.34	4.49	3.95	4.37	4.13	4.60	4.35	4.48	4.10	4.11	3.44	4.26	3.80	4.50	4.07	4.27	4.32
AG-Q4	1.01	0.93	1.12	1.03	1.01	0.94	0.91	0.80	1.18	1.03	0.96	0.89	1.05	0.84	0.98	0.95	1.03	0.91	0.97	1.01	0.90	0.76	1.07	1.02	0.90	0.84
AG-Q5	2.29	2.01	2.10	1.68	2.46	2.06	1.94	2.04	3.23	3.29	2.12	1.98	1.93	2.01	2.17	1.87	2.34	2.02	2.15	1.63	2.13	2.00	2.37	2.04	2.14	1.85
AG-Q6	0.47	0.46	0.57	0.60	0.42	0.45	0.50	0.47	0.39	0.37	0.48	0.47	0.51	0.48	0.52	0.53	0.47	0.46	0.45	0.48	0.49	0.48	0.47	0.46	0.46	0.45
AG-Q7	1.01	0.93	1.12	1.03	1.01	0.94	0.91	0.80	1.18	1.03	0.96	0.89	1.05	0.84	0.98	0.95	1.03	0.91	0.97	1.01	0.90	0.76	1.07	1.02	0.90	0.84
AG-Q8	0.49	0.47	0.47	0.48	0.49	0.46	0.56	0.58	0.60	0.71	0.46	0.44	0.53	0.58	0.44	0.46	0.50	0.47	0.48	0.54	0.60	0.57	0.48	0.45	0.43	0.44
AG-Q9	0.58	0.53	0.58	0.56	0.56	0.52	0.62	0.55	0.41	0.48	0.61	0.53	0.67	0.61	0.63	0.62	0.58	0.53	0.57	0.53	0.60	0.60	0.59	0.52	0.54	0.52
AG-Q10	10.00	10.15	10.88	9.95	9.94	10.24	8.85	8.22	8.33	8.58	10.45	10.39	9.96	10.66	10.85	10.99	10.42	10.32	8.11	6.89	10.66	10.62	10.16	10.17	8.74	8.30
AG-Q11	0.11	0.10	0.11	0.10	0.11	0.11	0.10	0.10	0.10	0.10	0.11	0.10	0.11	0.11	0.10	0.10	0.11	0.11	0.10	0.10	0.12	0.11	0.10	0.10	0.11	0.12
AG-Q12	0.08	0.08	0.08	0.06	0.08	0.08	0.08	0.07	0.06	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.08	0.07	0.07	0.07	0.09	0.09	0.08	0.07	0.08	0.08
AG-Q13	34.52	33.79	39.91	37.73	33.36	32.63	30.97	29.09	27.50	20.20	35.84	34.20	36.91	33.88	32.54	32.81	33.09	32.63	40.51	44.00	38.88	35.90	34.04	33.88	31.91	30.91
AH-Q1	5.84	5.54	6.38	5.54	5.91	5.62	4.88	4.56	5.88	6.26	5.93	5.56	5.38	5.13	6.43	6.12	5.83	5.54	5.61	5.25	4.36	4.19	5.94	5.65	6.96	7.27

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AH-Q2	4.36	3.95	5.04	3.97	4.29	3.97	3.77	3.59	4.44	3.71	4.44	4.07	3.91	3.85	5.22	4.11	4.42	4.05	3.75	3.84	3.42	3.40	4.15	3.83	6.06	5.24
AH-Q3	1.38	1.34	1.32	1.24	1.38	1.34	1.41	1.34	1.31	1.21	1.47	1.37	1.09	0.92	1.97	2.12	1.34	1.33	1.27	1.13	1.15	1.11	1.43	1.40	1.44	1.34
AH-Q4	0.75	0.70	0.74	0.67	0.71	0.69	0.97	0.99	0.76	0.71	0.76	0.72	0.74	0.58	0.78	0.73	0.73	0.69	0.81	0.74	0.93	0.94	0.72	0.70	0.70	0.66
AH-Q5	2.86	2.55	2.76	2.40	2.73	2.44	3.37	3.33	2.92	2.92	2.94	2.55	2.47	1.92	2.82	2.61	2.84	2.55	2.97	2.68	3.36	3.45	2.63	2.55	3.21	2.82
AH-Q6	0.57	0.56	0.54	0.53	0.55	0.54	0.64	0.63	0.52	0.53	0.58	0.57	0.57	0.54	0.62	0.61	0.55	0.55	0.59	0.56	0.71	0.70	0.54	0.53	0.52	0.49
AH-Q7	4.11	3.73	4.24	4.00	3.83	3.58	5.11	5.62	3.54	3.13	4.43	3.88	3.36	2.88	3.88	3.73	4.12	3.58	4.16	4.00	4.49	3.88	3.94	3.73	4.32	3.27
AH-Q8	19.22	19.00	21.44	22.00	17.12	14.83	23.18	19.50	20.00	19.58	19.33	19.13	17.85	17.00	22.00	22.63	19.03	19.17	18.62	15.67	20.85	19.92	18.89	18.67	18.74	19.33
AH-Q9	2.67	2.44	2.81	2.52	2.52	2.39	3.07	2.40	3.23	3.45	2.42	2.29	3.09	2.33	2.93	2.77	2.58	2.35	2.86	2.33	2.86	2.22	2.60	2.52	2.70	2.35
AH-Q10	0.25	0.25	0.27	0.26	0.25	0.26	0.26	0.25	0.26	0.26	0.24	0.25	0.29	0.25	0.26	0.26	0.26	0.26	0.23	0.20	0.23	0.20	0.25	0.26	0.28	0.25
AH-Q11	0.42	0.39	0.37	0.30	0.41	0.39	0.46	0.40	0.41	0.33	0.42	0.39	0.40	0.39	0.45	0.41	0.40	0.39	0.46	0.41	0.51	0.50	0.40	0.36	0.37	0.35
AH-Q12	0.35	0.34	0.35	0.35	0.34	0.34	0.34	0.28	0.38	0.35	0.34	0.34	0.36	0.36	0.41	0.40	0.34	0.34	0.34	0.35	0.38	0.36	0.36	0.35	0.29	0.26
AH-Q13	0.12	0.11	0.10	0.11	0.13	0.12	0.12	0.11	0.12	0.11	0.12	0.11	0.12	0.11	0.13	0.12	0.12	0.11	0.13	0.12	0.12	0.13	0.12	0.11	0.13	0.12
AH-Q14	0.11	0.10	0.12	0.12	0.11	0.11	0.11	0.09	0.11	0.10	0.11	0.10	0.13	0.11	0.12	0.11	0.12	0.11	0.10	0.09	0.11	0.10	0.12	0.11	0.10	0.10
AH-Q15	4.07	3.83	4.08	4.18	4.12	3.68	3.98	4.18	4.13	4.00	4.26	4.18	3.21	3.04	3.66	3.47	4.18	4.18	3.89	3.78	3.46	3.38	4.29	4.18	3.91	4.00
AH-Q16	2.17	2.05	2.20	2.14	2.23	2.06	2.03	1.93	2.18	2.14	2.17	1.99	2.18	2.07	2.08	2.03	2.23	2.03	2.01	2.07	1.68	1.67	2.18	2.02	2.65	2.56
AH-Q17	0.23	0.22	0.28	0.25	0.22	0.22	0.19	0.16	0.21	0.18	0.23	0.22	0.24	0.23	0.26	0.27	0.22	0.20	0.23	0.23	0.21	0.22	0.23	0.22	0.24	0.24
AH-Q18	23.09	22.12	27.49	25.35	22.16	21.94	20.66	19.52	24.83	22.44	21.75	21.53	26.86	25.35	26.51	24.94	22.46	21.65	23.83	23.38	22.25	23.23	22.99	22.12	24.31	21.53
AH-Q19	0.16	0.15	0.17	0.15	0.16	0.15	0.18	0.15	0.16	0.15	0.17	0.15	0.13	0.13	0.17	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.16	0.15	0.19	0.18
AH-Q20	0.19	0.19	0.20	0.19	0.18	0.19	0.24	0.18	0.22	0.20	0.18	0.19	0.21	0.19	0.20	0.22	0.19	0.19	0.21	0.15	0.22	0.17	0.18	0.19	0.20	0.20
AH-Q21	0.10	0.09	0.11	0.12	0.09	0.09	0.10	0.09	0.10	0.10	0.09	0.09	0.11	0.12	0.11	0.11	0.09	0.09	0.10	0.10	0.10	0.09	0.10	0.09	0.09	0.09
AH-Q22	204.15	200.00	226.98	202.47	192.83	195.83	213.74	179.55	243.94	231.25	190.43	196.99	217.45	232.17	240.71	229.91	199.81	192.39	203.32	199.21	205.64	170.65	202.64	193.98	208.13	202.33
AH-Q23	0.30	0.29	0.27	0.27	0.31	0.29	0.32	0.33	0.28	0.29	0.31	0.28	0.30	0.29	0.23	0.21	0.31	0.29	0.31	0.29	0.31	0.29	0.28	0.28	0.35	0.35
AH-Q24	0.46	0.44	0.50	0.47	0.46	0.46	0.44	0.44	0.46	0.44	0.48	0.46	0.38	0.37	0.52	0.55	0.47	0.46	0.40	0.34	0.36	0.37	0.49	0.46	0.48	0.47
AI-Q1	3.71	3.28	3.25	2.81	3.67	3.37	4.56	4.02	3.34	3.22	3.61	3.26	4.57	3.94	3.19	3.09	3.76	3.29	3.78	3.43	4.12	3.87	3.63	3.28	3.62	3.18
AI-Q2	0.41	0.30	0.31	0.28	0.43	0.34	0.51	0.55	0.47	0.39	0.39	0.28	0.46	0.51	0.33	0.26	0.41	0.29	0.47	0.49	0.47	0.45	0.42	0.29	0.32	0.29
AI-Q3	2.45	2.36	2.35	2.46	2.41	2.23	2.81	2.83	2.93	3.04	2.32	2.23	2.51	2.48	2.44	2.28	2.41	2.37	2.60	2.65	2.53	2.45	2.44	2.23	2.43	2.55
AI-Q4	0.37	0.40	0.39	0.40	0.37	0.40	0.36	0.41	0.43	0.45	0.35	0.38	0.37	0.40	0.41	0.43	0.35	0.38	0.42	0.45	0.36	0.42	0.38	0.40	0.34	0.40
AI-Q5	5.81	5.73	6.46	5.79	5.74	5.70	5.36	5.08	6.53	5.80	5.53	5.57	6.21	6.17	6.76	5.99	5.59	5.51	6.20	6.31	6.16	6.13	5.89	5.67	5.19	5.76
AI-Q6	0.35	0.35	0.38	0.42	0.36	0.36	0.28	0.32	0.40	0.42	0.35	0.35	0.32	0.32	0.36	0.36	0.35	0.35	0.36	0.38	0.31	0.34	0.37	0.35	0.34	0.35
AI-Q7	0.47	0.49	0.54	0.55	0.47	0.48	0.41	0.36	0.58	0.60	0.45	0.46	0.45	0.44	0.57	0.61	0.46	0.48	0.47	0.52	0.44	0.45	0.49	0.49	0.44	0.50
AI-Q8	0.09	0.09	0.08	0.07	0.09	0.09	0.11	0.10	0.09	0.09	0.09	0.09	0.08	0.09	0.08	0.09	0.09	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08
AI-Q9	9.33	9.11	10.44	10.08	9.20	9.03	8.06	7.95	8.17	9.03	9.71	9.21	9.01	8.74	9.79	9.70	9.49	9.03	8.56	8.89	8.05	8.13	9.50	9.41	9.99	9.03
AI-Q10	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03
AI-Q11	79.73	76.52	77.16	80.15	80.16	71.19	81.11	79.69	80.86	73.64	77.87	75.10	86.41	79.69	90.95	78.85	77.74	74.69	81.81	76.79	79.76	72.92	80.32	79.69	77.57	62.20
AJ-Q1	4.29	3.89	3.64	3.32	4.52	3.91	4.21	3.92	3.58	2.94	4.46	4.19	4.40	3.92	3.21	3.31	4.32	3.89	4.69	3.92	4.76	4.70	4.22	3.77	4.10	4.14
AJ-Q2	0.50	0.45	0.47	0.36	0.52	0.52	0.45	0.45	0.44	0.34	0.49	0.50	0.59	0.46	0.43	0.46	0.50	0.45	0.53	0.45	0.49	0.45	0.51	0.47	0.47	0.36
AJ-Q3	2.66	2.48	2.35	2.39	2.78	2.57	2.52	2.25	2.43	2.29	2.72	2.57	2.66	2.41	2.28	2.37	2.68	2.49	2.73	2.24	2.97	3.20	2.65	2.50	2.37	2.32
AJ-Q4	0.33	0.35	0.38	0.44	0.30	0.30	0.35	0.36	0.38	0.42	0.31	0.30	0.35	0.36	0.43	0.43	0.32	0.31	0.31	0.32	0.32	0.34	0.34	0.35	0.29	0.24
AJ-Q5	2.58	2.36	2.81	3.08	2.45	2.14	2.80	2.70	2.85	2.49	2.54	2.32	2.45	2.36	3.23	3.20	2.63	2.25	2.14	2.08	2.24	1.96	2.75	2.67	2.33	2.25
AJ-Q6	3.63	2.96	4.65	4.95	3.54	3.04	2.60	2.29	4.04	4.41	3.49	2.86	3.76	2.96	4.69	4.50	3.65	2.91	3.10	2.68	2.68	2.56	3.94	3.38	3.44	3.46
AJ-Q7	0.55	0.51	0.60	0.59	0.54	0.50	0.50	0.56	0.50	0.49	0.56	0.52	0.57	0.47	0.65	0.63	0.52	0.49	0.61	0.58	0.47	0.44	0.57	0.56	0.52	0.45
AJ-Q8	0.49	0.45	0.52	0.63	0.48	0.45	0.47	0.42	0.57	0.60	0.47	0.44	0.46	0.42	0.54	0.54	0.50	0.45	0.43	0.42	0.44	0.42	0.50	0.45	0.48	0.49
AJ-Q9	0.11	0.10	0.09	0.08	0.11	0.11	0.13	0.14	0.10	0.08	0.11	0.10	0.10	0.10	0.08	0.08	0.11	0.10	0.12	0.11	0.13	0.14	0.10	0.09	0.10	0.09
AJ-Q10	13.32	12.87	13.37	12.27	13.52	13.28	12.70	12.87	12.43	12.05	13.34	13.28	14.28	13.63	12.87	12.70	13.33	12.84	13.51	12.87	11.99	11.74	13.43	12.87	14.25	13.81
AJ-Q11	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
AJ-Q12	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
AJ-Q13	68.22	67.67	72.93	67.67	68.10	67.87	62.74	61.97	64.63	61.40	67.58	67.68	75.04	69.03	79.51	79.78	69.52	67.70	58.58	67.57	61.16	68.36	68.54	67.61	74.12	68.49
AK-Q1	2.08	2.03	2.17	2.00	2.05	2.03	2.19	2.10	2.05	1.90	2.09	2.03	2.06	1.97	1.87	1.74	2.11	2.03	2.06	1.90	2.15	2.16	2.08	2.00	2.01	2.04
AK-Q2	0.56	0.50	0.61	0.52	0.54	0.51	0.59	0.50	0.55	0.52	0.56	0.48	0.54	0.50	0.49	0.37	0.56	0.48	0.58	0.52	0.65	0.54	0.54	0.47	0.53	0.51
AK-Q3	2.15	2.15	2.03	1.80	2.25	2.18	2.07	2.18	2.10	2.13	2.24	2.19	1.84	1.85	2.01	1.89	2.22	2.16	1.96	2.18	2.11	2.07	2.18	2.15	2.08	2.16
AK-Q4	0.65	0.66	0.62	0.63	0.64	0.67	0.65	0.63	0.56	0.56	0.66	0.68	0.71	0.72	0.76	0.78	0.65	0.67	0.59	0.58	0.64	0.65	0.65	0.63	0.65	0.69
AK-Q5	28.05	27.56	24.79	25.00	29.15	27.78	25.30	28.27	25.56	25.95	28.86	27.19	27.44	30.10	31.79	31.54	27.47	27.78	28.47	24.90	33.79	30.07	27.14	27.00	25.64	24.83
AK-Q6	5.23	4.67	4.97	4.44	5.20	4.69	5.42	4.71	5.05	4.51	5.31	4.69	5.13	5.10	5.35	4.87	5.13	4.64	5.54	5.10	4.88	4.90	5.19	4.59	5.75	4.99
AK-Q7	0.60	0.59	0.61	0.59	0.57	0.57	0.68	0.63	0.57	0.59	0.58	0.58	0.71	0.74	0.55	0.59	0.60	0.58	0.61	0.62	0.68	0.77	0.59	0.59	0.54	0.53
AK-Q8	0.52	0.49	0.44	0.41	0.56	0.52	0.45	0.43	0.50	0.43	0.53	0.49	0.49	0.42	0.58	0.60	0.52	0.49	0.50	0.43	0.47	0.45	0.52	0.49	0.56	0.51
AK-Q9	0.33	0.31	0.32	0.31	0.33	0.31	0.35	0.41	0.37	0.34	0.32	0.31	0.34	0.29	0.35	0.31	0.33	0.32	0.31	0.29	0.39	0.39	0.32	0.31	0.30	0.31
AK-Q10	0.28	0.29	0.28	0.30	0.27	0.26	0.32	0.33	0.28	0.28	0.28	0.28	0.30	0.29	0.26	0.25	0.28	0.29	0.28	0.29	0.26	0.26	0.28	0.27	0.31	0.30
AK-Q11	9.06	8.97	9.84	8.78	8.63	9.00	9.92	9.79	8.54	8.28	9.03	9.00	9.79	9.45	8.31	7.99	9.48	9.15	7.92	7.86	8.20	7.99	9.18	9.03	9.48	9.03
AK-Q12	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04
AK-Q13	108.76	96.76	114.64	114.02	106.25	92.15	112.95	111.37	123.01	100.40	101.66	90.15	122.89	126.79	82.30	79.88	114.26	107.52	100.93	96.76	97.59	92.48	112.36	104.03	106.85	101.69
AL-Q1	2.80	2.62	3.00	2.43	2.75	2.64	2.74	2.62	2.51	2.53	2.74	2.59	3.43	2.74	3.28	2.89	2.69	2.55	2.99	2.66	3.43	3.10	2.76	2.62	2.34	2.29
AL-Q2	0.30	0.25	0.32	0.34	0.29	0.27	0.31	0.25	0.26	0.24	0.29	0.27	0.36	0.35	0.38	0.32	0.28	0.25	0.31	0.32	0.36	0.32	0.29	0.25	0.26	0.23
AL-Q3	2.06	1.91	1.94	1.91	2.08	1.99	2.22	1.76	2.20	2.40	2.03	1.89	2.06	1.85	2.29	2.31	2.01	1.89	2.14	2.04	2.40	2.10	1.99	1.85	1.97	1.86
AL-Q4	0.67	0.68	0.67	0.70	0.68	0.70	0.66	0.65	0.76	0.79	0.68	0.67	0.55	0.49	0.60	0.61	0.69	0.67	0.64	0.77	0.58	0.57	0.70	0.75	0.65	0.57
AL-Q5	1.19	1.08	1.36	1.13	1.19	1.07	1.01	1.05	1.26	1.25	1.21	1.07	1.00	1.05	1.12	1.08	1.21	1.08	1.14	1.05	1.08	1.08	1.18	1.06	1.33	1.06
AL-Q6	2.68	2.50	2.41	2.05	2.64	2.50	3.21	3.50	2.70	2.49	2.66	2.50	2.72	2.38	2.50	2.40	2.80	2.70	2.33	1.89	2.59	2.29	2.73	2.50	2.59	2.85
AL-Q7	2.97	2.76	3.01	2.93	2.94	2.70	3.14	2.80	3.21	3.14	2.99	2.78	2.61	2.66	2.66	2.50	3.12	2.92	2.59	2.58	2.74	2.70	3.04	2.77	2.95	2.77
AL-Q8	0.47	0.44	0.53	0.48	0.46	0.44	0.45	0.41	0.56	0.54	0.46	0.44	0.40	0.32	0.41	0.44	0.49	0.45	0.44	0.43	0.48	0.43	0.47	0.45	0.46	0.40
AL-Q9	0.48	0.45	0.47	0.45	0.48	0.47	0.49	0.45	0.52	0.53	0.48	0.46	0.40	0.36	0.35	0.33	0.50	0.48	0.45	0.45	0.44	0.45	0.49	0.48	0.46	0.44
AL-Q10	0.15	0.14	0.16	0.16	0.15	0.14	0.17	0.15	0.14	0.14	0.16	0.14	0.16	0.16	0.14	0.15	0.16	0.15	0.14	0.14	0.14	0.13	0.15	0.14	0.19	0.17
AL-Q11	0.33	0.32	0.31	0.30	0.34	0.34	0.34	0.31	0.34	0.33	0.33	0.32	0.35	0.31	0.34	0.35	0.32	0.32	0.38	0.34	0.38	0.32	0.32	0.32	0.33	0.35
AL-Q12	0.69	0.68	0.71	0.71	0.71	0.71	0.60	0.61	0.73	0.72	0.67	0.65	0.72	0.70	0.62	0.59	0.69	0.66	0.72	0.80	0.77	0.78	0.66	0.65	0.72	0.71
AL-Q13	10.88	10.42	9.80	10.10	10.52	10.07	13.61	13.67	10.75	8.75	10.73	10.40	11.64	11.40	10.22	10.19	10.73	10.40	11.70	11.40	10.82	9.64	10.84	10.42	11.07	11.52
AL-Q14	9.10	8.81	10.78	10.38	8.81	8.84	8.52	8.68	9.48	9.88	9.03	8.81	8.97	8.63	8.19	8.00	9.33	8.81	8.68	8.81	8.82	8.97	9.00	8.81	9.74	9.56
AL-Q15	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
AL-Q16	1.48	1.43	1.69	1.48	1.41	1.38	1.55	1.51	1.41	1.38	1.42	1.45	1.85	1.66	1.52	1.46	1.48	1.45	1.48	1.43	1.53	1.50	1.49	1.40	1.43	1.45
AL-Q17	505.30	476.47	535.31	479.69	496.31	476.79	513.36	469.41	566.04	525.24	489.79	470.51	502.37	478.69	550.56	458.05	515.07	478.63	450.47	471.60	472.03	461.45	513.75	478.69	507.98	478.08
AM-Q1	3.84	3.71	3.81	3.56	3.83	3.72	3.53	3.63	3.70	3.69	3.90	3.71	3.78	2.96	4.63	3.97	3.87	3.71	3.42	2.94	3.54	3.71	3.92	3.71	3.88	3.72
AM-Q2	0.61	0.58	0.66	0.70	0.62	0.58	0.47	0.46	0.57	0.51	0.62	0.58	0.61	0.48	0.70	0.68	0.61	0.58	0.57	0.48	0.60	0.52	0.60	0.58	0.64	0.57
AM-Q3	1.15	1.15	1.10	1.07	1.15	1.17	1.22	1.09	1.24	1.17	1.14	1.15	1.08	1.12	1.09	1.10	1.15	1.15	1.17	1.17	1.24	1.31	1.10	1.12	1.23	1.19

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AM-Q4	0.61	0.62	0.63	0.65	0.63	0.62	0.57	0.60	0.67	0.65	0.60	0.60	0.61	0.58	0.52	0.57	0.60	0.61	0.70	0.70	0.67	0.69	0.61	0.62	0.59	0.61
AM-Q5	2.44	2.01	2.38	1.93	2.54	2.45	2.20	1.60	2.28	1.92	2.45	1.97	2.57	2.35	1.91	1.93	2.49	2.03	2.51	2.35	2.38	2.18	2.47	2.04	2.40	1.92
AM-Q6	0.84	0.83	0.97	1.09	0.76	0.77	1.08	1.35	1.09	1.14	0.81	0.78	0.72	0.73	0.82	0.87	0.84	0.78	0.89	0.85	0.94	0.91	0.80	0.78	0.91	0.90
AM-Q7	1.68	1.64	1.61	1.64	1.71	1.67	1.70	1.61	1.83	1.85	1.64	1.60	1.65	1.83	1.62	1.71	1.64	1.63	1.85	1.83	1.78	1.63	1.65	1.64	1.65	1.61
AM-Q8	2.50	2.14	2.74	2.28	2.41	2.14	2.55	2.14	2.95	2.66	2.44	2.19	2.20	1.89	2.32	2.34	2.33	2.13	3.16	2.98	2.80	2.59	2.42	2.14	2.47	2.01
AM-Q9	1.10	0.97	1.15	1.38	1.06	0.93	1.23	1.25	1.24	1.38	1.08	0.96	1.04	0.84	1.25	1.18	1.03	0.92	1.30	1.38	1.17	1.12	1.07	0.96	1.16	1.04
AM-Q10	0.64	0.60	0.54	0.57	0.64	0.60	0.75	0.76	0.63	0.64	0.63	0.59	0.68	0.71	0.52	0.50	0.62	0.59	0.76	0.76	0.65	0.58	0.66	0.64	0.56	0.59
AM-Q11	0.41	0.39	0.39	0.34	0.43	0.41	0.39	0.37	0.45	0.41	0.38	0.37	0.50	0.48	0.42	0.42	0.39	0.37	0.48	0.46	0.43	0.41	0.42	0.41	0.37	0.36
AM-Q12	0.17	0.15	0.20	0.21	0.15	0.15	0.20	0.18	0.18	0.16	0.17	0.15	0.16	0.14	0.16	0.15	0.17	0.15	0.18	0.17	0.20	0.19	0.16	0.15	0.19	0.19
AM-Q13	0.30	0.29	0.26	0.22	0.31	0.29	0.29	0.23	0.22	0.21	0.30	0.29	0.38	0.39	0.27	0.25	0.30	0.29	0.30	0.29	0.32	0.32	0.30	0.28	0.27	0.27
AM-Q14	0.84	0.79	0.77	0.78	0.90	0.88	0.66	0.56	0.84	0.73	0.83	0.82	0.85	0.80	0.70	0.69	0.80	0.79	1.03	0.90	0.86	0.87	0.82	0.80	0.87	0.69
AM-Q15	0.31	0.30	0.31	0.30	0.32	0.30	0.29	0.31	0.25	0.21	0.32	0.30	0.33	0.36	0.26	0.25	0.31	0.30	0.33	0.30	0.32	0.33	0.30	0.30	0.33	0.29
AM-Q16	26.55	25.00	27.10	29.00	26.48	24.80	26.33	26.33	30.65	32.88	25.22	24.57	27.53	26.33	23.94	24.00	26.78	25.79	26.86	24.80	31.61	31.83	25.50	24.80	25.28	25.25
AM-Q17	0.13	0.12	0.13	0.13	0.13	0.12	0.15	0.15	0.11	0.11	0.13	0.12	0.16	0.18	0.17	0.17	0.13	0.12	0.12	0.09	0.13	0.12	0.13	0.12	0.14	0.14
AM-Q18	8.87	8.60	8.82	9.63	8.73	8.46	9.52	8.35	9.70	10.42	8.39	8.10	10.02	9.67	7.59	8.26	8.70	8.33	10.04	10.63	9.27	9.58	9.09	8.65	7.70	7.41
AM-Q19	0.22	0.21	0.22	0.21	0.23	0.21	0.22	0.24	0.25	0.24	0.21	0.21	0.23	0.24	0.19	0.17	0.22	0.21	0.24	0.24	0.21	0.21	0.23	0.23	0.19	0.20
AM-Q20	0.41	0.39	0.35	0.34	0.43	0.39	0.44	0.52	0.49	0.49	0.39	0.36	0.42	0.33	0.33	0.33	0.40	0.36	0.48	0.52	0.35	0.28	0.45	0.39	0.33	0.30
AM-Q21	2.58	2.48	2.38	2.62	2.64	2.48	2.47	2.48	2.50	2.58	2.60	2.48	2.60	2.38	2.95	2.90	2.53	2.48	2.62	2.48	3.11	2.65	2.43	2.48	2.61	2.43
AM-Q22	1039.37	994.87	1044.24	994.87	1048.87	984.53	1001.05	873.88	1130.22	1036.19	1013.54	932.50	1046.22	1124.44	806.58	815.35	1043.35	1017.70	1128.67	956.96	1033.46	917.90	1051.34	1003.51	1001.85	886.99
AN-Q1	1.23	1.31	1.16	1.50	1.19	1.24	1.46	1.29	1.10	0.99	1.17	1.27	1.64	1.57	1.67	1.66	1.12	1.27	1.45	1.57	1.33	1.44	1.21	1.29	1.20	1.26
AN-Q2	7.92	7.47	7.15	6.34	7.53	7.06	10.19	10.90	8.14	6.66	7.70	7.87	8.58	7.51	12.00	9.23	6.84	6.81	9.93	10.34	9.77	10.77	7.66	6.74	7.00	8.32
AN-Q3	4.13	4.63	3.70	4.77	3.98	4.55	5.07	4.91	3.52	3.72	4.05	4.63	5.19	4.77	5.39	4.90	3.74	4.62	4.99	5.79	4.21	4.59	4.30	4.63	3.46	4.46
AN-Q4	1.05	1.22	0.67	0.67	1.10	1.24	1.32	1.33	1.02	1.07	1.06	1.22	1.05	1.08	1.24	1.16	0.92	1.17	1.43	1.53	1.11	1.30	1.11	1.22	0.78	0.74
AN-Q5																										
AN-Q6	26.31	28.46	16.86	20.41	26.76	28.61	37.26	34.35	27.50	31.26	25.51	24.92	28.38	28.75	29.87	26.11	24.14	23.97	32.45	30.06	29.66	26.36	26.85	28.75	21.00	24.92
AN-Q7	1.43	1.44	1.15	1.04	1.42	1.46	1.59	1.42	0.98	1.05	1.52	1.47	1.59	1.42	1.80	1.45	1.37	1.45	1.48	1.42	1.50	1.46	1.45	1.38	1.29	1.31
AN-Q8	10.41	11.19	8.29	8.48	10.29	11.23	13.28	12.96	9.20	11.12	10.38	11.22	11.89	12.10	12.47	12.25	9.47	9.40	12.83	12.10	10.97	11.28	10.93	11.84	7.94	8.63
AN-Q9	10.92	11.80	10.35	9.33	10.67	11.90	11.66	10.00	8.99	12.03	10.26	11.08	15.97	13.25	13.56	12.63	9.99	9.47	13.07	12.50	11.60	12.08	11.19	12.00	9.28	8.42
AN-Q10	0.82	0.88	0.56	0.75	0.86	0.96	1.01	1.01	0.82	0.92	0.80	0.84	0.89	0.86	0.75	0.75	0.78	0.87	0.98	0.97	0.84	0.76	0.82	0.89	0.78	0.91
AN-Q11	8.50	8.70	6.54	6.81	8.32	9.04	10.80	8.98	8.47	9.97	8.34	8.05	9.21	8.96	10.92	10.95	7.58	7.29	10.70	11.21	9.87	9.33	8.78	8.98	6.13	6.92
AN-Q12	0.14	0.15	0.11	0.14	0.13	0.15	0.17	0.16	0.12	0.13	0.13	0.15	0.17	0.17	0.15	0.15	0.12	0.14	0.19	0.20	0.15	0.16	0.14	0.14	0.13	0.15
AN-Q13	0.17	0.17	0.16	0.20	0.17	0.18	0.18	0.17	0.18	0.21	0.15	0.16	0.24	0.22	0.21	0.20	0.14	0.16	0.25	0.23	0.17	0.20	0.17	0.17	0.14	0.15
AN-Q14	0.50	0.51	0.42	0.47	0.48	0.50	0.68	0.62	0.47	0.61	0.46	0.46	0.71	0.76	0.55	0.57	0.44	0.46	0.66	0.62	0.48	0.49	0.52	0.59	0.43	0.44
AN-Q15	0.13	0.14	0.11	0.14	0.13	0.14	0.16	0.13	0.10	0.13	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.13	0.16	0.15	0.13	0.14	0.12	0.14	0.15	0.15
AN-Q16	418.49	450.00	286.61	320.20	443.42	501.38	471.56	396.25	414.84	430.38	419.69	484.17	417.53	383.25	484.45	517.90	373.11	417.13	550.53	541.80	417.04	380.50	446.74	508.00	317.55	303.88
AN-Q17	0.10	0.11	0.08	0.11	0.10	0.11	0.13	0.12	0.09	0.10	0.10	0.11	0.13	0.12	0.12	0.12	0.09	0.11	0.13	0.11	0.12	0.12	0.10	0.11	0.09	0.10
AN-Q18	4.05	4.12	2.99	3.32	4.29	4.67	4.63	4.12	3.99	4.32	4.07	4.67	4.04	4.09	4.33	3.59	4.01	4.63	4.09	4.12	4.75	4.77	4.01	3.90	3.50	4.00
AN-Q19	0.15	0.16	0.13	0.16	0.15	0.15	0.19	0.19	0.16	0.18	0.13	0.16	0.20	0.17	0.14	0.13	0.15	0.17	0.14	0.14	0.15	0.16	0.15	0.16	0.13	0.14
AN-Q20	0.22	0.24	0.15	0.16	0.22	0.25	0.31	0.37	0.21	0.26	0.20	0.23	0.30	0.29	0.19	0.20	0.21	0.25	0.24	0.24	0.27	0.29	0.22	0.24	0.16	0.17
AN-Q21	17.15	18.82	14.43	18.75	17.25	18.75	20.86	21.15	17.60	20.98	15.96	18.69	21.73	21.15	22.36	19.34	16.24	18.80	18.07	19.05	18.33	20.20	16.78	18.75	17.29	21.42
AN-Q22	771.45	822.89	633.78	653.47	753.96	841.95	1004.46	880.73	686.05	837.19	800.75	869.34	743.52	751.47	1100.76	883.83	702.62	716.82	869.82	861.02	786.61	730.55	806.64	861.02	628.74	802.37
AO-Q1	1.58	1.48	1.79	1.73	1.52	1.45	1.63	1.53	1.66	1.74	1.50	1.32	1.85	2.06	1.51	1.30	1.52	1.38	1.81	1.85	1.36	1.41	1.63	1.42	1.62	1.56
AO-Q2	0.42	0.38	0.36	0.33	0.39	0.37	0.57	0.54	0.41	0.39	0.41	0.37	0.46	0.38	0.38	0.39	0.42	0.38	0.42	0.37	0.33	0.29	0.44	0.40	0.40	0.32
AO-Q3	2.04	1.98	2.04	1.98	1.93	1.94	2.48	2.28	2.49	2.23	1.89	1.96	2.17	2.05	1.89	2.01	1.92	1.96	2.55	2.81	2.02	1.89	2.04	1.96	2.07	2.03
AO-Q4	4.82	4.71	4.32	3.60	4.75	4.68	5.77	6.23	5.07	5.47	4.88	4.74	4.28	3.60	4.61	5.09	5.09	4.88	3.96	3.66	4.56	4.07	4.93	4.74	4.69	4.23
AO-Q5	6.67	6.03	5.29	4.54	6.77	6.07	7.85	6.82	6.65	5.97	6.75	6.09	6.35	5.86	5.98	6.08	7.09	6.22	5.45	4.55	6.60	5.87	6.87	6.11	6.00	5.15
AO-Q6	1.99	1.73	2.12	1.79	1.94	1.68	1.94	1.67	1.89	1.71	2.05	1.82	1.84	1.60	2.22	2.41	1.89	1.67	2.25	2.00	1.90	1.52	1.97	1.79	2.13	2.01
AO-Q7	35.85	33.33	29.45	24.75	36.34	34.17	40.80	40.50	34.81	35.23	36.11	33.17	35.92	32.25	34.84	34.75	36.90	34.75	32.57	32.25	35.56	33.79	36.38	35.00	34.21	26.10
AO-Q8	24.74	24.00	25.89	24.00	25.14	24.50	21.93	19.50	27.50	28.00	24.15	24.00	24.14	22.00	27.00	26.00	23.73	24.00	27.33	29.00	24.75	23.00	24.59	24.00	25.31	23.50
AO-Q9	4.82	4.62	4.08	4.71	4.81	4.49	5.58	5.04	4.76	4.29	4.95	4.71	4.30	4.15	5.05	4.66	5.13	4.82	3.61	3.53	5.12	4.39	4.76	4.57	4.74	4.83
AO-Q10	1.44	1.43	1.34	1.29	1.44	1.44	1.54	1.50	1.76	1.72	1.38	1.35	1.35	1.45	1.72	1.52	1.42	1.38	1.42	1.47	1.54	1.45	1.39	1.32	1.56	1.55
AO-Q11	0.14	0.13	0.16	0.15	0.14	0.14	0.14	0.12	0.15	0.14	0.14	0.12	0.15	0.14	0.13	0.11	0.13	0.12	0.18	0.20	0.16	0.13	0.14	0.13	0.15	0.13
AO-Q12	0.23	0.23	0.25	0.26	0.23	0.22	0.24	0.22	0.25	0.26	0.22	0.22	0.27	0.25	0.24	0.24	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.22	0.22	0.23
AO-Q13	0.75	0.69	0.70	0.68	0.76	0.69	0.80	0.86	0.71	0.62	0.76	0.83	0.72	0.68	0.65	0.58	0.78	0.83	0.69	0.65	0.83	0.90	0.71	0.65	0.81	0.85
AO-Q14	0.22	0.20	0.21	0.25	0.21	0.20	0.23	0.20	0.20	0.23	0.23	0.23	0.19	0.20	0.23	0.23	0.22	0.20	0.20	0.20	0.20	0.20	0.22	0.20	0.23	0.23
AO-Q15	3.09	2.86	2.34	2.18	3.10	2.86	3.92	3.14	3.18	2.87	3.11	2.96	2.89	2.84	2.78	2.82	3.19	3.00	2.85	2.82	3.37	2.79	2.92	2.87	3.42	3.23
AO-Q16	0.29	0.29	0.33	0.29	0.28	0.29	0.31	0.31	0.34	0.31	0.29	0.29	0.26	0.29	0.25	0.24	0.30	0.29	0.28	0.29	0.28	0.26	0.29	0.29	0.33	0.32
AO-Q17	7.31	7.10	7.42	6.87	7.04	7.05	7.76	7.42	7.21	6.70	7.30	7.16	7.49	7.43	9.44	9.10	7.13	7.07	7.04	6.72	7.02	7.61	7.37	6.96	7.41	7.56
AO-Q18	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
AO-Q19	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.02	0.02
AO-Q20	3.97	3.64	4.34	3.56	3.65	3.58	4.57	5.08	4.20	3.73	4.01	3.79	3.51	3.45	4.35	4.43	3.88	3.67	4.12	3.64	4.16	3.68	3.82	3.64	4.32	3.96
AO-Q21	42.08	40.32	33.22	29.66	43.77	40.59	43.56	44.71	40.73	41.64	44.00	40.59	35.41	32.13	48.36	50.66	41.91	39.69	39.91	41.21	43.00	41.03	43.14	39.38	37.30	36.45
AP-Q1	1.82	1.73	1.85	1.53	1.77	1.72	1.95	2.24	1.71	1.86	1.88	1.74	1.69	1.69	1.75	1.71	1.82	1.72	1.83	1.85	1.72	1.55	1.87	1.74	1.75	1.58
AP-Q2	2.50	2.26	3.00	2.33	2.32	2.13	2.53	2.39	2.37	2.19	2.59	2.29	2.29	2.33	2.74	3.07	2.42	2.14	2.69	2.39	2.28	2.29	2.59	2.28	2.40	2.24
AP-Q3	1.25	1.23	1.27	1.15	1.22	1.20	1.32	1.29	1.11	1.06	1.28	1.24	1.25	1.26	1.34	1.21	1.21	1.14	1.35	1.29	1.24	1.21	1.27	1.23	1.17	1.25
AP-Q4	3.86	3.82	4.01	4.08	3.81	3.81	3.91	3.85	4.50	4.80	3.67	3.75	3.96	3.82	4.36	4.58	3.70	3.75	4.24	4.69	4.05	3.94	3.91	3.82	3.50	2.98
AP-Q5	0.51	0.40	0.47	0.35	0.51	0.45	0.59	0.40	0.60	0.64	0.50	0.43	0.44	0.37	0.69	0.68	0.48	0.40	0.54	0.40	0.56	0.47	0.50	0.40	0.48	0.46
AP-Q6	3.09	2.73	3.04	2.73	3.11	2.71	2.93	2.67	3.36	3.08	2.95	2.68	3.35	3.56	3.27	3.21	3.04	2.71	3.17	3.42	3.20	3.02	3.09	2.73	2.97	2.63
AP-Q7	0.57	0.56	0.54	0.53	0.58	0.56	0.57	0.59	0.50	0.51	0.60	0.59	0.55	0.53	0.70	0.62	0.56	0.54	0.57	0.59	0.61	0.54	0.58	0.59	0.50	0.49
AP-Q8	0.23	0.22	0.26	0.25	0.22	0.22	0.24	0.23	0.24	0.22	0.23	0.23	0.22	0.20	0.26	0.27	0.23	0.23	0.21	0.22	0.26	0.25	0.22	0.21	0.25	0.23
AP-Q9	4.97	4.61	4.69	4.43	5.15	4.81	4.74	4.61	6.03	5.70	4.71	4.45	4.86	5.14	5.30	5.23	4.76	4.55	5.55	6.08	5.12	4.64	4.93	4.72	4.92	4.20
AP-Q10	15.36	14.81	15.40	14.87	15.53	14.76	14.67	14.43	15.93	16.67	14.89	14.84	16.74	14.43	17.24	16.96	14.76	14.69	16.65	15.58	15.99	14.62	14.93	14.87	16.31	15.43
AP-Q11	2.35	2.30	2.23	2.19	2.40	2.39	2.28	2.21	2.44	2.40	2.36	2.28	2.19	2.36	2.44	2.31	2.36	2.26	2.26	2.36	2.34	2.28	2.27	2.26	2.63	2.52
AP-Q12	882.88	803.00	912.90	789.19	859.22	810.36	984.25	847.14	1121.45	967.35	820.38	810.36	878.08	778.89	1090.72	1011.30	831.64	800.96	972.70	925.88	880.07	858.92	888.93	798.91	863.76	826.21
AP-Q13	0.50	0.46	0.46	0.46	0.49	0.46	0.56	0.49	0.54	0.50	0.48	0.46	0.49	0.47	0.55	0.50	0.48	0.46	0.53	0.51	0.52	0.49	0.50	0.46	0.45	0.45
AP-Q14	4.47	4.40	4.50	4.35	4.54	4.57	4.00	4.21	4.15	4.44	4.49	4.35	4.75	4.73	4.35	4.43	4.55	4.38	4.26	4.64	3.73	3.95	4.80	4.68	4.03	3.88
AP-Q15	2.22	2.00	2.32	2.02	2.21	1.98	1.88	1.97	2.26	1.87	2.22	2.00	2.17	2.05	2.65	2.58	2.19	1.98	2.12	2.05	2.03	2.01	2.41	2.00	1.70	1.39
AP-Q16	2.04	1.99	1.97	2.04	2.06	2.00	1.95	1.95	2.22	2.07	1.99	1.96	2.04	2.09	2.47	2.49	1.99	1.98	2.02	1.94	1.77	1.95	2.19	2.09	1.77	1.72
AP-Q17	0.98	0.97	0.98	0.97	0.99	0.96	0.98	0.98	0.97	0.97	0.98	0.97	1.03	0.97	1.03	1.00	0.98	0.97	0.97	0.95	0.92	0.96	0.99	1.00	1.03	0.96
AP-Q18	474.69	434.63	494.56	495.83	462.82	431.36	440.27	410.67	510.33	492.58	449.54	416.49	541.73	560.40	568.80	520.25	449.65	416.49	521.88	515.50	408.85	412.40	497.21	437.50	458.90	430.35

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AP-Q19	1.03	1.00	1.01	1.07	1.03	0.99	0.96	0.97	1.08	1.09	0.99	0.97	1.15	1.16	1.18	1.23	1.03	0.97	0.97	1.00	0.84	0.79	1.10	1.07	0.97	0.96
AP-Q20	1.04	1.01	1.06	0.97	1.03	1.03	0.94	0.91	1.09	1.03	1.00	1.00	1.13	1.29	1.28	1.26	1.02	0.99	0.98	1.00	0.82	0.84	1.12	1.08	0.95	0.94
AP-Q21	9.25	8.63	8.28	7.99	9.66	9.38	9.16	7.88	9.92	9.92	8.99	8.19	9.59	8.85	7.90	7.79	9.20	8.44	10.02	9.77	11.01	9.85	8.71	8.39	9.43	9.09
AQ-Q1	2.37	2.30	2.17	2.02	2.33	2.28	2.84	3.02	2.47	2.36	2.33	2.24	2.39	2.60	2.20	2.02	2.36	2.35	2.47	2.32	2.15	2.14	2.34	2.27	2.66	2.68
AQ-Q2	8.82	8.29	9.08	7.85	8.70	8.31	8.53	8.49	8.62	7.21	9.13	8.49	7.74	7.04	11.08	10.44	8.70	8.12	8.27	8.33	9.79	8.31	8.88	8.33	7.66	5.90
AQ-Q3	0.12	0.11	0.13	0.12	0.12	0.11	0.10	0.10	0.11	0.09	0.12	0.11	0.11	0.10	0.11	0.11	0.12	0.11	0.11	0.11	0.13	0.13	0.11	0.11	0.11	0.08
AQ-Q4	0.40	0.40	0.37	0.33	0.42	0.41	0.40	0.40	0.35	0.30	0.42	0.40	0.39	0.36	0.43	0.43	0.41	0.40	0.37	0.31	0.48	0.52	0.40	0.41	0.33	0.30
AQ-Q5	6.11	5.73	6.76	5.82	5.96	5.78	5.95	5.45	6.75	5.94	6.20	5.90	5.02	5.14	4.87	5.32	6.29	6.02	6.03	5.57	5.75	5.59	6.09	5.57	6.58	6.97
AQ-Q6	0.87	0.83	0.98	1.11	0.80	0.81	0.97	0.97	0.89	0.85	0.87	0.83	0.83	0.77	0.65	0.61	0.90	0.88	0.84	0.82	0.90	0.88	0.88	0.83	0.79	0.72
AQ-Q7	18.83	17.93	22.28	18.30	18.22	17.16	17.25	15.27	24.66	23.43	17.91	17.79	16.11	15.21	15.76	16.91	18.89	17.94	19.99	17.57	20.05	16.00	18.19	17.93	19.94	18.43
AQ-Q8	1.54	1.49	1.65	1.65	1.49	1.49	1.69	1.53	1.63	1.53	1.58	1.50	1.28	1.06	1.04	1.02	1.63	1.60	1.45	1.47	1.63	1.54	1.56	1.47	1.40	1.48
AQ-Q9	405.94	371.00	451.89	380.33	388.82	360.75	426.81	387.33	438.67	446.75	400.21	360.75	393.10	325.67	317.50	329.25	414.92	383.83	413.31	371.00	336.31	338.75	432.43	400.00	379.52	360.67
AQ-Q10	21.95	20.62	22.53	21.30	21.08	20.48	25.12	22.32	24.63	23.54	21.83	20.75	19.36	17.76	17.84	17.24	22.58	20.96	21.53	20.88	24.77	24.37	21.99	20.34	18.96	18.90
AQ-Q11	0.89	0.88	1.06	1.17	0.84	0.83	0.95	0.96	1.03	1.09	0.86	0.84	0.88	0.82	0.55	0.55	0.92	0.97	0.92	0.82	1.02	1.04	0.88	0.90	0.80	0.73
AR-Q1	3.12	2.76	3.94	4.09	3.04	2.57	2.46	2.39	2.69	2.70	3.18	2.59	3.38	2.98	3.34	3.34	3.17	2.84	2.85	2.46	2.21	2.03	3.24	2.96	3.60	3.60
AR-Q2	11.42	10.55	8.64	8.56	12.18	12.25	12.33	12.07	12.62	12.71	11.08	10.73	11.50	8.91	10.54	9.85	11.37	11.45	12.01	8.91	14.26	15.66	10.76	9.52	11.00	12.13
AR-Q3	0.12	0.11	0.10	0.10	0.13	0.12	0.13	0.11	0.12	0.11	0.12	0.11	0.12	0.10	0.11	0.10	0.13	0.11	0.12	0.11	0.15	0.16	0.12	0.11	0.12	0.11
AR-Q4	0.45	0.41	0.38	0.36	0.46	0.44	0.49	0.49	0.48	0.45	0.43	0.40	0.49	0.49	0.38	0.38	0.45	0.40	0.48	0.44	0.49	0.46	0.45	0.41	0.38	0.36
AR-Q5	5.94	5.78	5.14	5.19	5.85	5.71	6.57	6.74	5.43	5.26	6.36	6.18	4.73	3.86	7.04	5.90	5.88	5.86	5.65	5.33	6.95	7.70	5.63	5.56	6.06	5.90
AR-Q6	1.12	1.10	0.93	0.73	1.14	1.11	1.24	1.14	1.01	1.04	1.14	1.10	1.13	1.16	1.14	1.19	1.14	1.09	1.02	1.13	1.15	1.13	1.11	1.07	1.13	0.97
AR-Q7	14.72	14.85	13.26	14.79	14.53	14.24	16.92	18.82	14.49	14.69	15.23	15.26	12.78	12.10	17.38	16.52	14.15	14.59	15.57	14.59	15.93	15.11	14.25	14.79	15.20	14.38
AR-Q8	2.74	2.52	2.94	2.70	2.83	2.59	2.22	2.37	2.44	2.41	2.77	2.50	2.98	2.60	2.23	2.23	2.87	2.55	2.54	2.60	2.90	3.02	2.79	2.46	2.43	1.94
AR-Q9	0.73	0.72	0.73	0.70	0.76	0.73	0.64	0.52	0.59	0.60	0.75	0.72	0.81	0.84	0.67	0.69	0.76	0.73	0.68	0.72	0.68	0.72	0.73	0.72	0.79	0.80
AR-Q10	0.76	0.73	0.74	0.75	0.77	0.73	0.73	0.68	0.67	0.66	0.76	0.72	0.85	0.83	0.75	0.68	0.78	0.74	0.67	0.69	0.75	0.76	0.76	0.73	0.75	0.72
AR-Q11	0.91	0.87	0.73	0.68	0.91	0.87	1.08	0.99	0.80	0.77	0.96	0.87	0.81	0.88	1.01	1.06	0.92	0.87	0.84	0.83	0.90	0.87	0.91	0.87	0.92	0.83
AR-Q12	4.76	4.70	4.25	4.27	4.89	4.60	4.85	4.71	3.54	3.26	5.06	4.92	4.83	4.71	5.88	5.78	4.75	4.60	4.27	3.79	4.87	5.06	4.62	4.50	5.14	4.57
AR-Q13	1.09	1.06	1.01	0.96	1.14	1.07	1.01	1.04	0.87	0.77	1.12	1.06	1.22	1.15	1.04	1.07	1.13	1.06	0.97	1.04	0.92	0.93	1.11	1.07	1.21	1.11
AS-Q1	3.30	3.39	3.34	3.11	3.20	3.82	3.18	3.08	3.74	3.77	3.23	3.70	3.14	3.08	3.66	4.02	3.26	3.34	3.31	3.08	3.11	3.11	3.61	3.79	2.39	3.55
AS-Q2	0.47	0.48	0.54	0.60	0.43	0.47	0.55	0.50	0.45	0.47	0.47	0.49	0.49	0.54	0.52	0.65	0.43	0.47	0.59	0.65	0.45	0.47	0.52	0.59	0.31	0.37
AS-Q3	7.97	8.00	10.35	11.50	7.15	7.08	8.58	8.17	8.07	8.22	8.37	8.11	6.11	5.56	8.90	8.88	7.44	7.88	9.44	11.03	8.09	7.35	8.57	8.06	5.65	6.65
AS-Q4	0.49	0.50	0.57	0.66	0.45	0.48	0.54	0.49	0.49	0.51	0.49	0.49	0.49	0.60	0.51	0.62	0.45	0.48	0.61	0.68	0.49	0.47	0.53	0.52	0.35	0.48
AS-Q5	0.31	0.35	0.32	0.36	0.30	0.33	0.35	0.38	0.32	0.36	0.31	0.33	0.31	0.36	0.30	0.37	0.30	0.32	0.37	0.39	0.29	0.31	0.34	0.36	0.23	0.28
AS-Q6	0.44	0.46	0.55	0.54	0.40	0.45	0.48	0.44	0.45	0.43	0.45	0.47	0.44	0.44	0.43	0.50	0.44	0.46	0.48	0.45	0.49	0.52	0.48	0.48	0.27	0.38
AS-Q7	2.46	2.57	2.65	2.74	2.23	2.58	3.11	2.40	2.64	2.86	2.43	2.52	2.36	2.74	2.23	2.62	2.28	2.44	3.18	3.26	2.31	2.52	2.74	2.59	1.58	1.98
AS-Q8	0.09	0.09	0.08	0.09	0.08	0.09	0.10	0.12	0.07	0.08	0.09	0.09	0.08	0.09	0.08	0.09	0.08	0.09	0.10	0.12	0.10	0.09	0.09	0.09	0.06	0.06
AS-Q9	71.08	72.28	75.81	75.00	64.49	71.19	93.15	97.37	78.32	94.59	70.28	72.08	66.25	68.12	71.85	83.70	65.03	71.19	92.27	100.00	76.59	72.52	76.41	74.00	46.26	60.04
AS-Q10	0.24	0.25	0.24	0.25	0.22	0.23	0.28	0.27	0.22	0.22	0.23	0.25	0.31	0.35	0.15	0.17	0.24	0.25	0.26	0.27	0.26	0.28	0.24	0.25	0.22	0.25
AS-Q11	2.74	3.00	2.37	2.50	2.59	2.75	3.43	3.25	2.63	3.00	2.56	2.63	3.63	3.50	2.19	1.63	2.76	3.00	2.90	2.75	2.82	3.25	2.90	3.00	2.09	2.15
AS-Q12	2.59	2.93	2.72	3.01	2.41	2.84	3.08	2.98	2.62	2.91	2.60	2.95	2.52	2.71	2.24	2.95	2.68	3.01	2.43	2.71	2.93	3.21	2.71	2.91	1.81	2.61
AS-Q13	0.11	0.11	0.12	0.12	0.09	0.11	0.13	0.13	0.09	0.11	0.11	0.11	0.11	0.12	0.08	0.09	0.10	0.11	0.14	0.13	0.10	0.10	0.11	0.11	0.08	0.09
AS-Q14	3.99	4.50	3.64	3.51	3.57	4.17	5.47	5.52	4.01	3.92	3.93	4.55	4.24	5.03	3.87	3.44	3.97	4.55	4.12	4.07	4.21	4.81	4.31	4.55	2.60	3.16
AS-Q15	131.32	144.21	156.49	154.32	119.40	125.71	143.36	126.04	148.80	153.89	124.48	125.95	140.70	144.21	99.61	122.05	135.23	144.58	131.54	137.21	136.79	131.63	135.29	144.94	111.49	138.77
AT-Q1	8.59	7.76	9.01	8.88	8.33	7.76	7.98	6.78	11.64	12.91	8.09	7.71	7.25	10.47	6.37	4.44	9.02	8.57	8.05	7.75	7.95	7.26	8.39	7.76	9.96	12.33
AT-Q2	0.71	0.82	0.64	0.62	0.72	0.86	0.73	0.81	0.79	0.85	0.75	0.87	0.48	0.79	0.58	0.46	0.74	0.82	0.69	0.82	0.84	0.96	0.68	0.79	0.71	0.78
AT-Q3	5.75	5.77	5.07	4.65	5.67	5.69	6.18	7.43	4.56	5.03	6.39	6.44	4.34	7.14	5.10	4.75	5.90	5.94	5.49	5.17	7.18	7.20	5.57	5.77	4.97	5.37
AT-Q4	0.07	0.07	0.05	0.05	0.07	0.08	0.05	0.06	0.07	0.08	0.07	0.08	0.04	0.06	0.05	0.05	0.07	0.07	0.06	0.07	0.07	0.08	0.06	0.07	0.08	0.08
AT-Q5	0.31	0.34	0.26	0.30	0.32	0.37	0.31	0.34	0.30	0.33	0.33	0.38	0.22	0.28	0.21	0.17	0.32	0.35	0.30	0.39	0.35	0.45	0.30	0.34	0.32	0.37
AT-Q6	0.42	0.46	0.37	0.35	0.44	0.52	0.40	0.50	0.43	0.44	0.45	0.50	0.25	0.33	0.29	0.19	0.45	0.49	0.35	0.34	0.46	0.56	0.38	0.38	0.50	0.58
AT-Q7	23.71	28.85	21.72	20.59	23.92	29.01	24.66	27.03	25.15	25.29	24.17	29.06	20.13	27.03	17.94	14.63	24.93	29.42	21.97	22.92	26.57	28.00	23.58	29.17	21.33	24.26
AT-Q8	22.24	24.19	18.13	24.19	22.79	24.51	25.65	27.66	21.46	23.54	24.33	26.08	14.17	19.23	13.02	10.00	23.56	26.08	21.66	19.72	28.40	28.46	19.74	22.22	25.15	29.97
AT-Q9	109.85	121.43	92.66	87.50	111.17	130.77	113.78	121.43	100.45	96.15	121.36	145.00	71.26	107.14	97.22	94.44	113.35	130.77	103.00	108.33	130.90	150.00	101.76	116.67	118.09	122.25
AT-Q10	35.84	43.33	33.19	44.12	38.82	43.54	28.09	27.94	45.22	42.89	36.31	43.99	23.09	27.27	18.61	15.17	37.14	43.99	38.88	39.73	37.03	43.19	33.16	41.67	44.36	44.73
AT-Q11	20.04	24.14	18.21	26.63	20.75	24.05	18.59	21.24	23.89	28.14	20.17	23.93	15.08	19.39	14.66	13.37	20.21	23.44	21.83	28.04	20.59	24.16	19.14	23.15	22.77	25.07
AT-Q12	0.49	0.60	0.42	0.52	0.53	0.65	0.43	0.45	0.46	0.60	0.52	0.62	0.39	0.45	0.25	0.20	0.51	0.62	0.51	0.45	0.56	0.68	0.47	0.59	0.49	0.54
AT-Q13	1.46	1.79	1.60	1.88	1.40	1.77	1.50	2.00	1.39	1.83	1.57	1.83	1.07	1.00	0.79	0.64	1.55	1.83	1.43	2.00	1.58	1.88	1.30	1.78	1.90	2.29
AU-Q1	0.79	0.91	0.73	0.82	0.80	0.95	0.86	0.69	0.66	0.69	0.88	0.97	0.59	0.68	1.23	0.93	0.79	0.99	0.62	0.68	0.53	0.70	0.88	0.95	0.76	0.95
AU-Q2	1.17	1.40	0.99	1.09	1.19	1.45	1.34	1.41	1.18	1.42	1.14	1.25	1.30	1.95	1.27	1.27	1.08	1.07	1.45	1.95	1.01	1.20	1.19	1.40	1.24	1.41
AU-Q3	5.89	5.77	4.04	4.56	6.32	6.27	6.52	6.46	5.29	5.52	5.46	5.52	8.42	9.78	6.17	5.81	5.02	5.19	8.86	9.78	4.91	5.34	6.08	5.59	6.19	6.11
AU-Q4	0.21	0.20	0.18	0.20	0.20	0.20	0.27	0.28	0.22	0.26	0.20	0.20	0.22	0.25	0.17	0.18	0.20	0.20	0.25	0.26	0.19	0.25	0.21	0.20	0.22	0.23
AU-Q5	1.61	1.86	1.20	1.24	1.71	1.98	1.72	1.68	1.65	2.02	1.48	1.70	2.10	2.48	1.51	1.55	1.54	1.89	1.89	2.40	1.46	2.02	1.61	1.75	1.76	1.77
AU-Q6	0.13	0.15	0.12	0.11	0.14	0.15	0.14	0.16	0.14	0.15	0.13	0.15	0.15	0.17	0.15	0.15	0.12	0.14	0.17	0.17	0.09	0.12	0.14	0.15	0.15	0.14
AU-Q7	0.37	0.39	0.30	0.39	0.36	0.37	0.46	0.45	0.34	0.40	0.34	0.38	0.52	0.63	0.42	0.43	0.33	0.37	0.45	0.60	0.32	0.40	0.37	0.39	0.39	0.38
AU-Q8	6.13	7.24	4.86	7.06	6.36	7.54	7.09	7.08	6.84	7.97	5.73	7.03	7.06	7.74	6.24	6.18	5.71	7.14	7.60	8.50	4.92	6.96	6.42	7.44	6.32	7.51
AU-Q9	88.98	91.86	74.45	73.28	93.13	95.62	95.60	96.91	83.81	92.63	86.63	86.06	104.95	116.07	77.15	82.70	82.06	93.07	118.85	145.24	76.52	97.14	90.29	85.59	96.71	108.29
AU-Q10	30.27	36.75	22.20	27.89	31.64	37.61	35.29	39.25	32.99	41.13	28.65	35.73	34.08	39.11	32.84	35.12	29.24	35.73	32.80	40.50	30.10	37.27	30.27	37.22	30.42	32.80
AU-Q11	7.79	8.86	6.84	6.03	7.66	9.17	8.69	8.41	7.29	7.97	7.79	8.95	8.41	10.91	13.27	13.70	7.11	8.15	7.80	9.52	7.52	8.86	7.60	8.41	8.76	10.67
AV-Q1	0.55	0.65	0.55	0.55	0.53	0.66	0.53	0.70	0.68	0.69	0.54	0.60	0.44	0.55	0.66	0.51	0.56	0.67	0.45	0.57	0.54	0.62	0.53	0.61	0.61	0.72
AV-Q2	0.70	0.82	0.66	0.78	0.73	0.85	0.59	0.75	0.73	0.69	0.72	0.85	0.57	0.84	0.64	0.51	0.70	0.80	0.72	0.92	0.76	0.79	0.70	0.87	0.64	0.66
AV-Q3	0.65	0.84	0.55	0.65	0.68	0.91	0.64	0.85	0.77	0.97	0.65	0.79	0.48	0.68	0.49	0.35	0.66	0.86	0.67	0.85	0.74	0.96	0.61	0.70	0.69	0.90
AV-Q4	28.23	28.97	25.61	28.22	28.53	29.10	28.34	28.97	28.79	27.20	28.69	30.96	25.63	28.22	26.78	21.42	28.10	29.10	29.35	28.97	32.54	33.26	25.39	28.96	34.22	36.84
AV-Q5	16.47	17.25	19.74	17.25	15.74	18.09	15.37	13.60	20.30	19.50	16.53	17.13	11.80	12.00	11.75	7.50	17.77	18.09	13.94	13.60	17.43	17.18	17.27	18.75	12.58	14.98
AV-Q6	2.43	2.90	2.08	1.97	2.58	3.04	2.21	2.90	2.98	3.18	2.45	2.96	1.73	2.07	1.56	1.43	2.61	3.02	2.17	2.22	2.50	3.15	2.42	2.86	2.41	2.50
AV-Q7	0.08	0.10	0.09	0.07	0.08	0.09	0.11	0.10	0.08	0.07	0.09	0.10	0.07	0.07	0.04	0.03	0.09	0.10	0.07	0.07	0.10	0.12	0.08	0.08	0.08	0.08
AV-Q8	0.70	0.78	0.80	0.90	0.65	0.76	0.70	0.61	0.69	0.61	0.73	0.81	0.58	0.51	0.50	0.45	0.72	0.78	0.69	0.56	0.66	0.72	0.71	0.89	0.68	0.69
AV-Q9	4.69	5.63	4.29	5.15	4.63	5.77	5.15	5.63	4.96	5.88	4.78	5.68	3.99	5.63	2.99	2.57	4.98	5.77	4.40	5.63	5.23	5.62	4.28	5.50	5.60	6.85
AW-Q1	6.04	6.86	5.41	6.59	5.54	6.59	9.74	10.30	8.06	8.13	5.50	6.79	6.07	5.76	3.54	3.16	5.84	6.92	7.89	8.42	6.36	6.79	5.78	6.33	6.68	7.57
AW-Q2	0.85	0.92	1.04	1.41	0.79	1.00	0.94	0.86	1.18	1.10	0.71	0.71	1.05	1.30	0.80	0.72	0.73	0.76	1.29	1.40	0.74	0.83	0.81	0.80	1.09	1.34
AW-Q3	4.52	4.44	6.22	8.84	4.05	4.33	4.85	4.72	5.60	4.32	3.88	4.38	5.98	6.58	3.56	2.65	4.14	4.31	6.27	6.58	3.89	4.32	4.81	4.44	4.09	4.40
AW-Q4	0.90	1.14	1.05	1.17	0.88	1.10	0.94	1.20	1.00	1.03	0.78	1.13	1.32	1.41	0.63	0.57	0.80	0.97	1.38	1.22	0.83	0.73	0.87	1.12	1.10	1.18
AW-Q5	0.15	0.15	0.18	0.18	0.14	0.15	0.17	0.17	0.22	0.23	0.13	0.14	0.18	0.18	0.15	0.14	0.13	0.15	0.22	0.18	0.13	0.12	0.15	0.17	0.17	0.15

ADDENDUM G

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AW-Q6	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03
AW-Q7	11.14	13.35	11.99	15.87	10.41	12.89	14.54	16.29	15.90	18.66	9.21	11.22	13.95	16.96	12.04	11.76	9.71	11.22	15.82	16.29	11.02	12.11	11.00	13.45	11.74	11.93
BA-Q1	9.58	8.75	8.84	8.39	9.91	9.06	9.62	7.27	9.51	7.44	9.52	8.60	9.90	9.77	8.59	7.95	9.57	9.06	10.04	8.26	11.66	11.50	9.15	8.43	9.05	8.79
BA-Q2	1.45	1.45	1.31	1.29	1.48	1.46	1.48	1.41	1.62	1.53	1.40	1.43	1.45	1.29	1.86	1.84	1.38	1.38	1.49	1.29	1.69	1.83	1.41	1.35	1.35	1.44
BA-Q3	1.91	1.79	1.67	1.71	1.95	1.83	2.07	1.78	2.18	2.14	1.79	1.75	2.13	2.15	1.82	1.78	1.84	1.77	2.20	2.27	2.21	2.18	1.92	1.81	1.59	1.46
BA-Q4	1.71	1.64	1.55	1.63	1.77	1.76	1.49	1.36	1.78	1.76	1.68	1.67	1.70	1.55	1.97	1.95	1.66	1.64	1.75	1.64	1.78	1.64	1.74	1.69	1.48	1.29
BA-Q5	6.72	5.80	5.28	5.50	7.17	6.00	6.59	6.80	7.33	6.43	6.60	5.58	6.53	6.80	7.26	6.50	6.85	5.78	6.00	6.00	8.51	7.15	6.27	5.50	6.56	6.46
BB-Q1	27.86	23.48	25.17	21.64	27.80	26.47	28.15	20.35	22.23	20.78	28.94	26.01	29.68	30.19	34.22	33.30	28.29	26.01	23.52	20.35	24.07	19.36	29.46	26.03	25.86	22.54
BB-Q2	13.37	12.68	13.76	12.81	12.86	12.30	14.38	13.37	14.44	14.88	12.62	12.30	15.33	16.48	13.85	13.21	13.43	12.53	12.92	12.89	12.62	11.50	13.25	12.68	14.52	12.16
BB-Q3	12.47	12.33	12.63	12.58	12.25	12.18	12.48	11.80	11.49	12.17	12.58	12.18	13.09	12.58	13.77	12.45	12.69	12.35	11.10	12.33	12.91	12.34	12.40	12.31	12.28	12.10
BB-Q4	13.35	12.52	13.90	13.71	12.72	12.37	13.86	11.42	12.80	11.80	13.07	12.37	15.16	13.71	17.09	16.95	12.86	12.29	13.42	12.76	12.27	12.16	13.43	12.52	14.14	14.69
BB-Q5	98.85	94.92	100.39	101.25	97.13	94.60	100.63	89.44	102.37	100.54	93.77	89.72	116.62	120.07	105.89	105.00	99.83	101.42	92.24	89.44	94.52	85.52	100.46	101.25	97.38	93.42
BC-Q1	76.43	64.24	76.01	63.17	73.83	65.96	84.32	63.17	80.41	67.21	68.09	63.17	107.64	102.38	75.69	77.37	72.46	63.17	90.90	97.32	83.68	59.84	74.95	67.68	74.55	63.17
BC-Q2	31.26	29.15	35.91	38.35	30.00	28.60	31.09	27.35	33.77	36.04	29.07	27.63	37.74	39.73	32.82	32.92	30.13	28.96	34.57	38.77	32.94	29.78	31.49	29.15	28.71	30.06
BC-Q3	3.84	3.70	3.80	3.72	3.85	3.38	3.84	3.72	4.66	4.22	3.59	3.35	3.97	3.70	3.81	3.92	3.73	3.48	4.24	3.70	3.76	3.68	3.88	3.72	3.78	3.63
BC-Q4	34.08	32.29	36.55	34.09	32.51	31.39	36.12	30.99	31.35	30.23	32.61	31.36	43.50	47.54	33.15	32.81	32.71	31.36	39.37	46.60	33.50	31.11	35.43	34.09	29.77	29.39
BC-Q5	230.28	217.41	248.08	230.76	222.33	203.77	245.29	222.08	258.56	242.83	224.95	218.68	220.83	210.38	219.26	202.60	222.32	215.10	263.47	273.60	259.13	242.72	222.35	215.28	230.17	218.00
BC-Q6	238.13	228.94	223.55	227.26	236.30	228.44	253.67	273.72	217.61	195.89	235.62	228.09	272.35	304.05	247.06	259.40	236.92	228.09	238.45	231.41	243.27	236.14	240.97	228.25	222.70	230.47
BD-Q1	25.51	22.16	25.94	24.23	25.23	21.16	26.69	22.16	27.20	24.80	24.42	21.68	28.23	22.74	25.56	22.90	24.71	21.69	28.32	24.55	27.37	21.64	25.13	22.74	25.02	21.14
BD-Q2	45.84	45.11	45.85	47.73	45.21	44.96	50.76	43.00	50.53	49.00	44.13	42.73	47.84	45.91	41.13	41.96	45.34	45.31	49.74	47.00	51.51	44.26	42.88	43.00	50.93	48.62
BD-Q3	60.74	58.13	68.28	63.13	57.04	54.66	66.79	62.11	66.47	58.63	59.26	56.32	60.56	63.13	60.30	55.57	60.05	58.56	63.39	67.17	68.67	60.51	58.85	59.00	59.67	53.74
BD-Q4	46.49	42.58	42.87	44.60	48.31	43.26	45.11	35.26	53.94	51.47	44.50	42.14	46.52	47.00	44.73	41.25	46.63	43.26	46.80	41.83	44.90	41.92	45.56	42.58	51.45	46.56
BD-Q5	20.35	19.44	21.61	19.19	19.69	19.36	21.92	21.98	22.40	22.22	19.76	19.36	20.53	18.80	22.92	19.02	19.90	19.87	20.80	22.46	20.79	19.18	20.28	19.44	20.18	19.87
BE-Q1	16.54	13.69	16.06	10.91	16.73	14.18	16.19	13.73	18.91	13.97	15.77	13.16	17.10	14.08	14.25	13.95	16.46	13.63	17.81	14.08	15.65	13.23	17.64	14.67	13.43	11.07
BE-Q2	1.10	1.04	1.19	1.23	1.13	1.11	0.90	0.88	1.29	1.37	1.09	1.15	0.94	0.95	1.15	1.08	1.10	1.05	1.09	1.04	1.00	0.97	1.17	1.22	0.94	0.95
BE-Q3	1.98	1.91	1.85	1.95	2.10	1.89	1.64	1.60	1.99	1.93	1.98	1.91	1.95	1.84	1.94	1.98	2.02	1.91	1.85	1.84	2.07	1.89	1.96	1.95	1.93	1.84
BE-Q4	1.16	1.08	1.21	1.08	1.18	1.06	1.10	1.21	1.37	1.36	1.05	0.99	1.41	1.35	0.97	0.95	1.16	1.06	1.28	1.21	1.23	1.24	1.20	1.08	0.97	0.89
BE-Q5	6.10	5.57	6.16	5.43	6.23	5.54	5.51	5.60	6.23	6.00	6.08	5.40	6.02	5.60	6.71	6.25	5.97	5.46	6.28	5.57	5.45	5.21	6.46	5.60	5.46	5.63
BF-Q1	12.73	11.98	10.31	8.01	13.07	12.19	13.89	13.63	10.77	9.80	12.95	12.49	14.03	17.06	13.13	13.34	12.58	12.14	13.08	11.98	12.30	12.22	13.00	12.40	12.17	10.00
BF-Q2	25.10	22.00	20.09	20.83	26.34	22.93	24.68	20.18	23.86	21.77	25.39	23.06	25.29	20.93	25.37	24.95	24.14	22.08	28.41	22.00	22.37	20.97	25.55	22.43	26.21	23.15
BF-Q3	7.46	7.32	6.41	6.16	7.46	7.34	8.33	8.81	6.15	5.25	7.79	7.36	7.53	7.55	7.25	6.85	7.20	6.96	8.44	8.81	6.94	7.02	7.71	7.24	7.06	7.36
BF-Q4	22.84	22.59	22.02	20.83	23.10	23.17	22.89	24.23	23.38	22.34	23.11	22.79	21.08	19.33	22.09	21.71	22.80	22.71	23.31	23.33	22.90	23.91	23.92	22.43	18.89	19.29
BF-Q5	20.48	18.87	16.59	16.20	20.96	19.28	21.52	21.81	17.47	17.13	21.30	20.64	20.42	18.36	22.58	20.73	19.74	18.59	22.17	21.81	23.37	23.05	19.97	18.31	19.44	20.64
C-Q1	0.33	0.30	0.37	0.30	0.32	0.30	0.34	0.31	0.38	0.38	0.33	0.30	0.27	0.24	0.35	0.34	0.34	0.31	0.30	0.24	0.32	0.29	0.34	0.33	0.31	0.26
C-Q2	2.61	2.49	2.22	1.86	2.77	2.56	2.33	2.60	3.14	2.59	2.54	2.37	2.33	2.60	2.84	2.71	2.60	2.47	2.55	2.40	2.37	2.31	2.75	2.44	2.37	2.66
C-Q3	0.16	0.16	0.18	0.19	0.16	0.14	0.18	0.20	0.18	0.20	0.15	0.14	0.18	0.18	0.16	0.14	0.16	0.15	0.17	0.17	0.18	0.18	0.16	0.16	0.14	0.12
C-Q4	0.61	0.56	0.62	0.61	0.59	0.56	0.62	0.56	0.57	0.54	0.58	0.56	0.73	0.61	0.60	0.61	0.57	0.56	0.75	0.57	0.69	0.60	0.59	0.56	0.56	0.55
C-Q5	0.38	0.39	0.34	0.40	0.39	0.36	0.42	0.43	0.34	0.33	0.37	0.39	0.46	0.46	0.33	0.29	0.37	0.39	0.44	0.43	0.40	0.42	0.38	0.36	0.37	0.39
C-Q6	0.34	0.35	0.43	0.45	0.33	0.33	0.30	0.30	0.41	0.46	0.34	0.35	0.28	0.32	0.38	0.40	0.36	0.35	0.28	0.23	0.32	0.33	0.33	0.35	0.40	0.41
C-Q7	0.19	0.19	0.16	0.13	0.20	0.19	0.19	0.20	0.17	0.18	0.20	0.19	0.18	0.20	0.19	0.19	0.19	0.18	0.20	0.20	0.18	0.17	0.20	0.19	0.18	0.17
DA-Q1	59.98	55.60	60.48	54.30	63.90	58.79	44.80	44.45	50.98	47.84	63.24	56.41	56.27	55.60	64.17	52.99	61.91	56.41	51.23	50.65	50.86	53.70	60.38	55.60	67.63	58.26
DB-Q1	168.34	164.17	155.03	122.78	174.60	164.06	159.06	168.81	150.92	141.21	170.18	164.57	180.38	165.26	174.44	168.50	170.08	165.12	159.47	161.14	159.98	163.62	174.07	164.98	155.95	162.96
DC-Q1	300.90	273.85	254.60	259.07	317.98	297.77	265.59	276.85	275.16	263.20	302.49	275.35	323.50	292.69	349.56	333.28	291.13	270.84	314.00	273.85	275.70	245.41	308.64	277.41	298.05	266.22
DD-Q1	52.95	46.49	49.01	46.41	55.43	47.28	44.97	41.99	58.30	46.15	52.34	46.55	49.47	46.49	51.69	49.33	52.50	46.45	55.13	44.63	49.20	38.61	52.14	46.49	59.67	52.69
DE-Q1	114.83	106.66	100.42	103.46	120.88	107.01	108.61	109.04	113.52	102.58	111.46	103.49	130.80	139.16	104.64	100.87	110.18	103.96	135.91	134.83	122.69	123.42	105.49	101.00	140.85	137.89
E-Q1	261.57	236.32	223.48	209.87	267.95	240.52	268.82	243.93	247.80	226.41	263.31	239.69	269.83	250.76	242.79	222.62	268.51	243.49	245.21	233.16	256.25	221.36	270.29	238.32	235.27	244.33
E-Q2	218.09	192.98	194.60	179.85	227.36	224.75	201.16	189.05	207.96	181.64	218.74	200.97	226.88	192.98	231.08	229.05	216.30	195.35	218.68	189.05	209.19	194.60	218.05	189.05	227.14	226.87
F-Q1	17.88	16.80	15.34	16.40	19.21	16.80	16.10	17.42	17.38	16.80	17.94	16.80	18.20	17.35	16.58	16.43	18.26	16.99	17.09	16.68	16.74	16.21	18.02	16.80	18.52	16.60
F-Q2	51.67	48.21	43.85	36.98	52.94	50.29	49.02	50.61	46.89	35.50	52.91	48.81	51.86	51.17	61.15	52.90	50.04	44.77	53.28	52.50	50.34	50.79	51.48	47.11	53.72	47.00
F-Q3	0.25	0.23	0.24	0.23	0.24	0.21	0.29	0.30	0.25	0.25	0.23	0.21	0.30	0.24	0.21	0.21	0.25	0.23	0.23	0.18	0.24	0.22	0.25	0.23	0.23	0.19
F-Q4	0.70	0.67	0.68	0.67	0.70	0.67	0.75	0.74	0.68	0.66	0.70	0.69	0.75	0.66	0.66	0.66	0.73	0.70	0.63	0.60	0.59	0.56	0.74	0.67	0.68	0.69
G-Q1	25.17	22.74	24.15	21.48	26.06	24.41	24.14	22.74	26.25	25.32	25.87	22.74	20.94	18.41	28.36	21.04	24.51	22.74	26.08	24.66	28.17	26.33	25.64	23.85	20.45	18.40
G-Q2	311.25	276.76	305.28	287.08	316.99	273.11	282.79	250.10	360.88	374.91	305.39	273.11	279.62	245.22	355.66	292.43	308.57	276.85	301.01	269.47	333.04	312.29	312.12	276.94	286.29	238.86
G-Q3	9.05	8.25	8.97	8.25	9.16	8.19	9.17	9.92	7.25	5.92	9.63	8.61	8.65	8.38	11.13	10.00	8.67	8.11	9.51	9.92	8.11	8.38	9.42	8.25	8.66	8.19
G-Q4	6.39	5.97	5.43	5.12	6.72	6.13	6.01	6.11	7.23	7.49	6.48	6.01	5.06	5.12	6.99	7.30	6.24	5.86	6.69	6.04	6.16	5.74	6.55	5.97	6.08	5.73
G-Q5	0.69	0.59	0.90	0.84	0.63	0.58	0.68	0.63	0.68	0.71	0.65	0.58	0.85	0.73	0.59	0.51	0.69	0.59	0.71	0.70	0.76	0.77	0.69	0.59	0.61	0.55
G-Q6	1.42	1.34	1.32	1.27	1.50	1.39	1.31	1.33	1.48	1.31	1.46	1.39	1.19	1.09	1.81	1.35	1.38	1.35	1.39	1.33	1.32	1.18	1.49	1.37	1.29	1.07
G-Q7	27.43	23.73	29.54	25.94	26.89	22.91	25.99	26.86	24.24	19.30	28.17	24.07	27.90	24.43	21.57	18.36	28.74	24.59	25.35	19.12	34.22	31.47	24.43	22.91	31.48	26.98
G-Q8	0.58	0.44	0.54	0.39	0.59	0.44	0.61	0.66	0.83	0.83	0.54	0.44	0.45	0.38	0.63	0.61	0.52	0.42	0.77	0.66	0.52	0.47	0.62	0.52	0.50	0.42
G-Q9	3.98	3.69	4.04	3.92	3.98	3.66	3.71	3.39	4.38	4.11	3.86	3.49	4.04	3.56	4.46	4.47	3.95	3.55	3.90	3.82	4.58	4.17	3.88	3.56	3.76	3.54
G-Q10	10.26	9.97	10.35	9.87	10.62	10.57	9.27	8.13	11.69	11.01	10.32	9.92	8.35	8.13	9.23	8.91	10.48	10.20	9.92	10.72	9.82	10.13	10.68	10.42	9.19	7.95
G-Q11	4.13	3.99	3.98	3.96	4.07	3.97	4.32	4.35	4.82	5.06	3.91	3.85	4.24	4.32	4.23	3.87	3.93	3.96	4.77	4.67	4.29	4.17	4.29	4.03	3.38	3.21

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
RATE RATIOS																										
AB-R1	4.30	4.18	4.11	3.78	4.24	4.20	4.80	4.61	4.37	4.48	4.30	4.12	4.20	4.72	4.46	4.11	4.19	4.06	4.62	4.72	4.65	4.66	4.13	4.05	4.54	4.62
AB-R2	0.98	0.95	1.03	1.01	0.96	0.92	1.03	0.96	1.07	1.05	0.98	0.96	0.89	0.90	0.93	0.99	0.98	0.96	1.03	0.92	0.98	0.91	1.00	0.97	0.91	0.91
AB-R3	11.34	11.35	11.35	11.35	11.22	11.34	12.21	12.18	11.18	10.91	11.10	11.34	12.53	12.77	9.90	8.89	11.32	11.34	12.04	11.92	12.64	13.23	10.85	10.69	11.81	11.63
AB-R4	8.13	8.51	8.60	8.52	7.89	8.49	8.86	8.86	9.01	8.61	8.09	8.52	7.32	8.18	7.01	6.80	8.17	8.51	8.51	8.52	8.64	8.68	7.94	8.50	8.35	8.69
AC-R1	192.30	192.39	186.46	192.39	193.44	192.39	195.22	199.96	197.42	192.39	192.91	192.39	183.83	192.39	194.61	192.39	192.12	192.39	191.92	192.39	194.20	199.96	191.70	192.39	192.57	192.39
AC-R2	23.89	24.25	23.49	22.51	24.04	24.25	23.53	24.25	24.52	24.25	24.04	24.25	22.56	22.51	24.65	24.60	23.96	24.25	23.30	23.46	22.21	22.20	24.23	24.25	24.34	24.69
AC-R3	0.18	0.19	0.19	0.19	0.18	0.19	0.17	0.19	0.18	0.19	0.19	0.19	0.16	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.17	0.19	0.18	0.19	0.18	0.19
AC-R4	0.28	0.24	0.31	0.35	0.27	0.24	0.29	0.25	0.28	0.26	0.28	0.24	0.28	0.25	0.30	0.30	0.27	0.24	0.30	0.28	0.30	0.30	0.27	0.24	0.28	0.24
AC-R5	0.89	0.61	0.71	0.60	0.98	0.92	0.72	0.60	0.96	0.74	0.92	0.87	0.71	0.53	1.08	0.89	0.89	0.71	0.82	0.60	0.80	0.54	0.91	0.80	0.91	0.77
AC-R6	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.22	0.22	0.22	0.22	0.22	0.19	0.21	0.22	0.22	0.22	0.22	0.20	0.22	0.20	0.22	0.22	0.22	0.22	0.22
AC-R7	0.50	0.51	0.50	0.51	0.50	0.51	0.47	0.52	0.52	0.52	0.51	0.52	0.43	0.42	0.56	0.55	0.50	0.51	0.47	0.50	0.46	0.48	0.51	0.51	0.51	0.53
AC-R8	0.24	0.23	0.22	0.21	0.24	0.24	0.24	0.25	0.25	0.24	0.23	0.23	0.22	0.23	0.22	0.22	0.23	0.23	0.24	0.24	0.23	0.24	0.24	0.23	0.24	0.24
AC-R9	0.36	0.31	0.32	0.30	0.36	0.30	0.40	0.45	0.37	0.36	0.35	0.30	0.36	0.33	0.34	0.30	0.36	0.30	0.37	0.33	0.35	0.31	0.36	0.31	0.35	0.31
AC-R10	0.51	0.57	0.52	0.53	0.50	0.57	0.50	0.57	0.50	0.57	0.53	0.57	0.44	0.44	0.55	0.57	0.50	0.55	0.50	0.57	0.50	0.54	0.51	0.57	0.51	0.55
AC-R11	0.93	0.70	0.91	0.70	0.99	0.70	0.76	0.70	0.93	0.68	0.92	0.70	1.01	0.78	1.07	0.69	0.93	0.70	0.89	0.68	1.10	0.73	0.90	0.70	0.89	0.69
AC-R12	7.23	7.26	7.32	7.26	7.14	7.26	7.24	7.77	7.67	8.37	7.32	7.26	6.35	6.77	7.34	8.07	7.15	7.26	7.46	8.37	6.25	7.01	7.45	7.95	7.44	7.81
AC-R13	1.06	1.08	1.04	1.01	1.07	1.08	1.06	1.08	1.02	1.01	1.09	1.08	1.01	1.08	1.09	1.09	1.08	1.08	1.00	1.01	1.05	1.08	1.06	1.08	1.09	1.05
AC-R14	110.73	115.74	121.23	127.88	109.59	109.60	105.12	87.94	117.85	121.81	110.95	121.81	101.63	87.94	120.93	131.02	108.22	106.54	115.09	124.01	113.85	129.09	107.41	103.47	119.66	134.17
AC-R15	27.07	22.16	23.49	21.33	28.21	24.95	25.03	21.33	27.40	22.54	27.26	21.75	25.87	22.16	24.81	19.73	27.41	24.92	26.87	21.33	21.98	18.78	28.99	26.16	25.18	20.82
AC-R16	48.79	49.96	48.84	50.88	48.93	49.13	47.88	50.88	51.15	50.42	49.02	50.02	45.15	46.63	50.47	50.45	49.02	49.96	47.23	48.79	47.43	49.71	48.84	49.47	49.98	50.88
AC-R17	0.27	0.26	0.27	0.24	0.27	0.26	0.28	0.26	0.29	0.30	0.27	0.26	0.28	0.25	0.27	0.25	0.27	0.26	0.27	0.24	0.29	0.27	0.27	0.26	0.27	0.25
AD-R1	0.97	0.93	0.97	0.93	0.98	0.96	0.91	0.93	0.97	0.92	0.95	0.93	1.05	0.93	0.85	0.89	0.95	0.93	1.06	0.93	0.97	0.93	0.94	0.92	1.04	0.96
AD-R2	5.83	4.45	6.99	5.52	5.62	4.35	4.74	3.95	6.51	6.17	5.59	4.45	6.07	4.45	5.80	5.23	5.83	4.60	5.82	4.45	5.71	4.60	6.01	5.52	5.29	3.95
AD-R3	4.99	4.30	5.44	4.30	5.07	4.46	3.95	3.74	5.85	5.69	4.81	4.29	4.74	3.59	4.63	5.09	5.00	4.29	5.09	3.74	4.92	4.00	5.23	4.47	4.18	3.03
AD-R4	0.53	0.46	0.46	0.48	0.58	0.46	0.46	0.46	0.46	0.44	0.56	0.45	0.49	0.51	0.55	0.43	0.54	0.46	0.48	0.49	0.51	0.45	0.56	0.46	0.46	0.46
AD-R5	0.39	0.33	0.36	0.28	0.40	0.33	0.37	0.26	0.41	0.40	0.40	0.33	0.31	0.26	0.35	0.32	0.40	0.33	0.35	0.26	0.41	0.32	0.41	0.34	0.31	0.26
AD-R6	0.29	0.20	0.19	0.19	0.35	0.20	0.18	0.17	0.18	0.17	0.34	0.20	0.18	0.18	0.21	0.20	0.32	0.20	0.19	0.18	0.20	0.20	0.34	0.20	0.17	0.16
AD-R7	1.47	1.47	1.54	1.69	1.49	1.47	1.38	1.47	1.48	1.51	1.41	1.40	1.68	1.69	1.24	1.30	1.47	1.47	1.56	1.61	1.27	1.19	1.50	1.47	1.53	1.54
AD-R8	0.20	0.10	0.10	0.10	0.25	0.11	0.13	0.11	0.12	0.11	0.24	0.10	0.11	0.10	0.11	0.10	0.24	0.11	0.11	0.11	0.11	0.10	0.25	0.11	0.11	0.10
AD-R9	4.19	4.06	4.81	4.28	4.19	4.10	3.61	3.49	4.97	4.53	3.91	3.74	4.51	4.28	3.85	4.10	4.15	3.74	4.49	4.28	3.98	3.93	4.27	4.14	4.10	4.06
AD-R10	0.81	0.78	0.81	0.70	0.79	0.78	0.76	0.79	0.79	0.78	0.83	0.79	0.70	0.69	1.02	1.03	0.80	0.73	0.73	0.78	0.75	0.80	0.83	0.78	0.79	0.78
AD-R11	0.11	0.09	0.09	0.09	0.12	0.09	0.08	0.08	0.09	0.10	0.12	0.08	0.09	0.09	0.07	0.07	0.12	0.09	0.09	0.10	0.09	0.09	0.12	0.08	0.08	0.09
AD-R12	0.05	0.03	0.04	0.03	0.06	0.03	0.04	0.04	0.04	0.03	0.06	0.03	0.04	0.04	0.03	0.03	0.06	0.03	0.04	0.04	0.04	0.04	0.06	0.03	0.03	0.03
AD-R13	4.48	4.28	4.94	4.28	4.36	4.28	4.38	4.28	4.70	4.28	4.35	4.28	4.77	4.28	5.03	4.28	4.45	4.28	4.34	4.28	4.44	4.28	4.50	4.28	4.44	4.28
AD-R14	1.42	1.33	1.34	1.33	1.46	1.36	1.47	1.73	1.65	1.98	1.33	1.21	1.52	1.84	0.97	0.60	1.47	1.36	1.42	1.55	1.56	1.70	1.40	1.33	1.33	1.09
AD-R15	1.52	1.64	1.71	1.73	1.45	1.48	1.67	1.71	1.62	1.51	1.43	1.48	1.81	1.73	1.20	0.98	1.53	1.56	1.64	1.71	1.63	1.65	1.51	1.64	1.46	1.51
AD-R16	1.94	1.84	2.03	2.10	1.93	1.83	1.89	1.70	1.93	1.80	1.88	1.82	2.20	2.15	1.79	1.52	1.92	1.83	2.08	2.15	2.08	2.01	1.91	1.84	1.89	1.68
AD-R17	0.06	0.03	0.04	0.03	0.07	0.03	0.04	0.03	0.04	0.04	0.06	0.03	0.04	0.03	0.03	0.03	0.07	0.04	0.03	0.03	0.03	0.03	0.07	0.03	0.03	0.03
AE-R1	0.74	0.75	0.75	0.75	0.76	0.75	0.67	0.63	0.74	0.71	0.75	0.75	0.70	0.65	0.74	0.75	0.74	0.74	0.74	0.68	0.74	0.73	0.74	0.75	0.75	0.71
AE-R2	187.19	193.57	171.95	162.89	188.47	197.11	205.14	212.20	190.75	206.08	185.77	193.40	189.25	210.85	162.18	161.64	186.88	193.51	199.44	210.85	185.59	202.22	188.11	193.57	185.48	187.42
AE-R3	0.12	0.12	0.14	0.14	0.12	0.11	0.11	0.10	0.12	0.12	0.13	0.12	0.11	0.10	0.13	0.14	0.12	0.11	0.12	0.12	0.11	0.10	0.13	0.12	0.13	0.13
AE-R4	0.15	0.15	0.16	0.16	0.14	0.14	0.15	0.14	0.14	0.14	0.15	0.15	0.16	0.15	0.16	0.16	0.15	0.15	0.14	0.14	0.15	0.14	0.15	0.15	0.15	0.15
AE-R5	51.00	43.37	45.04	40.47	51.97	44.30	53.78	43.37	44.38	42.79	52.50	43.37	52.17	47.00	46.21	43.37	53.37	46.11	44.72	40.47	48.65	41.92	52.27	47.00	48.75	40.48
AE-R6	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.04
AE-R7	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08
AF-R1	0.64	0.63	0.64	0.68	0.63	0.63	0.65	0.60	0.67	0.66	0.64	0.63	0.61	0.46	0.77	0.75	0.64	0.63	0.59	0.64	0.60	0.59	0.63	0.64	0.70	0.59
AF-R2	1.43	1.35	1.27	1.30	1.47	1.38	1.45	1.35	1.09	0.99	1.44	1.38	1.77	1.80	1.50	1.36	1.44	1.36	1.36	1.35	1.49	1.38	1.35	1.30	1.64	1.43
AF-R3	25.24	23.71	24.41	23.01	24.93	23.60	26.65	25.12	21.06	21.27	26.21	24.66	25.88	25.12	22.67	20.87	24.91	23.99	27.58	25.12	25.16	25.09	25.88	24.26	23.01	22.27
AF-R4	20.88	19.17	19.34	16.70	21.30	19.17	20.38	20.36	16.84	16.88	21.04	19.17	24.77	20.36	21.06	21.49	20.08	18.89	23.61	20.36	19.54	20.22	22.17	19.17	17.53	15.43
AF-R5	29.51	31.87	27.19	29.74	31.21	32.34	26.66	25.69	32.47	32.38	28.53	29.46	30.34	29.74	22.18	20.07	29.28	29.97	33.59	35.77	31.73	34.15	29.74	31.87	26.49	27.79
AF-R6	0.91	0.81	0.93	1.04	0.91	0.81	0.92	0.89	1.02	0.96	0.91	0.85	0.80	0.81	0.90	0.92	0.91	0.81	0.92	0.87	0.96	0.81	0.88	0.81	0.98	1.00
AF-R7	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.05	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.04
AF-R8	158.37	123.90	158.63	132.32	155.62	122.24	151.78	123.51	121.36	117.72	167.48	129.94	161.61	120.86	163.73	140.48	155.08	124.97	167.66	118.02	141.88	122.03	164.41	126.26	152.94	119.02
AF-R9	0.12	0.12	0.12	0.13	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.13	0.12	0.12	0.12	0.12	0.13	0.12	0.12	0.12	0.12	0.13
AF-R10	0.12	0.12	0.14	0.14	0.11	0.10	0.14	0.13	0.12	0.10	0.13	0.13	0.10	0.10	0.15	0.13	0.12	0.12	0.11	0.10	0.12	0.11	0.12	0.12	0.13	0.10
AF-R11	0.18	0.17	0.19	0.18	0.19	0.17	0.17	0.17	0.18	0.19	0.18	0.17	0.18	0.17	0.17	0.17	0.18	0.17	0.18	0.18	0.17	0.16	0.19	0.19	0.18	0.17
AF-R12	1.19	0.92	0.84	0.75	1.36	0.98	0.81	0.75	1.17	0.88	1.24	0.93	1.01	0.91	1.34	1.31	1.13	0.92	1.33	0.91	1.17	1.00	1.27	0.99	0.93	0.71
AF-R13	34.10	33.55	31.04	31.84	34.32	33.55	35.46	34.37	28.77	28.02	34.43	33.55	38.75	34.08	39.74	38.94	33.53	33.55	33.59	32.15	31.76	33.07	34.37	33.55	35.42	32.69
AF-R14	8.10	8.37	7.25	7.30	8.57	8.73	7.29	8.28	8.39	8.15	7.94	8.32	8.42	8.69	7.27	6.78	7.98	8.08	8.89	8.69	8.88	9.39	8.21	8.36	6.90	6.91
AF-R15	2.68	2.72	2.64	2.75	2.69	2.74	2.66	2.52	2.52	2.43	2.63	2.73	3.03	3.13	2.90	2.97	2.68	2.74	2.58	2.51	2.56	2.56	2.74	2.74	2.54	2.42
AF-R16	0.13	0.12	0.11	0.10	0.13	0.13	0.12	0.11	0.11	0.11	0.13	0.13	0.11	0.10	0.12	0.13	0.12	0.12	0.13	0.15	0.12	0.12	0.13	0.13	0.13	0.12
AG-R1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04
AG-R2	0.67	0.68	0.63	0.64	0.66	0.67	0.71	0.75	0.59	0.63	0.66	0.68	0.79	0.80	0.64	0.59	0.66	0.68	0.70	0.79	0.66	0.70	0.69	0.68	0.60	0.62
AG-R3	1.32	1.27	1.33	1.19	1.32	1.28	1.31	1.34	1.33	1.27	1.29	1.23	1.38	1.29	1.09	1.10	1.33	1.28	1.38	1.29	1.19	1.18	1.34	1.27	1.37	1.36
AG-R4	0.05	0.05	0.06	0.07	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.06	0.07	0.05	0.04	0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.05
AG-R5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AG-R6	0.13	0.12	0.14	0.13	0.13	0.13	0.11	0.12	0.14	0.12	0.13	0.13	0.14	0.12	0.11	0.11	0.13	0.13	0.14	0.12	0.12	0.12	0.13	0.13	0.14	0.13
AG-R7	0.12	0.12	0.14	0.12	0.12	0.13	0.12	0.11	0.15	0.14	0.12	0.12	0.11	0.12	0.13	0.13	0.12	0.12	0.10	0.11	0.13	0.13	0.12	0.12	0.11	0.12
AG-R8	7.15	6.60	7.46	6.99	6.86	6.59	8.03	7.74	6.97	6.57	7.13	6.69	7.44	6.57	5.60	5.46	7.01	6.59	8.34	8.54	7.74	7.22	6.88	6.57	7.53	7.02
AG-R9	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02
AG-R10	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
AG-R11	6.52	5.98	7.51	6.53	6.10	5.98	7.07	5.98	7.08	6.82	6.32	5.98	6.76	6.26	5.52	5.62	6.55	5.98	6.89	6.53	7.46	6.60	6.22	5.98	6.68	5.82
AH-R1	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05
AH-R2	1.63	1.56	1.60	1.43	1.61	1.52	1.60	1.57	1.63	1.51	1.69	1.57	1.41	1.35	1.56	1.23	1.68	1.56	1.50	1.56	1.46	1.43	1.55	1.46	2.11	2.09
AH-R3	0.72	0.75	0.67	0.67	0.74	0.77	0.73	0.80	0.69	0.75	0.73	0.79	0.73	0.70	0.67	0.67	0.73	0.77	0.72	0.70	0.72	0.73	0.71	0.70	0.78	0.79
AH-R4	21.05	19.74	20.50	20.05	20.75	19.41	23.15	23.59	21.89	20.28	21.86	19.94	16.61	15.89	21.95	19.52	21.64	19.94	18.55	19.74	22.56	24.75	20.00	19.41	23.36	21.48
AH-R5	164.76	160.09	166.06	174.50	160.42	158.14	186.79	178.17	167.96	166.10	164.44	159.93	162.43	173.15	146.24	137.42	167.97	165.93	161.54	159.63	164.48	163.65	157.01	159.13	193.11	174.61
AH-R6	1.11	0.99	1.11	1.04	1.06	0.96	1.37	1.19	1.10	1.03	1.09	0.99	1.22	0.93	0.75	0.72	1.13	1.02	1.19	1.19	1.31	1.08	0.98	0.92	1.40	1.50

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AH-R7	1.05	1.05	0.90	0.69	1.06	1.03	1.21	1.16	1.00	1.02	1.08	1.09	1.02	0.92	1.15	1.14	1.05	1.06	1.01	1.00	1.22	1.35	0.98	1.00	1.17	1.17
AH-R8	1.12	1.05	1.20	1.31	1.06	0.99	1.31	1.14	1.17	1.27	1.10	1.04	1.19	0.91	1.18	1.18	1.11	1.05	1.14	0.98	1.14	1.14	1.10	1.02	1.21	1.07
AH-R9	1.14	1.05	1.17	1.05	1.09	1.05	1.31	1.33	1.08	1.05	1.13	1.04	1.22	1.08	0.86	0.91	1.15	1.05	1.20	1.33	1.13	1.01	1.04	1.00	1.48	1.50
AH-R10	8.12	7.56	7.94	7.44	8.04	7.62	8.82	10.20	6.94	6.24	8.20	7.52	9.14	9.04	6.00	6.04	8.37	7.76	8.21	7.68	9.88	11.03	7.44	7.10	8.83	9.16
AH-R11	7.63	7.22	7.50	7.06	7.72	7.40	7.15	6.65	7.22	7.17	7.80	7.30	7.40	6.75	6.83	6.23	7.63	7.29	8.01	7.06	8.61	9.08	7.33	7.22	7.76	6.90
AH-R12	7.10	6.85	7.35	7.36	6.95	6.57	7.38	6.57	7.03	7.11	7.28	6.81	6.42	5.91	8.11	7.28	7.36	6.89	5.76	5.23	7.60	7.36	7.20	6.94	6.26	6.12
AH-R13	7.32	7.32	7.21	7.51	7.52	7.28	6.63	7.09	7.31	7.41	7.44	7.16	6.80	7.53	8.14	7.51	7.38	7.16	6.75	7.32	6.69	6.94	7.71	7.50	6.53	6.92
AH-R14	8.21	8.05	9.04	9.18	8.13	8.04	7.74	8.10	9.13	9.03	7.95	7.32	8.25	8.28	7.67	7.11	8.27	7.94	8.23	8.39	7.58	7.85	8.64	8.14	7.28	7.13
AH-R15	23.56	22.00	29.21	30.03	22.36	21.60	21.98	18.44	25.38	20.41	22.62	22.00	25.49	26.41	21.86	19.52	23.73	22.27	23.71	18.99	19.04	16.21	24.11	22.00	26.08	24.29
AH-R16	1.02	0.90	1.00	0.86	1.07	0.98	0.91	0.78	1.09	0.87	1.00	0.89	1.04	0.99	1.20	1.10	0.98	0.87	1.10	0.99	1.10	1.03	1.01	0.87	1.02	0.90
AH-R17	61.15	54.97	60.71	53.16	56.28	53.29	76.14	66.66	63.42	59.05	62.38	55.01	53.30	46.38	71.59	70.15	62.59	55.01	51.40	48.38	53.78	46.72	61.26	54.97	68.14	62.42
AH-R18	214.69	218.75	213.24	219.35	213.20	213.66	220.92	225.00	249.69	259.22	208.03	210.34	203.28	221.26	206.49	222.41	217.52	212.13	208.30	228.75	188.30	195.06	213.86	218.75	244.12	240.40
AH-R19	207.02	198.48	217.02	222.38	199.38	191.65	209.80	203.55	188.87	194.47	213.94	211.67	198.10	197.51	220.38	220.38	208.98	203.46	194.14	178.14	188.87	183.68	207.98	197.51	221.72	229.82
AH-R20	0.17	0.16	0.17	0.16	0.16	0.15	0.19	0.16	0.18	0.16	0.17	0.16	0.16	0.15	0.16	0.16	0.17	0.16	0.16	0.16	0.18	0.17	0.16	0.16	0.19	0.19
AH-R21	24.89	24.07	25.09	23.39	25.02	24.01	25.72	25.43	27.25	23.57	24.34	24.56	24.56	23.97	21.26	14.09	24.76	23.86	26.96	24.73	24.76	24.40	24.62	23.94	26.02	23.67
AH-R22	16.88	15.71	20.57	24.15	16.34	15.71	15.50	13.17	17.17	16.11	16.50	15.34	18.18	16.89	15.17	12.42	17.04	15.76	17.10	16.89	17.19	15.91	17.14	15.80	15.63	14.44
AI-R1	0.05	0.05	0.04	0.04	0.05	0.05	0.07	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.04	0.04	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.04	0.05	0.05
AI-R2	1.98	1.58	1.44	1.27	1.96	1.65	2.93	2.67	2.63	2.27	1.80	1.41	2.03	2.11	1.35	1.31	1.91	1.41	2.52	2.45	2.47	2.20	1.90	1.46	1.81	1.55
AI-R3	0.87	0.78	0.91	0.86	0.81	0.76	1.09	1.22	1.08	1.20	0.80	0.74	0.94	0.86	0.93	0.94	0.85	0.78	0.95	0.79	0.97	1.02	0.85	0.78	0.86	0.76
AI-R4	22.19	24.38	27.26	28.57	21.03	22.60	20.62	25.23	25.16	25.17	21.10	23.17	23.49	28.71	24.62	24.80	22.15	24.74	21.27	24.37	22.06	25.98	22.31	24.38	21.89	23.94
AI-R5	1.34	1.35	1.62	1.61	1.23	1.16	1.38	1.21	1.56	1.51	1.28	1.28	1.33	1.21	1.61	1.61	1.34	1.28	1.21	1.19	1.43	1.48	1.35	1.40	1.22	1.28
AI-R6	173.00	182.61	209.77	197.20	164.85	162.64	146.46	155.84	191.39	189.38	170.38	162.64	163.21	184.14	194.71	190.78	175.43	186.69	154.72	153.61	157.33	156.38	179.54	183.42	164.98	183.37
AI-R7	9.63	11.01	11.63	12.08	9.04	8.17	9.00	11.18	11.99	11.99	9.05	8.34	9.42	11.18	11.82	12.41	9.54	10.78	8.98	9.28	8.88	9.69	9.96	11.18	9.17	9.83
AI-R8	6.99	6.94	6.52	6.80	7.12	6.90	7.26	6.96	7.00	7.24	7.03	6.73	6.80	6.96	6.51	6.46	6.89	6.95	7.55	7.65	7.49	7.02	6.78	6.80	7.24	7.59
AI-R9	225.70	198.55	223.94	227.77	226.40	196.50	232.18	200.22	282.11	293.15	208.07	185.42	236.80	242.93	253.90	221.64	213.71	189.71	255.80	261.49	246.13	225.00	224.99	198.55	207.84	214.47
AI-R10	0.18	0.17	0.22	0.23	0.17	0.17	0.16	0.16	0.20	0.19	0.18	0.17	0.18	0.16	0.21	0.21	0.18	0.17	0.18	0.16	0.19	0.18	0.18	0.17	0.18	0.16
AJ-R1	0.06	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.05	0.04	0.06	0.05	0.06	0.06	0.05	0.04	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.05
AJ-R2	1.90	1.88	2.04	1.94	1.81	1.73	2.16	2.08	1.34	1.14	2.02	2.07	2.02	1.76	1.63	1.42	1.98	1.92	1.76	1.70	1.75	1.79	1.85	1.70	2.25	2.17
AJ-R3	0.80	0.78	0.82	0.72	0.79	0.78	0.89	0.83	0.82	0.79	0.78	0.74	0.90	0.83	0.69	0.72	0.82	0.78	0.81	0.78	0.84	0.81	0.78	0.78	0.87	0.84
AJ-R4	21.39	21.52	21.47	25.75	21.00	21.31	21.80	20.97	22.20	25.43	22.00	22.86	17.89	17.95	24.30	24.35	21.26	22.04	20.57	20.98	22.04	21.37	21.16	21.52	21.61	22.20
AJ-R5	161.77	155.50	163.44	140.13	159.81	152.26	157.62	156.93	147.67	128.89	167.45	157.04	153.57	126.10	163.13	156.85	158.69	146.68	172.13	156.05	140.24	137.40	166.30	158.18	166.91	129.80
AJ-R6	8.32	8.00	8.40	7.39	8.23	7.90	8.55	9.27	9.01	9.81	8.17	7.79	8.15	7.87	8.24	8.17	8.50	8.32	7.70	7.18	7.75	7.84	8.53	8.28	8.13	7.80
AJ-R7	8.34	7.78	8.01	7.43	8.35	7.95	9.02	9.81	6.66	6.24	8.70	8.33	8.71	8.58	8.21	7.53	8.47	8.21	7.93	7.57	10.24	10.08	7.91	7.74	8.00	7.14
AJ-R8	217.74	190.91	235.47	146.91	215.26	189.70	207.62	215.98	218.57	196.05	206.50	186.94	265.00	249.51	202.62	198.52	212.56	181.04	242.88	249.51	220.54	217.44	224.03	198.46	192.16	148.51
AJ-R9	241.09	225.21	239.65	236.54	240.22	222.78	231.93	213.50	229.86	220.81	236.02	222.78	275.64	247.12	232.71	213.85	233.64	216.75	271.30	262.62	263.15	251.65	246.20	236.54	200.49	195.59
AJ-R10	0.17	0.17	0.15	0.16	0.17	0.17	0.16	0.17	0.14	0.14	0.17	0.17	0.16	0.17	0.14	0.15	0.17	0.17	0.15	0.17	0.18	0.17	0.16	0.17	0.18	0.19
AK-R1	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.06	0.04	0.04	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.06	0.06
AK-R2	1.66	1.64	1.96	1.73	1.59	1.64	1.64	1.35	1.63	1.60	1.72	1.67	1.47	1.49	1.09	1.12	1.78	1.69	1.52	1.57	1.64	1.69	1.68	1.57	1.64	1.67
AK-R3	0.79	0.76	0.84	0.76	0.81	0.78	0.68	0.69	0.83	0.79	0.79	0.75	0.73	0.76	0.76	0.75	0.81	0.77	0.73	0.71	0.75	0.74	0.77	0.76	0.90	0.92
AK-R4	20.36	20.25	19.87	22.47	20.73	20.61	18.67	19.65	15.15	15.28	21.94	24.04	19.52	17.97	22.21	23.15	20.99	23.09	17.30	16.71	20.35	20.21	20.19	19.66	20.97	23.51
AK-R5	158.85	157.14	161.64	151.62	161.29	158.17	146.45	159.22	154.73	152.56	165.04	159.13	137.03	117.82	163.86	155.98	162.55	159.13	143.48	110.08	163.88	164.40	153.80	157.07	172.11	171.89
AK-R6	8.23	7.78	6.67	5.61	9.01	8.33	6.98	7.78	7.91	6.57	8.57	8.10	7.15	6.50	8.52	8.70	8.52	7.90	7.07	7.29	8.00	6.90	8.49	8.01	7.50	6.65
AK-R7	7.44	7.42	7.96	7.62	7.68	7.55	5.93	5.51	7.89	8.03	7.36	7.43	7.25	6.72	7.50	7.70	7.16	7.31	8.38	5.80	8.80	7.50	7.14	7.42	7.16	7.29
AK-R8	8.09	7.75	7.30	7.43	8.35	8.14	8.16	7.45	8.58	8.21	7.94	7.49	8.16	7.45	7.33	7.17	8.08	7.76	8.45	8.24	8.13	7.90	7.93	7.75	8.63	8.01
AK-R9	209.18	200.18	213.54	182.94	211.23	200.20	194.99	176.73	190.47	198.28	212.03	195.54	218.37	209.65	244.33	216.47	198.95	184.86	229.96	250.14	214.66	234.73	208.19	196.38	207.32	191.56
AK-R10	0.16	0.16	0.17	0.18	0.17	0.17	0.13	0.14	0.15	0.15	0.17	0.16	0.16	0.15	0.20	0.21	0.16	0.16	0.15	0.14	0.18	0.16	0.17	0.16	0.15	0.15
AL-R1	0.06	0.05	0.06	0.06	0.06	0.05	0.06	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.06	0.05	0.06	0.07	0.06	0.05	0.05	0.05
AL-R2	2.12	2.02	2.32	2.28	2.06	2.03	2.18	1.96	2.16	1.99	2.09	2.06	2.18	1.96	1.95	2.05	2.09	2.03	2.28	2.02	2.43	2.30	2.08	1.96	1.93	1.89
AL-R3	0.82	0.79	0.90	0.84	0.80	0.78	0.81	0.78	0.88	0.87	0.82	0.79	0.72	0.72	0.71	0.65	0.82	0.79	0.86	0.86	0.89	0.87	0.81	0.78	0.79	0.76
AL-R4	19.99	20.00	18.91	19.46	20.71	20.68	19.14	19.37	21.84	21.41	20.04	20.27	17.64	14.37	19.03	19.92	19.83	19.76	20.99	23.16	17.43	19.39	19.99	20.16	22.52	21.77
AL-R5	151.33	145.46	155.09	160.98	158.23	154.00	124.84	112.52	151.56	151.27	156.18	154.00	130.31	105.92	157.99	155.78	149.86	145.99	153.60	145.46	133.91	121.50	153.25	145.29	161.80	162.45
AL-R6	0.95	0.88	0.93	0.93	0.98	0.88	0.84	0.78	1.17	1.00	0.89	0.88	0.95	0.95	0.87	0.91	0.93	0.88	1.05	0.87	0.98	0.93	0.97	0.95	0.83	0.77
AL-R7	0.95	0.88	0.93	0.93	0.98	0.88	0.84	0.78	1.17	1.00	0.89	0.88	0.95	0.95	0.87	0.91	0.93	0.88	1.05	0.87	0.98	0.93	0.97	0.95	0.83	0.77
AL-R8	7.50	7.44	6.33	6.73	7.88	7.69	7.43	7.32	8.04	7.56	7.39	7.44	7.36	7.32	7.77	8.14	7.44	7.38	7.60	7.11	7.65	6.93	7.65	7.78	6.83	6.73
AL-R9	6.55	6.41	8.22	6.94	6.10	6.18	6.48	6.41	6.99	6.54	6.39	6.34	6.73	6.47	5.60	5.74	6.57	6.51	6.89	6.40	7.99	7.72	6.25	6.26	6.18	6.03
AL-R10	7.98	7.35	7.26	7.11	8.31	7.51	7.72	7.65	7.18	6.38	8.19	7.36	7.99	7.81	7.07	7.29	8.15	7.41	7.77	6.84	7.05	6.95	7.78	7.29	9.62	9.42
AL-R11	6.11	5.90	6.80	7.23	6.10	5.84	5.61	5.46	6.96	6.26	5.89	5.79	6.06	5.88	5.06	5.09	6.27	5.89	6.02	5.98	7.45	8.06	5.81	5.77	5.86	5.83
AL-R12	6.55	6.41	8.22	6.94	6.10	6.18	6.48	6.41	6.99	6.54	6.39	6.34	6.73	6.47	5.60	5.74	6.57	6.51	6.89	6.40	7.99	7.72	6.25	6.26	6.18	6.03
AL-R13	5.37	4.87	6.34	6.52	4.77	4.71	6.56	6.45	5.54	4.88	5.08	4.79	6.41	4.94	4.71	4.69	5.30	4.80	5.90	6.18	6.25	5.69	5.33	4.77	4.63	4.44
AL-R14	262.64	260.94	199.94	171.28	261.12	261.05	312.18	343.98	236.98	218.71	273.25	265.96	246.48	227.18	302.28	269.46	256.78	257.59	265.85	261.08	263.14	281.12	267.81	260.94	243.38	214.70
AL-R15	215.28	199.28	192.11	192.46	211.96	196.37	243.57	264.75	185.99	182.33	225.12	213.95	206.57	192.46	250.56	267.16	213.93	198.21	204.41	194.36	209.56	200.46	219.79	199.28	204.66	216.24
AL-R16	0.16	0.16	0.17	0.17	0.17	0.17	0.13	0.13	0.19	0.18	0.16	0.15	0.14	0.12	0.16	0.16	0.16	0.16	0.16	0.17	0.14	0.16	0.16	0.17	0.18	0.19
AM-R1	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.06	0.05	0.05	0.05
AM-R2	1.79	1.69	1.81	1.64	1.78	1.69	1.79	1.96	1.48	1.46	1.84	1.69	1.95	1.83	1.81	1.82	1.87	1.69	1.51	1.27	1.81	1.82	1.77	1.69	1.86	1.77
AM-R3	0.79	0.78	0.75	0.76	0.75	0.78	1.03	1.05	0.73	0.77	0.77	0.77	0.95	0.81	0.67	0.66	0.79	0.78	0.85	0.79	0.75	0.77	0.81	0.78	0.76	0.77
AM-R4	20.06	19.41	19.43	19.66	20.32	19.40	18.97	19.17	19.92	18.78	20.57	20.24	18.01	16.03	20.56	19.77	20.06	19.40	19.82	19.17	23.02	26.53	19.32	19.38	19.76	17.96
AM-R5	0.97	0.88	0.84	0.78	1.03	0.99	0.87	0.80	0.94	0.88	0.99	0.91	0.90	0.84	0.77	0.72	0.98	0.89	1.03	1.05	1.03	0.90	0.94	0.87	1.03	1.02
AM-R6	1.07	1.07	1.19	1.20	1.08	1.05	0.95	0.95	1.16	1.12	1.08	1.07	0.93	0.98	0.97	0.98	1.08	1.06	1.08	1.19	1.20	1.23	1.02	1.04	1.13	1.12
AM-R7	1.02	1.00	1.06	1.01	1.04	0.98	0.91	0.88	1.04	1.03	1.02	0.95	1.01	0.85	1.08	1.03	1.00	0.93	1.09	1.12	1.17	1.14	0.96	0.90	1.10	1.05
AM-R8	0.97	0.92	0.83	0.84	1.04	1.01	0.87	0.70	1.06	1.01	1.00	1.00	0.78	0.84	0.87	0.88	0.97	0.91	1.03	0.96	0.91	0.87	0.96	0.96	1.10	0.94
AM-R9	1.05	1.00	0.92	0.93	1.12	1.05	0.94	0.78	1.09	1.03	1.07	1.00	0.90	0.84	0.98	0.99	1.05	1.00	1.09	1.23	1.18	1.13	0.99	0.99	1.16	1.05
AM-R10	169.32	152.05	150.39	137.71	172.93	158.21	181.58	155.70	167.97	153.74	166.41	152.41	183.32	146.78	137.84	145.11	161.72	148.61	210.32	221.72	218.41	237.65	151.49	141.34	184.88	199.62
AM-R11	7.65	7.60	7.91	6.35	7.77	7.76	6.85	5.96	8.66	7.83	7.26	7.55	8.14	6.38	8.21	7.80	7.53	7.21	7.83	7.93	7.89	8.10	7.57	7.46	7.70	7.60
AM-R12	6.34	6.20	5.35	4.78	6.20	6.06	7.74	8.40	5.22	4.82	6.40	6.24	7.36	7.38	5.97	5.49	6.32	6.17	6.59	6.38	6.63	6.49	6.27	6.23	6.30	5.38
AM-R13	5.15	4.91	4.89	4.31	5.20	4.92	5.19	4.89	5.46	4.82	4.98	4.87	5.50	4.96	4.41	4.16	5.01	4.86	5.97	5.48	5.51	5.03	4.90	4.47	5.67	5.13
AM-R14	7.57	7.19	9.23	9.13	7.12	7.08	7.36	6.73	8.63	8.52	7.45	7.16	6.86	6.70	9.85	9.68	7.58	7.25	6.52	6.73	7.31	7.08	7.55	7.25	7.88	8.01
AM-R15	3.23	3.11	2.54	2.20	3.35	3.19	3.03	2.88	3.19	3.05	3.16	3.06	3.57	3.22	3.68	2.53	3.11	3.13	3.44	3.29	3.12	3.16	3.24	2.84	3.30	3.42
AM-R16	5.75	5.65	6.26	5.79	5.38	5.47	6.95	6.62	5.77	5.43	5.54	5.57	6.66	6.50	5.26	5.05	5.74	5.68	6.02	5.39	5.49	5.44	6.01	5.72	5.09	5.40
AM-R17	8.09	7.88	8.54	8.40	7.67	7.50	9.26	10.28	6.82	6.04	8.36	8.00	8.38	8.73	8.59	8.72	8.21	7.86	7.41	8.03	9.08	8.64	7.91	7.50	7.75	7.86
AM-R18	255.59	251.20	202.73	164.90	277.88	273.21	243.94	279.64	252.40	213.04	261.12	256.09	235.58	252.47	223.96	198.63	252.13	248.34	281.98	300.67	252.92	275.93	245.50	230.81	294.85	259.65

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AM-R19	201.38	193.52	192.36	187.52	212.25	222.37	180.63	193.52	204.90	220.48	199.55	189.21	205.22	193.52	190.22	193.21	201.57	202.17	205.68	186.34	199.65	207.08	201.21	193.52	203.73	183.51
AM-R20	9.71	9.30	7.48	7.01	10.67	9.90	9.27	9.11	9.95	9.05	9.75	9.40	9.28	8.69	9.03	8.22	9.65	9.41	10.24	8.53	8.97	9.23	9.01	8.53	13.00	12.10
AM-R21	0.18	0.18	0.16	0.16	0.19	0.19	0.16	0.16	0.18	0.18	0.18	0.18	0.16	0.16	0.13	0.12	0.19	0.19	0.18	0.21	0.22	0.21	0.17	0.16	0.18	0.20
AN-R1	0.04	0.04	0.03	0.03	0.04	0.04	0.05	0.05	0.03	0.04	0.04	0.04	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06
AN-R2	1.42	1.41	1.05	1.27	1.37	1.36	1.92	1.57	1.19	1.29	1.41	1.47	1.76	1.45	1.79	1.57	1.34	1.38	1.58	1.41	1.24	1.38	1.47	1.36	1.46	1.68
AN-R3	0.63	0.74	0.49	0.50	0.62	0.74	0.81	0.83	0.54	0.55	0.62	0.73	0.80	0.74	0.69	0.70	0.61	0.74	0.68	0.59	0.49	0.50	0.68	0.78	0.59	0.73
AN-R4	17.95	19.45	14.56	13.78	17.88	19.55	20.82	19.26	18.01	20.12	17.83	19.43	18.41	19.65	26.10	28.70	14.78	17.88	25.62	27.64	18.54	18.57	19.07	20.97	13.32	15.55
AN-R5	138.41	160.92	125.36	164.69	132.53	157.16	174.07	187.51	134.68	166.57	134.69	157.16	158.60	173.69	175.06	185.25	127.90	157.16	159.48	161.03	138.22	157.12	139.74	160.92	133.78	172.72
AN-R6	6.94	6.92	6.30	6.52	6.55	6.48	8.76	8.34	6.80	6.47	6.75	6.84	7.96	8.34	8.67	8.90	5.89	6.04	9.92	11.87	8.17	8.01	7.04	7.34	5.38	5.89
AN-R7	5.63	5.95	5.03	5.78	5.37	5.47	7.13	7.02	5.40	4.85	5.35	5.94	7.08	6.89	8.53	7.53	5.00	5.58	6.59	6.20	5.81	6.11	5.71	5.78	5.18	5.98
AN-R8	4.72	5.05	3.91	4.46	4.41	4.56	6.82	8.14	4.19	4.65	4.83	4.95	4.90	5.05	5.68	5.33	4.58	5.07	4.80	4.35	5.88	6.24	4.57	5.05	4.14	4.06
AN-R9	6.30	6.36	4.21	4.38	6.66	6.79	7.60	6.88	4.97	5.93	6.38	6.35	7.52	6.88	8.42	6.39	5.59	5.93	7.91	6.89	6.42	6.80	6.12	5.51	6.85	8.06
AN-R10	2.98	3.22	2.18	2.32	2.91	3.13	4.09	4.09	2.57	2.67	2.93	3.25	3.67	3.31	4.55	4.92	2.66	3.23	3.42	2.92	2.98	2.79	3.13	3.30	2.42	2.84
AN-R11	4.85	5.35	3.85	4.62	4.86	5.41	6.17	6.29	4.40	4.76	4.56	5.02	6.58	6.35	4.66	4.44	4.30	4.76	6.89	6.35	5.18	5.34	4.60	4.69	5.43	6.09
AN-R12	6.38	6.97	5.14	5.61	6.48	7.04	7.87	7.84	4.98	5.57	6.22	6.84	8.68	8.25	5.10	4.64	6.02	7.04	8.24	7.84	8.24	8.18	6.04	6.82	5.79	6.30
AN-R13	200.08	209.64	185.24	229.36	186.33	179.02	281.65	306.36	173.01	159.41	183.61	197.38	301.62	306.32	187.27	168.26	194.68	212.49	224.96	169.07	208.66	210.95	212.29	218.75	147.25	150.93
AN-R14	167.91	171.78	136.12	168.71	157.76	161.86	254.92	277.82	133.69	145.80	159.71	170.24	242.15	264.13	155.30	148.99	156.69	176.27	213.43	190.28	188.94	179.81	170.99	180.77	135.71	171.78
AN-R15	0.15	0.16	0.14	0.17	0.15	0.15	0.18	0.16	0.14	0.16	0.15	0.17	0.15	0.15	0.20	0.20	0.13	0.15	0.19	0.18	0.15	0.17	0.16	0.15	0.12	0.14
AN-R16	5.40	6.14	4.93	6.14	5.33	5.97	6.40	6.75	5.18	6.81	4.83	5.21	8.06	8.20	5.25	4.83	4.96	5.85	7.03	6.91	5.22	6.17	5.61	6.56	4.81	5.49
AO-R1	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.07	0.05	0.05	0.05	0.05	0.06	0.05	0.03	0.03	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.05
AO-R2	1.76	1.56	1.52	1.46	1.76	1.66	2.14	1.57	1.62	1.51	1.66	1.47	2.37	2.25	1.53	1.33	1.71	1.56	2.05	1.96	1.99	1.90	1.79	1.64	1.44	1.38
AO-R3	0.80	0.78	0.78	0.76	0.77	0.75	0.96	0.99	0.75	0.74	0.79	0.78	0.90	0.78	0.90	0.82	0.76	0.75	0.90	0.78	0.94	0.95	0.78	0.78	0.74	0.76
AO-R4	20.78	21.03	18.48	17.32	21.90	21.87	18.67	20.25	22.03	21.17	20.82	21.76	19.16	18.56	25.60	24.97	20.58	21.06	19.33	18.99	21.08	20.07	21.29	21.32	18.61	17.87
AO-R5	162.71	151.91	153.92	151.91	171.14	164.69	133.31	149.09	156.18	153.28	168.49	158.05	145.39	123.60	199.08	210.30	161.97	149.64	149.16	151.51	164.62	153.66	161.75	155.05	164.27	137.39
AO-R6	8.18	7.62	7.86	6.93	8.32	7.74	7.86	6.86	8.70	8.20	8.07	7.24	8.08	7.20	12.25	11.58	7.64	6.73	8.33	7.62	7.96	6.88	8.29	7.69	8.04	7.49
AO-R7	6.98	6.99	6.95	7.89	7.13	6.93	6.28	6.35	6.73	6.78	7.04	6.93	6.98	7.89	7.33	7.22	6.85	6.93	7.26	7.88	6.49	6.32	7.05	6.86	7.19	8.10
AO-R8	6.34	5.94	6.57	6.79	6.27	5.79	6.44	6.95	5.44	5.31	6.50	6.32	6.67	6.95	7.68	7.75	6.16	5.79	6.36	6.01	5.74	5.37	6.51	6.01	6.31	6.11
AO-R9	6.85	6.26	7.57	7.06	6.42	5.43	7.64	6.50	7.23	6.23	6.88	6.38	6.30	5.47	6.43	6.64	6.94	6.39	6.73	5.47	6.95	5.17	6.84	7.02	6.82	6.36
AO-R10	3.87	3.67	3.85	3.75	3.86	3.45	3.97	3.73	3.20	2.67	4.07	3.63	3.77	3.73	4.02	4.17	3.86	3.40	3.82	3.73	3.77	3.52	3.78	3.58	4.30	4.17
AO-R11	6.17	5.72	6.61	5.72	6.04	5.73	6.51	7.01	6.23	6.20	6.06	5.64	6.59	5.15	4.90	5.16	6.39	6.17	5.97	5.41	5.32	4.55	6.45	5.72	6.00	6.03
AO-R12	7.54	7.33	8.48	7.50	7.42	7.36	6.68	6.95	9.06	8.42	7.28	7.38	6.91	6.02	7.92	7.56	7.56	7.44	7.31	6.59	6.80	6.86	7.78	7.50	7.39	7.19
AO-R13	212.67	188.96	181.63	171.51	202.57	187.31	258.58	279.67	207.68	180.24	220.87	201.43	183.19	153.43	243.71	187.03	209.93	194.67	208.59	161.67	243.58	241.08	199.75	174.20	228.56	216.52
AO-R14	208.59	197.35	212.56	199.49	206.84	196.91	197.73	190.25	193.68	181.13	209.68	203.80	220.95	199.49	252.24	250.34	200.84	190.92	216.72	205.30	211.43	211.35	211.21	190.91	196.24	192.41
AO-R15	0.19	0.17	0.15	0.14	0.20	0.18	0.18	0.17	0.20	0.19	0.18	0.17	0.19	0.18	0.23	0.23	0.18	0.17	0.19	0.17	0.20	0.18	0.19	0.17	0.16	0.15
AO-R16	6.37	6.09	6.25	6.26	6.08	5.96	7.18	6.91	5.86	5.84	6.68	6.33	5.61	6.26	6.81	6.31	6.34	6.04	6.29	6.26	6.60	6.40	6.45	6.09	5.85	5.80
AP-R1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.05
AP-R2	1.84	1.69	1.86	1.62	1.84	1.77	1.69	1.46	1.84	1.72	1.91	1.73	1.57	1.60	1.98	2.04	1.84	1.69	1.78	1.67	1.92	1.87	1.89	1.77	1.59	1.44
AP-R3	0.79	0.76	0.70	0.69	0.81	0.79	0.77	0.74	0.72	0.63	0.83	0.79	0.67	0.70	0.79	0.76	0.77	0.74	0.83	0.82	0.88	0.81	0.80	0.78	0.66	0.61
AP-R4	20.30	19.66	21.76	24.07	20.57	19.83	18.64	15.18	22.01	24.18	20.29	19.63	18.44	19.66	20.71	20.81	20.09	19.83	20.89	19.66	17.21	16.36	21.26	20.97	19.93	19.13
AP-R5	65.77	61.78	68.66	61.78	64.27	61.44	70.21	67.97	66.04	64.93	67.84	62.87	56.57	47.91	59.80	59.89	68.89	62.46	57.32	47.91	60.50	64.24	60.94	59.25	88.54	89.72
AP-R6	8.61	7.94	9.15	8.14	8.77	7.97	7.82	7.50	8.18	7.74	8.61	7.97	9.14	9.99	7.40	7.71	8.86	7.99	8.28	7.93	8.33	7.47	8.81	8.11	8.17	6.87
AP-R7	6.80	6.78	6.46	5.24	7.08	7.14	6.16	5.30	6.29	5.41	6.91	6.98	6.94	6.78	6.46	6.70	6.78	6.59	7.06	7.09	5.96	6.03	6.99	7.09	6.97	6.24
AP-R8	105.40	108.86	110.98	111.43	103.37	100.75	110.81	115.83	111.90	113.25	103.40	102.13	106.55	108.86	91.79	86.15	107.84	110.33	102.77	83.49	107.65	108.46	103.96	108.86	108.40	97.86
AP-R9	21.29	19.60	18.88	18.05	22.14	19.53	21.80	20.63	19.29	18.33	22.20	19.93	19.64	17.91	22.22	18.73	21.19	19.63	21.22	19.70	19.49	19.10	22.09	19.41	20.17	19.63
AP-R10	17.11	15.71	16.61	15.53	17.93	16.29	15.04	14.75	16.36	16.45	17.74	16.20	15.28	14.75	15.63	13.54	17.22	16.20	17.39	15.53	16.52	15.39	17.60	16.39	15.91	13.01
AP-R11	232.74	221.43	231.59	218.77	228.60	223.85	251.38	228.85	221.28	218.73	233.90	228.79	240.82	221.43	244.56	228.59	236.95	220.10	212.50	221.39	218.25	200.45	232.22	221.43	249.08	236.15
AP-R12	0.18	0.16	0.19	0.16	0.18	0.17	0.16	0.17	0.19	0.17	0.18	0.17	0.17	0.12	0.18	0.18	0.19	0.17	0.14	0.13	0.16	0.17	0.17	0.17	0.20	0.15
AP-R13	12.03	11.21	11.18	11.27	12.57	11.12	10.54	9.12	12.79	11.15	11.74	11.01	12.41	14.90	11.39	11.04	12.24	11.31	11.57	10.64	10.32	9.43	12.42	11.27	12.33	11.01
AP-R14	38.22	34.10	41.22	34.53	37.09	33.10	37.99	36.84	31.97	31.84	39.50	35.60	39.92	34.53	46.44	47.80	39.52	34.23	29.96	30.43	37.49	33.57	37.09	33.60	43.08	38.89
AP-R15																										
AP-R16	0.17	0.15	0.18	0.15	0.16	0.15	0.16	0.15	0.17	0.17	0.17	0.16	0.15	0.15	0.16	0.14	0.16	0.15	0.19	0.19	0.18	0.18	0.16	0.15	0.15	0.16
AP-R17	0.79	0.77	0.76	0.74	0.82	0.79	0.72	0.73	0.84	0.81	0.79	0.76	0.75	0.77	0.76	0.76	0.79	0.77	0.82	0.79	0.69	0.70	0.82	0.78	0.80	0.72
AP-R18	1.47	1.37	1.40	1.34	1.43	1.37	1.74	1.96	1.51	1.40	1.52	1.43	1.21	1.34	1.34	1.35	1.52	1.43	1.34	1.41	1.53	1.35	1.39	1.37	1.68	1.63
AP-R19	4.44	4.56	4.39	4.77	4.45	4.56	4.58	4.76	5.03	4.88	4.27	4.29	4.53	4.91	4.12	3.78	4.31	4.46	5.04	4.95	4.69	4.66	4.50	4.79	4.00	3.83
AP-R20	11.50	11.81	11.36	12.35	11.52	11.81	11.85	12.32	13.02	12.63	11.04	11.11	11.74	12.70	10.66	9.78	11.17	11.55	13.05	12.81	12.15	12.07	11.64	12.40	10.35	9.93
AP-R21	7.32	7.52	7.24	7.87	7.33	7.52	7.54	7.85	8.29	8.04	7.03	7.07	7.47	8.09	6.79	6.23	7.11	7.35	8.31	8.16	7.73	7.68	7.41	7.90	6.59	6.32
AP-R22	62.40	64.07	61.65	67.01	62.49	64.07	64.26	66.85	70.63	68.50	59.91	60.25	63.66	68.91	57.85	53.06	60.61	62.63	70.79	69.49	65.89	65.46	63.17	67.29	56.13	53.85
AP-R23	178.28	189.05	182.70	192.94	174.78	185.95	182.99	189.05	176.93	188.60	175.53	185.74	191.61	199.83	180.01	197.73	177.85	184.04	179.04	191.08	182.25	194.44	175.46	184.26	184.51	192.61
AQ-R1	0.17	0.16	0.20	0.15	0.17	0.16	0.15	0.16	0.14	0.15	0.18	0.16	0.19	0.16	0.15	0.15	0.18	0.16	0.17	0.17	0.17	0.16	0.18	0.16	0.15	0.14
AQ-R2	9.13	8.34	8.61	9.67	9.90	8.90	7.05	7.42	9.06	8.86	9.02	7.75	9.64	8.84	7.05	6.35	9.51	8.75	8.69	8.34	8.72	8.39	9.52	9.10	8.12	8.10
AQ-R3	10.27	9.20	11.76	10.44	10.24	9.17	9.12	8.72	9.60	9.58	10.29	9.18	10.91	9.74	7.63	7.29	10.76	9.43	9.69	9.16	9.23	9.02	10.16	9.43	11.67	9.89
AQ-R4	8.06	7.44	7.36	7.49	8.90	7.83	6.07	5.79	7.33	7.29	8.43	7.63	7.34	6.19	7.02	7.54	8.28	7.47	7.77	7.13	8.12	7.09	8.21	7.65	7.49	6.75
AQ-R5	6.08	5.65	6.53	7.12	6.21	5.65	5.21	5.32	5.72	5.65	6.18	5.75	6.09	5.66	4.76	4.32	6.43	5.87	5.44	5.65	5.42	5.73	6.26	5.65	6.12	5.77
AQ-R6	208.48	202.02	213.19	208.68	210.05	202.01	201.10	208.67	207.02	230.62	203.88	195.63	229.87	208.68	218.73	160.80	204.89	199.73	216.70	208.68	195.09	208.67	218.62	203.55	185.14	177.56
AQ-R7	0.98	0.95	0.90	0.95	1.02	0.95	0.93	0.96	0.98	0.91	0.96	0.95	1.06	0.96	0.93	1.01	0.96	0.95	1.06	0.93	0.93	0.91	0.99	0.96	0.98	0.99
AQ-R8	0.51	0.49	0.45	0.41	0.51	0.50	0.56	0.60	0.48	0.44	0.52	0.50	0.50	0.50	0.55	0.57	0.49	0.49	0.55	0.49	0.57	0.58	0.49	0.48	0.50	0.47
AQ-R9	11.48	10.67	13.90	14.40	11.41	10.39	8.96	9.13	12.69	10.53	11.07	10.37	11.83	13.05	9.96	8.60	11.61	10.86	11.69	10.39	8.66	8.81	11.77	10.86	13.21	12.70
AQ-R10	1.81	1.76	1.75	1.79	1.70	1.70	2.32	1.67	2.14	1.84	1.77	1.69	1.64	1.77	1.54	1.65	1.87	1.76	1.72	1.68	2.22	1.84	1.66	1.76	1.95	1.60
AR-R1	0.13	0.12	0.14	0.12	0.13	0.13	0.10	0.10	0.10	0.10	0.13	0.12	0.13	0.13	0.11	0.10	0.13	0.13	0.11	0.10	0.13	0.11	0.12	0.12	0.13	0.13
AR-R2	0.18	0.16	0.17	0.15	0.18	0.16	0.20	0.21	0.22	0.21	0.17	0.16	0.19	0.15	0.21	0.21	0.18	0.16	0.20	0.14	0.16	0.15	0.19	0.16	0.21	0.19
AR-R3	10.21	9.84	10.28	9.93	9.98	9.55	10.92	11.45	11.69	11.73	10.10	9.65	8.99	9.57	9.34	9.91	10.01	9.58	11.32	9.93	10.48	9.66	9.92	9.84	11.01	10.53
AR-R4	8.51	8.08	7.82	7.54	8.35	7.78	10.31	9.96	8.50	8.11	8.24	7.98	9.69	7.57	6.83	6.13	8.54	8.16	9.17	7.54	8.18	7.81	8.48	7.78	8.94	8.58
AR-R5	5.91	5.59	5.39	4.82	5.72	5.55	6.53	7.54	6.41	6.02	5.86	5.29	5.52	5.59	8.14	7.61	5.66	5.29	5.78	5.97	6.00	5.31	6.06	5.59	5.27	5.29
AR-R6	43.13	39.96	43.12	39.39	40.99	39.39	50.72	51.10	51.63	53.05	41.40	39.92	40.85	37.50	36.49	34.03	43.72	40.25	44.00	40.44	42.97	37.49	42.80	40.54	44.48	38.36
AR-R7	9.66	9.58	10.23	10.27	9.74	9.56	9.18	10.52	9.92	10.53	9.43	9.65	10.34	9.16	8.31	7.12	10.22	10.39	8.24	8.34	8.64	8.94	9.62	9.76	10.82	9.76
AR-R8	27.40	26.40	27.02	27.42	27.67	25.86	26.69	27.23	26.80	26.82	26.80	26.05	30.64	37.02	27.52	27.47	27.87	26.68	25.65	25.02	23.50	24.16	28.12	26.94	28.66	26.41
AR-R9	2.76	2.64	3.23	3.24	2.65	2.60	2.71	2.98	3.11	2.97	2.69	2.56	2.67	2.56	2.32	1.95	2.78	2.64	2.89	2.97	2.57	2.36	2.88	2.68	2.50	2.30
AR-R10	195.47	193.17	200.17	205.34	197.25	194.82	194.56	184.72	202.47	202.95	190.18	193.17	210.15	235.92	176.25	195.28	199.03	194.82	191.33	184.71	153.65	138.65	209.95	205.34	184.78	184.71
AR-R11	0.93	0.92	0.92	0.91	0.94	0.92	0.96	0.92	0.88	0.83	0.94	0.92	0.92	0.89	0.80	0.77	0.96	0.92	0.85	0.75	0.78	0.66	1.00	0.93	0.80	0.69
AR-R12	17.29	16.28	17.47	17.49	17.71	16.41	15.77	15.09	16.37	15.71	16.98	15.96	19.69	17.47	16.05	16.05	18.23	17.75	14.49	14.89	13.34	12.11	18.04	16.46	18.54	21.06

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AS-R1	8.02	7.88	9.53	11.19	6.79	7.61	10.60	11.19	7.60	7.28	8.09	7.94	8.19	10.63	5.50	5.50	7.77	7.87	10.04	11.19	9.46	10.82	8.25	7.86	5.75	6.82
AS-R2	18.72	20.45	21.85	27.58	17.34	19.98	19.94	19.41	18.29	19.06	18.78	20.46	18.95	21.19	15.39	19.49	17.93	19.53	23.00	24.76	20.04	22.06	20.17	20.97	12.12	13.91
AS-R3	50.23	48.38	53.53	45.16	47.70	46.77	58.41	54.71	51.76	45.06	48.96	49.03	53.92	58.80	54.61	59.10	49.90	49.03	49.46	45.15	45.21	49.97	57.76	54.71	27.95	39.48
AS-R4	7.58	7.78	8.08	9.77	6.92	7.52	9.30	10.60	6.91	5.72	7.42	7.78	9.07	10.80	5.13	5.37	7.58	7.78	8.70	10.20	8.19	10.49	7.43	7.78	7.54	8.33
AS-R5	103.65	108.02	123.92	148.68	94.07	101.63	113.37	108.02	111.67	114.35	101.45	106.95	103.92	112.20	75.09	89.48	103.08	105.36	118.37	120.28	117.87	137.65	106.86	105.88	77.79	88.75
AS-R6	15.35	15.71	16.28	18.11	14.47	15.01	18.19	15.71	16.23	16.17	15.59	15.95	13.34	14.55	10.41	12.96	14.93	15.95	19.06	16.62	17.48	15.07	16.12	16.62	10.45	13.08
AS-R7	179.47	204.99	174.40	200.75	174.76	197.10	202.67	217.92	169.02	164.78	183.04	206.15	176.10	206.10	224.47	264.00	181.70	212.52	151.53	154.37	190.89	208.27	193.40	206.10	117.52	143.43
AS-R8	2.53	2.62	2.72	3.07	2.27	2.53	3.31	3.34	2.61	2.63	2.46	2.62	2.77	2.75	1.82	2.24	2.41	2.55	3.29	3.34	3.06	3.05	2.58	2.62	1.83	1.69
AS-R9	0.15	0.17	0.20	0.24	0.13	0.16	0.18	0.16	0.15	0.16	0.15	0.17	0.17	0.16	0.11	0.13	0.15	0.16	0.19	0.22	0.18	0.18	0.16	0.17	0.11	0.14
AS-R10	0.26	0.28	0.28	0.28	0.24	0.24	0.28	0.29	0.24	0.22	0.27	0.29	0.22	0.22	0.33	0.41	0.26	0.28	0.21	0.22	0.22	0.21	0.29	0.30	0.18	0.23
AS-R11	0.21	0.22	0.24	0.21	0.20	0.22	0.23	0.24	0.20	0.19	0.21	0.22	0.23	0.25	0.25	0.29	0.21	0.23	0.20	0.18	0.25	0.25	0.22	0.22	0.17	0.22
AS-R12	0.08	0.09	0.08	0.07	0.08	0.08	0.10	0.09	0.09	0.09	0.09	0.09	0.07	0.07	0.11	0.12	0.08	0.09	0.08	0.07	0.06	0.06	0.10	0.09	0.06	0.08
AT-R1	6.07	6.28	6.16	5.21	5.65	6.12	7.40	8.52	5.37	5.33	6.70	7.07	4.16	4.55	4.87	3.94	6.35	6.57	5.61	5.17	6.94	6.57	5.71	5.21	6.52	8.24
AT-R2	14.50	15.92	13.87	8.13	14.16	15.97	16.72	22.47	14.71	15.15	15.12	16.09	11.59	8.13	9.81	7.05	15.53	17.84	12.92	14.28	15.92	17.51	14.55	16.02	12.90	14.73
AT-R3	5.72	5.92	4.91	4.93	6.02	6.08	5.66	5.99	4.44	5.55	6.33	6.68	4.55	4.42	2.95	2.49	6.27	6.00	4.99	5.34	6.36	6.68	5.39	5.75	6.25	6.56
AT-R4	77.96	81.15	70.15	85.77	72.76	79.52	100.38	121.87	72.49	77.82	80.73	83.15	72.32	79.05	73.01	68.35	81.31	83.15	68.21	51.09	69.94	64.67	80.95	81.68	75.13	82.31
AT-R5	12.46	15.43	13.08	11.33	11.79	15.16	13.72	17.68	11.46	15.30	13.87	15.94	7.56	7.10	9.45	8.39	13.59	15.79	9.77	10.34	13.80	15.67	11.47	13.72	14.70	15.93
AT-R6	163.17	181.80	143.96	160.58	171.99	202.32	153.78	163.92	170.48	193.98	165.38	172.86	145.38	167.08	113.46	77.46	176.63	196.27	137.44	167.08	179.95	224.07	159.26	160.58	160.60	178.53
AT-R7	0.62	0.79	0.65	0.83	0.55	0.58	0.74	0.90	0.69	0.85	0.62	0.76	0.50	0.52	0.54	0.47	0.61	0.76	0.69	0.83	0.60	0.78	0.58	0.55	0.76	0.85
AT-R8	0.13	0.16	0.11	0.11	0.12	0.15	0.17	0.21	0.11	0.13	0.14	0.17	0.10	0.11	0.08	0.07	0.13	0.17	0.12	0.12	0.13	0.15	0.12	0.15	0.14	0.17
AT-R9	0.22	0.26	0.22	0.24	0.23	0.27	0.19	0.24	0.29	0.34	0.22	0.25	0.15	0.22	0.19	0.15	0.23	0.25	0.19	0.27	0.22	0.29	0.21	0.22	0.26	0.26
AT-R10	0.18	0.18	0.16	0.17	0.19	0.22	0.16	0.17	0.23	0.32	0.18	0.17	0.14	0.18	0.13	0.08	0.19	0.18	0.17	0.19	0.19	0.21	0.17	0.18	0.21	0.22
AT-R11	4.24	4.81	3.93	3.97	4.09	4.45	5.01	6.40	3.63	4.39	4.59	5.20	3.42	3.76	2.69	2.53	4.61	5.31	3.59	3.75	4.34	5.17	4.12	5.03	4.55	4.65
AT-R12	1.22	1.32	1.20	1.24	1.22	1.35	1.27	1.24	1.25	1.31	1.27	1.34	1.02	1.24	0.94	0.59	1.29	1.34	1.14	1.32	1.35	1.43	1.13	1.32	1.42	1.61
AU-R1	6.10	7.10	5.39	6.12	6.27	7.63	6.49	7.10	4.96	5.46	6.23	7.20	6.84	8.56	6.85	6.78	5.50	6.52	7.92	10.23	5.39	5.57	6.25	7.49	6.26	7.20
AU-R2	16.23	19.02	14.96	19.66	16.40	19.10	17.64	19.02	16.66	20.32	16.34	18.91	15.23	17.88	16.30	16.33	16.25	20.19	16.09	19.02	12.49	14.79	16.46	19.02	19.13	28.00
AU-R3	6.04	7.01	6.00	7.01	5.92	6.48	6.50	7.38	5.75	5.77	6.33	7.44	5.13	6.88	8.27	8.30	5.73	6.58	6.15	6.88	5.25	6.24	6.19	6.88	6.30	7.52
AU-R4	0.12	0.13	0.09	0.11	0.13	0.14	0.14	0.14	0.11	0.11	0.12	0.12	0.12	0.15	0.11	0.11	0.12	0.13	0.13	0.15	0.08	0.11	0.13	0.13	0.13	0.16
AU-R5	12.88	14.67	9.95	12.09	13.36	14.96	14.59	13.81	13.55	14.41	12.48	14.79	13.84	12.09	11.47	11.24	12.59	14.79	14.52	15.73	9.67	12.95	13.34	14.92	14.42	15.06
AU-R6	196.16	214.19	195.21	190.58	193.19	216.47	202.18	183.71	213.59	229.94	195.89	209.29	177.39	214.19	373.75	393.35	179.93	213.02	174.94	183.71	125.79	176.45	215.82	236.45	195.26	210.46
AU-R7	0.22	0.25	0.20	0.25	0.22	0.25	0.27	0.25	0.20	0.23	0.23	0.25	0.22	0.26	0.37	0.33	0.20	0.25	0.24	0.24	0.20	0.24	0.23	0.24	0.22	0.25
AU-R8	162.42	172.18	180.77	221.80	150.44	165.52	185.94	208.84	177.74	193.23	154.01	176.55	180.94	165.74	255.42	274.91	152.33	176.55	156.95	145.20	156.40	166.90	164.54	172.18	160.75	173.01
AU-R9	35.98	41.05	37.20	45.04	33.63	40.17	39.87	40.85	36.74	42.77	36.26	40.95	33.88	43.51	53.50	53.62	33.45	38.04	37.18	43.63	34.86	39.81	34.67	40.85	41.81	43.19
AU-R10	0.30	0.36	0.27	0.36	0.28	0.34	0.39	0.45	0.26	0.29	0.31	0.36	0.30	0.38	0.39	0.38	0.29	0.36	0.30	0.31	0.24	0.33	0.31	0.36	0.32	0.37
AU-R11	4.37	4.77	3.74	4.16	4.55	5.26	4.25	4.77	4.11	5.18	4.59	5.26	3.73	4.16	5.76	5.85	4.15	4.56	4.54	4.75	3.20	3.74	4.58	5.33	4.75	4.69
AV-R1	1.68	1.69	1.88	2.05	1.71	1.69	1.31	1.79	1.62	1.78	1.79	1.73	1.29	1.56	0.91	0.80	1.85	1.74	1.42	1.83	1.60	1.79	1.69	1.69	1.74	1.68
AV-R2	1.16	1.50	1.13	1.63	1.18	1.44	1.04	1.33	1.09	1.41	1.27	1.61	0.77	1.06	0.67	0.50	1.23	1.60	1.11	1.39	1.18	1.30	1.15	1.55	1.17	1.56
AV-R3	0.53	0.59	0.44	0.48	0.53	0.61	0.57	0.72	0.53	0.57	0.57	0.67	0.36	0.50	0.39	0.24	0.55	0.58	0.52	0.72	0.58	0.62	0.50	0.59	0.58	0.65
AV-R4	0.24	0.26	0.27	0.36	0.24	0.24	0.19	0.25	0.26	0.29	0.24	0.27	0.19	0.25	0.17	0.15	0.25	0.25	0.22	0.27	0.20	0.22	0.24	0.30	0.25	0.25
AV-R5	0.10	0.11	0.08	0.09	0.11	0.12	0.12	0.17	0.09	0.10	0.11	0.13	0.07	0.09	0.05	0.05	0.12	0.13	0.08	0.09	0.12	0.13	0.10	0.10	0.12	0.13
AV-R6	0.04	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.04	0.04	0.02	0.05	0.05	0.04	0.05	0.04	0.04	0.05	0.05	0.05	0.06
AV-R7	5.85	5.83	5.83	5.48	5.68	6.06	6.88	5.46	5.70	6.46	6.22	5.65	4.43	5.08	3.49	1.81	6.26	5.92	5.44	6.11	8.13	8.41	5.10	5.83	6.29	5.63
AV-R8	6.64	7.36	6.05	5.49	6.88	8.42	6.56	7.36	6.80	6.56	7.06	8.42	4.68	5.90	4.79	3.02	6.98	7.86	6.28	7.36	8.28	10.07	6.04	6.82	7.20	8.00
AV-R9	0.12	0.14	0.12	0.11	0.12	0.14	0.12	0.10	0.13	0.14	0.12	0.14	0.09	0.10	0.06	0.05	0.13	0.14	0.11	0.15	0.14	0.16	0.10	0.12	0.14	0.15
AW-R1	5.56	5.85	5.26	5.62	5.55	7.29	6.79	5.31	8.40	8.07	4.34	5.17	7.59	5.62	4.02	3.94	4.83	5.31	8.86	7.92	6.06	5.46	5.46	5.85	5.45	6.05
AW-R2	13.49	13.72	10.96	13.17	13.55	13.62	18.45	20.45	20.38	22.59	10.97	12.51	16.43	19.46	8.91	6.58	11.71	12.98	21.84	25.80	14.89	16.22	13.22	14.07	13.06	12.51
AW-R3	38.60	41.22	38.08	46.37	35.46	39.49	57.38	49.01	50.71	41.14	32.31	39.87	51.73	49.01	26.83	23.18	37.63	40.44	47.29	45.15	31.83	42.73	39.28	41.96	42.93	39.22
AW-R4	5.36	5.63	4.78	5.63	5.34	5.93	6.96	5.53	8.30	8.47	4.26	5.15	6.71	7.78	4.11	4.10	4.83	5.47	7.80	6.08	5.59	4.92	4.81	5.63	7.11	6.41
AW-R5	140.16	157.23	145.42	201.72	128.80	144.97	198.83	218.02	217.85	220.13	114.03	136.74	163.31	162.42	101.02	100.86	131.60	144.99	187.99	222.24	124.91	156.48	144.33	157.23	140.28	164.04
AW-R6	0.16	0.18	0.17	0.18	0.15	0.18	0.23	0.25	0.22	0.18	0.14	0.18	0.19	0.26	0.10	0.09	0.16	0.18	0.21	0.24	0.15	0.17	0.16	0.18	0.19	0.18
BA-R1	28.73	25.58	33.26	31.21	27.26	23.59	27.53	23.21	33.82	32.05	28.74	24.39	22.92	20.93	34.09	34.83	28.19	23.59	28.30	23.21	34.08	28.49	27.80	25.58	26.78	25.99
BA-R2	16.97	15.88	18.23	15.74	15.96	15.87	18.73	16.59	18.97	20.37	16.85	15.87	15.22	14.58	16.88	17.70	17.49	16.38	15.19	14.16	17.21	15.18	16.95	15.88	16.81	16.53
BA-R3	76.94	75.83	80.94	75.74	74.08	76.16	71.28	51.98	80.79	75.46	78.55	76.16	65.61	66.63	96.08	84.10	77.81	76.48	65.33	56.30	69.73	63.39	79.81	76.49	73.73	75.34
BA-R4	95.97	90.17	94.41	91.64	98.53	87.41	83.27	66.53	116.59	101.22	94.52	86.25	78.59	71.50	104.91	101.85	95.96	90.91	92.03	71.50	119.76	100.12	90.13	84.66	93.34	92.19
BB-R1	30.43	29.85	35.64	36.27	30.36	29.94	26.56	20.12	41.42	39.21	26.19	24.97	36.02	37.19	30.48	28.67	31.38	29.60	27.02	29.85	28.34	31.66	30.81	29.17	31.14	30.85
BB-R2	18.55	16.37	19.95	21.69	18.70	16.68	17.22	15.86	20.46	20.96	17.32	15.87	21.61	21.69	17.19	15.78	19.21	16.99	16.80	15.86	18.17	16.31	18.65	16.37	18.56	16.54
BB-R3	84.90	77.41	98.88	97.20	81.92	75.85	86.21	77.16	88.27	87.74	78.15	72.87	109.98	112.30	74.06	70.18	86.04	77.41	85.67	85.29	72.24	71.14	85.97	85.29	93.65	82.75
BB-R4	9.14	8.53	10.36	11.05	9.08	8.47	8.57	7.50	11.23	12.36	8.21	7.52	10.72	11.13	8.73	9.41	9.40	8.86	8.37	8.53	9.30	9.08	9.20	9.32	8.74	7.72
BC-R1	30.84	28.17	36.69	27.20	28.72	28.00	33.30	36.27	31.86	30.04	31.26	28.83	27.86	26.80	34.15	26.15	30.87	28.35	29.23	27.20	28.93	27.93	31.75	29.50	29.44	28.35
BC-R2	16.10	15.96	18.33	18.85	14.84	15.65	18.59	17.79	15.98	16.64	16.28	16.18	15.43	13.17	17.38	15.71	16.13	15.82	15.39	15.98	16.70	15.83	15.96	15.96	15.98	16.18
BC-R3	83.17	77.41	82.45	80.02	84.98	77.56	80.44	76.37	83.88	83.66	82.91	76.94	83.48	77.71	82.33	76.02	82.12	76.89	87.30	80.94	73.11	70.74	86.33	77.71	81.80	84.78
BC-R4	101.90	91.87	106.25	96.24	97.21	91.41	122.81	133.55	112.35	107.81	98.54	91.78	104.37	95.89	87.58	74.81	101.15	92.82	110.97	95.89	109.30	109.32	101.99	91.87	94.19	90.14
BC-R5	8.38	8.10	8.01	7.56	8.18	8.20	10.04	10.87	7.18	7.96	8.55	8.08	9.04	8.30	8.39	8.61	8.21	8.08	8.99	9.20	8.77	8.69	8.47	8.10	7.67	7.58
BD-R1	30.11	26.08	24.10	21.39	31.91	26.84	31.33	26.08	26.84	19.30	31.79	26.46	26.65	25.68	41.84	42.51	30.08	26.46	25.02	25.75	28.94	21.35	30.05	26.10	31.51	25.30
BD-R2	17.06	15.86	16.03	15.63	17.67	16.42	16.87	17.79	18.14	17.77	17.65	16.57	13.29	13.88	19.67	20.91	16.74	15.65	17.02	16.99	15.78	14.98	17.52	17.29	16.66	16.31
BD-R3	79.97	77.41	65.87	70.27	82.98	80.67	85.00	71.87	87.33	80.79	82.16	79.21	62.22	56.31	87.93	88.19	81.66	78.27	70.46	73.75	80.65	72.81	81.06	79.13	75.37	77.67
BD-R4	8.64	8.11	8.53	8.68	9.01	9.02	7.72	7.12	8.47	8.03	8.83	8.77	7.98	8.11	9.92	10.80	8.67	8.39	7.94	7.73	8.58	7.85	8.42	8.07	9.45	9.92
BE-R1	31.41	26.86	33.83	35.10	31.07	26.48	31.28	26.09	37.04	35.10	27.13	23.09	43.34	45.25	28.57	28.06	31.41	26.48	32.68	26.86	29.66	27.27	31.27	26.09	33.70	29.88
BE-R2	16.95	15.68	17.09	17.21	17.29	15.84	15.87	15.08	15.63	14.92	16.57	15.54	20.12	20.04	19.12	17.64	16.75	15.54	16.71	16.21	16.29	15.55	16.73	15.68	18.43	18.18
BE-R3	80.43	76.30	81.04	91.61	76.45	75.39	95.80	107.73	91.71	95.86	74.28	73.94	93.89	91.61	94.97	98.76	77.91	75.39	82.92	74.76	103.63	99.67	77.28	76.03	68.64	67.40
BE-R4	106.99	95.13	109.65	99.20	109.18	94.54	96.22	95.13	114.53	104.81	98.84	93.96	133.30	137.04	92.78	91.04	106.72	97.17	114.26	95.13	97.62	95.13	105.09	93.97	123.27	128.66
BF-R1	32.05	26.10	33.97	26.10	31.94	27.25	24.75	20.25	27.62	25.03	31.11	25.98	41.10	40.07	37.75	31.07	33.03	27.25	26.01	20.25	24.04	19.86	32.26	25.87	39.28	41.48
BF-R2	17.66	15.97	18.59	17.79	17.40	16.16	16.30	14.99	16.13	15.48	16.99	15.91	22.31	24.45	18.60	16.18	18.29	17.30	15.04	15.63	13.29	13.46	17.94	16.36	21.02	24.25
BF-R3	84.46	78.04	91.38	98.52	83.71	78.01	72.92	66.69	77.39	79.02	85.05	79.06	89.99	77.41	112.60	114.22	84.92	78.01	70.29	73.13	68.67	62.76	83.84	77.74	102.47	114.57
BF-R4	8.85	8.22	10.14	10.30	8.52	8.15	8.60	8.41	8.08	8.13	8.95	8.21	9.31	8.41	9.25	9.44	9.20	8.53	7.45	7.71	8.43	8.15	9.08	8.24	8.45	8.58
DA-R1	5.93	5.52	5.75	5.51	6.03	5.89	5.91	5.07	5.90	5.67	5.88	5.63	6.19	5.51	6.18	5.06	5.97	5.66	5.70	5.51	5.61	5.62	6.19	5.59	5.33	5.11
DB-R1	5.88	3.03	2.81	2.85	7.57	3.10	3.50	3.83	2.87	2.97	7.40	3.07	2.79	2.50	2.75	2.47	6.97	3.02	3.38	3.16	3.77	3.76	3.06	3.04	18.19	2.91
DC-R1	2.12	1.89	1.80	1.80	2.15	1.93	2.43	2.30	1.70	1.75	2.13	2.00	2.54	1.93	1.85	1.73	2.13	1.94	2.18	1.85	2.21	1.97	2.09	1.89	2.11	2.07
DD-R1	6.93	6.50	6.26	5.73	7.13	6.82	7.49	7.59	8.15	7.77	6.76	6.28	6.29	5.73	5.54	5.98	7.07	7.02	7.06	6.09	6.10	5.97	7.43	7.02	5.95	5.74
DE-R1	4.15	2.39	2.42	2.36	5.13	2.45	2.85	2.74	2.62	2.45	2.51	2.38	12.95	2.53	2.03	2.07	4.71	2.38	3.10	3.42	2.88	2.95	4.94	2.39	2.57	2.37

ADDENDUM G

Quantity ratios	Project Ratio Mean	Project Ratio Median	Material						Labour						Engineering design						Current economic conditions					
			Simple		Normal		Complex		Simple		Normal		Complex		Simple		Normal		Complex		Good		Normal		Volatile	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
E-R1	0.75	0.73	0.70	0.68	0.72	0.72	0.90	0.84	0.80	0.83	0.73	0.69	0.74	0.73	0.61	0.61	0.74	0.74	0.83	0.73	0.75	0.75	0.78	0.73	0.61	0.66
E-R2	53.95	54.54	56.34	56.90	51.89	51.29	58.11	54.54	59.17	58.21	52.82	52.44	52.84	54.54	49.79	49.40	54.00	57.50	55.62	50.49	50.02	49.71	56.85	58.09	47.37	43.04
F-R1	0.34	0.32	0.30	0.26	0.36	0.34	0.31	0.33	0.30	0.28	0.35	0.33	0.33	0.25	0.38	0.37	0.33	0.32	0.34	0.24	0.35	0.29	0.34	0.33	0.30	0.26
F-R2	2.60	2.35	2.31	2.28	2.63	2.36	2.92	3.10	2.66	2.38	2.57	2.30	2.67	2.48	2.05	2.16	2.63	2.35	2.75	2.48	2.79	2.48	2.55	2.23	2.61	2.35
F-R3	0.82	0.81	0.67	0.60	0.88	0.87	0.85	0.78	0.77	0.79	0.84	0.84	0.83	0.88	0.77	0.75	0.82	0.82	0.87	0.80	0.92	0.87	0.82	0.82	0.75	0.74
F-R4	3.69	3.37	3.53	2.72	3.74	3.44	3.11	2.49	3.57	3.01	3.86	3.45	3.09	2.62	4.55	4.08	3.70	3.43	3.29	2.61	3.30	2.96	3.50	3.43	4.75	4.65
F-R5	1.17	1.16	1.14	1.16	1.17	1.16	1.07	1.06	1.23	1.18	1.20	1.17	0.96	0.85	1.27	1.20	1.19	1.16	1.02	0.82	1.10	1.19	1.15	1.16	1.28	1.37
G-R1	0.43	0.38	0.37	0.35	0.44	0.39	0.44	0.38	0.39	0.37	0.44	0.40	0.42	0.38	0.54	0.59	0.41	0.38	0.46	0.37	0.50	0.44	0.42	0.38	0.39	0.38
G-R2	0.11	0.10	0.10	0.08	0.12	0.10	0.10	0.10	0.11	0.09	0.10	0.10	0.14	0.13	0.13	0.12	0.11	0.10	0.12	0.11	0.14	0.14	0.11	0.10	0.09	0.08
G-R3	0.32	0.28	0.30	0.28	0.33	0.29	0.31	0.24	0.27	0.26	0.35	0.30	0.27	0.26	0.34	0.28	0.34	0.29	0.26	0.24	0.23	0.23	0.34	0.30	0.35	0.30
G-R4	1.65	1.65	1.46	1.32	1.74	1.68	1.42	1.26	1.59	1.63	1.64	1.61	1.74	1.69	1.99	2.00	1.63	1.63	1.53	1.53	1.65	1.68	1.67	1.65	1.54	1.28
G-R5	2.13	1.99	1.99	1.98	2.18	2.07	2.12	2.02	2.10	1.98	2.12	2.00	2.20	2.23	2.07	2.04	2.05	1.97	2.44	2.02	2.92	2.80	1.93	1.99	2.05	1.91
G-R6	0.35	0.32	0.31	0.34	0.36	0.31	0.36	0.31	0.34	0.34	0.33	0.31	0.43	0.42	0.42	0.42	0.33	0.31	0.38	0.34	0.47	0.44	0.33	0.31	0.28	0.27
G-R7	0.18	0.16	0.16	0.16	0.18	0.15	0.17	0.17	0.18	0.17	0.17	0.15	0.19	0.17	0.20	0.19	0.18	0.16	0.16	0.17	0.20	0.17	0.18	0.16	0.16	0.13
G-R8	0.16	0.15	0.15	0.15	0.16	0.15	0.20	0.19	0.18	0.20	0.16	0.15	0.15	0.14	0.12	0.11	0.16	0.15	0.19	0.20	0.19	0.19	0.15	0.14	0.16	0.15
G-R9	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
G-R10	0.13	0.11	0.12	0.11	0.12	0.11	0.14	0.13	0.12	0.11	0.13	0.12	0.11	0.09	0.10	0.10	0.12	0.11	0.14	0.13	0.12	0.12	0.12	0.11	0.14	0.12

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
QUANTITY																														
AB-Q1	2.03	1.98	2.18	2.20	2.32	2.36	2.25	2.27	2.18	2.19	2.16	2.04	2.05	2.05	2.17	2.20	2.28	2.24	2.33	2.36	2.15	2.19	2.16	2.05	2.28	2.24	2.16	2.14	2.18	2.18
AB-Q2	1.11	1.11	1.14	1.12	1.21	1.16	1.12	1.11	1.15	1.14	1.14	1.13	1.11	1.11	1.15	1.12	1.16	1.12	1.17	1.20	1.15	1.12	1.12	1.12	1.15	1.16	1.15	1.12	1.15	1.14
AB-Q3	1.46	1.39	1.76	1.60	1.89	1.84	1.71	1.65	1.73	1.57	1.77	1.74	1.49	1.49	1.73	1.62	1.80	1.83	1.86	1.85	1.70	1.55	1.70	1.62	1.81	1.85	1.71	1.58	1.75	1.59
AB-Q4	1.60	1.53	1.79	1.76	1.93	1.96	1.75	1.76	1.80	1.71	1.71	1.71	1.63	1.63	1.78	1.71	1.82	1.86	1.86	1.86	1.77	1.70	1.77	1.64	1.90	1.80	1.76	1.71	1.76	1.67
AC-Q1	1.53	1.43	1.48	1.47	1.51	1.58	1.70	1.81	1.44	1.47	1.56	1.53	1.83	1.83	1.48	1.57	1.50	1.47	1.68	1.58	1.48	1.47	1.38	1.28	1.46	1.47	1.50	1.57	1.53	1.42
AC-Q2	18.61	19.73	18.14	18.81	19.08	20.67	19.42	20.44	18.03	18.58	19.27	19.71	19.42	19.42	18.16	19.08	19.25	19.50	20.32	20.74	18.32	18.87	16.63	16.80	18.09	18.57	18.38	19.43	18.85	19.75
AC-Q3	0.84	0.76	1.01	1.00	0.79	0.69	1.07	1.07	0.91	0.92	0.91	0.82	1.39	1.39	0.91	0.93	0.90	0.96	0.91	0.84	0.94	0.93	0.95	0.80	0.98	1.04	0.87	0.81	1.10	1.11
AC-Q4	0.18	0.19	0.14	0.13	0.15	0.15	0.11	0.11	0.16	0.14	0.16	0.17	0.13	0.13	0.16	0.14	0.14	0.12	0.14	0.15	0.15	0.13	0.18	0.19	0.15	0.13	0.16	0.15	0.12	0.12
AC-Q5	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.06	0.05	0.04	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04
AC-Q6	0.54	0.55	0.52	0.55	0.55	0.56	0.58	0.58	0.51	0.54	0.55	0.56	0.53	0.53	0.53	0.54	0.54	0.55	0.59	0.59	0.52	0.55	0.49	0.48	0.52	0.53	0.53	0.55	0.53	0.55
AC-Q7	1.85	1.63	1.81	1.65	1.90	1.76	1.97	2.06	1.80	1.62	1.87	1.77	1.84	1.84	1.88	1.76	1.66	1.63	1.97	1.86	1.82	1.62	1.76	1.65	1.89	1.62	1.82	1.76	1.84	1.62
AC-Q8	1.66	1.64	1.58	1.56	1.74	1.66	1.56	1.55	1.61	1.60	1.76	1.71	1.66	1.66	1.57	1.55	1.84	1.88	1.70	1.66	1.60	1.56	1.64	1.65	1.53	1.56	1.64	1.56	1.65	1.65
AC-Q9	0.35	0.35	0.36	0.36	0.37	0.38	0.32	0.31	0.36	0.39	0.38	0.40	0.35	0.35	0.35	0.31	0.42	0.45	0.36	0.35	0.36	0.38	0.35	0.35	0.34	0.31	0.35	0.35	0.40	0.41
AC-Q10	0.19	0.17	0.18	0.17	0.17	0.16	0.19	0.16	0.18	0.17	0.19	0.17	0.22	0.22	0.18	0.18	0.16	0.15	0.18	0.15	0.18	0.17	0.19	0.20	0.18	0.17	0.18	0.16	0.19	0.17
AC-Q11	14.30	14.94	14.47	14.65	13.71	14.63	16.38	16.34	13.83	14.63	14.27	15.24	16.34	16.34	14.11	14.63	14.54	15.22	14.12	15.23	14.55	14.64	13.35	13.69	14.51	14.63	14.33	15.21	13.92	14.16
AC-Q12	1.33	1.16	1.29	1.16	1.38	1.16	1.33	1.16	1.31	1.16	1.38	1.23	1.28	1.28	1.33	1.16	1.30	1.16	1.44	1.16	1.29	1.16	1.31	1.16	1.19	1.16	1.32	1.16	1.44	1.23
AC-Q13	0.15	0.16	0.15	0.16	0.16	0.16	0.17	0.16	0.15	0.15	0.16	0.17	0.17	0.17	0.15	0.15	0.16	0.16	0.17	0.17	0.15	0.15	0.14	0.14	0.15	0.15	0.16	0.16	0.15	0.15
AC-Q14	0.07	0.07	0.07	0.07	0.08	0.08	0.07	0.08	0.07	0.07	0.08	0.08	0.06	0.06	0.07	0.08	0.08	0.08	0.07	0.08	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.07	0.07
AC-Q15	135.88	149.25	92.28	76.50	88.83	86.00	81.87	72.75	103.70	99.00	96.46	85.25	67.25	67.25	100.79	98.50	101.00	86.50	95.39	95.42	97.84	89.33	110.29	126.00	95.08	83.83	103.62	99.50	88.06	75.00
AC-Q16	315.88	313.00	256.04	257.50	217.00	229.00	265.00	266.00	256.47	251.50	264.50	270.50	269.00	269.00	256.69	253.00	265.88	263.00	250.50	250.50	261.73	257.50	256.14	255.00	261.63	263.00	258.45	253.00	264.88	261.50
AC-Q17	1.22	1.17	1.26	1.18	1.28	1.27	1.38	1.44	1.22	1.14	1.28	1.33	1.41	1.41	1.22	1.19	1.36	1.47	1.36	1.48	1.24	1.14	1.20	1.22	1.12	1.09	1.30	1.28	1.23	1.13
AD-Q1	0.14	0.12	0.15	0.15	0.15	0.15	0.15	0.14	0.15	0.14	0.14	0.14	0.16	0.16	0.15	0.14	0.16	0.15	0.15	0.14	0.15	0.14	0.13	0.14	0.14	0.14	0.15	0.14	0.16	0.16
AD-Q2	0.11	0.08	0.14	0.12	0.10	0.08	0.11	0.08	0.12	0.09	0.20	0.21	0.11	0.11	0.12	0.08	0.17	0.17	0.13	0.08	0.12	0.09	0.17	0.18	0.14	0.10	0.13	0.09	0.14	0.14
AD-Q3	0.48	0.45	0.59	0.52	0.49	0.46	0.50	0.49	0.54	0.49	0.63	0.56	0.91	0.91	0.53	0.49	0.54	0.52	0.56	0.48	0.55	0.49	0.55	0.56	0.51	0.51	0.55	0.49	0.58	0.48
AD-Q4	0.27	0.23	0.27	0.20	0.22	0.17	0.21	0.20	0.26	0.20	0.29	0.27	0.31	0.31	0.25	0.20	0.28	0.21	0.20	0.17	0.27	0.21	0.27	0.20	0.24	0.19	0.26	0.20	0.27	0.21
AD-Q5	0.50	0.44	0.41	0.36	0.37	0.35	0.36	0.33	0.43	0.38	0.43	0.39	0.40	0.40	0.41	0.36	0.48	0.41	0.32	0.30	0.44	0.38	0.45	0.38	0.37	0.35	0.43	0.38	0.42	0.36
AD-Q6	1.94	1.54	1.61	1.47	1.50	1.51	1.57	1.51	1.71	1.50	1.41	1.33	1.25	1.25	1.61	1.50	1.91	1.59	1.53	1.53	1.73	1.51	1.43	1.35	1.48	1.47	1.74	1.51	1.50	1.43
AD-Q7	2.42	1.90	2.19	1.81	2.19	2.08	2.09	1.50	2.22	1.77	2.48	2.17	3.42	3.42	2.25	1.94	1.86	1.61	2.03	1.83	2.16	1.68	2.74	2.17	2.13	1.92	2.30	1.94	2.09	1.81
AD-Q8	4.16	4.21	3.81	3.89	3.77	3.86	3.75	3.88	3.88	3.90	3.93	3.89	3.93	3.93	3.86	3.90	3.87	3.89	3.68	3.72	3.86	3.89	4.08	4.16	3.64	3.88	3.93	3.90	3.85	3.90
AD-Q9	5.27	4.51	4.61	4.29	4.67	4.46	4.34	4.29	4.86	4.34	4.57	4.65	4.85	4.85	4.78	4.34	4.54	4.31	4.55	4.31	4.64	4.31	5.43	4.65	4.84	4.49	4.85	4.35	4.27	4.17
AD-Q10	0.92	0.91	0.82	0.79	0.80	0.71	0.87	0.88	0.84	0.81	0.74	0.68	0.78	0.78	0.83	0.78	0.85	0.80	0.76	0.73	0.86	0.88	0.79	0.77	0.80	0.72	0.84	0.88	0.83	0.76
AD-Q11	1.14	1.15	1.00	0.99	0.98	0.99	1.14	1.09	1.05	1.01	0.73	0.64	1.22	1.22	1.02	0.99	0.97	0.99	1.01	0.99	1.05	1.05	0.91	0.81	0.94	0.90	1.04	0.99	1.02	0.99
AD-Q12	1.23	1.17	0.92	0.90	0.92	1.00	1.06	1.09	1.00	1.00	0.72	0.68	0.87	0.87	1.01	1.00	0.83	0.73	0.95	1.00	0.99	0.98	0.94	0.70	0.97	0.95	1.01	1.00	0.86	0.81
AD-Q13	1.10	0.93	0.94	0.93	0.92	0.93	1.03	0.93	0.97	0.93	0.84	0.93	0.91	0.91	0.98	0.93	0.92	0.93	0.92	0.93	0.97	0.93	0.99	0.93	0.96	0.93	0.98	0.93	0.92	0.93
AD-Q14	0.20	0.22	0.14	0.14	0.16	0.19	0.18	0.19	0.16	0.18	0.08	0.07	0.15	0.15	0.16	0.19	0.12	0.09	0.15	0.20	0.16	0.15	0.14	0.09	0.15	0.14	0.16	0.19	0.14	0.12
AD-Q15	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AD-Q16	2.29	2.09	1.73	1.47	1.72	1.60	2.26	2.10	1.83	1.70	1.31	1.13	1.83	1.83	1.90	1.78	1.50	1.40	1.69	1.53	1.90	1.70	1.66	1.78	1.60	1.46	1.95	1.91	1.62	1.61
AE-Q1	4.81	4.71	5.13	5.01	4.86	4.57	4.63	4.54	5.12	5.06	4.94	4.81	4.85	4.85	4.99	4.74	5.18	5.07	4.85	4.80	5.11	5.03	4.81	4.72	4.93	4.81	4.90	4.72	5.52	5.75
AE-Q2	0.13	0.14	0.14	0.14	0.12	0.11	0.15	0.15	0.13	0.13	0.12	0.12	0.14	0.14	0.13	0.14	0.12	0.11	0.12	0.13	0.13	0.13	0.12	0.11	0.14	0.14	0.13	0.14	0.12	0.13
AE-Q3	7.00	6.46	7.31	6.94	7.34	6.93	6.28	6.05	7.43	6.93	7.47	7.63	7.30	7.30	6.93	6.85	8.68	9.49	6.89	6.24	7.41	6.97	7.03	5.98	7.25	6.91	7.17	6.90	7.59	8.45
AE-Q4	0.84	0.78	0.82	0.80	0.85	0.82	0.74	0.70	0.84	0.82	0.87	0.84	0.79	0.79	0.82	0.79	0.88	0.90	0.77	0.76	0.83	0.81	0.90	0.79	0.83	0.84	0.83	0.79	0.84	0.86
AE-Q5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AE-Q6	641.20	643.00	551.27	524.37	641.72	717.29	467.28	435.21	600.30	617.12	643.34	662.32	400.83	400.83	595.48	617.10	587.12	578.79	612.61	613.16	572.47	578.79	609.37	617.22	565.56	541.07	608.88	642.25	519.82	459.87
AE-Q7	3.06	3.01	4.17	4.25	4.30	3.41	4.76	4.97	3.84	3.40	3.98	3.57	5.08	5.08	3.80	3.41	4.59	4.31	4.22	4.25	3.99	3.57	3.80	3.40	3.91	4.12	3.92	3.50	4.37	4.89
AE-Q8	2.26	2.08	2.18	2.02	2.29	2.25	1.87	1.83	2.29	2.30	2.24	2.16	2.12	2.12	2.17	2.02	2.43	2.57	2.09	2.04	2.24	2.24	2.27	2.01	2.09	1.98	2.24	2.02	2.24	2.37
AF-Q1	13.64	12.52	12.37	12.12	12.99	12.12	13.39	12.95	12.50	12.12	13.15	11.68	12.73	12.73	12.89	12.13	11.99	11.68	13.31	12.13	12.77	12.13	11.84	11.30	12.40	11.72	12.55	12.12	13.67	12.13
AF-Q2	1.59	1.42	1.44	1.38	1.62	1.76	1.28	1.33	1.55	1.47	1.48	1.36	1.79	1.79	1.51	1.47	1.39	1.10	1.56	1.74	1.50	1.42	1.45	1.35	1.51	1.28	1.53	1.49	1.40	1.34
AF-Q3	0.57	0.54	0.62	0.57	0.51	0.51	0.54	0.52	0.60	0.55	0.61	0.58	0.50	0.50	0.57	0.54	0.68	0.65	0.52	0.49	0.61	0.58	0.56	0.54	0.64	0.61	0.58	0.56	0.55	0.53
AF-Q4	0.45	0.42	0.44	0.43	0.49	0.45	0.47	0.45	0.45	0.42	0.49	0.47	0.44	0.44	0.45	0.43	0.47	0.42	0.43	0.42	0.46	0.45	0.46	0.41	0.42	0.42	0.46	0.44	0.47	0.46
AF-Q5	0.04	0.04	0.04	0.05	0.04	0.04	0.05	0.05	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04
AF-Q6	0.85	0.90	0.85	0.73	0.78	0.62	0.84	0.71	0.81	0.71	0.96	1.09	1.00	1.00	0.78	0.71	1.02	1.05	0.78	0.65	0.82	0.71	0.95	1.06	0.78	0.68	0.85	0.72	0.84	0.81
AF-Q7	0.10	0.10	0.10	0.12	0.09	0.09	0.11	0.12	0.10	0.11	0.10	0.11	0.11	0.11	0.10	0.11	0.10	0.11	0.11	0.11	0.10	0.10	0.10	0.12	0.11	0.13	0.10	0.11	0.09	0.09
AF-Q8	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.02
AF-Q9	0.72	0.68	0.70	0.64	0.68	0.48	0.63	0.53	0.69	0.62	0.82	0.66	0.97	0.97	0.67	0.53	0.77	0.66	0.64	0.48	0.69	0.62	0.80	0.78	0.68	0.57	0.70	0.61	0.71	0.66
AF-Q10	1.74	1.75	1.70	1.74	1.61	1.58	1.69	1.75	1.70	1.73	1.68	1.60	1.67	1.67	1.70	1.73	1.65	1.73	1.69	1.64	1.68	1.73	1.76	1.76	1.68	1.74	1.70	1.73	1.66	1.59
AF-Q11	12.95	11.96	12.12	10.89	13.92	11.50	11.32	9.25	12.82	11.43	13.15	10.91	11.07	11.07	12.73	11.13	12.56	12.14	12.25	10.90	12.59	11.26	13.24	10.94	10.71	8.98	12.87	11.35	13.69	13.88
AF-Q12	5.08	4.73	6.08	6.00	5.65	5.50	5.90	5.00	5.85	5.83	5.53	5.08	6.33	6.33	5.70	5.50	6.19	6.00	6.58	6.00	5.64	5.50	5.69	4.67	6.54	6.00	5.52	5.50	6.15	5.75
AF-Q13	0.12	0.08	0.11	0.08	0.14	0.13	0.14	0.13	0.11	0.08	0.14	0.10	0.17	0.17	0.12	0.08	0.12	0.08	0.12	0.08	0.12	0.09	0.11	0.08	0.11	0.08	0.11	0.08	0.16	0.15
AF-Q14	10.53	8.83	10.61	9.42	11.01	9.37	10.45	9.61	10.14	9.12	13.80	13.60	14.47	14.47	10.13	9.21	12.10	11.72	10.52	9.40	10.52	9.01	11.53	9.96	10.29	9.43	10.18	9.00	12.85	11.13
AF-Q15	0.42	0.38	0.47	0.46	0.46	0.47	0.44	0.45	0.46	0.46	0.46	0.43	0.48	0.48	0.47	0.45	0.42	0.44	0.44	0.47	0.47	0.45	0.45	0.44	0.48	0.49	0.45	0.43	0.49	0.49
AF-Q16	0.44	0.43	0.42	0.40	0.43	0.47	0.40	0.41	0.43	0.45	0.42	0.45	0.41	0.41	0.42	0.44	0.44	0.46	0.40	0.40	0.43	0.44	0.43	0.44	0.46	0.50	0.42	0.43	0.40	0.41
AF-Q17	0.09	0.08	0.08	0.07	0.09	0.07	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.08	0.09	0.08	0.09	0.09	0.08	0.07	0.08	0.07
AG-Q1	1.43	1.31	1.78	1.71	1.63	1.47	1.77	1.61	1.72	1.68	1.43	1.42	2.00	2.00	1.63	1.48	1.88	1.83	2.08	1.97	1.61	1.61	1.61	1.39	1.78	1.71	1.72	1.61	1.50	1.49
AG-Q2	0.35	0.34	0.39	0.33	0.37	0.31	0.33	0.33	0.39	0.34	0.38	0.32	0.37	0.37	0.38	0.33	0.38	0.32	0.45	0.41	0.35	0.32	0.44	0.37	0.36	0.31	0.40	0.33	0.36	0.29
AG-Q3	4.11	3.77	4.58	3.95	4.18	4.15	3.97	4.07	4.56	4.17	4.19	3.66	5.66	5.66	4.37	3.93	4.31	4.34	4.47	4.17	4.47	4.02	4.11	3.72	3.87	3.68	4.52	4.13	4.58	4.59
AG-Q4	1.16	1.17	0.97	0.91	1.01	0.75	0.99	0.90	1.02	0.96	1.00	0.88	0.82	0.82	1.06	0.99	0.85	0.88	0.90	0.97	1.01	0.89	1.14	1.03	0.85	0.80	1.03	0.93	1.10	1.05
AG-Q5	3.07	2.92	2.00	1.67	2.48	2.04	2.12	2.04	2.26	2.02	2.61	1.74	1.51	1.51	2.44	2.06	1.83	1.45	2.12	1.82	2.24	2.01	2.66	2.51	1.74	1.55	2.35	2.05	2.62	1.67
AG-Q6	0.37	0.38	0.48	0.47	0.52	0.49	0.42	0.45	0.47	0.46	0.51	0.57	0.56	0.56	0.44	0.46	0.56	0.53	0.46	0.46	0.48	0.47	0.45	0.47	0.50	0.47	0.46	0.46	0.47	0.50
AG-Q7	1.16	1.17	0.97	0.91	1.01	0.75	0.99	0.90	1.02	0.96	1.00	0.88	0.82	0.82	1.06	0.99	0.85	0.88	0.90	0.97	1.01	0.89	1.14	1.03	0.85	0.80	1.03	0.93	1.10	1.05
AG-Q8	0.59	0.65	0.46	0.46	0.51	0.48	0.41	0.46	0.50	0.47	0.58	0.62	0.36	0.36	0.52	0.48	0.41	0.38	0.40	0.33	0.50	0.47	0.57	0.60	0.50	0.47	0.48	0.47	0.53	0.49
AG-Q9	0.48	0.52	0.62	0.53	0.55	0.59	0.53	0.51	0.60	0.55	0.57	0.56	0.75	0.75	0.57	0.53	0.60	0.53	0.60	0.52	0.60	0.55	0.51	0.53	0.59	0.53	0.58	0.53	0.60	0.51
AG-Q10	9.19	10.24	10.15	9.22	10.24	10.53	8.72	7.53	10.31	10.39	9.83	8.22	8.98	8.98	9.95	10.17	10.47	9.91	9.94	8.52	9.55	9.22	11.99	10.71	8.83	7.86	10.65	10.53	8.81	8.39
AG-Q11	0.11	0.11	0.11	0.10	0.11	0.10	0.10	0.11	0.11	0.10	0.11	0.11	0.10	0.10	0.11	0.10	0.11	0.10	0.11	0.11	0.10	0.10	0.12	0.12	0.11	0.10	0.11	0.10	0.11	0.10
AG-Q12	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.07	0.08	0.07	0.08	0.07	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.07
AG-Q13	27.39	23.22	35.83	35.21	36.81	34.62	31.60	29.47	35.09	33.35	34.89	40.08	44.71	44.71	33.86	32.92	34.87	31.62	38.18	32.78	35.23	35.25	27.32	22.77	31.69	30.02	34.70	32.92	36.73	40.08
AH-Q1	5.16	4.66	6.26	5.66	5.13	5.13	6.47	5.66	5.79	5.54	5.39	4.81	7.64	7.64	5.59	5.25	6.48	6.35	5.85	5.19	6.04	5.65	4.96	4.69	5.27	4.73	5.94	5.54	6.05	5.89

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AH-Q2	3.81	3.77	4.77	4.14	3.57	3.19	4.74	3.85	4.35	3.98	3.95	3.89	5.75	5.75	4.25	3.85	4.49	3.98	3.91	3.62	4.63	4.12	3.68	3.59	4.62	4.04	4.10	3.57	5.04	4.11
AH-Q3	1.40	1.46	1.42	1.34	1.25	1.30	1.46	1.34	1.38	1.34	1.30	1.27	1.37	1.37	1.40	1.34	1.31	1.27	1.29	1.31	1.44	1.41	1.25	1.00	1.48	1.38	1.30	1.29	1.58	1.60
AH-Q4	0.84	0.97	0.73	0.70	0.75	0.67	0.61	0.65	0.76	0.72	0.88	0.74	0.70	0.70	0.76	0.70	0.73	0.68	0.70	0.69	0.74	0.69	0.87	0.88	0.87	0.83	0.71	0.67	0.77	0.71
AH-Q5	3.18	3.10	2.71	2.42	3.05	2.56	2.62	2.21	2.88	2.56	3.03	2.83	2.46	2.46	2.94	2.56	2.62	1.85	3.06	3.02	2.82	2.42	2.80	2.56	3.22	3.07	2.72	2.40	3.02	2.85
AH-Q6	0.62	0.62	0.55	0.54	0.58	0.58	0.48	0.47	0.58	0.57	0.58	0.56	0.63	0.63	0.57	0.56	0.52	0.49	0.58	0.55	0.56	0.56	0.56	0.54	0.55	0.48	0.54	0.56	0.67	0.67
AH-Q7	4.34	3.91	3.93	3.58	4.44	4.10	3.76	3.23	4.11	3.85	4.50	3.53	3.31	3.31	4.12	3.77	4.27	3.41	4.14	3.79	4.11	3.75	4.04	3.00	4.46	3.91	4.03	3.59	4.04	3.85
AH-Q8	21.07	19.58	17.70	16.83	22.30	20.50	15.79	15.67	19.68	19.42	20.74	17.50	14.08	14.08	19.69	19.25	18.42	18.58	20.82	18.17	18.55	18.67	20.25	19.50	21.96	19.42	18.10	18.67	20.53	19.46
AH-Q9	3.00	2.71	2.69	2.42	2.30	2.08	2.23	2.29	2.75	2.49	2.77	2.73	3.12	3.12	2.56	2.33	3.02	3.18	2.45	1.95	2.60	2.42	3.21	2.90	3.22	3.02	2.50	2.33	2.72	2.61
AH-Q10	0.26	0.27	0.26	0.26	0.24	0.23	0.25	0.25	0.26	0.26	0.23	0.23	0.20	0.20	0.25	0.25	0.30	0.27	0.24	0.25	0.26	0.26	0.25	0.25	0.28	0.27	0.25	0.25	0.23	0.24
AH-Q11	0.47	0.42	0.40	0.39	0.41	0.39	0.42	0.40	0.40	0.38	0.50	0.46	0.46	0.46	0.42	0.39	0.39	0.32	0.47	0.50	0.39	0.38	0.47	0.53	0.45	0.50	0.39	0.38	0.48	0.46
AH-Q12	0.38	0.36	0.35	0.35	0.33	0.33	0.30	0.35	0.36	0.34	0.37	0.34	0.35	0.35	0.36	0.35	0.32	0.33	0.34	0.33	0.34	0.34	0.41	0.37	0.38	0.36	0.33	0.34	0.40	0.41
AH-Q13	0.11	0.10	0.13	0.12	0.11	0.11	0.14	0.11	0.12	0.11	0.11	0.11	0.19	0.19	0.12	0.11	0.11	0.11	0.12	0.11	0.12	0.11	0.12	0.11	0.12	0.12	0.12	0.11	0.14	0.13
AH-Q14	0.11	0.10	0.12	0.11	0.12	0.10	0.13	0.11	0.11	0.10	0.12	0.11	0.12	0.12	0.11	0.10	0.13	0.13	0.11	0.10	0.11	0.11	0.11	0.09	0.11	0.10	0.12	0.11	0.11	0.10
AH-Q15	4.04	3.88	4.07	3.80	4.13	3.88	3.99	3.83	4.11	4.02	4.00	3.61	3.46	3.46	4.08	3.78	4.20	4.38	4.02	3.46	4.08	3.83	4.11	4.18	4.58	4.78	4.00	3.78	3.83	3.47
AH-Q16	2.12	1.99	2.23	2.06	2.05	1.84	2.73	2.10	2.02	1.88	2.31	2.37	1.70	1.70	2.16	2.02	2.35	2.68	2.11	1.75	2.15	2.07	2.36	1.79	2.63	2.51	2.15	2.05	1.81	1.81
AH-Q17	0.22	0.22	0.23	0.22	0.23	0.21	0.19	0.17	0.24	0.22	0.20	0.21	0.24	0.24	0.22	0.22	0.25	0.22	0.21	0.20	0.23	0.22	0.21	0.21	0.22	0.22	0.22	0.22	0.25	0.22
AH-Q18	23.90	22.75	23.39	22.03	21.45	17.61	18.36	16.02	24.50	23.23	21.09	21.67	25.99	25.99	21.92	21.77	27.50	24.38	22.34	20.39	23.23	22.23	23.33	21.57	25.53	24.20	21.75	22.12	25.52	22.52
AH-Q19	0.16	0.15	0.16	0.15	0.17	0.15	0.18	0.15	0.16	0.15	0.16	0.16	0.13	0.13	0.16	0.15	0.17	0.16	0.16	0.15	0.17	0.15	0.16	0.15	0.18	0.19	0.16	0.15	0.15	0.15
AH-Q20	0.20	0.20	0.20	0.19	0.17	0.18	0.19	0.18	0.19	0.19	0.19	0.18	0.23	0.23	0.19	0.18	0.21	0.21	0.21	0.20	0.18	0.18	0.22	0.19	0.25	0.21	0.17	0.17	0.21	0.21
AH-Q21	0.10	0.10	0.10	0.09	0.09	0.09	0.08	0.09	0.10	0.10	0.09	0.09	0.10	0.10	0.09	0.09	0.11	0.11	0.10	0.10	0.09	0.09	0.10	0.10	0.10	0.09	0.10	0.09	0.10	0.10
AH-Q22	226.19	216.98	206.88	200.50	176.06	150.50	195.12	199.21	210.61	201.99	180.20	183.46	187.84	187.84	200.15	200.00	225.72	217.18	195.06	196.59	203.76	201.18	216.21	187.33	255.86	256.52	189.74	190.80	204.67	200.50
AH-Q23	0.28	0.27	0.30	0.29	0.33	0.29	0.34	0.32	0.29	0.28	0.29	0.28	0.27	0.27	0.32	0.30	0.24	0.26	0.33	0.31	0.30	0.28	0.28	0.28	0.34	0.33	0.31	0.29	0.24	0.22
AH-Q24	0.44	0.42	0.47	0.45	0.46	0.47	0.44	0.44	0.46	0.45	0.48	0.42	0.27	0.27	0.45	0.44	0.56	0.56	0.46	0.44	0.46	0.45	0.48	0.40	0.55	0.52	0.46	0.45	0.38	0.35
AI-Q1	3.24	2.98	3.66	3.26	4.31	4.34	4.24	3.43	3.61	3.23	3.65	3.23	3.37	3.37	3.91	3.79	2.93	2.58	4.15	3.89	3.67	3.29	3.40	2.86	3.85	3.87	3.83	3.28	3.14	3.09
AI-Q2	0.48	0.44	0.38	0.29	0.46	0.45	0.42	0.30	0.40	0.29	0.48	0.47	0.30	0.30	0.42	0.38	0.39	0.28	0.44	0.31	0.41	0.33	0.41	0.28	0.48	0.44	0.41	0.36	0.36	0.29
AI-Q3	2.74	2.55	2.33	2.23	2.60	2.46	2.54	2.36	2.44	2.37	2.45	2.34	2.61	2.61	2.44	2.36	2.48	2.35	2.62	2.45	2.39	2.35	2.54	2.46	2.69	2.84	2.40	2.34	2.40	2.22
AI-Q4	0.42	0.46	0.36	0.40	0.36	0.41	0.30	0.35	0.37	0.40	0.44	0.45	0.32	0.32	0.36	0.40	0.43	0.43	0.36	0.41	0.36	0.39	0.44	0.44	0.40	0.40	0.36	0.40	0.38	0.42
AI-Q5	6.71	6.24	5.79	5.57	5.10	5.73	5.19	5.40	5.76	5.77	6.83	6.53	5.60	5.60	5.60	5.56	6.82	6.46	5.46	5.76	5.41	5.51	7.94	8.00	5.71	5.68	5.85	5.75	5.79	5.57
AI-Q6	0.39	0.40	0.35	0.35	0.33	0.33	0.33	0.37	0.36	0.35	0.37	0.37	0.36	0.36	0.35	0.35	0.39	0.35	0.32	0.35	0.35	0.34	0.39	0.38	0.36	0.35	0.35	0.35	0.37	0.37
AI-Q7	0.56	0.56	0.45	0.44	0.45	0.48	0.39	0.44	0.48	0.51	0.51	0.52	0.46	0.46	0.45	0.44	0.55	0.55	0.44	0.45	0.46	0.48	0.56	0.60	0.46	0.45	0.47	0.49	0.47	0.47
AI-Q8	0.10	0.08	0.09	0.10	0.09	0.09	0.09	0.10	0.09	0.09	0.09	0.07	0.08	0.08	0.09	0.09	0.08	0.07	0.08	0.08	0.10	0.10	0.07	0.07	0.10	0.10	0.09	0.09	0.09	0.08
AI-Q9	9.84	9.69	9.26	9.03	9.08	8.72	8.62	8.89	9.89	9.47	7.16	7.38	9.39	9.39	9.21	8.89	9.81	9.72	8.64	9.07	9.57	8.92	9.08	9.58	8.03	8.46	9.41	8.96	10.33	9.46
AI-Q10	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.03
AI-Q11	97.17	89.47	78.40	76.65	68.37	69.05	77.25	79.69	78.71	76.28	88.09	78.94	71.83	71.83	76.31	74.15	96.68	96.61	71.07	71.62	79.46	76.65	90.81	80.15	82.96	83.59	77.25	69.05	85.51	82.25
AJ-Q1	4.47	3.85	4.34	3.92	4.00	3.60	4.05	3.35	4.34	3.92	4.37	3.91	3.73	3.73	4.26	3.89	4.60	4.29	4.54	3.75	4.41	4.19	3.52	2.95	4.71	4.58	4.43	3.86	3.37	3.23
AJ-Q2	0.54	0.49	0.47	0.45	0.54	0.46	0.42	0.34	0.51	0.46	0.52	0.45	0.50	0.50	0.50	0.45	0.50	0.48	0.48	0.41	0.52	0.52	0.43	0.34	0.48	0.40	0.51	0.46	0.47	0.46
AJ-Q3	2.66	2.45	2.60	2.45	2.82	2.68	2.55	2.25	2.66	2.53	2.76	2.82	2.84	2.84	2.72	2.48	2.33	2.48	3.00	3.20	2.57	2.45	2.66	2.35	2.76	2.80	2.61	2.48	2.72	2.68
AJ-Q4	0.33	0.35	0.32	0.31	0.37	0.39	0.32	0.38	0.33	0.35	0.33	0.31	0.39	0.39	0.33	0.35	0.30	0.29	0.31	0.33	0.32	0.30	0.39	0.40	0.30	0.31	0.31	0.30	0.42	0.42
AJ-Q5	2.41	2.06	2.49	2.31	3.03	2.84	2.42	2.72	2.72	2.47	2.06	2.10	2.83	2.83	2.64	2.36	2.26	2.11	2.54	2.15	2.56	2.31	2.72	2.57	2.15	2.04	2.56	2.23	3.08	2.83
AJ-Q6	3.51	3.32	3.59	2.87	3.88	3.41	3.52	3.73	3.70	3.07	3.38	2.87	4.35	4.35	3.61	3.17	3.57	2.83	2.94	2.82	3.67	3.13	4.27	4.45	2.89	2.60	3.54	2.96	4.72	4.61
AJ-Q7	0.55	0.53	0.55	0.52	0.54	0.51	0.55	0.55	0.55	0.51	0.54	0.54	0.74	0.74	0.53	0.49	0.55	0.57	0.55	0.56	0.53	0.49	0.62	0.59	0.49	0.51	0.51	0.49	0.72	0.73
AJ-Q8	0.50	0.56	0.46	0.44	0.55	0.55	0.52	0.43	0.48	0.45	0.47	0.45	0.48	0.48	0.50	0.45	0.43	0.39	0.49	0.45	0.47	0.43	0.54	0.57	0.45	0.43	0.47	0.44	0.58	0.60
AJ-Q9	0.11	0.10	0.11	0.10	0.11	0.09	0.11	0.11	0.11	0.10	0.10	0.09	0.08	0.08	0.11	0.11	0.10	0.10	0.12	0.11	0.11	0.10	0.09	0.08	0.11	0.11	0.11	0.10	0.10	0.08
AJ-Q10	11.56	12.45	13.80	13.35	13.43	12.27	14.65	14.35	12.85	12.78	14.29	13.20	20.57	20.57	13.14	12.87	12.33	12.16	14.28	14.08	12.75	12.72	14.69	14.35	13.16	13.03	12.79	12.69	15.41	16.25
AJ-Q11	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
AJ-Q12	0.06	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.04	0.05	0.05	0.05	0.06	0.06
AJ-Q13	63.45	61.40	68.63	67.87	71.18	67.70	66.64	68.06	67.69	67.60	72.87	82.11	67.55	67.55	69.34	68.06	63.48	65.15	56.79	65.25	70.81	69.59	70.19	67.67	67.16	64.77	67.26	67.70	72.77	67.61
AK-Q1	2.06	2.14	2.03	2.00	2.26	2.29	2.36	2.43	2.10	2.03	1.65	1.57	1.47	1.47	2.09	2.03	2.19	2.04	2.36	2.46	2.02	2.03	2.00	1.90	2.09	1.92	2.13	2.05	1.87	1.83
AK-Q2	0.51	0.52	0.52	0.46	0.71	0.85	0.51	0.47	0.58	0.52	0.49	0.42	0.50	0.50	0.55	0.50	0.62	0.52	0.65	0.63	0.55	0.51	0.47	0.40	0.55	0.51	0.58	0.52	0.47	0.36
AK-Q3	2.10	2.17	2.05	2.06	2.54	2.51	2.27	2.20	2.16	2.16	1.99	1.97	1.95	1.95	2.15	2.17	2.22	2.10	2.47	2.36	2.07	2.10	2.13	2.06	1.97	2.13	2.20	2.15	2.17	1.97
AK-Q4	0.61	0.59	0.65	0.68	0.67	0.69	0.52	0.39	0.65	0.65	0.76	0.81	0.72	0.72	0.64	0.63	0.66	0.73	0.55	0.57	0.68	0.70	0.60	0.55	0.60	0.66	0.65	0.67	0.67	0.63
AK-Q5	23.82	23.16	29.95	28.22	25.92	27.56	21.83	19.08	28.12	27.78	34.95	30.33	36.86	36.86	27.95	27.00	26.28	27.41	23.55	22.63	29.93	28.25	25.16	26.82	27.52	28.36	27.79	26.82	29.54	28.10
AK-Q6	5.28	4.52	5.14	4.63	5.47	4.77	5.52	4.59	5.05	4.62	5.87	6.70	7.49	7.49	5.01	4.61	5.65	4.91	4.89	4.48	5.37	4.69	5.03	4.59	4.88	4.45	5.35	4.72	5.16	4.40
AK-Q7	0.56	0.56	0.60	0.59	0.62	0.59	0.54	0.43	0.59	0.59	0.73	0.73	0.61	0.61	0.59	0.59	0.64	0.62	0.54	0.53	0.60	0.58	0.67	0.69	0.67	0.61	0.59	0.57	0.57	0.61
AK-Q8	0.50	0.49	0.52	0.49	0.53	0.49	0.47	0.34	0.53	0.49	0.51	0.49	0.86	0.86	0.51	0.49	0.46	0.47	0.58	0.52	0.52	0.49	0.44	0.43	0.49	0.44	0.50	0.49	0.62	0.67
AK-Q9	0.33	0.32	0.32	0.31	0.34	0.32	0.29	0.23	0.34	0.32	0.31	0.29	0.25	0.25	0.35	0.32	0.27	0.29	0.34	0.30	0.33	0.32	0.33	0.28	0.34	0.32	0.32	0.31	0.34	0.32
AK-Q10	0.30	0.30	0.27	0.26	0.30	0.30	0.32	0.32	0.28	0.27	0.26	0.24	0.27	0.27	0.28	0.28	0.28	0.30	0.29	0.29	0.28	0.26	0.30	0.31	0.28	0.29	0.29	0.30	0.25	0.24
AK-Q11	8.32	8.63	9.43	9.06	8.59	7.47	10.07	9.08	8.98	9.07	8.31	7.28	9.94	9.94	8.84	8.62	9.82	9.21	8.72	8.42	8.96	9.06	9.87	8.78	10.00	9.38	8.97	9.03	8.44	8.45
AK-Q12	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04
AK-Q13	117.40	99.10	111.57	102.60	92.32	90.79	98.33	96.76	108.15	92.48	124.17	119.15	129.95	129.95	103.19	90.79	127.81	127.77	97.42	90.38	110.21	100.40	115.48	114.02	116.47	101.31	111.00	106.61	92.93	87.86
AL-Q1	2.40	2.60	2.86	2.70	2.98	2.43	2.47	2.43	2.95	2.65	2.39	2.30	2.75	2.75	2.89	2.66	2.46	2.41	3.41	3.27	2.63	2.55	2.85	2.74	2.62	2.55	2.85	2.62	2.83	2.71
AL-Q2	0.30	0.28	0.29	0.28	0.31	0.25	0.23	0.24	0.32	0.32	0.28	0.28	0.24	0.24	0.31	0.30	0.28	0.29	0.31	0.28	0.29	0.25	0.32	0.34	0.27	0.28	0.31	0.30	0.28	0.25
AL-Q3	2.48	2.67	1.93	1.85	2.10	1.80	1.60	1.43	2.18	2.00	1.96	1.89	2.02	2.02	2.09	1.95	1.96	1.88	2.23	2.00	2.01	1.86	2.10	1.92	1.79	1.74	2.15	1.95	2.04	2.04
AL-Q4	0.77	0.79	0.66	0.67	0.62	0.54	0.61	0.47	0.67	0.66	0.75	0.78	0.71	0.71	0.64	0.65	0.78	0.80	0.54	0.51	0.70	0.72	0.71	0.75	0.79	0.80	0.66	0.66	0.59	0.51
AL-Q5	1.34	1.29	1.13	1.05	1.23	1.06	1.18	1.05	1.20	1.07	1.13	1.11	1.27	1.27	1.13	1.06	1.42	1.17	1.03	0.94	1.22	1.08	1.24	1.08	1.36	1.14	1.15	1.05	1.17	1.07
AL-Q6	2.81	2.56	2.69	2.50	2.52	2.32	2.41	1.77	2.71	2.50	2.84	2.54	2.32	2.32	2.72	2.50	2.56	2.02	2.44	2.29	2.69	2.50	2.90	2.38	2.39	2.14	2.81	2.58	2.49	2.40
AL-Q7	3.50	3.62	2.81	2.68	3.00	2.94	2.53	2.56	3.04	2.77	3.11	2.97	2.52	2.52	2.93	2.69	3.26	3.40	2.44	2.42	3.01	2.78	3.42	3.62	2.94	2.78	3.03	2.70	2.78	2.58
AL-Q8	0.54	0.44	0.45	0.44	0.49	0.45	0.36	0.33	0.48	0.44	0.54	0.61	0.44	0.44	0.45	0.44	0.58	0.64	0.44	0.40	0.47	0.44	0.53	0.45	0.52	0.48	0.46	0.44	0.44	0.40
AL-Q9	0.56	0.53	0.45	0.45	0.49	0.48	0.45	0.44	0.48	0.46	0.49	0.46	0.46	0.46	0.45	0.45	0.58	0.59	0.45	0.47	0.48	0.45	0.49	0.47	0.49	0.47	0.49	0.45	0.42	0.44
AL-Q10	0.13	0.14	0.17	0.15	0.14	0.14	0.17	0.14	0.15	0.14	0.15	0.16	0.17	0.17	0.16	0.14	0.14	0.16	0.15	0.15	0.16	0.14	0.15	0.15	0.13	0.14	0.16	0.15	0.16	0.14
AL-Q11	0.32	0.32	0.35	0.33	0.30	0.29	0.39	0.40	0.32	0.31	0.35	0.34	0.38	0.38	0.33	0.32	0.31	0.31	0.31	0.31	0.34	0.33	0.32	0.29	0.35	0.32	0.33	0.32	0.33	0.35
AL-Q12	0.71	0.70	0.70	0.69	0.64	0.61	0.77	0.70	0.65	0.65	0.82	0.82	0.61	0.61	0.68	0.68	0.74	0.74	0.65	0.66	0.70	0.66	0.68	0.70	0.70	0.73	0.69	0.65	0.67	0.69
AL-Q13	11.95	10.72	11.31	11.19	8.59	9.25	10.57	10.45	10.58	10.24	12.83	13.45	10.82	10.82	10.91	10.42	10.77	9.86	9.53	9.56	11.00	10.40	11.90	11.40	10.23	10.45	11.14	10.38	10.58	10.52
AL-Q14	10.21	10.56	8.40	8.15	10.30	8.92	8.67	8.60	9.21	8.81	9.03	9.08	6.81	6.81	8.87	8.81	10.68	10.06	8.59	8.36	9.00	8.72	10.14	10.38	9.36	9.50	9.19	8.81	8.52	7.77
AL-Q15	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03
AL-Q16	1.47	1.47	1.45	1.37	1.60	1.60	1.35	1.43	1.54	1.48	1.37	1.37	1.35	1.35	1.51	1.49	1.40	1.37	1.49	1.45	1.44	1.39	1.65	1.49	1.44	1.43	1.53	1.47	1.36	1.40
AL-Q17	618.88	626.62	471.96	473.30	508.08	460.78	477.78	479.03	511.51	474.04	504.34	467.89	484.96	484.96	499.41	469.41	536.17	501.68	448.78	465.43	481.18	472.21	673.30	701.59	487.09	475.65	515.13	478.57	487.90	463.24
AM-Q1	4.36	4.30	3.85	3.71	3.37	3.56	3.63	3.63	3.94	3.75	3.58	3.62	3.69	3.69	3.78	3.67	4.15	3.76	3.84	3.32	3.78	3.66	4.14	4.46	3.64	3.55	3.86	3.72	4.00	3.68
AM-Q2	0.56	0.48	0.62	0.57	0.61	0.64	0.56	0.55	0.62	0.58	0.61	0.59	0.52	0.52	0.60	0.56	0.69	0.66	0.62	0.61	0.60	0.56	0.63	0.62	0.54	0.52	0.63	0.61	0.61	0.57
AM-Q3	1.34	1.25	1.12	1.14	1.06	1.00	1.02	1.15	1.18	1.15	1.11	1.15	1.13	1.13	1.13	1.14	1.24	1.18	1.09	1.05	1.20	1.17	1.01	1.05	1.17	1.10	1.18	1.17	1.00	1.11

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AM-Q4	0.56	0.61	0.61	0.60	0.69	0.70	0.59	0.58	0.61	0.62	0.64	0.72	0.56	0.56	0.62	0.62	0.59	0.54	0.60	0.63	0.64	0.64	0.52	0.52	0.55	0.60	0.64	0.62	0.58	0.59
AM-Q5	1.72	1.77	2.59	2.46	2.64	2.55	2.76	3.11	2.29	1.93	2.90	2.75	2.76	2.76	2.37	2.01	2.67	2.01	2.40	2.24	2.51	2.03	2.21	1.93	2.43	2.41	2.50	2.01	2.25	1.93
AM-Q6	1.16	1.13	0.75	0.71	0.86	0.83	0.69	0.49	0.88	0.84	0.82	0.74	0.41	0.41	0.86	0.83	0.89	0.83	0.84	0.84	0.84	0.80	0.87	0.78	0.92	0.84	0.85	0.83	0.74	0.70
AM-Q7	1.56	1.65	1.70	1.61	1.71	1.85	1.62	1.62	1.62	1.62	2.01	2.15	1.95	1.95	1.67	1.62	1.63	1.44	1.51	1.39	1.73	1.67	1.64	1.83	1.68	1.69	1.67	1.62	1.68	1.78
AM-Q8	3.12	2.84	2.34	2.14	2.44	2.08	1.91	1.66	2.61	2.34	2.55	2.11	2.42	2.42	2.56	2.24	2.23	2.11	2.76	2.68	2.49	2.13	2.21	2.12	2.51	2.22	2.33	2.12	3.10	2.74
AM-Q9	1.26	1.38	1.05	0.95	1.14	1.26	1.09	0.92	1.12	0.99	1.01	0.90	0.82	0.82	1.15	0.99	0.95	0.87	1.15	1.11	1.09	0.97	1.09	0.99	0.96	0.97	1.16	0.99	1.06	0.95
AM-Q10	0.62	0.64	0.65	0.61	0.61	0.57	0.55	0.41	0.64	0.59	0.75	0.75	0.67	0.67	0.64	0.60	0.63	0.60	0.69	0.69	0.65	0.60	0.55	0.57	0.74	0.67	0.59	0.58	0.70	0.67
AM-Q11	0.43	0.40	0.40	0.38	0.44	0.46	0.41	0.39	0.40	0.40	0.46	0.46	0.29	0.29	0.43	0.41	0.38	0.32	0.37	0.39	0.41	0.41	0.44	0.34	0.36	0.34	0.43	0.42	0.37	0.38
AM-Q12	0.20	0.19	0.16	0.15	0.17	0.14	0.15	0.14	0.18	0.16	0.15	0.15	0.14	0.14	0.17	0.16	0.17	0.15	0.18	0.15	0.16	0.15	0.19	0.21	0.19	0.16	0.17	0.15	0.16	0.14
AM-Q13	0.24	0.23	0.31	0.29	0.32	0.29	0.29	0.26	0.30	0.29	0.31	0.29	0.39	0.39	0.30	0.29	0.25	0.25	0.29	0.29	0.30	0.29	0.31	0.27	0.27	0.25	0.30	0.29	0.32	0.29
AM-Q14	0.64	0.64	0.88	0.86	0.85	0.80	0.98	0.92	0.79	0.79	0.91	0.72	1.45	1.45	0.83	0.80	0.71	0.76	0.95	0.88	0.83	0.79	0.74	0.65	0.72	0.81	0.84	0.79	0.93	0.83
AM-Q15	0.27	0.27	0.31	0.30	0.33	0.31	0.35	0.29	0.30	0.30	0.30	0.29	0.23	0.23	0.31	0.31	0.30	0.26	0.35	0.34	0.30	0.30	0.29	0.27	0.32	0.35	0.32	0.30	0.26	0.25
AM-Q16	31.30	34.25	25.07	23.58	26.91	27.60	22.72	24.80	27.69	25.77	24.93	22.54	20.30	20.30	27.54	26.20	23.78	23.14	23.67	25.50	27.01	25.13	27.87	24.80	24.60	22.40	27.08	25.33	26.57	25.13
AM-Q17	0.14	0.13	0.13	0.12	0.12	0.13	0.15	0.13	0.13	0.12	0.12	0.11	0.09	0.09	0.13	0.12	0.14	0.13	0.12	0.11	0.13	0.12	0.16	0.18	0.13	0.11	0.14	0.13	0.10	0.09
AM-Q18	9.11	9.01	8.78	8.46	8.95	10.21	7.92	7.63	9.15	9.00	8.49	7.96	8.64	8.64	9.06	8.60	8.11	7.93	9.87	11.04	8.81	8.79	7.99	7.93	8.52	7.85	8.52	8.32	10.52	10.37
AM-Q19	0.23	0.22	0.22	0.21	0.21	0.21	0.20	0.20	0.23	0.21	0.23	0.21	0.26	0.26	0.22	0.21	0.22	0.22	0.24	0.21	0.22	0.21	0.22	0.20	0.26	0.25	0.21	0.21	0.22	0.20
AM-Q20	0.43	0.42	0.41	0.39	0.39	0.31	0.39	0.37	0.40	0.39	0.50	0.48	0.41	0.41	0.41	0.39	0.41	0.36	0.44	0.42	0.42	0.39	0.34	0.33	0.44	0.42	0.39	0.37	0.47	0.44
AM-Q21	2.36	2.53	2.68	2.48	2.48	2.50	2.34	1.98	2.51	2.47	3.27	3.23	2.71	2.71	2.61	2.48	2.45	2.48	2.46	2.38	2.60	2.48	2.65	2.62	2.71	2.57	2.58	2.48	2.47	2.54
AM-Q22	1037.77	1110.61	1054.71	980.21	993.04	956.96	879.98	873.98	1033.37	996.22	1257.31	1156.46	919.77	919.77	1023.09	965.00	1140.45	1111.11	1239.17	1209.91	1000.81	965.28	976.25	1031.88	1174.06	1234.09	1002.24	965.00	1039.27	943.81
AN-Q1	1.16	1.09	1.36	1.50	0.92	1.22	1.35	1.31	1.26	1.41	0.94	0.90	1.62	1.62	1.27	1.32	0.95	0.43	1.16	1.40	1.24	1.31	1.27	1.24	1.23	1.19	1.17	1.31	1.48	1.65
AN-Q2	7.53	6.96	8.59	8.92	6.15	6.15	7.95	9.86	8.29	7.87	5.91	6.39	9.85	9.85	8.42	8.67	5.23	3.17	7.63	8.76	8.22	7.87	6.95	7.07	8.76	9.02	6.86	6.74	10.91	9.70
AN-Q3	4.25	4.16	4.24	4.70	3.71	4.49	4.36	4.91	4.28	4.62	3.11	3.89	5.68	5.68	4.36	4.67	2.77	2.23	4.15	5.14	4.11	4.62	4.22	4.67	3.89	4.39	3.89	4.63	5.25	4.80
AN-Q4	1.41	1.66	0.98	1.16	0.96	1.30	1.07	1.22	1.08	1.21	0.89	1.02	1.50	1.50	1.16	1.27	0.47	0.25	1.04	1.26	1.06	1.21	1.04	1.08	0.95	1.07	0.99	1.17	1.39	1.40
AN-Q5																														
AN-Q6	35.55	37.86	24.53	26.49	23.63	23.96	28.65	30.97	26.37	24.92	23.29	26.69	43.32	43.32	28.51	28.75	12.43	7.14	25.00	25.54	25.93	29.94	29.44	28.75	24.29	28.50	24.66	23.99	34.31	30.87
AN-Q7	1.63	1.42	1.45	1.46	1.19	1.12	1.17	1.21	1.57	1.47	0.98	1.18	1.13	1.13	1.56	1.47	0.96	0.52	1.27	1.09	1.53	1.47	1.21	1.38	1.30	1.23	1.37	1.46	1.78	1.42
AN-Q8	11.86	10.91	10.09	11.18	10.09	12.96	9.94	11.19	10.86	11.41	8.53	9.77	13.95	13.95	11.14	11.28	6.30	3.95	10.62	12.79	10.29	11.15	10.66	10.76	10.60	12.90	9.67	11.14	12.87	11.93
AN-Q9	13.27	12.50	11.00	12.13	8.60	10.00	9.22	10.00	11.96	12.13	7.36	9.47	10.55	10.55	11.77	12.00	7.30	4.67	9.41	11.58	11.11	11.90	11.86	11.00	10.17	12.29	10.76	11.40	12.28	11.83
AN-Q10	1.10	1.03	0.77	0.78	0.73	0.99	0.84	0.88	0.84	0.88	0.66	0.83	0.97	0.97	0.89	0.88	0.45	0.34	0.83	0.97	0.81	0.88	0.83	0.86	0.74	0.75	0.81	0.86	0.92	0.96
AN-Q11	10.78	11.54	7.77	7.66	8.74	8.70	7.62	8.98	8.90	8.31	7.40	7.85	13.51	13.51	8.96	8.98	5.23	2.24	8.90	9.24	8.22	7.66	9.23	9.33	8.14	8.44	7.74	7.41	11.61	12.49
AN-Q12	0.18	0.16	0.13	0.15	0.11	0.11	0.14	0.15	0.14	0.15	0.13	0.14	0.14	0.14	0.15	0.16	0.08	0.05	0.11	0.12	0.15	0.16	0.12	0.14	0.12	0.14	0.13	0.16	0.16	0.14
AN-Q13	0.19	0.19	0.17	0.19	0.13	0.16	0.19	0.17	0.17	0.17	0.14	0.20	0.22	0.22	0.18	0.18	0.11	0.08	0.17	0.17	0.16	0.17	0.20	0.22	0.16	0.19	0.16	0.17	0.19	0.18
AN-Q14	0.68	0.64	0.47	0.48	0.43	0.38	0.53	0.62	0.51	0.57	0.38	0.46	0.73	0.73	0.55	0.59	0.23	0.19	0.45	0.51	0.49	0.47	0.57	0.63	0.44	0.48	0.48	0.48	0.61	0.62
AN-Q15	0.14	0.14	0.13	0.14	0.11	0.14	0.16	0.15	0.13	0.14	0.11	0.15	0.16	0.16	0.14	0.14	0.08	0.06	0.13	0.14	0.13	0.14	0.11	0.10	0.10	0.11	0.13	0.14	0.17	0.16
AN-Q16	581.00	543.78	401.15	417.13	327.99	343.50	374.45	343.50	431.30	452.67	401.56	561.40	557.83	557.83	452.26	494.75	235.94	176.63	372.65	387.77	419.87	435.50	464.97	522.80	381.16	389.75	406.51	450.00	499.25	528.90
AN-Q17	0.13	0.12	0.10	0.11	0.07	0.08	0.12	0.11	0.10	0.11	0.09	0.10	0.11	0.11	0.11	0.12	0.06	0.05	0.07	0.08	0.11	0.12	0.11	0.12	0.08	0.09	0.10	0.12	0.11	0.11
AN-Q18	5.35	4.84	3.56	3.76	4.45	4.88	3.46	3.79	4.40	4.72	2.92	3.92	4.84	4.84	4.36	4.12	2.53	1.64	4.47	4.70	4.10	4.35	3.36	3.73	2.63	3.02	4.28	4.77	4.66	4.32
AN-Q19	0.21	0.22	0.14	0.15	0.13	0.17	0.15	0.14	0.15	0.16	0.13	0.13	0.12	0.12	0.16	0.16	0.12	0.11	0.12	0.15	0.15	0.16	0.18	0.17	0.16	0.18	0.15	0.16	0.14	0.14
AN-Q20	0.28	0.27	0.19	0.23	0.23	0.33	0.23	0.24	0.22	0.24	0.17	0.20	0.21	0.21	0.24	0.24	0.13	0.08	0.21	0.23	0.21	0.23	0.24	0.25	0.20	0.20	0.22	0.24	0.22	0.25
AN-Q21	21.43	20.98	17.24	18.80	13.05	17.03	17.65	18.66	17.43	18.80	15.05	19.30	21.80	21.80	17.82	19.05	13.03	9.38	13.69	16.77	17.97	18.94	17.57	20.29	15.22	21.12	17.51	19.25	17.76	18.58
AN-Q22	1023.93	1020.95	701.35	828.72	765.12	763.33	756.13	880.73	817.21	809.66	545.30	727.87	932.29	932.29	813.51	861.02	547.24	322.60	709.19	809.66	766.35	822.70	864.48	861.02	683.47	833.65	740.58	763.33	971.36	889.28
AO-Q1	1.92	2.01	1.46	1.30	1.64	1.52	1.49	1.33	1.58	1.47	1.65	1.61	1.02	1.02	1.58	1.49	1.71	1.47	1.48	1.30	1.55	1.50	1.81	2.06	1.42	1.27	1.70	1.59	1.31	1.23
AO-Q2	0.48	0.42	0.40	0.38	0.40	0.36	0.49	0.33	0.41	0.38	0.38	0.33	0.38	0.38	0.42	0.38	0.39	0.33	0.34	0.33	0.44	0.39	0.39	0.38	0.34	0.29	0.44	0.39	0.40	0.38
AO-Q3	2.02	1.98	1.96	1.96	2.30	2.28	2.10	2.28	2.02	1.99	2.07	1.85	2.40	2.40	2.03	1.96	1.99	1.97	2.48	2.62	1.94	1.97	1.99	1.95	2.08	1.95	2.04	1.96	2.00	2.00
AO-Q4	4.18	3.98	5.02	4.74	4.78	4.87	5.27	5.04	4.79	4.63	4.47	4.20	7.15	7.15	4.67	4.62	4.88	5.52	5.37	5.49	4.73	4.68	4.59	3.60	5.36	5.52	4.52	4.30	5.37	5.86
AO-Q5	5.85	5.50	6.99	6.22	6.40	5.88	7.07	6.82	6.64	5.90	6.31	4.94	10.97	10.97	6.60	6.03	5.89	5.44	6.11	6.10	6.74	5.97	7.00	6.26	7.50	6.12	6.19	5.86	7.54	7.62
AO-Q6	1.85	1.64	2.04	1.74	1.97	1.73	1.92	1.69	2.00	1.70	2.03	1.80	1.66	1.66	2.02	1.78	1.94	1.69	2.17	1.95	2.02	1.80	1.67	1.67	1.90	1.63	1.99	1.73	2.08	1.83
AO-Q7	27.63	29.23	38.51	41.17	34.91	32.75	46.75	44.33	34.49	32.88	30.42	24.13	47.80	47.80	35.20	33.00	35.73	35.50	37.72	35.50	37.03	34.29	28.67	24.75	38.78	41.33	35.81	33.00	33.09	30.94
AO-Q8	28.13	28.50	24.91	24.00	21.22	20.00	21.93	22.00	25.38	24.50	24.67	23.50	20.00	20.00	24.70	24.00	26.13	24.50	25.75	23.00	24.85	24.00	23.14	24.00	26.75	25.50	24.12	24.00	25.00	23.50
AO-Q9	3.72	3.54	5.11	4.75	4.87	4.17	5.35	4.92	4.72	4.59	4.72	3.28	6.07	6.07	4.67	4.45	5.14	4.75	4.96	4.81	4.87	4.67	4.41	4.52	5.12	4.83	4.58	4.18	5.39	5.69
AO-Q10	1.38	1.32	1.48	1.44	1.40	1.37	1.52	1.47	1.43	1.34	1.45	1.54	2.14	2.14	1.40	1.43	1.47	1.30	1.46	1.41	1.47	1.43	1.32	1.32	1.57	1.41	1.36	1.40	1.62	1.49
AO-Q11	0.13	0.14	0.15	0.12	0.14	0.14	0.15	0.15	0.14	0.13	0.14	0.12	0.14	0.14	0.14	0.12	0.15	0.15	0.17	0.20	0.14	0.14	0.11	0.11	0.16	0.14	0.14	0.13	0.14	0.13
AO-Q12	0.22	0.21	0.23	0.23	0.25	0.25	0.25	0.23	0.23	0.22	0.23	0.23	0.29	0.29	0.23	0.22	0.25	0.25	0.24	0.25	0.23	0.22	0.23	0.24	0.25	0.25	0.23	0.23	0.23	0.24
AO-Q13	0.81	0.83	0.73	0.67	0.75	0.70	0.81	0.87	0.74	0.68	0.74	0.75	0.64	0.64	0.74	0.69	0.80	0.83	0.75	0.78	0.75	0.69	0.73	0.68	0.72	0.71	0.77	0.70	0.68	0.64
AO-Q14	0.19	0.20	0.22	0.23	0.23	0.25	0.23	0.20	0.22	0.20	0.20	0.20	0.21	0.21	0.22	0.20	0.20	0.23	0.22	0.25	0.22	0.20	0.18	0.17	0.17	0.17	0.22	0.25	0.23	0.23
AO-Q15	2.85	2.59	3.20	2.86	2.95	3.14	3.78	3.62	2.96	2.84	2.98	2.69	4.29	4.29	3.13	2.86	2.63	2.64	3.32	3.66	2.99	2.86	3.24	2.84	3.73	3.35	2.83	2.82	3.39	3.72
AO-Q16	0.32	0.32	0.28	0.29	0.32	0.29	0.26	0.27	0.30	0.29	0.31	0.30	0.30	0.30	0.30	0.29	0.24	0.24	0.29	0.29	0.28	0.29	0.36	0.31	0.28	0.27	0.28	0.29	0.35	0.34
AO-Q17	7.09	6.99	7.28	7.05	7.62	7.43	7.54	7.39	7.49	7.16	6.09	5.83	5.53	5.53	7.36	7.16	7.58	6.46	6.88	6.68	7.55	7.41	6.79	6.29	7.91	6.50	7.30	7.39	6.75	6.89
AO-Q18	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
AO-Q19	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AO-Q20	3.50	3.51	4.20	3.93	3.67	3.50	4.19	4.38	3.94	3.54	3.86	3.67	3.65	3.65	3.98	3.64	4.01	3.63	3.67	3.75	4.09	3.67	3.78	3.44	4.49	4.54	3.84	3.56	3.91	4.01
AO-Q21	35.34	37.09	44.05	41.05	41.95	40.00	45.94	45.78	42.56	40.59	35.04	39.16	64.16	64.16	42.57	41.21	34.42	34.25	44.83	40.30	42.67	40.16	36.42	41.32	41.80	42.22	39.17	39.50	52.91	57.06
AP-Q1	1.80	1.86	1.93	1.72	1.50	1.39	1.94	1.36	1.77	1.74	1.93	1.79	1.83	1.83	1.80	1.73	1.92	1.77	1.89	1.70	1.77	1.71	1.98	1.87	1.97	1.89	1.83	1.74	1.62	1.50
AP-Q2	2.31	2.23	2.69	2.60	2.09	2.05	2.40	1.65	2.47	2.29	2.79	2.10	2.40	2.40	2.38	2.25	3.08	2.90	2.61	2.19	2.44	2.30	2.64	2.14	2.59	2.61	2.55	2.22	2.26	2.19
AP-Q3	1.28	1.32	1.30	1.20	1.06	1.03	1.37	1.26	1.22	1.21	1.23	1.15	1.35	1.35	1.20	1.17	1.42	1.31	1.34	1.19	1.20	1.21	1.33	1.26	1.34	1.26	1.25	1.26	1.15	1.10
AP-Q4	4.04	4.22	3.78	3.81	3.97	4.08	3.74	3.18	3.92	3.84	3.72	3.81	4.04	4.04	3.88	3.83	3.74	3.44	3.69	3.96	3.87	3.81	4.03	4.05	3.78	3.69	3.82	3.82	4.10	4.25
AP-Q5	0.58	0.50	0.48	0.42	0.53	0.36	0.56	0.56	0.51	0.42	0.43	0.34	0.57	0.57	0.50	0.40	0.54	0.47	0.48	0.48	0.54	0.45	0.41	0.35	0.48	0.40	0.50	0.40	0.57	0.58
AP-Q6	2.84	2.62	2.94	2.71	3.76	4.44	3.06	3.04	3.05	2.71	3.30	3.15	3.23	3.23	3.06	2.73	3.17	2.65	3.06	2.72	3.19	2.76	2.65	2.53	2.50	2.20	3.18	2.77	3.35	3.27
AP-Q7	0.54	0.39	0.57	0.56	0.61	0.63	0.54	0.59	0.59	0.58	0.51	0.52	0.59	0.59	0.58	0.59	0.51	0.51	0.54	0.54	0.57	0.59	0.61	0.53	0.52	0.53	0.57	0.59	0.63	0.64
AP-Q8	0.26	0.24	0.22	0.21	0.24	0.24	0.24	0.21	0.23	0.23	0.21	0.21	0.22	0.22	0.22	0.22	0.27	0.25	0.21	0.22	0.24	0.22	0.23	0.20	0.22	0.21	0.23	0.23	0.24	0.22
AP-Q9	4.95	4.59	5.05	4.69	4.73	4.53	4.73	4.04	4.94	4.64	5.37	4.84	5.73	5.73	4.88	4.66	5.16	4.43	5.06	4.93	4.98	4.61	4.80	4.61	5.14	5.41	4.85	4.46	5.21	5.32
AP-Q10	14.51	13.56	15.65	15.14	15.21	14.81	17.45	16.41	15.19	14.76	13.85	13.47	19.70	19.70	14.86	14.43	16.47	16.79	16.39	18.03	15.57	14.84	13.31	13.48	15.21	14.02	14.99	14.70	16.87	16.53
AP-Q11	2.50	2.56	2.27	2.26	2.45	2.50	2.26	2.36	2.41	2.33	2.15	1.82	2.33	2.33	2.34	2.36	2.40	2.23	2.39	2.42	2.41	2.39	2.04	1.69	2.04	2.12	2.36	2.36	2.62	2.55
AP-Q12	1032.06	852.70	844.63	796.05	869.28	817.72	881.97	885.26	867.05	796.59	968.38	887.53	834.48	834.48	863.26	803.00	980.83	801.00	760.96	709.84	909.72	810.36	907.19	870.71	850.11	730.19	886.78	803.00	901.53	966.34
AP-Q13	0.50	0.47	0.49	0.46	0.52	0.53	0.52	0.54	0.49	0.46	0.47	0.44	0.59	0.59	0.49	0.46	0.50	0.46	0.49	0.50	0.51	0.46	0.44	0.46	0.50	0.48	0.49	0.46	0.51	0.49
AP-Q14	4.19	4.25	4.55	4.46	4.49	4.16	4.26	3.47	4.44	4.38	4.90	4.84	3.60	3.60	4.42	4.40	4.92	4.65	4.50	4.25	4.43	4.39	4.64	4.68	4.42	4.41	4.51	4.36	4.38	4.80
AP-Q15	1.92	1.87	2.25	2.00	2.40	2.00	1.74	1.89	2.19	2.00	2.95	2.64	1.39	1.39	2.10	1.98	2.94	2.86	2.27	2.01	2.24	1.99	2.09	1.85	2.03	2.00	2.22	1.99	2.41	1.94
AP-Q16	1.91	1.99	2.04	1.95	2.16	2.07	2.11	1.92	2.02	2.01	2.10	1.75	1.94	1.94	2.00	1.99	2.24	2.32	2.14	2.01	2.01	1.98	2.07	1.99	1.83	1.64	2.04	2.04	2.27	1.98
AP-Q17	1.01	0.99	0.97	0.96	1.01	1.02	1.02	0.95	0.98	0.99	0.98	0.95	0.86	0.86	0.96	0.97	1.13	1.13	0.83	0.81	1.03	0.98	0.96	0.98	0.96	0.96	1.00	0.97	0.95	0.96
AP-Q18	433.01	421.22	476.40	436.06	506.43	416.57	533.33	494.57	455.74	415.77	507.32	478.68	543.06	543.06	458.36	428.09	529.03	558.53	513.65	487.14	460.85	436.31	489.47	407.33	440.96	401.92	459.61	435.11	563.07	505.67

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AP-Q19	0.97	0.95	1.04	0.97	1.05	1.07	1.01	0.97	1.03	1.00	1.05	0.85	0.79	0.79	1.00	1.00	1.20	1.19	0.92	0.88	1.07	1.00	0.98	0.95	0.96	0.93	1.04	1.01	1.08	0.91
AP-Q20	0.97	1.02	1.03	1.02	1.12	0.91	1.08	0.98	1.01	1.01	1.13	1.07	0.81	0.81	0.99	1.01	1.28	1.21	0.94	0.94	1.07	1.06	1.02	1.01	0.94	0.96	1.06	1.05	1.05	1.04
AP-Q21	9.51	9.06	9.15	8.51	9.31	9.57	9.37	9.75	9.33	8.62	8.69	7.97	9.53	9.53	9.51	8.85	8.02	6.93	8.70	8.13	9.69	8.74	7.99	8.26	7.70	8.19	9.69	9.25	9.18	8.32
AQ-Q1	2.81	3.14	2.18	2.19	2.55	2.69	2.44	2.32	2.34	2.24	2.44	2.49	2.68	2.68	2.35	2.27	2.34	2.31	2.24	2.27	2.44	2.35	2.18	2.13	2.19	1.87	2.47	2.56	2.15	2.02
AQ-Q2	8.24	8.69	9.60	8.66	6.94	7.50	7.27	6.80	9.23	8.41	8.49	7.25	6.79	6.79	8.91	8.47	8.95	7.98	7.83	7.76	9.26	8.66	8.09	6.08	11.46	11.28	7.93	7.77	9.42	8.16
AQ-Q3	0.10	0.11	0.12	0.11	0.12	0.11	0.11	0.08	0.12	0.11	0.12	0.13	0.08	0.08	0.12	0.11	0.13	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.12	0.11	0.11	0.12	0.11
AQ-Q4	0.32	0.28	0.43	0.41	0.38	0.31	0.37	0.40	0.41	0.40	0.38	0.36	0.25	0.25	0.41	0.40	0.39	0.41	0.40	0.36	0.40	0.40	0.42	0.44	0.47	0.48	0.37	0.36	0.44	0.34
AQ-Q5	6.29	5.51	6.06	5.70	6.13	5.82	6.29	7.18	6.08	5.58	6.08	6.07	8.80	8.80	5.77	5.56	6.94	7.52	6.24	5.65	6.26	6.02	5.36	5.18	5.77	5.46	6.09	5.99	6.54	5.70
AQ-Q6	0.83	0.80	0.88	0.83	0.85	0.88	0.86	0.87	0.87	0.83	0.84	0.70	1.11	1.11	0.84	0.83	0.91	0.88	0.79	0.82	0.85	0.83	1.03	1.12	0.90	0.82	0.88	0.88	0.77	0.72
AQ-Q7	19.34	20.94	18.85	17.94	18.31	17.57	17.92	15.27	18.51	17.79	21.58	23.63	30.11	30.11	18.11	17.57	19.16	18.12	18.07	16.42	18.18	17.94	22.47	24.06	18.64	19.19	18.14	16.67	21.53	21.29
AQ-Q8	1.55	1.51	1.51	1.47	1.64	1.53	1.55	1.45	1.55	1.50	1.47	1.50	1.58	1.58	1.56	1.48	1.46	1.55	1.43	1.50	1.55	1.50	1.65	1.45	1.48	1.57	1.58	1.48	1.46	1.42
AQ-Q9	399.60	411.92	398.30	372.67	435.33	329.50	483.19	481.00	395.67	347.00	370.58	344.50	453.67	453.67	393.66	343.50	447.71	403.17	372.69	334.00	410.31	372.67	425.21	387.33	367.79	357.17	422.24	371.00	384.98	357.67
AQ-Q10	23.16	23.32	21.20	20.48	23.19	20.24	22.49	20.34	21.99	20.75	21.07	18.65	26.89	26.89	21.53	20.24	22.53	25.66	20.03	20.56	21.69	20.48	25.21	23.79	24.44	24.73	21.56	20.24	20.84	21.19
AQ-Q11	0.85	0.72	0.89	0.89	0.95	0.96	0.89	0.88	0.90	0.87	0.84	0.83	1.23	1.23	0.85	0.83	1.00	1.10	0.96	1.03	0.86	0.84	0.93	1.07	0.88	0.93	0.91	0.90	0.84	0.68
AR-Q1	2.83	2.37	3.42	2.99	2.45	2.34	3.21	2.55	3.13	2.68	3.00	2.95	2.23	2.23	2.91	2.58	4.28	4.68	3.32	2.44	3.03	2.68	3.29	3.26	3.69	3.73	2.98	2.55	3.07	2.78
AR-Q2	11.66	11.73	11.42	10.40	11.23	10.91	12.57	11.99	11.13	10.13	11.62	12.64	14.42	14.42	11.91	11.99	8.52	8.06	10.69	10.05	11.28	11.27	12.87	9.45	11.63	10.13	11.66	11.99	10.36	10.18
AR-Q3	0.13	0.12	0.12	0.11	0.13	0.11	0.13	0.11	0.12	0.11	0.14	0.14	0.15	0.15	0.13	0.11	0.10	0.10	0.11	0.11	0.12	0.11	0.13	0.11	0.11	0.09	0.13	0.12	0.11	0.11
AR-Q4	0.49	0.54	0.44	0.40	0.44	0.47	0.41	0.36	0.45	0.41	0.46	0.42	0.55	0.55	0.47	0.44	0.32	0.31	0.42	0.44	0.43	0.40	0.54	0.60	0.48	0.41	0.44	0.40	0.46	0.46
AR-Q5	5.42	5.79	6.09	5.79	5.91	5.43	5.41	5.33	5.96	5.71	6.43	6.60	4.34	4.34	6.01	5.80	6.04	5.86	5.47	5.63	6.50	5.91	4.07	3.90	5.95	5.79	5.83	5.64	6.31	5.91
AR-Q6	1.00	1.04	1.13	1.11	1.18	1.14	1.22	1.16	1.07	1.04	1.27	1.24	0.88	0.88	1.16	1.10	1.02	1.08	0.98	1.01	1.16	1.14	1.10	1.05	1.02	1.05	1.18	1.14	1.01	0.98
AR-Q7	14.68	14.49	15.00	15.07	13.89	14.79	13.70	11.10	14.61	14.87	16.47	15.54	15.71	15.71	15.00	14.89	13.24	13.72	12.77	11.22	15.52	15.10	13.52	14.39	14.34	14.83	14.45	14.79	16.09	16.27
AR-Q8	2.60	2.34	2.74	2.50	2.88	2.70	2.43	1.97	2.74	2.55	3.11	2.81	2.02	2.02	2.59	2.46	3.59	3.25	3.28	3.28	2.56	2.45	2.92	2.16	2.76	2.50	2.89	2.70	2.21	2.02
AR-Q9	0.76	0.73	0.73	0.72	0.72	0.73	0.87	0.86	0.70	0.72	0.75	0.72	0.55	0.55	0.73	0.73	0.80	0.68	0.79	0.78	0.71	0.72	0.76	0.75	0.69	0.50	0.75	0.72	0.73	0.73
AR-Q10	0.73	0.71	0.77	0.73	0.74	0.72	0.73	0.69	0.77	0.74	0.72	0.70	0.62	0.62	0.75	0.73	0.82	0.78	0.77	0.70	0.75	0.73	0.76	0.73	0.87	0.85	0.75	0.72	0.68	0.73
AR-Q11	0.87	0.90	0.94	0.85	0.85	0.87	1.07	0.83	0.86	0.87	1.00	0.92	0.68	0.68	0.93	0.87	0.86	0.86	0.83	0.83	0.96	0.88	0.79	0.72	0.80	0.81	0.94	0.87	0.90	0.85
AR-Q12	3.99	3.26	4.86	4.75	5.11	4.82	4.84	4.71	4.68	4.39	5.04	4.75	4.22	4.22	4.83	4.71	4.58	4.49	4.32	4.58	5.02	4.71	4.12	3.79	4.48	4.17	4.82	4.70	4.78	4.94
AR-Q13	1.13	1.05	1.07	1.05	1.13	1.07	1.10	1.08	1.10	1.06	1.06	1.05	1.08	1.08	1.06	1.04	1.22	1.27	1.21	1.12	1.09	1.06	0.97	0.85	1.07	1.04	1.11	1.07	1.02	1.05
AS-Q1	3.64	3.54	2.90	3.04	4.24	3.84	2.73	3.71	3.46	3.34	3.16	3.29	2.07	2.07	3.25	3.15	3.85	4.17	3.53	3.61	3.51	3.75	2.17	2.80	3.00	3.19	3.46	3.70	3.04	3.57
AS-Q2	0.43	0.43	0.46	0.49	0.54	0.50	0.36	0.40	0.49	0.52	0.53	0.61	0.25	0.25	0.46	0.48	0.59	0.59	0.50	0.48	0.47	0.48	0.47	0.54	0.51	0.55	0.50	0.48	0.34	0.45
AS-Q3	6.51	5.53	8.30	8.11	8.22	8.42	5.09	5.56	8.14	8.03	10.38	11.52	2.50	2.50	7.47	7.88	11.51	11.15	8.40	6.69	8.02	8.11	7.24	6.73	8.88	9.68	8.76	8.38	4.19	5.03
AS-Q4	0.51	0.59	0.47	0.49	0.53	0.50	0.36	0.47	0.51	0.52	0.52	0.51	0.26	0.26	0.47	0.49	0.61	0.56	0.53	0.54	0.49	0.49	0.44	0.47	0.52	0.54	0.53	0.50	0.32	0.48
AS-Q5	0.29	0.34	0.31	0.34	0.35	0.35	0.21	0.22	0.32	0.35	0.39	0.41	0.16	0.16	0.31	0.35	0.37	0.39	0.34	0.36	0.31	0.33	0.26	0.36	0.31	0.31	0.32	0.35	0.27	0.33
AS-Q6	0.37	0.39	0.44	0.47	0.52	0.51	0.38	0.44	0.45	0.47	0.49	0.47	0.23	0.23	0.42	0.45	0.59	0.52	0.45	0.48	0.44	0.45	0.44	0.48	0.45	0.48	0.47	0.48	0.32	0.40
AS-Q7	2.75	2.57	2.38	2.75	2.41	2.43	1.81	2.24	2.55	2.58	2.69	3.21	1.05	1.05	2.39	2.48	3.08	3.08	2.51	2.34	2.53	2.68	2.09	2.45	2.79	2.76	2.62	2.61	1.53	2.03
AS-Q8	0.08	0.08	0.08	0.09	0.10	0.09	0.06	0.06	0.09	0.09	0.09	0.11	0.04	0.04	0.09	0.09	0.10	0.10	0.10	0.09	0.09	0.09	0.07	0.08	0.09	0.10	0.09	0.09	0.07	0.07
AS-Q9	67.85	72.50	70.94	73.00	74.41	72.15	56.10	68.12	71.72	72.29	85.13	96.43	32.83	32.83	70.48	72.28	83.29	83.93	74.66	78.38	71.65	71.19	64.58	74.00	81.09	73.86	73.33	72.28	52.92	62.21
AS-Q10	0.25	0.23	0.21	0.23	0.30	0.28	0.22	0.29	0.24	0.25	0.24	0.21	0.08	0.08	0.24	0.25	0.25	0.23	0.24	0.26	0.24	0.25	0.22	0.25	0.24	0.25	0.25	0.25	0.18	0.20
AS-Q11	2.78	3.00	2.54	2.75	3.31	3.50	2.71	2.75	2.78	3.00	2.58	2.75	2.00	2.00	2.77	3.00	2.78	2.42	2.45	2.54	2.86	3.00	2.57	2.50	2.34	2.63	2.92	3.00	2.50	3.25
AS-Q12	2.54	2.90	2.50	2.95	2.90	3.10	2.38	2.70	2.61	2.95	2.71	2.96	1.96	1.96	2.47	2.91	3.26	3.02	2.65	2.44	2.57	2.93	2.61	3.33	2.98	3.03	2.72	2.91	1.73	1.75
AS-Q13	0.09	0.09	0.11	0.11	0.12	0.11	0.08	0.08	0.11	0.11	0.11	0.12	0.06	0.06	0.10	0.11	0.14	0.12	0.12	0.11	0.10	0.11	0.09	0.12	0.12	0.11	0.11	0.12	0.07	0.09
AS-Q14	3.83	3.74	3.71	4.47	5.01	5.06	3.63	4.44	4.04	4.52	4.15	4.47	1.59	1.59	4.12	4.60	4.01	4.17	3.86	4.24	4.13	4.47	3.55	5.12	4.01	4.76	4.04	4.44	3.81	4.45
AS-Q15	125.68	121.23	128.51	152.16	145.10	137.21	134.85	163.38	125.30	125.86	159.31	180.99	100.00	100.00	118.97	125.86	193.18	208.34	132.95	141.08	128.13	125.86	143.14	201.92	152.20	157.72	137.12	137.21	89.44	103.85
AT-Q1	5.72	3.34	8.95	9.93	10.05	7.67	12.42	12.71	7.58	7.20	9.51	7.71	9.08	9.08	8.54	7.76	8.71	8.04	9.65	8.39	8.56	8.32	7.52	7.20	4.89	3.00	9.33	9.38	9.62	11.89
AT-Q2	0.54	0.24	0.75	0.85	0.73	0.86	1.06	1.09	0.62	0.64	0.79	0.94	0.55	0.55	0.71	0.82	0.77	0.81	0.73	0.74	0.77	0.90	0.46	0.58	0.60	0.41	0.76	0.86	0.67	0.75
AT-Q3	3.58	2.59	6.29	6.44	5.99	7.11	7.72	6.77	5.10	4.95	6.90	6.44	2.44	2.44	5.93	6.11	5.79	6.27	5.17	4.86	6.32	6.54	3.96	3.61	4.33	3.38	6.30	6.98	5.16	4.86
AT-Q4	0.05	0.04	0.07	0.08	0.07	0.07	0.10	0.09	0.06	0.06	0.09	0.08	0.04	0.04	0.07	0.07	0.06	0.07	0.06	0.07	0.08	0.09	0.04	0.04	0.05	0.03	0.07	0.07	0.06	0.08
AT-Q5	0.25	0.21	0.32	0.35	0.34	0.34	0.42	0.39	0.27	0.32	0.38	0.47	0.17	0.17	0.32	0.35	0.32	0.37	0.31	0.34	0.33	0.38	0.23	0.30	0.24	0.20	0.34	0.39	0.28	0.34
AT-Q6	0.30	0.17	0.44	0.47	0.44	0.52	0.64	0.56	0.36	0.36	0.44	0.46	0.26	0.26	0.42	0.48	0.45	0.43	0.38	0.49	0.47	0.51	0.24	0.35	0.33	0.16	0.47	0.52	0.29	0.36
AT-Q7	15.60	6.74	25.33	30.00	25.90	27.03	32.51	32.08	20.71	21.75	29.47	31.30	9.84	9.84	24.28	28.85	24.69	31.30	25.02	28.20	24.68	29.06	18.07	20.59	20.30	18.37	25.25	28.85	21.57	24.47
AT-Q8	17.96	9.26	21.92	27.16	27.04	22.45	28.49	31.37	19.69	22.34	28.58	27.89	14.29	14.29	22.58	22.45	22.73	29.12	23.53	27.62	24.06	26.57	12.97	14.29	15.88	13.83	25.93	26.67	15.23	19.26
AT-Q9	88.29	73.68	110.20	119.81	127.93	157.14	141.71	123.08	95.64	108.71	148.45	177.08	46.15	46.15	113.52	123.08	109.72	119.23	94.82	100.70	123.55	148.68	68.28	87.50	82.24	54.17	119.77	123.08	101.49	124.73
AT-Q10	28.20	19.86	38.90	43.93	33.09	42.62	51.13	44.87	31.51	43.19	41.08	40.70	47.62	47.62	35.16	43.75	35.88	42.48	39.51	43.76	36.98	43.54	26.75	32.61	23.76	13.64	39.87	44.87	33.31	35.03
AT-Q11	15.09	10.78	20.59	25.17	22.73	22.55	28.29	26.00	17.26	22.77	25.26	26.20	20.83	20.83	19.81	24.14	20.85	24.89	21.98	21.89	20.24	24.25	16.96	26.85	15.72	13.32	21.71	24.14	18.30	23.46
AT-Q12	0.34	0.20	0.53	0.62	0.51	0.60	0.64	0.64	0.45	0.59	0.54	0.54	0.36	0.36	0.50	0.60	0.48	0.56	0.46	0.59	0.52	0.62	0.39	0.43	0.34	0.22	0.57	0.63	0.35	0.40
AT-Q13	1.03	0.50	1.56	1.83	1.52	1.88	1.79	2.00	1.32	1.77	1.80	2.14	1.11	1.11	1.43	1.78	1.68	1.83	1.35	1.60	1.53	1.78	1.28	2.00	1.16	0.66	1.67	2.00	0.99	1.05
AU-Q1	0.77	0.82	0.84	0.97	0.69	0.72	0.98	1.09	0.77	0.87	0.73	0.84	0.27	0.27	0.78	0.82	0.98	0.99	0.83	0.93	0.86	0.95	0.48	0.68	0.86	0.82	0.85	0.99	0.52	0.60
AU-Q2	1.51	1.65	1.02	1.03	1.33	1.47	1.29	1.45	1.11	1.37	1.35	1.48	0.84	0.84	1.19	1.41	1.15	1.24	1.16	1.18	1.24	1.40	0.89	0.98	1.46	1.61	1.12	1.09	1.08	1.33
AU-Q3	7.21	7.49	5.10	5.19	7.18	6.77	7.49	5.77	5.13	5.52	8.09	8.84	4.16	4.16	6.21	6.46	4.92	4.72	5.72	4.64	6.04	5.90	5.46	6.32	6.29	5.95	6.02	5.46	5.01	6.64
AU-Q4	0.26	0.29	0.17	0.18	0.26	0.28	0.23	0.20	0.20	0.22	0.22	0.22	0.15	0.15	0.21	0.24	0.20	0.20	0.23	0.22	0.21	0.24	0.16	0.17	0.25	0.24	0.21	0.24	0.17	0.18
AU-Q5	2.11	2.14	1.41	1.70	1.79	1.99	1.88	1.99	1.45	1.68	2.17	2.64	0.88	0.88	1.63	1.97	1.72	1.64	1.62	2.03	1.69	1.81	1.24	1.64	1.75	1.99	1.65	1.94	1.31	1.68
AU-Q6	0.19	0.19	0.12	0.14	0.14	0.17	0.13	0.14	0.13	0.15	0.16	0.17	0.11	0.11	0.13	0.15	0.16	0.13	0.13	0.11	0.15	0.16	0.10	0.13	0.15	0.14	0.13	0.15	0.13	0.15
AU-Q7	0.48	0.48	0.31	0.36	0.45	0.45	0.48	0.40	0.33	0.37	0.40	0.43	0.19	0.19	0.36	0.38	0.42	0.41	0.41	0.50	0.37	0.38	0.30	0.34	0.43	0.43	0.37	0.37	0.30	0.39
AU-Q8	8.47	8.40	5.39	6.69	6.39	7.20	7.00	7.08	5.78	7.13	7.00	8.12	5.85	5.85	6.01	7.08	6.77	7.62	5.55	6.96	6.57	7.49	4.95	7.74	7.34	7.84	6.00	7.08	5.42	6.30
AU-Q9	96.66	99.69	79.26	85.58	112.40	116.49	106.83	117.11	80.02	85.74	115.95	130.65	71.75	71.75	91.74	94.27	81.24	85.73	108.14	105.69	88.67	89.20	68.42	81.21	103.32	105.06	87.89	86.54	78.61	69.26
AU-Q10	43.98	41.81	25.54	31.38	32.79	39.11	30.66	28.85	29.28	36.56	35.07	40.92	17.55	17.55	30.27	38.00	33.46	30.63	27.51	29.15	31.86	36.83	26.59	40.63	34.95	39.17	30.95	36.38	23.13	32.23
AU-Q11	9.44	9.88	6.99	8.25	8.82	10.53	10.18	10.91	7.27	7.63	7.83	9.19	4.04	4.04	7.70	9.48	9.13	9.91	8.15	9.31	8.03	9.17	6.38	5.46	8.83	9.68	7.53	8.86	7.71	10.34
AV-Q1	0.36	0.29	0.57	0.67	0.64	0.74	0.80	0.73	0.48	0.55	0.60	0.67	0.36	0.36	0.55	0.65	0.60	0.62	0.53	0.66	0.57	0.66	0.46	0.55	0.44	0.23	0.59	0.68	0.49	0.61
AV-Q2	0.49	0.36	0.74	0.85	0.75	0.84	0.89	0.84	0.61	0.77	0.95	1.10	0.31	0.31	0.70	0.87	0.78	0.74	0.78	0.77	0.71	0.83	0.57	0.91	0.60	0.35	0.74	0.84	0.65	0.82
AV-Q3	0.51	0.42	0.65	0.70	0.77	0.92	0.85	0.92	0.57	0.69	0.80	0.89	0.52	0.52	0.65	0.84	0.66	0.79	0.74	0.99	0.68	0.87	0.41	0.65	0.53	0.48	0.69	0.84	0.60	0.80
AV-Q4	20.03	14.22	29.99	31.59	30.06	28.13	37.56	39.42	23.66	28.18	41.75	39.71	13.63	13.63	28.47	28.97	30.86	35.49	24.25	29.05	31.05	31.22	20.72	25.43	26.27	20.77	30.05	29.24	23.60	28.11
AV-Q5	11.33	8.71	16.16	16.90	21.99	23.75	19.34	19.00	15.53	17.13	18.13	18.38	9.50	9.50	16.21	17.00	19.34	21.50	20.15	24.75	15.75	17.13	15.35	12.00	11.08	6.80	19.05	18.75	12.50	17.00
AV-Q6	1.69	1.11	2.49	3.02	2.90	2.90	3.40	3.16	2.28	2.88	2.08	2.10	2.50	2.50	2.52	3.03	2.00	2.16	2.91	3.11	2.43	3.02	1.87	1.97	1.51	0.99	2.64	3.03	2.61	2.54
AV-Q7	0.06	0.04	0.09	0.10	0.10	0.10	0.11	0.10	0.07	0.07	0.13	0.13	0.03	0.03	0.08	0.10	0.12	0.13	0.09	0.09	0.09	0.10	0.07	0.07	0.06	0.03	0.10	0.10	0.06	0.06
AV-Q8	0.55	0.29	0.74	0.81	0.72	0.79	0.95	1.00	0.58	0.62	1.03	1.21	0.28	0.28	0.66	0.73	0.99	1.26	0.80	0.88	0.67	0.76	0.69	0.65	0.52	0.26	0.79	0.89	0.57	0.57
AV-Q9	3.47	3.16	4.70	5.62	5.74	6.25	6.63	6.72	4.05	5.33	5.81	6.87	4.22	4.22	4.55	5.63	5.41	6.11	5.60	6.11	4.70	5.69	3.58	4.37	3.52	2.57	5.23	5.79	3.88	4.58
AW-Q1	8.07	7.16	5.12	6.31	7.11	6.72	7.86	7.81	5.95	6.66	4.41	4.03	8.58	8.58	5.91	6.59	5.98	7.28	6.20	8.20	6.64	7.57	3.32	4.18	6.04	7.42	6.24	6.72	5.34	6.73
AW-Q2	1.09	1.06	0.77	0.71	0.85	0.86	1.25	1.46	0.81	0.83	0.56	0.48	1.56	1.56	0.81	0.86	0.82	0.86	0.79	0.78	0.87	1.00	0.81	0.79	0.83	1.04	0.87	0.92	0.78	0.83
AW-Q3	5.28	4.80	4.31	4.39	4.48	4.72	6.18	4.72	4.49	4.45	2.73	2.15	9.23	9.23	4.21	4.44	4.65	4.38	4.05	4.39	4.70	4.47	4.25	3.90	3.54	4.17	4.72	4.47	4.76	4.82
AW-Q4	1.20	1.08	0.81	1.13	0.94	1.20	1.28	1.20	0.88	1.11	0.61	0.47	1.57	1.57	0.90	1.08	0.74	1.13	0.83	0.88	0.92	1.16	0.91	0.85	0.72	1.00	0.97	1.17	0.83	1.04
AW-Q5	0.24	0.25	0.13	0.15	0.14	0.13	0.21	0.17	0.14	0.15	0.12	0.10	0.23	0.23	0.15	0.15	0.14	0.17	0.12	0.13	0.16	0.17	0.15	0.22	0.13	0.15	0.16	0.17	0.15	0.17

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AW-Q6	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.01	0.04	0.04	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03
AW-Q7	13.45	13.65	10.18	12.89	12.06	15.64	14.77	14.57	10.44	12.18	10.59	10.14	23.49	23.49	10.32	12.42	11.63	12.68	12.18	16.79	11.34	12.89	9.09	8.57	10.71	11.01	10.73	12.42	13.04	16.90
BA-Q1	10.20	9.02	9.08	8.60	10.55	9.18	8.07	7.08	9.62	8.93	11.12	9.50	7.92	7.92	9.99	9.01	8.20	7.80	8.74	7.31	9.88	8.79	9.24	9.57	8.13	7.80	9.87	9.40	9.94	8.28
BA-Q2	1.67	1.68	1.41	1.43	1.37	1.29	1.34	1.41	1.45	1.45	1.55	1.46	1.28	1.28	1.45	1.41	1.49	1.54	1.23	1.13	1.47	1.46	1.60	1.35	1.28	1.25	1.51	1.45	1.41	1.30
BA-Q3	2.01	1.91	1.80	1.78	2.17	2.00	1.66	1.57	1.95	1.83	1.99	2.01	2.00	2.00	1.96	1.85	1.67	1.70	2.03	2.02	1.89	1.78	1.85	1.94	1.86	1.77	1.90	1.78	2.00	1.95
BA-Q4	1.72	1.52	1.70	1.64	1.70	1.69	1.38	1.29	1.71	1.64	2.05	1.90	1.89	1.89	1.68	1.63	1.75	1.77	1.59	1.64	1.75	1.68	1.65	1.55	1.58	1.59	1.64	1.63	2.06	1.96
BA-Q5	7.78	7.33	6.72	5.75	5.76	4.40	6.82	7.33	6.77	5.88	6.35	5.40	4.67	4.67	7.01	6.20	5.96	5.28	5.37	4.70	6.94	6.00	7.30	7.50	5.38	5.58	7.32	6.20	5.90	4.70
BB-Q1	23.89	21.00	30.62	27.04	22.82	21.64	21.34	18.55	28.73	24.73	30.85	30.48	22.73	22.73	28.01	21.64	28.49	28.99	23.47	22.29	29.34	26.45	26.55	21.30	36.30	32.66	25.54	21.30	27.86	26.01
BB-Q2	12.81	12.38	13.74	12.68	12.71	12.73	12.01	8.88	13.36	12.74	15.01	15.28	16.55	16.55	13.27	12.68	13.00	11.89	12.29	12.41	13.54	12.61	13.84	12.81	15.46	14.82	12.96	12.68	12.74	11.51
BB-Q3	11.16	11.16	12.79	12.33	12.62	13.17	11.65	12.05	12.39	12.32	13.83	12.65	10.42	10.42	12.38	12.33	13.37	12.61	12.78	12.57	12.23	12.16	13.13	12.58	13.54	12.92	12.45	12.33	11.48	10.42
BB-Q4	12.42	12.37	14.04	12.45	12.02	12.80	10.31	10.31	13.44	12.79	16.40	15.97	11.26	11.26	13.13	12.52	14.80	15.82	12.47	13.08	13.58	12.43	13.34	11.97	16.64	17.82	12.36	11.97	13.62	12.48
BB-Q5	95.18	94.63	102.18	105.17	91.78	92.55	87.31	70.46	98.46	98.08	114.42	115.07	76.53	76.53	99.55	99.82	101.39	108.62	79.43	79.45	103.59	102.99	100.77	101.25	106.31	104.54	100.18	101.25	86.58	94.60
BC-Q1	98.53	108.43	72.27	63.17	69.72	63.16	68.57	63.17	78.43	65.96	74.95	68.19	48.05	48.05	78.42	67.68	74.85	60.22	72.41	62.09	73.29	63.17	94.49	97.32	88.63	84.74	78.82	67.68	55.60	50.36
BC-Q2	34.58	39.49	30.66	28.80	30.17	28.76	28.05	27.90	31.88	28.96	31.68	31.81	23.02	23.02	30.90	28.76	34.88	37.54	30.67	27.52	30.00	28.60	37.31	39.73	35.50	39.09	31.44	30.49	26.36	26.07
BC-Q3	4.90	4.80	3.63	3.61	3.54	3.33	3.92	3.35	3.84	3.72	3.77	3.54	3.15	3.15	3.81	3.55	4.14	4.26	3.97	3.95	3.68	3.51	4.39	3.72	3.94	3.72	3.98	3.72	3.23	3.34
BC-Q4	34.90	31.37	33.28	31.64	35.84	34.19	31.13	28.99	35.37	33.45	30.60	26.98	25.91	25.91	34.29	32.30	35.21	31.21	36.89	33.81	32.31	30.42	38.43	43.63	35.57	30.72	35.07	33.43	29.00	25.91
BC-Q5	278.81	295.43	219.49	215.10	220.70	222.08	205.72	191.92	238.49	219.74	215.19	209.66	182.20	182.20	231.82	222.08	235.57	220.60	214.34	212.65	225.88	216.35	267.36	268.25	261.21	243.57	234.19	222.85	185.19	180.14
BC-Q6	269.67	276.43	236.63	228.09	214.76	227.26	211.97	159.18	249.12	237.84	210.03	191.77	164.46	164.46	242.23	234.81	238.60	215.04	253.15	240.92	224.76	227.04	278.25	228.94	309.07	315.22	228.79	228.94	201.06	203.03
BD-Q1	28.66	24.89	25.94	21.97	21.35	19.54	20.81	19.54	27.22	24.55	21.88	19.85	37.01	37.01	25.21	21.22	23.93	23.48	21.22	19.54	26.63	21.98	25.61	24.60	29.21	25.56	24.08	21.21	26.98	22.90
BD-Q2	52.84	47.69	45.46	44.00	40.81	45.11	45.91	47.00	46.95	45.31	39.87	41.31	67.95	67.95	45.66	45.00	41.13	43.80	41.09	38.55	46.01	45.25	50.56	47.00	50.89	46.18	44.96	45.50	44.00	43.79
BD-Q3	61.57	52.57	62.16	59.06	55.59	48.00	58.41	60.75	60.35	56.32	65.59	55.88	51.55	51.55	61.76	60.00	58.58	55.81	55.60	53.23	60.60	56.32	67.22	63.13	72.74	70.52	59.94	58.13	51.67	50.80
BD-Q4	58.38	63.86	45.35	43.26	39.49	41.83	41.48	42.27	48.43	43.59	42.03	40.81	81.31	81.31	45.24	42.00	43.26	44.93	39.49	36.62	47.50	43.26	50.19	50.00	50.19	47.63	43.33	42.00	54.27	51.13
BD-Q5	20.35	21.26	21.27	19.98	17.48	16.00	19.75	19.44	21.10	20.41	17.07	16.79	26.93	26.93	19.45	19.03	22.65	20.54	20.13	20.41	20.71	19.92	19.05	18.80	25.32	24.42	19.12	18.80	19.84	19.74
BE-Q1	18.89	17.68	16.18	13.29	15.54	13.57	15.47	14.33	17.18	13.63	14.34	11.04	11.91	11.91	16.52	13.73	17.76	15.30	18.84	16.12	15.44	13.23	18.60	19.17	17.99	15.52	16.86	13.73	13.91	11.91
BE-Q2	1.19	1.26	1.13	1.09	0.91	0.88	1.02	0.97	1.13	1.15	1.05	0.97	0.79	0.79	1.09	1.04	1.22	1.46	1.15	1.18	1.06	1.01	1.20	1.14	1.13	1.21	1.10	1.04	1.05	1.10
BE-Q3	2.14	2.01	2.00	1.95	1.76	1.70	1.74	1.84	2.03	1.93	1.96	1.88	2.04	2.04	1.96	1.84	2.03	1.99	1.84	1.91	2.00	1.89	2.04	1.95	1.92	1.99	2.00	1.91	1.96	1.80
BE-Q4	1.25	1.36	1.14	1.06	1.16	1.07	1.21	1.09	1.17	1.08	1.10	1.09	0.91	0.91	1.16	1.07	1.23	1.12	1.21	1.11	1.11	1.03	1.35	1.26	1.09	1.10	1.21	1.10	1.07	0.97
BE-Q5	6.89	6.65	6.11	5.46	5.35	4.86	6.57	5.88	6.22	5.61	4.92	4.79	4.35	4.35	6.16	5.57	6.29	5.92	6.85	4.98	5.63	5.54	7.26	8.00	6.63	5.64	6.08	5.60	5.63	5.27
BF-Q1	12.69	10.48	12.87	12.19	12.34	12.42	14.20	15.98	12.84	12.14	10.45	8.02	9.53	9.53	13.44	12.57	10.43	7.94	12.32	11.64	12.86	12.14	12.63	12.42	10.82	8.75	12.64	11.87	14.97	17.36
BF-Q2	24.43	22.00	26.40	23.75	21.65	20.25	32.53	30.56	23.67	21.88	24.06	21.70	24.72	24.72	25.70	22.00	22.56	21.63	21.81	18.52	25.90	22.93	25.42	22.43	24.23	22.32	25.33	22.00	25.15	24.95
BF-Q3	7.40	7.59	7.66	7.28	6.87	6.13	8.69	9.40	7.35	7.22	6.59	6.05	5.86	5.86	7.82	7.43	6.28	5.72	7.27	6.68	7.74	7.40	6.45	6.16	6.98	5.51	7.55	7.36	7.60	7.49
BF-Q4	22.54	22.51	22.85	22.51	23.10	23.00	22.10	23.33	23.35	22.79	20.99	20.88	22.40	22.40	23.36	23.00	20.68	21.63	19.11	20.99	23.05	22.79	26.23	24.23	20.98	21.92	23.00	21.44	24.14	23.17
BF-Q5	18.93	19.94	20.37	18.23	22.19	24.14	23.79	24.81	19.50	18.59	21.82	17.93	14.30	14.30	21.51	21.81	17.53	16.36	20.27	20.69	20.96	18.98	18.65	18.31	17.76	15.87	21.19	21.81	20.61	18.77
C-Q1	0.39	0.42	0.33	0.29	0.30	0.26	0.26	0.23	0.34	0.31	0.35	0.31	0.27	0.27	0.32	0.28	0.42	0.43	0.28	0.23	0.35	0.31	0.32	0.30	0.37	0.39	0.31	0.28	0.36	0.35
C-Q2	3.17	2.76	2.57	2.53	2.25	1.78	2.86	2.70	2.59	2.36	2.43	2.22	2.68	2.68	2.60	2.49	2.66	2.50	2.08	2.03	2.82	2.62	2.33	2.30	2.33	2.49	2.55	2.49	3.14	2.70
C-Q3	0.18	0.18	0.16	0.17	0.15	0.13	0.12	0.10	0.17	0.17	0.17	0.19	0.13	0.13	0.16	0.15	0.18	0.19	0.14	0.12	0.16	0.16	0.18	0.18	0.20	0.21	0.15	0.13	0.16	0.16
C-Q4	0.56	0.52	0.60	0.56	0.66	0.63	0.59	0.56	0.61	0.57	0.60	0.60	0.62	0.62	0.63	0.57	0.51	0.42	0.70	0.66	0.57	0.55	0.66	0.65	0.66	0.67	0.59	0.56	0.62	0.61
C-Q5	0.35	0.34	0.38	0.36	0.42	0.41	0.44	0.44	0.38	0.37	0.34	0.35	0.34	0.34	0.40	0.40	0.29	0.26	0.41	0.40	0.37	0.37	0.38	0.36	0.38	0.34	0.40	0.41	0.32	0.34
C-Q6	0.34	0.34	0.35	0.35	0.33	0.35	0.28	0.28	0.35	0.36	0.36	0.35	0.41	0.41	0.33	0.32	0.41	0.45	0.36	0.34	0.33	0.33	0.39	0.36	0.36	0.35	0.32	0.30	0.40	0.44
C-Q7	0.17	0.18	0.20	0.20	0.17	0.15	0.23	0.23	0.18	0.17	0.18	0.19	0.24	0.24	0.19	0.19	0.19	0.17	0.18	0.16	0.20	0.19	0.18	0.21	0.19	0.21	0.18	0.18	0.21	0.21
DA-Q1	54.43	49.65	61.59	56.12	59.89	56.40	65.41	56.43	60.92	54.84	48.62	49.03	70.21	70.21	59.38	55.60	60.05	54.68	68.00	67.56	59.71	54.84	51.97	51.09	52.90	54.13	62.28	56.43	58.71	55.35
DB-Q1	156.48	159.95	170.83	166.89	171.16	163.94	188.00	181.54	169.73	165.12	138.03	134.37	185.44	185.44	170.38	163.06	155.14	167.07	181.23	182.08	165.45	164.57	166.02	142.14	148.07	151.64	174.85	165.26	165.04	164.46
DC-Q1	312.47	271.26	311.26	287.20	258.37	217.38	354.29	381.34	296.37	273.18	262.75	246.92	284.82	284.82	309.72	281.72	266.32	263.57	265.98	261.69	314.14	292.29	284.06	245.12	262.74	275.63	313.36	276.85	293.87	263.20
DD-Q1	53.43	46.25	52.23	46.45	54.79	53.43	63.32	63.04	51.09	46.55	50.78	44.72	71.93	71.93	52.26	46.49	51.24	47.04	51.66	41.55	54.17	47.18	49.21	46.49	44.33	41.43	55.68	50.98	51.69	41.99
DE-Q1	122.99	107.85	112.64	103.49	114.40	122.89	138.31	144.22	108.95	103.47	118.85	107.30	152.29	152.29	114.23	106.66	108.11	102.10	121.36	115.30	116.58	107.01	99.89	104.41	102.39	98.26	118.28	109.04	114.79	107.01
E-Q1	247.68	228.81	266.05	240.69	259.95	219.66	317.96	304.02	256.70	233.47	221.72	229.55	270.17	270.17	261.58	233.79	259.37	224.10	269.68	213.32	264.29	241.13	240.61	219.66	252.13	212.12	272.08	243.93	232.88	234.74
E-Q2	207.07	191.02	220.35	193.38	220.85	204.24	259.30	271.85	212.45	189.05	200.10	183.85	234.78	234.78	222.00	207.01	196.83	181.84	227.02	196.64	218.72	202.36	205.17	179.44	191.74	183.83	228.23	235.91	207.69	184.25
F-Q1	18.66	16.80	17.20	16.80	19.31	16.80	20.67	19.01	17.76	16.80	15.25	16.06	18.49	18.49	18.36	16.80	15.64	16.14	19.06	17.31	17.89	16.74	16.48	16.80	15.61	16.88	18.98	16.80	16.17	16.29
F-Q2	50.87	37.41	52.21	50.01	50.73	48.21	62.01	69.18	51.02	45.32	43.08	38.94	56.74	56.74	53.53	51.17	42.29	35.20	59.24	56.10	51.47	45.32	43.92	37.25	43.82	34.85	54.62	53.38	48.86	37.41
F-Q3	0.28	0.26	0.25	0.23	0.23	0.17	0.23	0.21	0.25	0.24	0.23	0.23	0.28	0.28	0.24	0.23	0.25	0.22	0.24	0.24	0.24	0.21	0.27	0.29	0.27	0.25	0.25	0.21	0.21	0.19
F-Q4	0.76	0.74	0.69	0.67	0.68	0.67	0.67	0.64	0.71	0.68	0.68	0.66	0.71	0.71	0.69	0.67	0.73	0.67	0.67	0.61	0.70	0.68	0.72	0.67	0.75	0.67	0.69	0.67	0.69	0.69
G-Q1	29.56	26.33	24.93	22.11	22.01	19.22	20.56	17.29	24.30	23.15	35.20	34.49	21.13	21.13	24.52	22.74	29.01	24.66	22.71	18.81	24.29	23.70	31.74	25.26	23.53	22.52	25.12	22.74	27.00	23.30
G-Q2	376.35	372.80	302.93	268.66	279.24	266.78	275.41	253.35	309.04	276.85	364.83	356.34	289.06	289.06	299.38	266.78	368.71	342.46	266.85	268.66	303.86	271.77	393.65	404.89	281.27	256.54	308.63	276.76	350.72	326.19
G-Q3	7.54	6.31	9.72	8.61	8.33	8.73	8.55	10.00	9.44	8.45	7.57	7.52	9.47	9.47	9.20	8.53	8.32	8.23	9.55	10.75	9.58	8.61	6.22	5.69	9.15	8.60	9.17	8.38	8.53	7.80
G-Q4	7.52	7.23	6.13	5.72	6.22	5.44	6.54	5.74	6.52	6.17	5.53	5.70	6.87	6.87	6.48	6.11	5.89	5.64	6.85	6.02	6.32	5.82	6.19	6.79	5.58	4.76	6.52	6.04	6.74	6.36
G-Q5	0.65	0.67	0.71	0.58	0.64	0.63	0.55	0.55	0.69	0.63	0.85	0.75	0.52	0.52	0.68	0.59	0.75	0.60	0.60	0.50	0.66	0.59	0.92	0.73	0.76	0.81	0.68	0.58	0.63	0.53
G-Q6	1.75	1.42	1.41	1.38	1.17	1.12	1.31	1.33	1.41	1.35	1.62	1.73	1.48	1.48	1.38	1.33	1.58	1.43	1.25	1.24	1.42	1.35	1.61	1.26	1.21	1.26	1.42	1.37	1.64	1.38
G-Q7	24.93	21.54	27.35	23.15	29.88	29.53	26.53	21.38	28.89	25.81	20.67	21.01	20.90	20.90	28.34	26.86	25.05	18.82	26.38	29.54	27.98	22.91	26.27	25.94	29.31	24.88	27.55	24.43	25.08	22.91
G-Q8	0.73	0.64	0.56	0.42	0.52	0.52	0.66	0.53	0.55	0.44	0.64	0.49	0.71	0.71	0.55	0.43	0.66	0.65	0.68	0.54	0.58	0.44	0.45	0.38	0.67	0.57	0.55	0.52	0.61	0.44
G-Q9	4.09	3.80	3.98	3.52	3.90	3.92	3.77	3.53	4.01	3.74	4.11	3.97	3.69	3.69	3.98	3.69	4.06	3.72	4.11	4.20	3.77	3.53	4.76	5.44	3.92	3.52	3.85	3.54	4.54	4.31
G-Q10	11.74	12.77	9.90	9.90	10.06	9.87	9.16	8.13	10.54	10.20	10.02	10.34	12.74	12.74	10.00	9.97	10.77	10.54	10.98	11.49	10.00	9.85	10.53	10.81	9.08	8.07	10.12	9.97	11.93	11.73
G-Q11	4.42	4.15	4.11	3.99	3.91	3.99	4.21	3.72	4.06	4.00	4.39	4.04	4.09	4.09	4.03	3.99	4.58	4.77	4.53	4.49	4.01	3.94	4.19	3.99	4.55	4.47	3.91	3.93	4.47	4.44

ADDENDUM G

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
RATE RATI																														
AB-R1	4.36	4.48	4.23	4.06	4.45	4.53	4.52	4.72	4.28	4.12	4.12	4.29	4.68	4.68	4.36	4.43	3.92	3.78	4.62	4.47	4.24	4.17	4.18	3.78	4.33	4.06	4.20	4.18	4.62	4.39
AB-R2	0.94	0.96	0.99	0.96	1.01	0.89	0.97	0.92	0.99	0.96	0.99	0.93	1.11	1.11	0.99	0.95	0.91	0.92	1.01	0.88	0.96	0.94	1.05	0.97	1.05	0.96	0.96	0.95	1.00	0.98
AB-R3	10.45	10.07	11.37	11.35	12.02	11.91	12.36	11.93	11.14	11.00	11.20	11.18	11.02	11.02	11.38	11.33	11.22	11.64	12.72	11.64	10.95	10.57	11.42	12.18	11.19	11.19	11.16	11.35	12.14	11.02
AB-R4	7.85	8.61	8.08	8.51	8.56	8.52	8.49	8.51	8.09	8.51	7.97	8.34	9.55	9.55	8.10	8.51	7.93	8.22	8.90	9.17	7.94	8.50	8.08	8.18	8.45	8.43	7.84	8.50	8.90	9.13
AC-R1	192.68	192.39	190.34	192.39	198.05	199.96	204.49	211.47	189.78	192.39	191.53	194.73	192.39	192.39	193.35	192.39	187.67	192.35	198.78	199.97	192.34	192.39	184.73	192.39	193.08	194.73	193.11	192.39	188.58	192.39
AC-R2	23.93	23.45	23.91	24.25	23.82	24.25	25.18	25.12	23.63	23.84	23.79	24.02	24.25	24.25	23.92	24.25	23.71	23.06	23.68	23.38	23.96	24.25	23.85	24.25	23.63	24.25	23.81	23.44	24.46	24.60
AC-R3	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.19	0.19	0.18	0.19	0.19	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.17	0.19	0.18	0.19	0.18	0.19
AC-R4	0.30	0.33	0.27	0.24	0.28	0.24	0.23	0.24	0.29	0.27	0.29	0.30	0.30	0.30	0.27	0.24	0.30	0.29	0.29	0.28	0.27	0.24	0.30	0.32	0.29	0.30	0.28	0.24	0.26	0.24
AC-R5	0.90	0.58	0.91	0.71	0.82	0.95	1.23	1.25	0.83	0.60	0.83	0.58	0.85	0.85	0.88	0.61	0.94	0.77	0.85	0.75	0.92	0.84	0.84	0.60	0.73	0.58	0.89	0.61	1.05	1.02
AC-R6	0.22	0.22	0.22	0.22	0.21	0.22	0.22	0.21	0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.22	0.23	0.22	0.21	0.21	0.22	0.22	0.21	0.22	0.21	0.22	0.22	0.22	0.22	0.23
AC-R7	0.51	0.51	0.50	0.54	0.48	0.50	0.54	0.57	0.50	0.51	0.46	0.49	0.57	0.57	0.49	0.51	0.52	0.51	0.49	0.51	0.51	0.52	0.49	0.51	0.48	0.54	0.50	0.51	0.52	0.54
AC-R8	0.25	0.25	0.23	0.23	0.24	0.23	0.26	0.27	0.23	0.23	0.24	0.25	0.21	0.21	0.24	0.24	0.21	0.20	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.25	0.24	0.24	0.22	0.21
AC-R9	0.39	0.41	0.35	0.31	0.34	0.29	0.40	0.48	0.34	0.30	0.37	0.36	0.29	0.29	0.37	0.33	0.32	0.29	0.33	0.29	0.36	0.31	0.37	0.36	0.38	0.38	0.37	0.31	0.29	0.29
AC-R10	0.49	0.53	0.50	0.57	0.54	0.57	0.54	0.57	0.51	0.57	0.46	0.46	0.57	0.57	0.50	0.57	0.53	0.51	0.54	0.57	0.50	0.57	0.48	0.49	0.50	0.57	0.51	0.57	0.50	0.53
AC-R11	0.92	0.70	0.88	0.70	1.09	0.70	0.91	0.70	0.92	0.70	1.00	0.73	0.68	0.68	0.95	0.70	0.92	0.73	1.14	0.70	0.87	0.70	0.96	0.75	0.72	0.69	0.94	0.70	1.12	0.68
AC-R12	7.37	7.51	7.25	7.51	7.06	7.26	7.60	8.33	7.19	7.26	7.02	7.01	8.37	8.37	7.15	7.26	7.31	7.01	6.91	7.26	7.38	7.77	6.97	6.77	7.68	8.07	7.11	7.26	7.22	8.37
AC-R13	1.06	1.08	1.08	1.08	1.04	1.01	1.13	1.16	1.05	1.08	1.04	1.05	1.01	1.01	1.07	1.08	1.05	1.08	1.03	1.05	1.07	1.08	1.09	1.08	1.02	1.05	1.09	1.08	1.03	1.01
AC-R14	126.81	134.17	108.89	106.54	102.16	87.34	94.70	87.14	112.03	120.64	122.51	134.17	107.61	107.61	108.72	103.47	120.31	131.02	106.09	101.54	110.54	109.60	116.84	134.17	115.40	127.88	110.54	115.74	106.74	101.54
AC-R15	23.55	19.22	27.32	22.54	29.42	31.48	35.89	38.88	26.09	21.33	21.98	20.82	30.11	30.11	27.39	22.16	24.90	20.82	30.02	27.94	27.20	22.54	23.13	18.14	24.34	20.82	27.16	23.74	29.45	26.82
AC-R16	50.14	49.37	48.25	49.96	49.28	50.88	48.64	50.02	48.91	49.99	48.34	48.14	50.95	50.95	48.70	49.96	48.66	48.05	48.41	48.05	49.06	49.99	48.11	49.96	47.40	48.72	48.98	49.96	49.51	50.45
AC-R17	0.28	0.26	0.27	0.26	0.28	0.26	0.27	0.26	0.27	0.26	0.29	0.28	0.24	0.24	0.27	0.26	0.27	0.25	0.28	0.25	0.27	0.26	0.27	0.24	0.28	0.26	0.27	0.26	0.27	0.26
AD-R1	0.94	0.92	0.96	0.93	1.01	0.93	1.06	0.99	0.94	0.93	1.02	0.92	1.00	1.00	0.95	0.93	1.03	0.93	1.01	0.93	0.95	0.93	0.96	0.91	0.98	0.93	0.93	0.93	1.07	0.92
AD-R2	5.87	4.10	5.71	4.45	6.14	4.74	4.94	3.95	5.71	4.45	7.49	8.22	6.66	6.66	5.66	4.45	6.35	4.20	4.83	4.22	5.69	4.45	7.56	9.11	6.16	4.22	5.56	4.45	6.47	6.10
AD-R3	4.98	4.09	4.86	4.38	5.40	4.27	4.05	3.11	4.93	4.21	6.38	6.28	5.11	5.11	4.99	4.15	4.93	4.52	3.93	3.72	4.94	4.31	6.38	6.62	5.06	4.03	4.80	4.14	5.59	5.11
AD-R4	0.45	0.43	0.55	0.44	0.55	0.52	0.46	0.46	0.56	0.46	0.45	0.41	0.43	0.43	0.56	0.46	0.44	0.41	0.45	0.46	0.57	0.46	0.46	0.44	0.46	0.46	0.57	0.46	0.48	0.45
AD-R5	0.39	0.32	0.41	0.33	0.32	0.28	0.34	0.26	0.39	0.33	0.44	0.37	0.48	0.48	0.40	0.33	0.33	0.27	0.34	0.29	0.39	0.29	0.44	0.37	0.35	0.27	0.41	0.33	0.37	0.37
AD-R6	0.17	0.17	0.35	0.20	0.19	0.19	0.17	0.17	0.33	0.20	0.21	0.21	0.18	0.18	0.32	0.20	0.18	0.20	0.18	0.19	0.33	0.20	0.20	0.20	0.18	0.19	0.34	0.20	0.20	0.20
AD-R7	1.52	1.51	1.43	1.27	1.55	1.69	1.48	1.47	1.48	1.47	1.38	1.02	0.94	0.94	1.50	1.47	1.45	1.51	1.23	1.25	1.53	1.50	1.47	1.21	1.50	1.51	1.47	1.47	1.40	1.16
AD-R8	0.12	0.11	0.25	0.10	0.11	0.10	0.12	0.11	0.23	0.10	0.12	0.12	0.10	0.10	0.23	0.11	0.11	0.10	0.10	0.10	0.25	0.11	0.12	0.10	0.12	0.10	0.25	0.11	0.11	0.11
AD-R9	4.39	4.16	4.01	4.06	4.58	4.28	3.97	3.42	4.20	4.20	4.42	4.29	4.29	4.29	4.23	4.26	4.00	3.92	3.69	3.38	4.09	4.06	5.18	4.66	4.02	3.78	4.22	4.06	4.24	4.47
AD-R10	0.81	0.79	0.85	0.80	0.67	0.68	0.78	0.78	0.82	0.79	0.78	0.75	1.18	1.18	0.76	0.78	0.89	0.79	0.76	0.64	0.82	0.79	0.81	0.78	0.76	0.74	0.78	0.74	0.95	0.84
AD-R11	0.08	0.08	0.12	0.08	0.10	0.10	0.09	0.08	0.12	0.09	0.09	0.09	0.07	0.07	0.12	0.09	0.07	0.07	0.09	0.09	0.12	0.08	0.10	0.10	0.08	0.09	0.13	0.09	0.08	0.08
AD-R12	0.03	0.03	0.06	0.03	0.04	0.04	0.04	0.03	0.06	0.04	0.04	0.03	0.03	0.03	0.06	0.04	0.03	0.03	0.03	0.04	0.06	0.03	0.04	0.03	0.03	0.03	0.06	0.04	0.03	0.03
AD-R13	4.37	4.28	4.43	4.28	4.71	4.28	4.72	4.28	4.40	4.28	4.59	4.28	3.10	3.10	4.61	4.28	4.26	4.28	4.26	4.28	4.35	4.28	5.25	4.28	4.37	4.28	4.65	4.28	3.97	4.28
AD-R14	1.53	1.82	1.24	1.17	1.86	1.84	1.49	1.17	1.37	1.36	1.56	1.44	1.00	1.00	1.51	1.57	1.10	0.85	1.44	1.50	1.41	1.36	1.43	1.33	1.34	1.27	1.50	1.57	1.18	0.98
AD-R15	1.47	1.51	1.48	1.43	1.71	1.73	1.55	1.64	1.52	1.56	1.52	1.56	1.45	1.45	1.59	1.64	1.25	1.17	1.52	1.56	1.45	1.56	1.83	1.73	1.60	1.69	1.56	1.64	1.32	1.22
AD-R16	1.93	1.86	1.87	1.81	2.15	1.94	1.75	1.70	1.88	1.85	2.45	2.33	1.69	1.69	2.02	1.88	1.64	1.70	1.76	1.76	1.91	1.83	2.28	2.25	2.01	1.96	1.95	1.82	1.82	1.85
AD-R17	0.03	0.03	0.07	0.03	0.04	0.04	0.04	0.03	0.06	0.03	0.03	0.03	0.03	0.03	0.06	0.03	0.03	0.02	0.03	0.03	0.07	0.03	0.04	0.03	0.03	0.03	0.07	0.03	0.03	0.03
AE-R1	0.71	0.67	0.74	0.75	0.78	0.81	0.74	0.68	0.75	0.75	0.72	0.67	0.81	0.81	0.74	0.72	0.74	0.71	0.78	0.83	0.74	0.75	0.72	0.68	0.69	0.67	0.74	0.68	0.82	0.86
AE-R2	194.47	211.87	187.27	190.49	180.50	193.57	197.52	212.00	184.43	193.40	189.90	206.61	174.02	174.02	192.59	211.54	166.88	155.63	174.25	187.62	190.11	197.11	189.50	212.43	202.65	211.85	190.20	211.54	160.84	162.94
AE-R3	0.11	0.11	0.13	0.11	0.12	0.12	0.12	0.10	0.13	0.12	0.11	0.11	0.17	0.17	0.12	0.10	0.14	0.14	0.12	0.13	0.12	0.12	0.11	0.10	0.12	0.11	0.12	0.11	0.14	0.16
AE-R4	0.14	0.14	0.15	0.15	0.15	0.15	0.13	0.13	0.15	0.15	0.15	0.14	0.16	0.16	0.14	0.14	0.17	0.17	0.15	0.15	0.15	0.14	0.15	0.15	0.15	0.14	0.15	0.14	0.16	0.16
AE-R5	42.38	41.92	52.37	45.18	54.43	58.30	62.03	62.59	49.70	43.37	45.07	40.48	49.05	49.05	52.23	45.23	46.10	40.48	50.98	49.39	51.46	43.37	49.07	43.37	46.64	40.14	52.22	45.23	50.94	50.83
AE-R6	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.05	0.04	0.04	0.04	0.06	0.06	0.05	0.04	0.05	0.04	0.06	0.06	0.05	0.05	0.04	0.03	0.04	0.04	0.05	0.04	0.06	0.06
AE-R7	0.07	0.07	0.08	0.08	0.07	0.08	0.07	0.06	0.08	0.08	0.07	0.07	0.09	0.09	0.07	0.07	0.08	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08
AF-R1	0.72	0.64	0.61	0.63	0.67	0.63	0.62	0.46	0.64	0.64	0.66	0.60	0.75	0.75	0.64	0.64	0.60	0.54	0.59	0.59	0.66	0.64	0.61	0.63	0.57	0.53	0.66	0.64	0.64	0.68
AF-R2	1.48	1.28	1.42	1.37	1.41	1.37	1.64	1.35	1.41	1.32	1.28	1.41	1.18	1.18	1.42	1.35	1.54	1.43	1.43	1.36	1.50	1.40	1.12	1.10	1.41	1.36	1.49	1.35	1.23	1.25
AF-R3	23.10	21.36	25.63	23.99	25.95	25.13	25.31	21.53	24.89	23.71	27.04	26.13	25.91	25.91	25.42	24.26	24.32	22.27	24.38	25.09	25.46	23.71	25.29	21.92	22.49	22.27	25.66	24.26	26.48	24.38
AF-R4	19.64	17.51	20.80	18.89	22.22	20.36	23.13	18.61	20.29	18.57	21.36	21.07	22.96	22.96	20.92	19.17	20.17	17.44	18.80	18.89	21.01	19.29	22.69	17.97	17.42	17.69	21.53	19.41	21.98	18.11
AF-R5	31.37	32.13	28.71	29.97	30.35	32.38	28.65	29.18	28.42	29.74	36.34	35.99	27.53	27.53	30.36	32.29	26.30	25.08	32.65	35.05	27.90	27.79	32.82	33.39	30.21	33.81	28.80	29.74	31.40	32.29
AF-R6	0.97	0.96	0.90	0.89	0.91	0.75	0.84	0.75	0.94	0.89	0.87	0.81	1.05	1.05	0.91	0.81	0.90	0.92	0.86	0.74	0.93	0.89	0.92	0.81	0.96	1.01	0.90	0.81	0.91	0.83
AF-R7	0.03	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.04	0.04	0.03	0.03	0.04	0.04	0.03	0.03	0.04	0.03	0.04	0.03	0.03	0.03
AF-R8	140.80	119.30	159.09	124.97	171.71	132.32	159.21	117.80	156.15	127.77	169.23	115.97	223.13	223.13	155.07	126.04	156.58	122.38	135.56	118.06	167.57	129.94	144.99	117.74	116.64	117.88	162.57	129.28	184.84	139.31
AF-R9	0.13	0.14	0.12	0.12	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.13
AF-R10	0.10	0.10	0.13	0.12	0.12	0.12	0.12	0.10	0.13	0.13	0.10	0.09	0.13	0.13	0.12	0.10	0.14	0.14	0.11	0.10	0.13	0.12	0.11	0.10	0.13	0.10	0.12	0.12	0.12	0.11
AF-R11	0.17	0.17	0.19	0.18	0.18	0.15	0.20	0.20	0.18	0.17	0.17	0.16	0.18	0.18	0.18	0.17	0.19	0.18	0.23	0.21	0.18	0.17	0.16	0.16	0.19	0.18	0.18	0.16	0.19	0.20
AF-R12	1.15	0.82	1.22	0.93	1.13	0.99	1.53	1.68	1.14	0.92	1.03	0.91	1.45	1.45	1.18	0.94	1.16	0.90	1.35	0.89	1.14	0.91	1.21	1.15	1.24	0.83	1.12	0.92	1.39	1.34
AF-R13	31.58	30.65	34.54	33.62	34.97	33.56	37.22	35.96	33.61	33.16	33.04	30.95	38.76	38.76	34.41	33.55	31.54	31.99	31.35	31.78	35.19	33.62	32.54	26.36	30.17	31.99	35.08	33.93	34.45	31.92
AF-R14	8.99	8.56	7.63	8.29	8.77	8.98	7.88	8.69	7.91	8.29	9.36	9.59	5.65	5.65	8.34	8.42	7.63	6.91	8.73	9.47	7.81	8.29	8.59	8.77	8.23	8.40	7.86	8.36	8.84	8.33
AF-R15	2.57	2.27	2.64	2.71	2.88	2.86	2.86	2.74	2.67	2.73	2.48	2.58	2.59	2.59	2.73	2.74	2.44	2.55	2.50	2.58	2.75	2.74	2.56	2.47	2.43	2.52	2.78	2.81	2.56	2.66
AF-R16	0.12	0.12	0.13	0.12	0.12	0.13	0.13	0.13	0.12	0.12	0.13	0.13	0.14	0.14	0.12	0.12	0.14	0.14	0.14	0.13	0.12	0.12	0.12	0.11	0.11	0.10	0.12	0.12	0.14	0.14
AG-R1	0.05	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.04	0.05	0.06	0.06	0.05	0.05	0.05	0.04	0.06	0.05	0.05	0.04	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.04
AG-R2	0.68	0.77	0.67	0.66	0.65	0.70	0.69	0.68	0.66	0.69	0.66	0.74	0.54	0.54	0.66	0.68	0.71	0.72	0.59	0.60	0.67	0.69	0.71	0.79	0.77	0.83	0.65	0.68	0.60	0.58
AG-R3	1.49	1.40	1.31	1.23	1.18	1.04	1.53	1.46	1.26	1.20	1.36	1.19	1.39	1.39	1.29	1.24	1.43	1.36	1.20	1.26	1.33	1.24	1.38	1.27	1.39	1.24	1.28	1.28	1.37	1.12
AG-R4	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.07	0.05	0.04	0.06	0.05	0.05	0.05
AG-R5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AG-R6	0.14	0.12	0.13	0.13	0.12	0.12	0.14	0.12	0.14	0.13	0.10	0.09	0.18	0.18	0.13	0.12	0.13	0.13	0.14	0.12	0.13	0.13	0.14	0.12	0.13	0.12	0.13	0.13	0.12	0.12
AG-R7	0.13	0.13	0.11	0.12	0.14	0.13	0.10	0.11	0.12	0.12	0.14	0.13	0.06	0.06	0.12	0.12	0.13	0.13	0.11	0.11	0.12	0.12	0.15	0.14	0.13	0.13	0.12	0.12	0.11	0.11
AG-R8	6.98	6.71	7.24	6.47	7.02	7.05	7.20	6.78	7.36	6.63	5.97	6.09	8.87	8.87	7.24	6.77	6.32	5.05	8.52	7.86	6.88	6.62	6.72	6.50	7.12	6.36	7.22	6.65	6.93	6.82
AG-R9	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.02
AG-R10	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
AG-R11	7.14	7.12	6.34	5.98	6.55	5.98	5.16	5.08	6.83	6.07	6.49	6.65	6.16	6.16	6.42	5.98	7.08	6.31	7.12	6.54	6.30	5.98	6.82	6.43	6.94	5.87	6.53	5.98	6.09	6.09
AH-R1	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.08	0.08	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.04	0.06	0.06
AH-R2	1.62	1.48	1.64	1.56	1.63	1.46	1.75	1.62	1.61	1.52	1.63	1.47	2.36	2.36	1.59	1.48	1.64	1.51	1.75	1.67	1.64	1.56	1.46	1.35	1.68	1.62	1.50	1.43	2.06	2.03
AH-R3	0.76	0.79	0.72	0.75	0.70	0.68	0.86	0.82	0.70	0.72	0.71	0.77	0.81	0.81	0.72	0.75	0.73	0.77	0.78	0.81	0.71	0.75	0.74	0.75	0.75	0.77	0.71	0.70	0.77	0.80
AH-R4	22.56	22.20	20.48	19.35	21.50	20.33	19.51	18.92	20.90	19.94	23.65	19.82	17.18	17.18	20.54	19.82	24.23	19.70	21.54	20.92	20.59	19.55	22.48	20.33	22.40	21.78	20.72	19.41	20.90	20.02
AH-R5	175.55	180.55	156.20	156.35	181.77	177.87	163.77	160.09	158.33	158.14	200.18	206.09	129.09	129.09	164.23	160.09	175.95	178.74	160.37	159.38	163.89	158.46	173.48	173.56	164.25	163.93	165.11	160.09	163.99	159.86
AH-R6	1.18	1.20	1.06	0.89	1.22	1.10	1.11	0.93	1.07	0.98	1.33	1.57	0.77	0.77	1.11	0.99	1.22	1.23	1.12	1.04	1.12	0.96	1.07	0.97	1.16	0.95	1.15	1.10	0.92	0.82

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AH-R7	1.24	1.20	1.01	1.00	1.01	0.82	0.93	0.92	1.05	1.03	1.21	1.27	0.80	0.80	1.07	1.05	1.03	1.17	1.06	1.05	1.03	1.03	1.14	1.20	1.12	1.22	1.01	1.01	1.13	1.09
AH-R8	1.15	1.12	1.10	0.99	1.18	1.09	1.22	1.05	1.09	1.01	1.19	1.31	0.73	0.73	1.10	1.05	1.30	1.35	1.01	0.97	1.11	1.05	1.33	1.39	1.27	1.15	1.11	1.05	1.03	0.99
AH-R9	1.12	1.07	1.10	1.03	1.25	1.15	1.26	1.38	1.10	1.04	1.17	1.22	0.98	0.98	1.15	1.06	1.13	1.04	1.28	1.30	1.10	1.04	1.12	1.03	1.22	1.13	1.13	1.06	1.06	0.93
AH-R10	7.90	7.49	8.07	7.50	8.49	8.05	7.97	7.56	8.06	7.37	8.63	8.50	5.80	5.80	8.17	7.47	8.51	8.47	8.57	8.61	7.83	7.29	8.89	8.11	8.75	9.31	8.38	7.78	6.57	6.67
AH-R11	7.93	7.10	7.62	7.29	7.42	6.69	6.89	7.04	7.65	7.29	8.44	7.29	10.43	10.43	7.72	7.22	6.53	6.91	8.39	7.88	7.43	6.97	7.64	7.36	6.64	6.08	7.62	7.22	8.66	8.36
AH-R12	7.20	6.88	7.16	6.77	6.86	6.94	5.98	5.24	7.50	7.20	6.30	5.49	7.50	7.50	7.04	6.57	7.29	7.15	6.47	5.33	7.11	6.77	7.78	7.19	6.94	6.64	7.06	6.68	7.43	7.20
AH-R13	7.75	7.52	7.31	7.28	6.99	7.51	8.34	7.32	7.20	7.37	6.80	7.03	6.41	6.41	7.42	7.50	7.10	6.26	7.06	6.65	7.31	7.16	7.65	7.53	6.74	6.70	7.22	7.09	8.29	7.87
AH-R14	8.02	8.04	8.26	7.95	8.20	8.28	9.53	8.28	8.11	8.05	7.22	6.63	9.02	9.02	7.78	8.05	9.89	9.10	8.19	6.73	8.25	8.06	8.06	7.63	9.00	7.97	8.29	8.05	7.12	6.66
AH-R15	21.26	19.36	23.71	22.27	25.12	24.35	26.58	26.41	23.44	21.86	20.66	18.97	24.45	24.45	23.32	21.72	24.38	22.37	23.72	23.26	23.36	21.60	24.22	26.41	21.69	20.40	24.82	22.54	20.85	19.02
AH-R16	1.08	1.10	1.03	0.88	0.97	0.90	1.05	1.00	1.01	0.89	1.07	0.87	1.07	1.07	1.04	0.96	0.95	0.81	0.95	0.95	1.04	0.92	1.03	0.78	1.01	0.89	0.98	0.87	1.19	1.13
AH-R17	66.14	61.64	62.78	53.90	51.66	45.23	58.27	46.86	62.81	55.59	55.67	55.26	81.45	81.45	59.73	54.97	62.29	58.14	53.74	44.28	63.69	57.36	58.76	53.16	63.79	63.39	58.70	53.16	67.41	55.21
AH-R18	235.56	228.00	216.96	216.34	189.11	201.91	234.59	225.00	208.95	212.39	222.13	225.00	245.71	245.71	205.22	210.85	248.38	262.34	218.19	222.20	214.18	216.08	212.91	218.75	228.81	228.69	208.08	201.91	224.56	229.31
AH-R19	180.37	182.66	209.33	198.97	223.55	203.55	191.38	190.46	212.23	200.92	197.47	182.87	240.84	240.84	201.75	196.28	221.64	233.23	218.20	189.84	206.66	201.98	195.79	197.51	214.14	203.80	209.74	200.42	190.07	162.07
AH-R20	0.18	0.18	0.17	0.16	0.16	0.16	0.18	0.15	0.16	0.16	0.21	0.22	0.12	0.12	0.17	0.16	0.18	0.17	0.15	0.16	0.17	0.16	0.19	0.20	0.18	0.17	0.17	0.16	0.16	0.16
AH-R21	22.21	23.18	25.06	23.77	26.75	27.84	32.56	30.77	23.62	24.06	22.72	23.18	27.65	27.65	23.90	23.97	28.55	26.46	27.60	26.86	25.08	24.11	21.01	20.08	27.49	24.79	25.36	24.73	20.59	20.14
AH-R22	15.41	15.34	16.77	15.34	18.54	16.86	17.20	16.89	16.84	15.71	16.77	16.48	13.44	13.44	16.30	15.71	20.31	23.10	17.97	17.30	16.42	15.34	17.60	16.89	17.85	18.00	17.37	15.80	14.14	14.23
AI-R1	0.05	0.05	0.05	0.04	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.04
AI-R2	2.71	2.72	1.77	1.46	2.01	1.76	1.67	1.62	1.98	1.41	2.35	2.42	2.20	2.20	2.05	1.69	1.63	1.27	1.66	1.37	2.10	1.70	1.87	1.27	2.39	1.93	1.95	1.58	1.71	1.56
AI-R3	1.02	0.99	0.81	0.74	0.96	1.05	0.73	0.68	0.90	0.84	0.90	0.79	0.93	0.93	0.89	0.82	0.80	0.76	0.76	0.73	0.90	0.84	0.90	0.78	0.94	0.93	0.88	0.78	0.80	0.77
AI-R4	25.70	25.23	21.10	21.47	22.46	27.23	13.79	11.52	22.98	25.17	27.78	28.11	20.31	20.31	21.40	24.37	26.10	28.50	18.32	18.94	22.50	24.80	25.29	28.42	23.11	27.08	22.40	25.22	20.52	20.64
AI-R5	1.59	1.51	1.29	1.24	1.27	1.35	0.83	0.80	1.39	1.40	1.66	1.66	1.15	1.15	1.27	1.28	1.68	1.65	1.09	0.83	1.34	1.38	1.60	1.68	1.45	1.24	1.34	1.40	1.21	1.13
AI-R6	168.51	167.29	171.79	185.93	180.78	183.42	127.84	114.37	180.54	186.79	185.51	192.77	208.60	208.60	164.45	168.13	201.53	193.22	154.70	163.62	177.22	182.82	175.83	190.85	178.24	192.90	168.96	171.39	182.41	186.83
AI-R7	12.05	11.84	8.91	8.17	9.71	11.47	6.52	5.59	10.08	11.32	10.87	11.87	10.38	10.38	9.22	8.70	11.25	12.24	7.95	7.54	9.89	11.10	10.42	12.17	9.36	8.17	9.72	11.24	9.58	9.83
AI-R8	6.71	6.08	7.15	7.32	6.74	6.61	7.94	7.53	6.86	6.73	6.59	5.74	6.35	6.35	7.17	6.96	6.38	6.50	7.14	6.70	7.12	7.05	6.26	6.26	7.13	7.52	7.08	6.96	6.55	6.00
AI-R9	270.83	276.05	222.74	199.39	194.80	176.69	272.28	243.62	223.34	189.71	183.96	166.38	202.15	202.15	235.75	200.22	187.64	189.89	234.29	232.52	213.99	188.51	266.11	244.06	246.72	243.49	223.22	190.91	213.67	160.33
AI-R10	0.21	0.22	0.17	0.17	0.19	0.17	0.13	0.14	0.19	0.17	0.21	0.23	0.19	0.19	0.18	0.17	0.21	0.21	0.16	0.16	0.18	0.18	0.21	0.23	0.18	0.17	0.18	0.17	0.19	0.20
AJ-R1	0.05	0.05	0.06	0.05	0.05	0.05	0.07	0.07	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.06	0.05	0.06	0.05	0.06	0.06	0.05	0.04
AJ-R2	1.57	1.33	2.06	2.01	1.71	1.69	2.22	2.28	1.90	1.89	1.51	1.43	2.08	2.08	1.92	1.70	1.80	1.92	1.81	1.89	1.92	1.98	1.92	1.70	1.75	1.83	2.03	2.06	1.58	1.42
AJ-R3	0.83	0.83	0.82	0.79	0.74	0.72	0.84	0.80	0.80	0.78	0.77	0.74	0.80	0.80	0.80	0.77	0.84	0.86	0.78	0.73	0.81	0.79	0.81	0.74	0.85	0.81	0.82	0.78	0.69	0.70
AJ-R4	21.36	21.04	21.16	22.34	22.14	22.57	19.88	20.00	22.00	21.84	19.93	22.79	17.34	17.34	21.85	21.10	20.43	22.04	20.56	21.91	21.97	22.04	19.88	21.10	21.87	24.28	20.85	20.98	22.87	24.14
AJ-R5	161.84	133.50	159.67	155.78	168.26	150.23	143.72	109.36	166.91	157.66	155.44	136.42	148.80	148.80	166.32	156.05	145.13	131.37	162.64	157.58	168.78	156.60	130.75	108.81	162.94	157.13	152.05	143.14	195.87	194.17
AJ-R6	7.84	7.84	8.35	7.94	8.66	9.27	9.01	8.00	8.11	7.84	8.60	9.27	7.05	7.05	8.58	8.28	7.49	7.31	7.76	7.37	8.30	7.94	9.05	9.72	8.74	9.24	8.11	7.61	8.66	8.17
AJ-R7	8.61	8.76	8.18	7.50	8.58	9.71	7.77	6.86	8.40	8.08	8.70	8.23	6.10	6.10	8.59	8.29	7.79	7.78	8.07	7.09	8.25	7.65	9.02	8.82	8.61	7.85	8.63	8.38	7.01	6.18
AJ-R8	213.23	213.16	206.77	188.12	255.89	188.50	205.67	202.10	219.64	189.70	221.69	201.44	249.10	249.10	216.06	198.46	217.27	144.58	253.55	208.12	206.95	183.81	223.07	198.46	190.71	180.61	215.96	185.38	251.22	199.41
AJ-R9	210.10	207.87	241.69	222.78	266.76	277.79	237.42	241.61	242.26	222.78	239.10	221.82	260.79	260.79	244.40	225.21	221.67	222.47	264.00	276.62	230.00	216.75	262.42	236.54	199.72	203.58	246.76	236.54	261.91	260.79
AJ-R10	0.16	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.18	0.18	0.13	0.13	0.17	0.17	0.15	0.16	0.14	0.13	0.18	0.17	0.15	0.17	0.17	0.17	0.17	0.17	0.15	0.17
AK-R1	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.05	0.06	0.05	0.05
AK-R2	1.61	1.63	1.57	1.52	1.99	1.77	1.43	1.49	1.70	1.68	1.76	1.70	1.90	1.90	1.59	1.57	1.93	1.69	1.66	1.66	1.66	1.62	1.67	1.49	1.45	1.31	1.78	1.69	1.46	1.42
AK-R3	0.81	0.80	0.77	0.75	0.84	0.92	0.82	0.86	0.78	0.74	0.82	0.83	1.07	1.07	0.76	0.74	0.84	0.80	0.72	0.71	0.77	0.74	0.94	0.93	0.72	0.74	0.82	0.78	0.75	0.68
AK-R4	15.85	16.53	21.73	24.04	20.11	17.32	20.70	22.61	19.95	19.66	22.12	23.10	23.92	23.92	19.44	19.41	23.48	24.80	20.57	19.97	20.92	21.72	17.69	17.97	19.01	17.79	20.11	19.66	22.60	23.51
AK-R5	149.87	147.83	167.32	159.13	140.47	143.08	148.25	161.07	156.55	153.57	183.49	169.77	187.36	187.36	150.33	152.27	188.98	176.58	148.18	148.21	163.23	158.11	152.24	150.24	147.78	156.98	158.45	157.14	171.35	156.61
AK-R6	7.59	7.14	8.53	8.10	7.88	5.62	7.25	7.57	8.44	7.90	8.23	7.34	10.91	10.91	8.12	7.78	8.04	7.23	8.82	8.61	8.42	7.78	6.76	5.61	8.10	7.68	8.04	7.78	9.04	8.98
AK-R7	6.62	6.30	7.32	7.11	8.53	7.81	7.10	6.72	7.39	7.45	8.07	7.43	9.78	9.78	7.48	7.20	6.66	6.92	9.12	9.08	7.00	6.92	7.39	7.20	7.32	6.71	7.37	7.42	7.78	7.80
AK-R8	9.44	9.10	7.91	7.60	7.44	7.43	7.27	6.79	8.23	7.75	8.25	7.97	7.95	7.95	8.08	7.64	8.14	7.76	8.52	8.67	7.93	7.31	8.28	8.11	8.21	8.20	7.93	7.64	8.53	7.87
AK-R9	228.86	239.26	208.86	195.54	192.69	176.72	166.56	175.63	216.82	203.76	218.16	223.80	219.08	219.08	208.21	200.18	210.95	166.58	242.85	229.88	200.09	189.76	209.68	209.65	204.85	198.21	208.36	188.60	216.51	206.19
AK-R10	0.15	0.14	0.17	0.17	0.17	0.15	0.12	0.12	0.17	0.16	0.20	0.20	0.18	0.18	0.16	0.15	0.20	0.20	0.15	0.14	0.17	0.17	0.16	0.15	0.15	0.13	0.17	0.16	0.16	0.15
AL-R1	0.06	0.07	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.05	0.06	0.05	0.04	0.04	0.06	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.06	0.05	0.05	0.05
AL-R2	2.54	2.55	1.84	1.76	2.59	2.73	1.94	1.96	2.15	2.11	2.12	1.90	1.40	1.40	2.15	2.05	2.14	2.12	2.60	2.89	1.92	1.95	2.42	2.41	2.07	2.07	2.20	2.05	1.85	1.57
AL-R3	0.97	0.91	0.73	0.77	0.97	0.89	0.68	0.76	0.85	0.84	0.81	0.79	0.69	0.69	0.84	0.83	0.76	0.77	0.93	0.86	0.79	0.78	0.82	0.84	0.68	0.70	0.85	0.80	0.84	0.83
AL-R4	20.72	20.13	20.41	20.97	18.02	19.41	21.44	22.05	19.29	19.66	22.03	25.92	22.95	22.95	19.76	19.87	20.26	21.01	21.75	25.23	19.97	19.93	18.06	19.37	21.92	23.66	19.52	19.87	19.74	19.83
AL-R5	152.01	143.50	153.92	158.11	142.67	130.56	128.44	115.62	152.27	148.07	173.06	178.64	193.92	193.92	146.10	141.70	163.58	168.03	156.26	143.29	155.54	158.11	127.69	117.07	145.53	124.60	150.59	150.85	159.82	152.26
AL-R6	1.02	0.86	0.93	0.91	0.94	0.87	0.87	0.78	0.92	0.92	1.21	0.90	0.88	0.88	0.91	0.87	1.14	1.00	0.98	0.92	0.97	0.88	0.82	0.93	0.89	0.86	0.95	0.88	0.99	0.93
AL-R7	1.02	0.86	0.93	0.91	0.94	0.87	0.87	0.78	0.92	0.92	1.21	0.90	0.88	0.88	0.91	0.87	1.14	1.00	0.98	0.92	0.97	0.88	0.82	0.93	0.89	0.86	0.95	0.88	0.99	0.93
AL-R8	8.39	7.84	7.33	7.20	7.26	7.32	6.95	7.28	7.33	7.20	9.09	7.90	6.55	6.55	7.53	7.56	7.62	6.77	6.47	6.74	7.78	7.44	7.52	7.88	7.42	7.12	7.62	7.56	7.16	7.43
AL-R9	6.29	6.26	6.33	6.34	7.45	6.81	5.87	6.17	6.72	6.43	6.43	6.52	5.85	5.85	6.60	6.41	6.49	6.63	7.64	6.77	6.20	6.19	6.80	6.54	6.60	6.49	6.64	6.40	6.17	5.85
AL-R10	7.18	6.82	8.11	7.29	8.28	7.45	8.64	8.11	8.02	7.32	6.98	5.14	11.19	11.19	8.23	7.65	6.09	6.36	9.02	7.51	7.84	7.20	7.39	7.45	8.01	7.15	7.68	7.29	9.05	9.17
AL-R11	6.24	6.03	5.94	5.79	6.50	5.91	6.52	5.78	6.06	5.90	5.91	5.92	4.07	4.07	6.12	5.79	6.55	6.56	6.42	6.62	5.94	5.84	6.50	6.33	6.56	6.00	6.18	5.88	5.39	5.22
AL-R12	6.29	6.26	6.33	6.34	7.45	6.81	5.87	6.17	6.72	6.43	6.43	6.52	5.85	5.85	6.60	6.41	6.49	6.63	7.64	6.77	6.20	6.19	6.80	6.54	6.60	6.49	6.64	6.40	6.17	5.85
AL-R13	5.54	5.08	4.93	4.76	6.58	5.16	6.21	5.56	5.30	4.90	4.73	4.76	4.03	4.03	5.26	4.87	6.19	5.92	5.98	5.84	5.18	4.82	5.47	4.82	5.39	4.84	5.60	4.99	4.50	4.39
AL-R14	249.82	242.20	269.78	263.05	251.83	227.18	307.33	295.45	252.67	226.29	263.69	278.21	266.59	266.59	267.55	261.08	240.17	217.85	303.66	276.73	251.20	257.59	264.77	300.99	287.96	322.49	252.43	254.24	274.33	241.35
AL-R15	195.90	186.71	222.67	213.95	209.54	199.28	231.19	217.03	211.49	196.37	216.94	235.35	214.35	214.35	216.81	197.13	208.83	208.16	246.88	240.86	207.00	195.02	214.67	216.65	207.80	216.84	218.05	197.13	212.73	207.77
AL-R16	0.17	0.15	0.16	0.15	0.18	0.18	0.16	0.17	0.16	0.16	0.17	0.15	0.21	0.21	0.16	0.16	0.17	0.18	0.19	0.19	0.16	0.15	0.14	0.13	0.15	0.15	0.16	0.16	0.19	0.18
AM-R1	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05
AM-R2	1.75	1.72	1.86	1.69	1.64	1.62	1.78	1.69	1.78	1.69	1.89	1.85	1.87	1.87	1.78	1.69	1.84	1.63	1.38	1.37	1.85	1.73	2.01	1.83	1.68	1.66	1.87	1.77	1.62	1.66
AM-R3	0.77	0.78	0.75	0.76	0.96	0.86	0.91	0.78	0.76	0.75	0.83	0.81	0.91	0.91	0.80	0.78	0.72	0.77	0.78	0.77	0.80	0.78	0.77	0.79	0.72	0.72	0.82	0.78	0.78	0.78
AM-R4	18.58	17.54	20.45	20.12	20.13	20.97	19.31	17.57	20.47	19.53	18.74	19.82	14.16	14.16	20.82	19.89	18.19	17.96	19.80	19.27	21.14	20.12	15.71	14.85	18.70	17.96	21.03	20.97	17.89	18.65
AM-R5	0.83	0.75	1.04	1.02	0.88	0.87	1.10	1.19	0.92	0.86	1.07	1.06	1.08	1.08	0.97	0.91	0.96	0.82	1.09	1.02	0.98	0.91	0.79	0.70	0.89	0.80	1.02	0.99	0.87	0.84
AM-R6	1.07	1.06	1.08	1.09	1.04	1.04	0.95	1.02	1.11	1.14	1.02	0.99	0.78	0.78	1.07	1.05	1.13	1.15	1.07	1.06	1.10	1.14	0.95	0.98	1.19	1.25	1.08	1.05	0.94	1.03
AM-R7	0.96	0.86	1.05	1.03	1.00	0.82	0.90	0.88	1.02	1.00	1.15	1.20	1.13	1.13	1.03	1.00	0.94	0.87	0.92	0.86	1.05	1.03	1.01	0.88	1.02	0.95	1.02	0.91	1.04	1.05
AM-R8	0.94	0.94	1.03	0.98	0.82	0.85	1.10	1.16	0.94	0.90	1.00	0.93	1.20	1.20	0.97	0.90	0.95	0.94	0.99	0.97	1.01	0.98	0.81	0.74	0.94	0.93	0.98	0.90	0.99	0.98
AM-R9	0.92	0.85	1.10	1.00	1.00	0.94	1.16	1.10	1.03	1.00	1.05	0.90	1.04	1.04	1.08	1.00	0.92	0.86	1.17	1.27	1.07	1.00	0.84	0.87	1.03	0.98	1.07	1.00	0.98	0.99
AM-R10	160.04	153.74	173.56	154.95	164.37	141.34	171.12	179.97	166.82	151.24	180.55	173.70	165.51	165.51	173.22	152.77	153.23	139.71	177.48	160.65	176.47	154.95	129.34	137.71	180.56	167.83	169.85	146.78	156.18	152.41
AM-R11	8.33	7.45	7.43	7.49	7.72	8.05	7.32	6.12	7.77	7.69	7.39	7.46	6.02	6.02	7.96	7.78	6.69	6.08	7.06	7.04	7.66	7.60	8.27	6.38	6.93	6.25	7.96	7.93	7.25	7.38
AM-R12	5.11	4.98	6.50	6.24	6.95	7.42	7.12	7.05	6.07	6.06	6.91	6.02	7.54	7.54	6.33	6.20	6.10	5.84	7.01	6.91	6.39	5.90	5.37	5.07	5.84	5.37	6.48	6.26	6.33	5.66
AM-R13	4.45	4.24	5.14	4.61	5.78	5.10	5.80	4.92	4.87	4.87	5.84	5.98	7.36	7.36	5.11	4.92	4.78	4.16	5.68	4.94	5.07	4.91	4.88	4.17	4.09	3.83	5.39	4.96	5.34	5.21
AM-R14	8.50	9.34	7.33	6.97	7.48	7.26	5.94	6.23	8.11	7.93	6.54	6.87	7.06	7.06	7.43	7.12	8.28	8.56	6.67	6.47	7.52	7.16	8.79	9.13	8.55	7.81	7.20	7.12	7.92	7.23
AM-R15	2.91	2.98	3.38	3.13	3.04	2.82	3.76	3.74	3.01	2.86	3.80	3.64	4.72	4.72	3.26	3.11	2.74	2.29	2.99	3.02	3.28	3.13	3.31	2.77	2.64	2.68	3.27	3.22	3.67	2.92
AM-R16	6.46	7.07	5.64	5.68	5.48	5.48	6.01	5.86	5.81	5.59	5.16	4.76	4.55	4.55	5.69	5.53	6.33	6.67	5.83	5.55	5.47	5.48	6.90	7.26	6.78	6.75	5.66	5.53	5.07	4.42
AM-R17	8.63	8.73	7.72	7.49	8.74	8.59	7.34	7.50	8.43	8.31	7.11	7.04	5.66	5.66	8.15	8.11	8.41	7.62	8.54	7.95	8.10	7.96	7.53	6.24	8.01	7.62	8.12	8.11	8.03	7.75
AM-R18	262.92	277.96	272.79	270.29	195.60	164.60	303.85	302.93	249.19	237.51	233.43	243.24	428.21	428.21	258.57	260.97	199.43	186.32	225.55	164.61	260.66	256.72	268.23	302.93	260.93	279.63	234.23	235.28	327.70	350.36

ADDENDUM G

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AM-R19	193.74	201.97	219.18	225.92	152.79	150.65	227.55	225.94	196.13	189.21	198.85	200.56	295.38	295.38	196.51	192.46	199.18	200.34	179.72	179.81	202.92	202.17	219.55	235.84	205.61	225.92	194.61	187.52	221.71	261.39
AM-R20	10.74	10.71	10.12	9.51	7.54	6.83	11.29	8.38	9.22	9.40	10.51	9.95	14.54	14.54	9.80	9.50	8.13	7.46	8.72	7.46	9.99	9.53	9.68	8.69	9.66	9.26	9.42	8.69	10.84	10.18
AM-R21	0.15	0.12	0.19	0.18	0.19	0.19	0.20	0.22	0.17	0.17	0.20	0.19	0.17	0.17	0.18	0.17	0.19	0.19	0.21	0.22	0.18	0.18	0.14	0.14	0.18	0.17	0.19	0.19	0.16	0.16
AN-R1	0.04	0.04	0.04	0.05	0.03	0.03	0.05	0.05	0.04	0.04	0.03	0.03	0.05	0.05	0.04	0.05	0.02	0.01	0.03	0.04	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.04
AN-R2	1.33	1.27	1.62	1.69	0.91	1.27	1.71	1.68	1.39	1.38	1.25	1.27	1.89	1.89	1.57	1.56	0.66	0.59	1.23	1.29	1.47	1.47	1.46	1.15	1.62	1.55	1.26	1.32	1.83	1.76
AN-R3	0.71	0.66	0.64	0.74	0.54	0.69	0.74	0.78	0.61	0.66	0.61	0.71	0.98	0.98	0.68	0.74	0.35	0.23	0.56	0.71	0.63	0.71	0.71	0.78	0.55	0.52	0.56	0.69	0.96	0.90
AN-R4	21.84	22.77	17.77	19.43	15.06	20.00	19.30	20.98	17.63	18.57	18.10	23.77	26.70	26.70	19.06	19.45	10.93	5.02	17.48	20.97	18.17	19.04	17.55	19.65	16.99	19.56	16.47	18.68	24.27	24.33
AN-R5	166.36	166.57	135.62	157.20	122.22	166.77	149.34	180.74	140.32	157.16	115.45	159.07	168.96	168.96	143.56	160.92	108.23	92.08	124.97	158.40	142.75	161.32	135.15	145.89	130.88	155.48	132.16	157.14	168.59	167.66
AN-R6	7.09	6.36	6.89	6.98	7.00	8.24	6.24	5.61	7.05	6.90	7.22	9.45	12.49	12.49	7.11	6.92	4.83	2.98	8.27	10.06	6.85	6.98	5.81	5.62	7.26	9.37	6.23	5.96	9.22	8.90
AN-R7	6.01	6.10	5.80	5.88	4.75	5.95	6.54	7.02	5.82	6.08	3.53	4.39	6.69	6.69	5.93	6.20	4.07	2.89	5.49	6.33	5.55	5.65	6.15	6.11	5.39	5.58	5.46	6.11	6.47	6.05
AN-R8	5.49	4.65	4.57	4.91	4.52	5.14	4.66	5.21	5.11	5.30	2.72	3.52	5.01	5.01	5.13	5.14	2.90	1.63	4.68	5.19	4.77	4.81	4.58	5.05	4.48	4.70	4.71	5.09	5.01	4.95
AN-R9	9.18	9.03	6.34	6.52	3.64	4.56	7.11	6.89	6.22	6.35	5.82	7.23	5.75	5.75	6.98	6.71	3.49	2.19	4.50	5.63	6.22	6.52	8.71	9.80	4.96	5.53	6.34	6.95	7.50	6.22
AN-R10	3.54	3.22	3.01	3.20	2.40	3.23	3.14	3.01	3.14	3.31	1.94	2.56	3.81	3.81	3.13	3.22	2.13	1.62	2.70	3.10	2.98	3.20	3.30	3.31	2.88	3.35	2.93	3.22	3.27	3.10
AN-R11	6.39	5.89	4.81	5.30	3.62	4.13	6.18	6.35	4.75	4.87	3.82	4.46	4.74	4.74	5.30	5.46	2.89	1.85	4.17	5.15	5.02	5.28	4.89	5.50	4.02	3.93	4.92	5.46	5.41	5.37
AN-R12	7.04	6.71	6.35	7.12	5.89	8.41	6.35	5.62	6.28	7.04	6.94	7.83	7.78	7.78	6.96	7.39	3.50	1.87	5.57	5.97	6.66	7.25	6.12	6.46	5.07	6.05	6.33	7.11	7.87	8.81
AN-R13	233.86	216.53	189.53	207.72	202.87	229.36	204.14	209.64	204.11	214.24	173.84	167.00	192.67	192.67	209.06	209.64	162.64	142.93	174.15	161.49	190.61	207.72	270.31	295.41	204.93	209.56	199.68	212.36	196.69	159.41
AN-R14	193.45	190.24	167.29	171.78	147.15	134.09	173.39	171.78	176.32	190.59	116.69	126.81	146.92	146.92	184.75	190.91	99.50	84.36	153.47	152.93	160.41	170.25	216.58	264.13	181.90	200.57	159.33	168.71	185.02	183.31
AN-R15	0.16	0.15	0.15	0.17	0.14	0.18	0.14	0.17	0.15	0.16	0.15	0.18	0.28	0.28	0.15	0.16	0.11	0.06	0.16	0.18	0.15	0.15	0.14	0.16	0.16	0.17	0.13	0.14	0.22	0.19
AN-R16	6.48	6.73	5.14	5.57	5.25	6.75	5.90	6.20	5.28	5.97	5.43	7.05	7.49	7.49	5.54	6.00	4.23	3.73	5.31	6.44	5.08	5.85	6.85	7.57	4.85	5.81	5.27	6.14	6.43	5.89
AO-R1	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.06	0.05	0.05	0.05
AO-R2	1.94	1.92	1.79	1.50	1.53	1.57	1.69	1.46	1.80	1.65	1.64	1.50	1.97	1.97	1.79	1.64	1.59	1.46	1.53	1.46	1.80	1.55	1.87	1.64	1.82	1.49	1.80	1.67	1.57	1.40
AO-R3	0.83	0.75	0.79	0.78	0.82	0.82	0.67	0.74	0.82	0.79	0.83	0.76	0.76	0.76	0.84	0.78	0.65	0.63	0.71	0.62	0.81	0.78	0.88	0.78	0.84	0.81	0.80	0.78	0.77	0.75
AO-R4	16.85	16.82	21.99	22.50	20.49	21.03	21.54	21.58	20.03	20.07	23.87	28.00	28.48	28.48	20.13	20.97	21.67	21.07	21.03	20.43	20.70	21.45	20.81	20.25	24.20	23.69	19.46	19.41	22.11	26.23
AO-R5	139.55	143.28	173.26	161.11	150.49	123.60	147.14	143.45	159.09	151.71	200.19	212.20	188.49	188.49	156.63	149.99	182.89	158.01	150.59	151.05	164.25	154.30	169.97	155.05	187.64	161.62	153.09	149.99	172.65	188.49
AO-R6	7.36	6.35	8.29	7.70	8.61	8.58	9.03	8.85	7.79	7.07	9.31	9.43	10.15	10.15	8.16	7.20	7.79	7.21	8.35	8.13	7.98	7.03	8.87	6.93	8.99	8.94	7.74	6.86	8.99	9.42
AO-R7	7.15	7.01	6.80	6.80	7.39	8.21	6.59	7.18	7.17	7.17	6.43	6.24	9.24	9.24	6.73	6.55	7.50	8.05	7.48	8.22	7.09	7.02	5.90	6.39	6.55	6.69	7.01	7.18	7.30	7.22
AO-R8	6.22	6.21	6.46	5.87	6.08	6.70	6.11	5.37	6.52	6.74	5.62	5.79	6.71	6.71	6.17	5.61	7.01	6.91	7.04	6.08	6.22	5.87	6.04	6.01	7.33	6.87	6.06	5.94	6.37	5.49
AO-R9	6.22	5.35	7.25	6.84	6.18	4.86	8.63	8.08	6.46	6.08	6.87	4.88	7.62	7.62	6.76	6.21	7.09	6.86	7.02	6.15	6.48	6.20	8.25	7.65	7.31	6.43	6.91	6.50	6.19	5.61
AO-R10	4.32	4.51	3.68	3.40	4.05	3.75	3.76	3.37	3.86	3.70	4.04	3.33	3.81	3.81	3.72	3.58	4.53	4.28	4.32	3.33	3.84	3.74	3.46	3.55	3.88	3.51	3.88	3.67	3.81	3.80
AO-R11	7.08	7.17	5.94	5.64	6.07	4.85	6.09	5.60	6.38	5.97	5.17	4.42	6.04	6.04	6.09	5.46	6.57	6.44	6.80	6.43	6.11	5.75	5.71	5.15	6.16	5.66	6.16	5.67	6.23	6.03
AO-R12	6.10	5.59	7.67	7.51	8.41	7.26	7.09	6.00	7.47	7.32	8.41	8.42	9.04	9.04	7.47	7.31	7.48	7.41	8.32	7.38	7.07	7.19	8.65	7.75	8.14	7.38	7.34	7.05	7.67	7.77
AO-R13	192.64	176.92	226.33	205.39	187.96	174.16	213.87	205.97	207.63	174.20	238.10	223.33	227.19	227.19	212.46	188.96	209.91	174.20	196.77	187.29	227.38	204.23	167.77	150.28	228.82	194.67	201.28	174.20	237.78	220.74
AO-R14	183.29	184.97	215.65	202.39	209.11	204.68	241.09	258.03	196.81	188.94	233.48	224.48	146.09	146.09	204.51	190.92	242.04	259.31	218.03	206.10	206.53	194.14	206.61	199.49	196.87	188.65	219.15	205.30	182.02	171.15
AO-R15	0.16	0.15	0.20	0.18	0.17	0.17	0.18	0.18	0.18	0.17	0.24	0.25	0.21	0.21	0.19	0.17	0.19	0.18	0.17	0.17	0.19	0.17	0.20	0.20	0.22	0.23	0.18	0.17	0.20	0.19
AO-R16	5.36	5.53	6.76	6.32	6.05	5.74	6.51	6.33	6.41	6.14	5.98	5.78	7.50	7.50	6.31	6.09	6.36	6.12	6.41	6.32	6.59	6.14	5.37	5.31	7.19	6.12	6.14	6.20	6.36	5.98
AP-R1	0.05	0.04	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.04	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
AP-R2	1.71	1.54	1.83	1.68	2.00	1.77	1.61	1.67	1.92	1.73	1.73	1.75	2.71	2.71	1.83	1.77	1.69	1.47	1.73	1.68	1.90	1.77	1.71	1.67	1.77	1.70	1.78	1.69	2.15	2.07
AP-R3	0.81	0.79	0.76	0.72	0.85	0.81	0.72	0.80	0.80	0.76	0.80	0.74	0.89	0.89	0.79	0.78	0.75	0.71	0.88	0.83	0.79	0.77	0.68	0.68	0.78	0.70	0.79	0.78	0.81	0.76
AP-R4	21.64	22.89	20.75	19.83	17.74	13.91	19.53	19.66	20.36	19.83	20.93	21.42	19.77	19.77	19.58	19.60	23.61	24.69	21.83	22.90	19.58	19.51	21.70	25.31	21.29	21.28	19.72	19.66	21.45	22.16
AP-R5	80.42	86.42	62.93	59.53	61.57	62.98	69.71	66.46	66.45	61.97	57.52	57.34	83.99	83.99	61.10	59.81	81.65	80.10	75.21	79.61	65.09	61.97	57.87	54.87	66.29	59.45	62.07	60.00	78.67	80.69
AP-R6	8.46	7.97	8.96	7.99	7.66	7.43	7.28	7.60	8.71	8.06	9.67	9.56	6.23	6.23	8.56	7.93	9.45	9.41	8.17	7.74	8.66	7.90	8.92	8.14	7.90	7.46	8.59	8.11	9.43	7.97
AP-R7	7.11	6.10	6.99	7.14	5.94	5.28	6.79	7.18	6.71	6.70	7.33	7.22	7.06	7.06	6.66	6.67	7.36	7.84	7.41	7.22	6.64	6.49	6.80	6.67	6.45	5.57	6.66	6.78	7.67	7.06
AP-R8	127.17	118.48	101.24	90.77	99.00	110.66	105.78	83.49	105.81	110.33	102.80	103.82	71.98	71.98	100.54	105.49	135.01	126.47	101.60	94.44	107.88	107.74	99.14	108.86	103.39	112.34	108.59	105.49	95.84	96.14
AP-R9	24.49	25.14	20.57	19.51	20.66	17.97	19.82	19.60	21.82	19.41	20.16	19.93	20.58	20.58	21.00	19.41	22.70	20.40	24.22	25.38	20.69	19.41	20.50	20.16	22.42	23.34	19.89	19.41	25.21	26.74
AP-R10	18.23	18.54	17.88	16.20	13.72	10.80	19.50	16.64	16.18	15.51	19.30	20.56	15.81	15.81	16.49	15.53	20.14	22.06	17.56	15.48	16.76	15.60	18.10	17.47	17.58	15.47	16.52	15.49	18.77	17.99
AP-R11	240.18	223.85	226.59	224.93	245.24	218.73	252.57	268.47	233.98	224.93	202.98	203.82	276.19	276.19	223.86	218.77	260.69	247.27	255.53	254.73	226.48	223.85	233.51	218.73	229.45	229.87	230.70	218.75	243.39	245.54
AP-R12	0.20	0.17	0.18	0.17	0.14	0.13	0.16	0.11	0.17	0.17	0.21	0.19	0.15	0.15	0.16	0.16	0.25	0.26	0.16	0.16	0.18	0.16	0.19	0.17	0.18	0.17	0.18	0.16	0.18	0.16
AP-R13	12.43	10.97	11.94	11.31	11.96	10.57	13.19	14.90	11.61	11.06	12.91	11.67	10.93	10.93	11.75	10.91	13.53	11.84	12.56	10.61	11.91	11.24	11.91	11.27	11.00	10.81	11.81	10.91	13.84	11.28
AP-R14	37.63	31.93	39.38	35.60	35.17	33.90	35.15	34.10	40.61	38.20	29.06	29.63	52.13	52.13	36.12	32.61	43.97	40.31	39.74	37.74	38.58	33.36	34.95	31.25	36.94	36.86	35.34	32.61	49.95	53.38
AP-R15																														
AP-R16	0.15	0.15	0.17	0.15	0.17	0.16	0.15	0.15	0.17	0.16	0.17	0.16	0.15	0.15	0.17	0.15	0.16	0.15	0.18	0.18	0.16	0.15	0.16	0.15	0.17	0.14	0.17	0.15	0.16	0.14
AP-R17	0.78	0.76	0.82	0.77	0.71	0.77	0.90	0.79	0.78	0.76	0.72	0.74	0.79	0.79	0.80	0.77	0.77	0.77	0.79	0.78	0.80	0.77	0.74	0.73	0.81	0.75	0.79	0.77	0.77	0.78
AP-R18	1.54	1.41	1.44	1.37	1.50	1.48	1.55	1.41	1.41	1.34	1.70	1.56	1.09	1.09	1.47	1.37	1.57	1.44	1.34	1.34	1.52	1.40	1.39	1.37	1.56	1.47	1.48	1.42	1.33	1.25
AP-R19	4.65	4.85	4.32	4.46	4.63	4.78	4.22	4.22	4.39	4.56	5.00	4.79	3.22	3.22	4.66	4.76	3.80	3.21	3.91	3.45	4.49	4.56	4.87	4.77	4.23	4.66	4.68	4.77	3.79	3.59
AP-R20	12.05	12.57	11.19	11.55	11.98	12.37	10.93	10.93	11.36	11.81	12.94	12.40	8.33	8.33	12.07	12.32	9.83	8.32	10.13	8.94	11.62	11.81	12.60	12.35	10.96	12.07	12.12	12.35	9.81	9.29
AP-R21	7.67	8.00	7.13	7.35	7.63	7.88	6.96	6.96	7.23	7.52	8.24	7.89	5.30	5.30	7.68	7.85	6.26	5.30	6.45	5.69	7.40	7.52	8.02	7.87	6.98	7.68	7.72	7.87	6.25	5.92
AP-R22	65.38	68.17	60.72	62.63	64.97	67.11	59.30	59.31	61.62	64.07	70.21	67.26	45.19	45.19	65.45	66.85	53.34	45.12	54.92	48.48	63.01	64.07	68.34	67.01	59.43	65.46	65.75	67.01	53.23	50.40
AP-R23	166.07	155.63	175.01	189.36	199.30	199.83	172.19	191.08	180.61	190.06	172.92	159.38	194.43	194.43	183.17	191.08	152.81	135.41	174.44	188.35	179.68	191.66	176.63	184.26	175.29	185.95	181.76	191.08	168.66	188.62
AQ-R1	0.16	0.15	0.19	0.18	0.14	0.14	0.17	0.16	0.17	0.16	0.18	0.15	0.16	0.16	0.17	0.16	0.17	0.15	0.15	0.15	0.17	0.16	0.21	0.16	0.16	0.16	0.18	0.16	0.16	0.15
AQ-R2	7.49	7.14	9.67	8.59	8.89	8.81	9.02	7.53	9.11	8.34	9.36	9.57	9.67	9.67	9.39	8.81	7.84	7.97	8.25	7.94	9.03	7.97	10.55	10.04	8.02	7.92	9.22	8.70	9.88	9.48
AQ-R3	8.60	8.52	10.36	9.51	11.45	9.13	10.58	8.98	9.98	9.15	11.40	10.29	7.51	7.51	10.43	9.20	10.23	9.66	9.60	8.33	10.27	9.18	10.99	9.74	9.85	9.23	10.28	9.43	10.65	8.48
AQ-R4	6.70	7.01	8.44	7.57	8.11	9.55	8.00	6.86	8.01	7.22	8.42	7.57	9.82	9.82	8.18	7.24	7.11	7.47	7.48	6.91	8.13	7.22	8.43	7.88	7.44	7.22	8.17	7.24	8.30	7.66
AQ-R5	5.02	4.78	6.40	5.90	6.06	5.66	5.34	5.59	6.13	5.65	6.72	6.99	7.12	7.12	6.03	5.65	6.08	6.02	6.03	5.65	6.06	5.73	6.27	5.59	6.04	5.56	5.96	5.65	6.58	6.47
AQ-R6	187.20	184.83	211.32	199.73	218.57	208.68	210.93	221.09	205.48	199.73	221.65	203.66	216.95	216.95	203.36	197.45	228.78	220.46	233.85	214.88	205.12	196.54	193.93	184.70	203.90	205.34	213.95	203.55	193.24	163.01
AQ-R7	1.01	0.91	0.99	0.96	0.91	0.92	1.03	1.12	0.98	0.95	0.94	0.90	1.07	1.07	0.98	0.95	0.95	0.98	1.01	1.06	0.97	0.92	0.98	0.97	0.93	1.01	0.98	0.93	1.02	0.98
AQ-R8	0.50	0.49	0.52	0.51	0.47	0.41	0.49	0.52	0.51	0.48	0.54	0.52	0.49	0.49	0.53	0.49	0.44	0.47	0.48	0.46	0.50	0.49	0.57	0.53	0.56	0.59	0.48	0.47	0.55	0.51
AQ-R9	10.40	9.94	11.89	10.77	11.14	11.53	13.71	14.11	11.00	10.39	11.40	11.30	15.66	15.66	10.57	10.36	14.39	13.77	13.77	11.96	10.64	10.27	12.44	14.11	12.32	10.18	11.37	11.14	11.00	9.08
AQ-R10	2.12	1.71	1.75	1.77	1.75	1.76	1.82	1.28	1.83	1.77	1.71	1.72	1.60	1.60	1.88	1.76	1.56	1.75	1.51	1.59	1.83	1.75	2.07	1.79	1.97	1.74	1.78	1.77	1.78	1.72
AR-R1	0.10	0.09	0.13	0.13	0.12	0.12	0.12	0.10	0.12	0.11	0.19	0.18	0.09	0.09	0.12	0.12	0.15	0.14	0.11	0.11	0.13	0.12	0.14	0.12	0.11	0.10	0.13	0.13	0.11	0.10
AR-R2	0.23	0.22	0.18	0.15	0.17	0.17	0.22	0.16	0.18	0.17	0.14	0.14	0.21	0.21	0.18	0.16	0.18	0.16	0.19	0.16	0.18	0.16	0.20	0.17	0.16	0.15	0.19	0.17	0.19	0.18
AR-R3	12.33	12.46	9.84	9.57	9.50	9.93	10.95	10.64	10.48	9.89	7.92	7.64	13.10	13.10	9.92	9.60	10.77	10.53	10.80	9.92	10.24	9.58	9.42	9.70	9.10	9.41	10.55	10.12	10.11	9.65
AR-R4	8.95	8.57	8.12	7.56	9.35	9.02	9.87	8.17	8.46	8.11	7.18	6.44	10.45	10.45	8.53	7.78	7.97	8.17	8.62	8.15	8.48	7.96	8.54	8.08	7.96	7.52	8.88	8.51	7.71	7.19
AR-R5	7.25	7.90	5.54	5.55	5.84	4.81	5.39	5.88	6.19	5.64	5.00	5.42	5.12	5.12	6.13	5.69	5.15	4.79	5.36	4.18	6.02	5.55	6.03	6.13	5.55	5.26	5.90	5.59	6.28	5.58
AR-R6	51.19	52.69	40.00	38.78	45.72	40.91	46.92	41.18	43.77	40.20	35.28	33.87	49.23	49.23	42.35	39.88	45.03	42.91	47.15	41.05	41.41	39.06	45.92	37.50	46.25	40.66	43.46	40.54	38.83	38.02
AR-R7	10.71	10.61	8.81	8.45	11.34	11.73	8.78	8.33	10.06	10.17	8.51	8.09	9.20	9.20	9.26	9.54	11.51	10.87	9.71	9.31	9.83	9.92	8.84	8.88	8.54	7.73	10.53	10.86	7.59	7.52
AR-R8	29.95	27.08	26.58	26.05	27.66	24.85	29.34	26.02	27.00	26.68	27.23	26.05	26.92	26.92	27.07	26.09	28.93	27.11	23.37	23.54	27.98	26.24	29.50	29.53	24.17	24.31	29.14	26.56	24.30	25.71
AR-R9	2.87	2.60	2.54	2.52	3.35	3.33	2.29	1.94	2.91	2.72	2.51	2.60	2.00	2.00	2.74	2.64	3.02	2.66	2.85	3.00	2.80	2.66	2.48	2.49	2.87	2.87	2.79	2.64	2.54	2.37
AR-R10	202.85	205.42	184.13	189.05	224.18	245.50	199.90	185.28	191.70	193.17	210.38	215.81	184.37	184.37	193.28	193.17	207.79	206.95	177.04	170.98	198.94	193.17	201.65	208.55	156.33	131.70	214.16	213.09	166.85	168.90
AR-R11	0.90	0.84	0.93	0.92	0.93	0.92	0.87	0.92	0.91	0.90	1.09	1.15	0.72	0.72	0.95	0.92	0.86	0.78	0.83	0.77	0.93	0.92	1.02	0.93	0.77	0.60	0.99	0.93	0.85	0.72
AR-R12	17.58	15.89	16.70	15.96	18.88	19.16	18.82	17.47	17.27	16.32	15.65	14.66	16.22	16.22	17.05	15.42	18.64	18.33	14.39	14.98	18.22	16.87	16.62	16.46	14.99	14.99	18.31	16.52	15.90	15.76

ADDENDUM G

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AS-R1	8.24	7.58	7.27	7.78	10.18	10.04	5.59	7.25	8.45	7.96	8.56	9.13	2.39	2.39	8.01	7.86	9.49	9.17	9.32	9.23	7.80	7.86	7.47	7.25	8.56	7.63	8.80	8.50	4.67	5.22
AS-R2	17.70	19.96	17.42	20.05	23.65	25.79	13.30	14.37	19.59	20.97	20.41	23.59	5.93	5.93	18.47	20.48	22.98	24.02	22.30	23.38	18.13	19.62	17.13	21.19	18.29	19.48	20.16	20.97	13.90	15.73
AS-R3	47.38	45.16	45.94	46.77	66.10	58.80	52.02	66.69	51.40	49.03	41.89	42.07	38.07	38.07	48.49	48.38	60.88	55.92	55.37	52.02	50.54	49.03	43.01	44.96	52.82	54.71	53.61	48.38	35.40	36.67
AS-R4	7.71	6.46	6.82	7.78	9.84	9.77	5.85	7.67	7.59	7.88	9.55	11.53	3.98	3.98	7.36	7.78	9.45	9.55	8.33	9.61	7.68	7.57	6.33	8.03	7.00	6.68	8.49	9.02	4.88	6.33
AS-R5	107.01	106.43	94.19	107.46	130.09	144.92	73.78	74.47	109.31	106.95	108.29	122.03	49.21	49.21	103.78	110.00	116.70	114.35	107.93	103.52	102.17	106.47	105.12	141.26	105.21	104.77	112.47	112.20	70.13	88.88
AS-R6	15.53	15.53	15.32	15.71	15.31	15.71	10.56	11.25	15.34	15.65	21.04	20.52	8.41	8.41	14.75	14.55	19.74	19.94	15.51	16.48	15.92	15.71	12.73	14.45	16.71	15.13	16.37	16.19	10.34	11.07
AS-R7	140.59	155.79	176.77	211.33	222.42	218.80	165.46	227.98	187.79	202.87	151.42	162.92	145.69	145.69	175.56	204.99	205.02	208.66	176.80	208.27	191.96	215.03	128.97	164.91	185.85	217.36	188.86	206.10	139.02	160.57
AS-R8	2.59	2.60	2.33	2.61	3.11	3.18	1.86	2.11	2.61	2.72	2.91	3.11	0.87	0.87	2.60	2.75	2.69	2.62	2.72	2.92	2.58	2.63	2.13	2.62	2.52	2.57	2.80	2.91	1.58	2.07
AS-R9	0.16	0.16	0.14	0.15	0.21	0.21	0.09	0.11	0.17	0.17	0.16	0.18	0.06	0.06	0.16	0.17	0.17	0.17	0.18	0.19	0.15	0.16	0.14	0.14	0.15	0.13	0.17	0.17	0.11	0.14
AS-R10	0.26	0.25	0.24	0.28	0.31	0.22	0.20	0.22	0.28	0.29	0.18	0.20	0.15	0.15	0.24	0.26	0.34	0.31	0.24	0.20	0.27	0.29	0.20	0.22	0.23	0.22	0.28	0.28	0.21	0.26
AS-R11	0.19	0.21	0.20	0.22	0.28	0.25	0.19	0.23	0.23	0.24	0.18	0.19	0.17	0.17	0.20	0.22	0.27	0.24	0.22	0.22	0.22	0.24	0.16	0.17	0.23	0.24	0.23	0.24	0.14	0.18
AS-R12	0.10	0.09	0.08	0.08	0.08	0.07	0.07	0.06	0.09	0.09	0.06	0.06	0.06	0.06	0.09	0.09	0.09	0.08	0.07	0.07	0.09	0.09	0.07	0.06	0.08	0.08	0.09	0.09	0.07	0.08
AT-R1	3.74	2.21	6.71	7.00	6.17	7.86	8.02	8.22	5.82	6.33	5.15	5.52	4.11	4.11	6.01	6.50	6.84	5.97	6.52	7.16	6.60	7.07	3.28	4.55	5.20	3.05	6.83	6.64	4.20	4.99
AT-R2	9.58	4.06	15.60	17.72	15.46	16.27	20.78	22.21	13.88	15.55	10.50	11.29	7.14	7.14	14.66	15.92	15.65	18.01	16.23	18.27	15.20	16.15	9.51	8.13	12.16	10.00	16.57	19.41	9.36	11.12
AT-R3	3.43	1.96	6.66	6.48	4.83	5.75	9.03	8.14	5.15	5.44	4.90	5.47	2.67	2.67	5.70	5.92	6.55	6.41	6.12	5.63	6.17	6.48	3.32	4.42	5.22	3.41	6.51	6.15	3.34	4.45
AT-R4	47.19	25.55	83.84	83.73	87.01	113.79	126.65	122.44	72.01	83.15	52.87	53.85	52.01	52.01	79.10	79.99	79.42	95.46	86.48	113.27	82.70	80.57	47.89	56.61	68.96	54.88	85.05	81.15	61.25	66.39
AT-R5	7.96	3.96	13.83	15.71	12.21	15.87	16.30	15.71	11.95	15.30	10.67	11.87	7.85	7.85	12.01	15.43	15.59	14.98	12.93	13.69	13.75	16.51	6.38	7.10	10.35	6.86	13.79	15.87	9.75	9.82
AT-R6	92.25	71.44	170.76	171.17	202.63	212.21	233.19	175.26	144.52	171.19	180.96	215.80	87.63	87.63	162.92	192.42	183.17	178.79	206.30	192.68	162.87	194.71	115.17	152.50	147.86	98.50	170.01	192.42	153.69	165.09
AT-R7	0.48	0.42	0.66	0.76	0.60	0.83	0.97	0.83	0.51	0.58	0.77	0.68	0.73	0.73	0.60	0.79	0.68	0.68	0.59	0.54	0.62	0.83	0.63	0.52	0.41	0.26	0.68	0.83	0.58	0.58
AT-R8	0.09	0.04	0.13	0.16	0.14	0.17	0.18	0.19	0.12	0.16	0.09	0.10	0.10	0.10	0.13	0.17	0.12	0.13	0.14	0.18	0.14	0.16	0.07	0.07	0.10	0.07	0.14	0.17	0.10	0.12
AT-R9	0.17	0.14	0.23	0.26	0.23	0.26	0.32	0.24	0.19	0.23	0.29	0.31	0.14	0.14	0.22	0.26	0.26	0.28	0.21	0.24	0.23	0.27	0.19	0.22	0.18	0.12	0.24	0.28	0.18	0.27
AT-R10	0.13	0.09	0.18	0.17	0.21	0.25	0.25	0.19	0.15	0.17	0.23	0.25	0.17	0.17	0.17	0.18	0.22	0.22	0.22	0.21	0.18	0.18	0.14	0.18	0.17	0.08	0.19	0.19	0.16	0.17
AT-R11	2.54	1.79	4.71	5.33	4.27	5.78	6.31	6.40	3.84	4.76	3.95	3.99	1.87	1.87	4.31	5.03	4.52	4.74	4.12	4.14	4.56	5.33	3.00	3.76	3.04	2.21	4.92	5.78	2.96	3.67
AT-R12	0.82	0.59	1.29	1.34	1.38	1.32	1.67	1.40	1.13	1.28	1.23	1.28	0.89	0.89	1.22	1.32	1.31	1.36	1.32	1.56	1.28	1.35	0.86	1.17	1.11	0.95	1.33	1.35	0.94	1.18
AU-R1	7.14	8.53	5.51	5.76	7.02	7.49	6.00	6.92	5.83	6.96	7.68	8.62	5.70	5.70	6.21	7.41	5.71	5.76	6.06	5.88	6.41	7.35	4.82	5.52	6.45	6.40	6.24	7.10	5.24	6.62
AU-R2	19.28	20.00	14.99	17.07	17.37	21.43	15.72	17.88	15.89	19.22	18.60	21.03	14.35	14.35	15.82	18.79	18.45	22.70	13.89	13.94	18.10	20.97	10.84	16.27	19.03	21.31	16.33	19.41	13.04	14.04
AU-R3	6.74	7.15	5.64	6.31	6.67	7.38	5.48	6.88	6.21	7.15	5.82	5.60	5.52	5.52	6.02	7.24	6.28	6.58	6.66	7.50	6.33	7.22	4.10	5.74	7.13	7.72	5.92	7.01	5.38	5.67
AU-R4	0.15	0.13	0.11	0.12	0.12	0.15	0.14	0.14	0.12	0.11	0.13	0.15	0.09	0.09	0.12	0.13	0.13	0.12	0.12	0.12	0.13	0.14	0.08	0.11	0.14	0.12	0.12	0.13	0.09	0.11
AU-R5	17.93	19.16	11.29	13.90	13.32	16.39	12.46	12.56	12.20	14.36	16.97	19.00	7.46	7.46	12.68	14.09	15.10	15.23	11.13	13.84	14.09	14.96	9.69	12.55	14.80	14.59	13.14	15.01	10.02	13.08
AU-R6	220.41	226.72	191.11	212.73	190.31	211.84	195.63	206.74	196.44	213.02	195.27	230.84	184.95	184.95	191.77	211.84	218.16	216.46	157.15	185.87	218.72	219.69	144.04	178.28	232.46	217.37	185.07	211.84	200.06	243.35
AU-R7	0.27	0.23	0.20	0.24	0.28	0.35	0.25	0.26	0.22	0.24	0.23	0.25	0.17	0.17	0.22	0.25	0.25	0.26	0.22	0.23	0.24	0.26	0.18	0.19	0.24	0.23	0.23	0.26	0.20	0.23
AU-R8	193.07	201.95	144.35	170.06	191.38	209.69	173.60	180.93	162.35	181.55	149.72	165.52	121.49	121.49	153.93	165.29	209.76	221.48	176.62	201.36	169.66	181.50	115.12	145.20	181.66	194.88	164.06	172.18	137.23	166.61
AU-R9	40.35	43.53	32.83	39.24	41.88	41.05	30.71	32.06	35.76	42.28	43.26	42.77	29.94	29.94	35.56	41.05	39.33	41.35	38.21	43.04	37.16	40.07	28.37	43.56	43.53	51.96	34.22	39.29	34.80	44.95
AU-R10	0.35	0.38	0.27	0.33	0.34	0.41	0.32	0.36	0.30	0.36	0.27	0.30	0.17	0.17	0.31	0.36	0.28	0.32	0.27	0.32	0.32	0.36	0.25	0.36	0.35	0.36	0.30	0.36	0.26	0.32
AU-R11	5.20	5.98	4.11	4.98	4.43	4.16	3.94	4.77	4.33	4.98	5.08	4.99	4.29	4.29	4.23	4.75	4.97	5.47	4.20	4.26	4.73	5.29	3.03	3.49	4.89	5.62	4.27	4.75	4.20	5.08
AV-R1	1.04	0.85	1.82	1.79	1.83	1.63	2.64	2.38	1.40	1.62	2.07	1.96	0.85	0.85	1.67	1.69	1.93	2.05	1.98	2.05	1.55	1.65	1.89	2.38	1.12	0.84	1.95	1.79	1.26	1.60
AV-R2	0.73	0.53	1.23	1.54	1.32	1.63	1.62	1.58	1.00	1.28	1.49	1.63	0.75	0.75	1.17	1.55	1.21	1.45	1.45	1.61	1.13	1.33	0.92	1.39	0.69	0.50	1.32	1.60	1.02	1.39
AV-R3	0.36	0.21	0.55	0.55	0.61	0.68	0.67	0.68	0.47	0.50	0.65	0.74	0.44	0.44	0.54	0.64	0.51	0.48	0.58	0.67	0.57	0.69	0.28	0.43	0.33	0.24	0.58	0.64	0.53	0.72
AV-R4	0.16	0.12	0.26	0.33	0.24	0.24	0.35	0.35	0.20	0.24	0.29	0.36	0.10	0.10	0.23	0.25	0.29	0.36	0.24	0.26	0.24	0.25	0.23	0.35	0.18	0.16	0.26	0.26	0.20	0.25
AV-R5	0.07	0.05	0.11	0.11	0.12	0.16	0.15	0.16	0.09	0.10	0.10	0.11	0.08	0.08	0.11	0.11	0.09	0.11	0.11	0.15	0.11	0.11	0.07	0.09	0.06	0.04	0.12	0.13	0.07	0.10
AV-R6	0.03	0.02	0.05	0.05	0.05	0.05	0.07	0.06	0.04	0.04	0.05	0.06	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.03	0.04	0.03	0.02	0.05	0.05	0.05	0.07
AV-R7	4.66	3.06	5.77	5.64	7.16	6.80	6.42	5.80	5.61	5.64	6.44	7.27	2.90	2.90	5.90	6.02	6.35	5.85	5.95	5.82	6.23	6.06	4.10	5.48	5.01	3.11	6.74	6.11	3.45	4.36
AV-R8	4.34	3.03	7.06	7.43	7.40	8.21	8.57	9.26	5.67	6.44	9.57	11.18	3.53	3.53	6.56	7.36	7.81	8.91	6.64	7.64	7.11	8.14	4.64	5.49	5.56	3.68	7.46	8.93	4.77	6.43
AV-R9	0.09	0.06	0.11	0.14	0.14	0.17	0.14	0.15	0.11	0.13	0.12	0.13	0.08	0.08	0.12	0.14	0.12	0.13	0.13	0.13	0.12	0.14	0.10	0.10	0.09	0.07	0.13	0.15	0.08	0.11
AW-R1	7.88	7.60	5.19	6.05	4.66	5.17	6.84	7.25	5.56	5.47	4.07	2.93	10.44	10.44	5.62	5.62	4.09	4.80	4.42	5.46	5.59	5.88	6.77	7.88	6.00	6.83	5.44	5.31	5.59	7.90
AW-R2	20.16	23.27	11.89	12.60	12.53	14.28	18.96	20.45	13.12	13.45	9.10	6.58	27.78	27.78	13.68	14.07	9.08	11.60	12.17	13.35	13.41	13.62	15.32	22.47	12.66	11.60	13.60	14.07	13.91	16.61
AW-R3	46.88	41.14	35.38	42.16	41.28	41.22	60.92	51.84	35.23	41.59	30.57	19.91	38.31	38.31	38.81	41.96	37.76	43.79	36.29	41.91	41.02	41.59	30.88	40.31	34.58	43.34	42.11	45.15	29.92	38.31
AW-R4	6.82	6.61	4.97	5.47	5.27	5.63	7.68	7.78	4.95	5.57	4.82	2.57	14.23	14.23	5.10	5.53	4.27	5.52	4.73	4.84	5.45	5.58	5.67	7.78	5.69	5.67	5.13	5.93	5.83	5.01
AW-R5	199.31	220.13	121.01	142.27	147.15	150.54	174.77	157.21	135.59	166.65	124.13	69.73	161.26	161.26	136.15	157.21	152.41	186.30	156.17	227.13	141.87	157.22	114.48	150.50	131.36	166.65	146.64	157.21	125.45	148.42
AW-R6	0.22	0.24	0.14	0.18	0.19	0.26	0.22	0.23	0.15	0.18	0.17	0.14	0.18	0.18	0.16	0.18	0.18	0.18	0.15	0.20	0.17	0.18	0.13	0.16	0.13	0.17	0.18	0.22	0.13	0.18
BA-R1	32.18	31.08	29.03	25.93	24.75	19.11	26.05	20.93	29.00	25.93	30.46	25.48	27.29	27.29	27.50	22.52	34.48	31.63	25.29	18.58	28.82	26.57	32.32	26.31	29.82	28.39	28.72	24.66	27.70	26.31
BA-R2	16.14	15.55	17.62	16.03	15.69	16.40	16.63	16.59	17.17	16.04	16.32	14.43	19.24	19.24	16.52	15.86	18.39	18.42	15.74	15.28	17.27	16.29	17.11	15.60	17.46	15.67	16.80	16.21	17.12	16.14
BA-R3	72.81	68.37	81.39	77.79	66.73	59.60	70.21	77.27	79.25	75.49	72.47	78.79	84.24	84.24	74.48	75.14	85.84	88.12	73.15	72.64	77.10	75.81	80.55	75.83	77.03	81.40	74.52	75.74	85.60	71.56
BA-R4	105.82	99.04	94.24	82.73	92.58	92.23	90.37	71.61	95.67	90.91	104.09	89.64	78.41	78.41	100.01	91.64	82.66	87.41	74.77	81.59	98.61	87.41	108.86	91.64	86.40	85.38	99.49	90.17	92.75	85.42
BB-R1	33.39	32.13	29.69	29.94	30.08	27.37	34.42	37.19	30.35	27.11	26.20	24.77	36.47	36.47	29.49	29.17	33.03	31.29	27.99	28.27	29.60	26.73	36.79	36.27	31.68	32.11	30.75	27.37	27.99	32.14
BB-R2	20.33	20.10	18.27	15.90	17.81	16.99	21.54	20.10	17.85	15.77	18.80	17.39	13.90	13.90	18.15	16.37	21.43	21.89	19.63	18.66	17.56	16.01	21.52	24.13	20.30	19.71	18.61	16.99	16.57	15.82
BB-R3	88.91	85.96	84.40	77.41	82.88	93.49	97.19	105.58	82.93	75.85	81.03	77.41	121.59	121.59	80.86	74.29	93.38	89.12	96.03	102.64	77.26	73.89	104.93	112.30	90.46	89.12	79.77	77.41	97.93	97.33
BB-R4	9.01	9.52	9.26	8.35	8.88	9.32	9.80	9.60	8.97	8.01	9.24	9.60	11.66	11.66	9.09	8.30	8.70	9.38	9.17	9.84	8.64	7.63	11.24	11.23	9.34	9.77	8.78	7.90	10.24	10.71
BC-R1	28.54	28.28	31.60	29.30	30.49	28.17	29.28	31.82	31.19	27.93	30.76	30.40	26.97	26.97	29.10	27.84	39.40	34.34	32.61	31.92	31.19	28.35	27.31	27.20	34.11	31.18	29.81	27.84	31.28	30.78
BC-R2	14.96	16.50	15.93	15.96	17.62	17.00	15.88	16.40	15.97	15.68	17.00	18.09	12.11	12.11	15.54	15.68	19.54	18.70	17.78	16.48	16.08	16.19	14.25	11.51	18.23	17.27	15.41	14.85	16.43	17.14
BC-R3	74.57	68.84	87.47	79.33	77.44	76.37	89.23	86.93	81.74	76.94	83.73	76.63	76.99	76.99	81.41	76.48	92.42	100.21	84.72	80.48	84.99	79.26	73.61	75.55	78.63	72.94	83.95	77.41	84.88	78.56
BC-R4	116.38	110.49	96.23	88.92	106.69	95.89	88.57	86.48	99.51	92.82	130.23	122.82	70.54	70.54	101.96	91.87	109.52	96.30	89.43	85.67	103.72	93.78	108.36	91.69	123.36	125.75	96.69	91.87	99.36	89.08
BC-R5	8.21	8.75	8.54	7.71	8.03	8.10	8.08	7.71	8.37	8.08	8.80	8.98	5.64	5.64	8.36	8.10	9.16	8.30	9.70	8.08	8.23	8.30	7.49	7.56	9.17	7.99	8.26	8.30	8.04	7.91
BD-R1	32.98	25.29	30.52	26.46	26.30	21.39	37.37	32.05	28.54	24.94	30.03	30.11	26.19	26.19	30.29	26.08	30.29	25.29	29.35	22.97	28.67	25.73	37.17	32.05	34.78	27.13	28.76	25.68	30.34	25.74
BD-R2	18.72	20.08	17.09	16.42	15.48	14.85	18.47	17.32	16.89	15.65	16.33	17.16	20.69	20.69	16.64	15.68	17.98	17.12	16.77	16.15	16.69	15.65	18.96	18.55	16.73	16.55	17.17	15.86	16.97	15.88
BD-R3	95.27	85.98	76.15	72.61	78.27	73.75	79.97	68.41	79.74	76.19	81.25	79.21	81.52	81.52	81.08	78.03	74.74	72.61	69.81	70.18	80.33	81.08	90.06	79.13	78.23	68.38	78.31	78.03	87.75	81.25
BD-R4	8.50	7.86	9.10	8.77	7.31	6.19	9.40	11.75	8.47	7.92	8.64	9.42	7.88	7.88	8.68	8.66	8.63	8.14	7.87	7.86	8.53	7.92	9.97	10.28	9.35	9.12	8.36	7.71	8.92	9.06
BE-R1	40.16	37.77	29.21	26.30	30.50	23.47	29.24	24.66	30.89	26.48	36.74	31.10	27.62	27.62	30.76	26.09	35.20	35.10	32.19	26.30	30.32	26.09	35.23	35.10	36.30	35.43	29.16	26.09	34.70	28.32
BE-R2	18.99	18.16	16.71	15.49	15.92	14.99	16.93	15.88	16.73	15.35	18.20	18.33	10.98	10.98	17.29	15.68	16.96	16.21	16.14	15.43	17.19	15.74	16.90	14.99	16.89	15.15	17.09	16.21	16.55	14.55
BE-R3	89.26	90.03	78.05	76.16	79.99	74.76	74.71	64.00	81.28	76.16	82.55	82.67	64.62	64.62	81.32	76.03	80.47	78.43	83.24	93.48	77.36	74.76	90.36	99.40	90.15	91.14	77.38	74.76	81.75	85.85
BE-R4	139.30	117.95	102.55	93.96	92.08	91.43	106.97	107.43	107.29	95.13	105.44	94.55	71.81	71.81	106.51	95.13	117.88	103.73	101.16	95.32	108.58	95.13	106.85	93.97	115.68	115.38	104.72	93.97	106.52	91.04
BF-R1	26.49	22.89	33.88	27.25	31.28	29.17	37.20	37.19	30.49	25.98	34.31	25.03	29.34	29.34	32.29	25.87	31.64	25.88	31.76	29.97	30.26	25.50	40.00	40.07	34.48	30.80	31.18	26.10	32.75	26.89
BF-R2	19.30	18.60	16.98	15.91	18.35	16.74	19.16	16.81	16.67	15.77	21.22	22.62	13.60	13.60	17.48	16.36	19.47	19.39	15.05	13.89	17.72	15.91	20.39	17.79	19.11	18.54	17.72	15.86	16.01	15.63
BF-R3	78.92	77.46	85.34	77.89	86.62	81.11	84.79	75.56	81.27	77.86	101.05	103.92	71.39	71.39	81.57	77.74	100.35	108.98	65.98	67.62	88.89	81.57	86.59	81.11	86.40	74.34	82.22	78.04	90.62	82.69
BF-R4	7.78	7.61	9.16	8.46	8.84	8.15	8.42	8.41	9.02	8.21	8.48	8.41	10.60	10.60	8.41	7.94	10.35	10.31	10.17	9.63	8.24	8.14	9.95	8.89	9.83	8.78	8.59	8.14	8.85	8.46
DA-R1	5.56	5.10	6.02	5.50	6.02	5.79	7.07	6.76	5.64	5.32	6.17	6.14	5.79	5.79	6.02	5.52	5.62	5.72	5.70	5.77	5.91	5.36	6.31	5.59	5.87	5.06	6.06	5.74	5.53	5.36
DB-R1	2.88	3.10	3.24	3.04	16.73	2.85	3.29	3.01	2.99	3.00	24.29	4.07	2.96	2.96	6.78	3.04	2.68	2.82	3.13	2.79	7.23	3.04	3.20	3.11	3.30	3.41	7.44	3.04	2.78	2.81
DC-R1	1.93	1.79	2.10	1.91	2.34	2.00	2.62	2.68	2.00	1.82	2.14	1.81	1.96	1.96	2.20	1.93	1.79	1.72	2.20	1.97	2.07	1.89	2.22	1.93	2.12	1.76	2.20	1.94	1.79	1.82
DD-R1	7.55	6.01	6.65	6.60	7.27	7.59	8.35	8.52	6.77	6.06	6.17	6.53	7.78	7.78	7.05	6.50	6.21	6.13	7.13	7.50	6.75	6.08	7.48	7.59	6.60	6.76	7.14	6.69	6.53	6.29
DE-R1	2.64	2.39	5.01	2.36	2.84	3.16	2.86	2.97	2.51	2.38	14.43	2.36	3.11	3.11	4.69	2.48	2.05	2.16	2.94	3.08	2.48	2.37	12.70	2.48	11.41	2.33	2.63	2.48	2.42	2.23

ADDENDUM G

	Current economic factors						Level of scope definition						Rework						Scope change						Weather					
	Good		Normal		Volatile		Good		Normal		Poor		Little		Normal		Extensive		Few		Normal		Extensive		Good		Normal		Poor	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
E-R1	0.84	0.77	0.73	0.73	0.72	0.65	0.88	0.86	0.74	0.72	0.64	0.68	0.79	0.79	0.74	0.73	0.74	0.69	0.75	0.75	0.73	0.69	0.79	0.83	0.76	0.76	0.78	0.71	0.62	0.61
E-R2	59.88	59.73	53.28	54.11	50.76	54.54	51.64	52.34	55.54	56.39	48.16	44.31	56.57	56.57	52.49	52.09	59.70	60.36	51.32	52.51	54.63	55.21	54.03	56.90	55.63	57.69	54.70	54.54	49.55	46.70
F-R1	0.32	0.28	0.34	0.32	0.33	0.33	0.31	0.25	0.33	0.31	0.40	0.39	0.41	0.41	0.34	0.33	0.27	0.26	0.30	0.28	0.33	0.30	0.38	0.34	0.32	0.30	0.34	0.32	0.34	0.31
F-R2	2.77	2.85	2.55	2.30	2.61	2.48	3.34	3.62	2.47	2.30	2.45	2.40	1.87	1.87	2.69	2.36	2.41	2.35	2.82	2.72	2.57	2.33	2.48	2.31	2.62	2.33	2.65	2.36	2.40	2.20
F-R3	0.82	0.80	0.83	0.84	0.82	0.82	0.94	0.97	0.77	0.79	0.95	0.79	0.78	0.78	0.87	0.82	0.65	0.57	0.81	0.88	0.82	0.79	0.87	0.88	0.81	0.77	0.85	0.82	0.77	0.83
F-R4	4.24	4.53	3.63	3.40	3.40	3.19	3.00	3.06	3.93	3.45	3.22	2.82	2.99	2.99	3.62	3.21	4.19	3.47	3.35	3.28	3.95	3.47	2.96	2.61	4.38	4.18	3.44	3.19	3.89	3.60
F-R5	1.35	1.42	1.17	1.16	0.98	0.78	0.92	1.06	1.20	1.17	1.28	1.20	0.93	0.93	1.14	1.14	1.36	1.22	0.99	0.72	1.23	1.18	1.11	1.16	1.35	1.34	1.12	1.16	1.16	1.13
G-R1	0.43	0.38	0.45	0.40	0.38	0.39	0.35	0.34	0.44	0.39	0.44	0.46	0.62	0.62	0.44	0.40	0.35	0.33	0.33	0.33	0.45	0.40	0.43	0.46	0.42	0.36	0.40	0.38	0.54	0.54
G-R2	0.14	0.13	0.11	0.10	0.10	0.10	0.08	0.07	0.12	0.10	0.12	0.12	0.12	0.12	0.12	0.10	0.09	0.09	0.08	0.07	0.11	0.10	0.13	0.12	0.09	0.08	0.11	0.10	0.12	0.11
G-R3	0.24	0.24	0.34	0.30	0.33	0.30	0.39	0.42	0.31	0.28	0.29	0.27	0.30	0.30	0.33	0.28	0.30	0.28	0.35	0.33	0.33	0.28	0.26	0.24	0.30	0.26	0.32	0.28	0.35	0.30
G-R4	1.63	1.60	1.65	1.63	1.66	1.65	1.37	1.23	1.70	1.67	1.70	1.63	2.23	2.23	1.64	1.65	1.52	1.37	1.63	1.69	1.71	1.66	1.39	1.23	1.36	1.34	1.59	1.61	2.12	2.08
G-R5	2.19	2.26	2.10	1.98	2.18	1.94	1.75	1.78	2.07	2.00	2.92	2.87	2.05	2.05	2.18	2.04	1.93	1.97	1.70	1.67	2.25	2.00	2.09	2.23	1.89	1.73	2.17	2.02	2.24	2.18
G-R6	0.34	0.32	0.36	0.33	0.33	0.31	0.33	0.30	0.36	0.33	0.28	0.27	0.42	0.42	0.36	0.31	0.29	0.31	0.33	0.32	0.35	0.31	0.35	0.34	0.33	0.29	0.35	0.32	0.37	0.36
G-R7	0.19	0.20	0.18	0.15	0.17	0.17	0.14	0.15	0.18	0.16	0.20	0.19	0.23	0.23	0.17	0.16	0.17	0.16	0.14	0.14	0.19	0.16	0.18	0.17	0.15	0.15	0.18	0.17	0.19	0.19
G-R8	0.19	0.20	0.15	0.15	0.17	0.17	0.15	0.15	0.17	0.16	0.13	0.10	0.16	0.16	0.17	0.17	0.13	0.11	0.18	0.18	0.16	0.16	0.13	0.12	0.16	0.14	0.16	0.15	0.17	0.17
G-R9	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02
G-R10	0.13	0.11	0.12	0.11	0.13	0.12	0.13	0.11	0.12	0.12	0.13	0.11	0.11	0.11	0.13	0.12	0.12	0.11	0.13	0.13	0.13	0.12	0.11	0.11	0.13	0.12	0.12	0.11	0.15	0.14

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
QUANTITY																														
AB-Q1	2.20	2.33	2.18	2.18	2.19	2.20	2.03	1.98	2.19	2.20	2.32	2.33	2.29	2.38	2.20	2.21	2.00	1.98	2.11	2.20	2.19	2.19	2.24	2.22	2.13	2.02	2.20	2.24	2.16	2.18
AB-Q2	1.20	1.24	1.13	1.12	1.14	1.14	1.11	1.11	1.14	1.12	1.21	1.20	1.19	1.19	1.16	1.13	1.08	1.11	1.12	1.11	1.16	1.12	1.14	1.12	1.08	1.02	1.16	1.12	1.15	1.12
AB-Q3	1.70	1.49	1.71	1.61	1.80	1.69	1.46	1.39	1.77	1.65	1.88	1.77	1.75	1.50	1.77	1.66	1.54	1.42	1.67	1.52	1.72	1.60	1.84	1.88	1.69	1.67	1.71	1.57	1.87	1.98
AB-Q4	1.73	1.63	1.77	1.73	1.85	1.88	1.60	1.53	1.81	1.76	1.88	1.92	1.82	1.63	1.81	1.76	1.63	1.69	1.75	1.69	1.80	1.73	1.76	1.77	1.75	1.77	1.76	1.69	1.90	1.96
AC-Q1	1.46	1.48	1.54	1.47	1.43	1.58	1.53	1.43	1.49	1.47	1.49	1.57	1.23	1.12	1.55	1.57	1.47	1.46	1.38	1.20	1.47	1.47	1.68	1.58	1.63	1.70	1.49	1.47	1.48	1.48
AC-Q2	18.44	20.27	18.48	19.24	18.22	19.94	18.61	19.73	18.22	19.40	18.89	19.95	15.63	14.10	18.82	19.52	18.94	19.53	16.96	15.71	18.15	18.75	20.64	20.68	19.43	20.11	18.08	18.65	19.46	19.53
AC-Q3	0.75	0.69	1.01	1.04	0.88	0.92	0.84	0.76	1.01	1.00	0.76	0.69	0.91	0.80	0.96	1.00	0.86	0.93	0.95	1.09	0.92	0.93	0.98	0.93	1.02	0.96	0.94	0.97	0.87	0.92
AC-Q4	0.18	0.19	0.14	0.14	0.15	0.13	0.18	0.19	0.14	0.13	0.16	0.15	0.19	0.19	0.15	0.14	0.14	0.12	0.15	0.13	0.16	0.14	0.14	0.15	0.15	0.12	0.16	0.14	0.13	0.13
AC-Q5	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
AC-Q6	0.54	0.57	0.53	0.55	0.52	0.54	0.54	0.55	0.52	0.55	0.54	0.56	0.47	0.44	0.54	0.56	0.54	0.55	0.51	0.45	0.52	0.54	0.58	0.56	0.54	0.56	0.53	0.54	0.54	0.55
AC-Q7	1.82	1.75	1.86	1.76	1.78	1.61	1.85	1.63	1.81	1.65	1.90	1.68	1.59	1.59	1.89	1.78	1.80	1.61	1.80	1.62	1.81	1.65	1.96	1.78	2.00	1.89	1.83	1.76	1.75	1.62
AC-Q8	1.60	1.60	1.59	1.57	1.72	1.65	1.66	1.64	1.57	1.55	1.78	1.80	1.53	1.54	1.63	1.60	1.70	1.63	1.52	1.53	1.61	1.60	1.79	1.73	1.77	1.76	1.56	1.55	1.84	2.01
AC-Q9	0.35	0.35	0.35	0.33	0.38	0.39	0.35	0.35	0.35	0.35	0.38	0.39	0.34	0.33	0.36	0.38	0.36	0.38	0.34	0.37	0.36	0.36	0.39	0.41	0.36	0.35	0.35	0.33	0.41	0.45
AC-Q10	0.18	0.17	0.18	0.16	0.18	0.18	0.19	0.17	0.18	0.17	0.17	0.17	0.18	0.19	0.18	0.17	0.17	0.16	0.18	0.18	0.18	0.17	0.19	0.16	0.19	0.17	0.18	0.18	0.16	0.15
AC-Q11	13.35	14.16	14.75	15.23	13.87	13.69	14.30	14.94	14.50	14.66	13.52	14.16	13.30	12.78	14.34	14.93	14.89	14.62	15.07	13.68	13.95	14.63	14.88	15.23	15.14	15.28	14.06	14.62	14.93	15.21
AC-Q12	1.43	1.16	1.30	1.16	1.28	1.16	1.33	1.16	1.29	1.16	1.41	1.16	1.16	1.16	1.38	1.16	1.17	1.16	1.30	1.16	1.32	1.16	1.35	1.23	1.20	1.16	1.37	1.16	1.15	1.16
AC-Q13	0.15	0.16	0.16	0.16	0.15	0.13	0.15	0.16	0.15	0.16	0.16	0.16	0.14	0.12	0.16	0.16	0.15	0.15	0.15	0.13	0.15	0.15	0.17	0.17	0.17	0.17	0.15	0.16	0.15	0.16
AC-Q14	0.08	0.08	0.07	0.08	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.07	0.07	0.07	0.07
AC-Q15	119.63	124.75	93.76	80.50	97.77	93.50	135.88	149.25	91.23	76.33	92.19	89.75	105.68	117.75	97.08	93.08	104.21	77.00	99.88	100.00	100.71	95.42	93.71	78.67	93.21	74.54	99.47	97.92	102.19	80.33
AC-Q16	274.75	282.00	259.15	254.00	246.64	230.00	315.88	313.00	255.76	255.00	213.13	224.50	241.33	242.00	255.75	252.50	288.14	291.00	254.43	248.00	258.93	257.50	262.50	256.50	278.25	291.00	255.35	254.00	264.86	253.00
AC-Q17	1.23	1.12	1.29	1.28	1.20	1.19	1.22	1.17	1.27	1.22	1.24	1.23	1.25	1.18	1.26	1.23	1.22	1.19	1.19	1.13	1.26	1.21	1.30	1.48	1.28	1.34	1.24	1.19	1.29	1.47
AD-Q1	0.13	0.13	0.15	0.15	0.16	0.15	0.14	0.12	0.15	0.15	0.15	0.14	0.15	0.14	0.15	0.14	0.15	0.14	0.15	0.15	0.14	0.14	0.17	0.16	0.14	0.13	0.15	0.14	0.17	0.15
AD-Q2	0.13	0.08	0.13	0.10	0.13	0.10	0.11	0.08	0.14	0.12	0.10	0.09	0.14	0.13	0.14	0.11	0.09	0.08	0.10	0.08	0.13	0.09	0.17	0.19	0.15	0.14	0.13	0.09	0.14	0.14
AD-Q3	0.56	0.49	0.56	0.50	0.51	0.51	0.48	0.45	0.59	0.52	0.48	0.46	0.59	0.52	0.56	0.51	0.46	0.40	0.46	0.43	0.58	0.52	0.52	0.46	0.53	0.51	0.52	0.49	0.71	0.56
AD-Q4	0.25	0.20	0.27	0.21	0.24	0.18	0.27	0.23	0.26	0.20	0.23	0.18	0.28	0.28	0.26	0.20	0.22	0.20	0.22	0.18	0.27	0.21	0.26	0.19	0.20	0.20	0.25	0.20	0.32	0.40
AD-Q5	0.38	0.32	0.44	0.36	0.40	0.38	0.50	0.44	0.40	0.36	0.38	0.36	0.44	0.43	0.41	0.36	0.44	0.36	0.37	0.38	0.43	0.36	0.43	0.36	0.33	0.34	0.41	0.36	0.53	0.48
AD-Q6	1.48	1.33	1.67	1.51	1.73	1.50	1.94	1.54	1.62	1.50	1.48	1.43	1.51	1.35	1.61	1.50	1.97	1.50	1.51	1.51	1.69	1.43	1.61	1.53	1.41	1.35	1.54	1.47	2.34	1.51
AD-Q7	2.40	2.01	2.22	1.93	2.15	1.57	2.42	1.90	2.16	1.68	2.28	2.16	2.50	2.67	2.17	1.90	2.26	1.51	2.09	1.68	2.31	1.94	2.04	1.87	2.69	2.66	2.21	1.94	2.06	1.51
AD-Q8	3.93	3.90	3.85	3.89	3.84	4.17	4.16	4.21	3.80	3.89	3.81	3.88	3.94	3.89	3.83	3.89	3.93	4.00	3.79	3.89	3.88	3.89	3.85	3.93	3.83	3.89	3.85	3.89	3.95	3.89
AD-Q9	4.86	4.10	4.70	4.31	4.77	4.65	5.27	4.51	4.61	4.29	4.71	4.46	4.71	4.47	4.67	4.34	5.08	4.65	4.69	4.34	4.77	4.31	4.68	4.40	5.40	5.13	4.64	4.23	4.87	4.46
AD-Q10	0.84	0.81	0.85	0.86	0.80	0.71	0.92	0.91	0.82	0.74	0.81	0.73	0.85	0.82	0.82	0.73	0.88	0.93	0.85	0.88	0.83	0.77	0.83	0.82	0.80	0.82	0.84	0.81	0.81	0.68
AD-Q11	0.97	0.95	1.05	1.05	1.00	0.95	1.14	1.15	1.00	0.99	0.98	0.99	1.03	1.00	1.00	0.99	1.12	0.99	1.00	0.98	1.04	1.01	0.95	0.90	0.96	0.80	1.01	0.99	1.11	0.99
AD-Q12	1.17	1.11	0.97	0.97	0.86	0.91	1.23	1.17	0.92	0.91	0.91	0.98	0.98	0.99	0.95	0.90	1.08	1.08	0.96	1.00	1.03	1.01	0.78	0.71	0.94	0.86	1.01	1.00	0.82	0.73
AD-Q13	0.95	0.93	0.99	0.93	0.92	0.93	1.10	0.93	0.94	0.93	0.92	0.93	0.89	0.93	0.96	0.93	1.03	0.93	0.93	0.93	0.98	0.93	0.92	0.93	1.11	0.93	0.96	0.93	0.92	0.93
AD-Q14	0.17	0.19	0.15	0.15	0.14	0.14	0.20	0.22	0.14	0.14	0.16	0.18	0.14	0.12	0.15	0.14	0.19	0.21	0.17	0.19	0.16	0.18	0.11	0.09	0.15	0.15	0.16	0.16	0.14	0.11
AD-Q15	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AD-Q16	2.15	1.93	1.79	1.53	1.69	1.49	2.29	2.09	1.72	1.47	1.76	1.77	1.82	1.91	1.73	1.54	2.27	2.26	1.98	2.10	1.88	1.84	1.50	1.37	2.58	2.35	1.84	1.84	1.34	1.37
AE-Q1	4.94	4.73	5.03	4.95	5.05	5.00	4.81	4.71	5.11	5.00	4.90	4.81	4.99	4.87	5.07	5.03	4.81	4.74	5.09	4.88	5.04	4.87	4.89	5.06	4.61	4.49	5.04	4.87	5.13	5.06
AE-Q2	0.12	0.14	0.14	0.14	0.12	0.11	0.13	0.14	0.14	0.14	0.11	0.11	0.13	0.14	0.13	0.13	0.13	0.13	0.15	0.14	0.13	0.13	0.12	0.12	0.13	0.13	0.13	0.14	0.12	0.11
AE-Q3	6.54	6.46	7.20	6.75	7.92	8.47	7.00	6.46	7.28	6.92	7.46	7.66	7.49	7.35	7.07	6.54	7.94	8.27	6.93	6.43	7.21	6.93	7.73	7.56	7.84	7.67	6.77	6.26	9.28	9.93
AE-Q4	0.82	0.78	0.80	0.78	0.92	0.89	0.84	0.78	0.81	0.80	0.88	0.85	0.87	0.85	0.81	0.78	0.90	0.91	0.82	0.80	0.83	0.80	0.82	0.85	0.84	0.81	0.81	0.78	0.94	0.89
AE-Q5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AE-Q6	696.39	692.86	570.02	550.12	540.80	498.09	641.20	643.00	548.23	498.43	664.03	717.39	588.59	617.16	580.75	578.79	603.57	607.16	506.36	463.16	602.06	617.12	591.77	552.62	560.05	524.21	589.41	617.06	580.07	498.09
AE-Q7	3.21	2.85	4.12	3.80	4.29	3.50	3.06	3.01	4.21	4.85	4.19	3.40	3.83	3.11	4.02	3.58	4.06	3.65	3.85	3.50	3.91	3.53	4.45	4.25	5.05	5.13	3.72	3.40	4.77	5.30
AE-Q8	2.14	2.04	2.17	2.02	2.39	2.40	2.26	2.08	2.16	2.02	2.38	2.41	2.24	2.19	2.19	2.06	2.30	2.34	2.16	2.02	2.23	2.06	2.23	2.30	2.19	2.10	2.15	2.02	2.55	2.57
AF-Q1	12.91	12.10	12.79	12.13	12.42	12.12	13.64	12.52	12.37	12.12	13.10	12.12	9.88	9.80	13.06	12.13	13.60	12.13	12.65	12.93	12.26	12.12	14.52	13.86	16.21	15.80	12.76	12.12	10.57	9.84
AF-Q2	1.85	1.74	1.45	1.42	1.37	1.33	1.59	1.42	1.45	1.42	1.61	1.63	1.75	1.72	1.50	1.46	1.28	1.08	1.34	1.42	1.58	1.48	1.36	1.25	1.34	1.25	1.52	1.47	1.51	1.04
AF-Q3	0.57	0.56	0.59	0.56	0.60	0.51	0.57	0.54	0.62	0.57	0.51	0.51	0.64	0.57	0.56	0.52	0.67	0.64	0.52	0.50	0.63	0.58	0.51	0.50	0.57	0.58	0.56	0.53	0.77	0.86
AF-Q4	0.46	0.45	0.45	0.43	0.46	0.39	0.45	0.42	0.44	0.42	0.50	0.49	0.50	0.51	0.45	0.43	0.44	0.42	0.47	0.45	0.44	0.42	0.49	0.47	0.46	0.46	0.45	0.44	0.48	0.39
AF-Q5	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04
AF-Q6	0.81	0.79	0.84	0.73	0.83	0.68	0.85	0.90	0.84	0.72	0.80	0.62	1.10	1.13	0.82	0.71	0.67	0.65	0.83	0.71	0.82	0.71	0.89	0.81	0.58	0.60	0.83	0.73	0.98	1.01
AF-Q7	0.09	0.08	0.10	0.11	0.10	0.12	0.10	0.10	0.10	0.12	0.09	0.08	0.09	0.08	0.10	0.11	0.10	0.11	0.10	0.11	0.10	0.11	0.09	0.08	0.09	0.09	0.10	0.11	0.08	0.06
AF-Q8	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
AF-Q9	0.70	0.62	0.69	0.62	0.71	0.53	0.72	0.68	0.69	0.63	0.71	0.50	1.00	0.87	0.68	0.58	0.54	0.49	0.63	0.54	0.70	0.62	0.74	0.57	0.50	0.49	0.69	0.64	0.87	0.75
AF-Q10	1.66	1.64	1.69	1.74	1.73	1.73	1.74	1.75	1.70	1.73	1.62	1.64	1.57	1.45	1.74	1.78	1.58	1.70	1.65	1.58	1.72	1.74	1.62	1.58	1.67	1.64	1.73	1.76	1.54	1.72
AF-Q11	13.78	12.66	11.90	11.07	13.50	10.94	12.95	11.96	12.02	10.65	14.50	11.52	12.86	11.98	12.73	11.26	11.94	9.00	13.10	11.35	12.40	11.04	13.09	12.04	13.48	12.88	12.55	11.04	12.51	12.74
AF-Q12	5.02	4.90	6.03	6.00	5.89	6.00	5.08	4.73	6.07	6.00	5.60	5.50	4.83	4.83	6.01	5.83	5.78	5.67	5.61	5.50	5.50	5.50	7.17	7.08	7.20	7.00	5.59	5.50	6.10	6.00
AF-Q13	0.14	0.10	0.12	0.08	0.11	0.09	0.12	0.08	0.11	0.08	0.14	0.11	0.10	0.08	0.13	0.09	0.10	0.08	0.15	0.13	0.12	0.08	0.08	0.08	0.08	0.08	0.13	0.09	0.10	0.07
AF-Q14	10.80	9.95	10.69	9.39	10.56	9.29	10.53	8.83	10.56	9.41	11.26	9.59	11.67	10.30	11.10	9.39	7.86	6.38	11.25	9.00	10.73	9.37	9.95	9.39	7.30	6.94	10.88	9.40	11.63	11.73
AF-Q15	0.52	0.45	0.45	0.45	0.43	0.45	0.42	0.38	0.47	0.45	0.48	0.47	0.51	0.41	0.45	0.45	0.45	0.47	0.43	0.39	0.47	0.45	0.46	0.47	0.41	0.42	0.47	0.45	0.44	0.46
AF-Q16	0.44	0.47	0.42	0.44	0.43	0.44	0.44	0.43	0.42	0.41	0.42	0.47	0.37	0.40	0.43	0.46	0.44	0.45	0.38	0.39	0.45	0.47	0.37	0.33	0.42	0.44	0.42	0.43	0.46	0.48
AF-Q17	0.08	0.08	0.08	0.07	0.09	0.07	0.09	0.08	0.08	0.08	0.09	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.09	0.07
AG-Q1	1.67	1.57	1.68	1.59	1.74	1.61	1.43	1.31	1.78	1.69	1.63	1.41	2.07	2.31	1.64	1.51	1.61	1.73	1.50	1.61	1.69	1.57	1.87	1.63	1.74	1.30	1.63	1.49	1.97	1.89
AG-Q2	0.46	0.39	0.36	0.30	0.37	0.33	0.35	0.34	0.39	0.33	0.38	0.32	0.45	0.41	0.38	0.32	0.35	0.33	0.31	0.30	0.40	0.36	0.40	0.29	0.36	0.31	0.38	0.33	0.39	0.26
AG-Q3	4.54	3.91	4.33	4.02	4.51	4.19	4.11	3.77	4.56	3.97	4.18	4.14	4.78	3.80	4.38	4.14	4.27	3.44	4.64	4.19	4.35	3.93	4.45	3.93	3.68	3.61	4.29	3.93	5.46	5.85
AG-Q4	1.06	1.01	1.01	0.91	0.98	0.84	1.16	1.17	0.96	0.90	1.04	0.92	0.84	0.84	1.02	0.96	1.13	1.01	0.92	0.90	1.03	0.93	1.03	0.97	1.07	0.86	1.04	1.00	0.84	0.84
AG-Q5	3.04	2.71	2.10	1.98	2.18	1.68	3.07	2.92	2.00	1.68	2.54	1.99	1.81	1.74	2.36	2.04	2.37	2.01	2.10	2.05	2.38	2.01	2.09	1.57	2.02	1.80	2.47	2.07	1.56	1.44
AG-Q6	0.38	0.37	0.48	0.47	0.50	0.46	0.37	0.38	0.48	0.47	0.53	0.56	0.51	0.50	0.48	0.46	0.40	0.45	0.49	0.53	0.44	0.46	0.55	0.49	0.50	0.50	0.44	0.46	0.61	0.64
AG-Q7	1.06	1.01	1.01	0.91	0.98	0.84	1.16	1.17	0.96	0.90	1.04	0.92	0.84	0.84	1.02	0.96	1.13	1.01	0.92	0.90	1.03	0.93	1.03	0.97	1.07	0.86	1.04	1.00	0.84	0.84
AG-Q8	0.56	0.63	0.48	0.46	0.47	0.48	0.59	0.65	0.46	0.45	0.53	0.52	0.41	0.30	0.50	0.47	0.55	0.59	0.49	0.46	0.51	0.48	0.45	0.41	0.57	0.64	0.50	0.47	0.43	0.44
AG-Q9	0.55	0.52	0.59	0.53	0.58	0.55	0.48	0.52	0.62	0.53	0.56	0.60	0.65	0.61	0.58	0.52	0.53	0.52	0.70	0.74	0.54	0.52	0.64	0.56	0.63	0.64	0.55	0.52	0.72	0.60
AG-Q10	8.81	7.63	10.66	10.59	9.30	8.77	9.19	10.24	10.35	9.67	9.52	10.24	11.55	10.78	10.08	10.16	8.30	7.30	10.00	7.53	10.16	10.24	9.38	8.56	9.20	9.25	10.25	10.06	9.26	10.15
AG-Q11	0.10	0.10	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.11	0.11	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.10	0.11	0.11	0.12	0.12	0.11	0.11	0.09	0.09
AG-Q12	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.09	0.08	0.08	0.07	0.08	0.07	0.07	0.08	0.08	0.07	0.08	0.08
AG-Q13	33.04	33.48	34.77	31.93	35.02	36.63	27.39	23.22	35.43	33.79	38.36	36.31	36.75	36.04	34.71	33.84	31.75	29.09	35.15	33.79	32.68	32.63	40.89	41.03	34.91	38.21	32.78	30.21	42.77	45.41
AH-Q1	5.35	5.18	5.90	5.41	6.05	5.73	5.16	4.66	6.20	5.65	5.22	5.33	5.31	5.76	6.04	5.56	5.38	4.96	6.00	5.54	5.83	5.61	5.74	5.19	4.17	4.27	5.74	5.54	7.29	7.09

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AH-Q2	3.68	3.70	4.51	4.05	4.50	4.03	3.81	3.77	4.70	4.11	3.66	3.58	3.71	3.51	4.59	4.07	3.82	3.84	4.79	4.19	4.32	3.84	4.11	3.96	3.61	3.45	4.29	3.90	5.10	4.13
AH-Q3	1.43	1.46	1.41	1.37	1.28	1.11	1.40	1.46	1.41	1.34	1.27	1.32	1.21	1.16	1.39	1.34	1.51	1.58	1.59	1.75	1.37	1.34	1.28	1.32	1.58	1.59	1.39	1.34	1.24	0.96
AH-Q4	0.79	0.74	0.73	0.72	0.78	0.63	0.84	0.97	0.73	0.71	0.75	0.65	0.81	0.71	0.71	0.68	0.90	0.84	0.69	0.66	0.77	0.73	0.76	0.67	0.91	0.86	0.74	0.69	0.74	0.63
AH-Q5	2.98	2.75	2.81	2.62	2.89	2.33	3.18	3.10	2.74	2.55	2.98	2.48	2.80	2.65	2.80	2.55	3.19	3.46	3.11	3.46	2.71	2.32	3.21	3.02	4.26	3.84	2.83	2.55	2.21	1.92
AH-Q6	0.58	0.56	0.56	0.55	0.56	0.51	0.62	0.62	0.55	0.54	0.57	0.55	0.56	0.58	0.56	0.54	0.60	0.61	0.60	0.64	0.55	0.53	0.60	0.55	0.70	0.69	0.56	0.55	0.53	0.42
AH-Q7	4.67	4.42	3.87	3.55	4.27	4.10	4.34	3.91	3.90	3.57	4.61	4.33	4.01	3.53	3.92	3.56	5.05	5.62	3.80	3.29	4.11	3.75	4.37	4.05	5.51	5.57	4.05	3.66	3.60	3.25
AH-Q8	19.82	16.83	18.89	18.83	19.55	19.25	21.07	19.58	18.16	17.00	21.21	20.50	15.69	15.71	19.58	19.46	20.59	19.00	22.62	26.67	17.35	18.46	23.24	22.25	29.75	32.25	18.75	18.96	15.43	12.50
AH-Q9	2.24	2.10	2.74	2.39	2.80	2.67	3.00	2.71	2.67	2.40	2.33	2.26	2.91	2.39	2.59	2.48	2.83	2.29	2.13	2.08	2.80	2.49	2.66	2.59	1.91	1.82	2.59	2.37	3.48	3.16
AH-Q10	0.24	0.26	0.26	0.25	0.26	0.25	0.26	0.27	0.26	0.26	0.23	0.22	0.23	0.23	0.25	0.25	0.27	0.27	0.25	0.25	0.26	0.26	0.23	0.24	0.22	0.23	0.25	0.25	0.31	0.33
AH-Q11	0.41	0.35	0.42	0.39	0.41	0.39	0.47	0.42	0.41	0.39	0.40	0.36	0.44	0.42	0.40	0.39	0.48	0.51	0.41	0.40	0.39	0.37	0.51	0.50	0.53	0.55	0.42	0.39	0.33	0.30
AH-Q12	0.36	0.35	0.36	0.35	0.32	0.30	0.38	0.36	0.35	0.34	0.33	0.33	0.36	0.34	0.35	0.35	0.32	0.33	0.36	0.34	0.36	0.35	0.32	0.32	0.41	0.41	0.35	0.34	0.32	0.31
AH-Q13	0.12	0.11	0.12	0.11	0.12	0.11	0.11	0.10	0.13	0.12	0.11	0.11	0.15	0.14	0.12	0.11	0.12	0.11	0.11	0.10	0.12	0.11	0.11	0.10	0.11	0.11	0.12	0.11	0.14	0.15
AH-Q14	0.11	0.10	0.11	0.10	0.12	0.11	0.11	0.10	0.12	0.11	0.12	0.10	0.10	0.09	0.12	0.10	0.12	0.11	0.11	0.11	0.11	0.10	0.11	0.10	0.10	0.10	0.11	0.10	0.13	0.12
AH-Q15	4.25	3.98	4.09	3.85	3.90	3.72	4.04	3.88	4.03	3.78	4.26	4.03	3.76	3.44	4.11	3.85	4.20	4.18	3.38	3.24	4.34	4.19	3.69	3.24	4.02	3.81	4.14	3.85	3.81	3.72
AH-Q16	2.00	2.01	2.15	1.97	2.35	2.14	2.12	1.99	2.21	2.05	2.10	1.97	2.05	1.98	2.17	1.99	2.31	2.07	2.34	1.95	2.10	2.03	2.29	2.14	2.19	1.71	2.19	2.05	2.07	2.07
AH-Q17	0.24	0.22	0.22	0.21	0.23	0.22	0.22	0.22	0.23	0.22	0.24	0.21	0.21	0.21	0.23	0.22	0.21	0.22	0.20	0.17	0.22	0.21	0.26	0.24	0.22	0.21	0.22	0.21	0.27	0.25
AH-Q18	21.69	23.02	23.84	22.23	22.35	19.52	23.90	22.75	23.10	21.72	22.23	20.44	21.51	23.17	23.41	21.92	22.96	21.77	19.46	19.52	23.19	22.23	25.88	23.56	19.62	19.54	22.05	21.94	30.10	30.99
AH-Q19	0.16	0.16	0.17	0.15	0.16	0.15	0.16	0.15	0.16	0.15	0.17	0.15	0.17	0.17	0.16	0.15	0.16	0.14	0.17	0.15	0.16	0.15	0.16	0.14	0.14	0.14	0.17	0.15	0.15	0.14
AH-Q20	0.15	0.15	0.20	0.20	0.21	0.19	0.20	0.20	0.20	0.19	0.16	0.17	0.20	0.14	0.19	0.19	0.20	0.20	0.18	0.16	0.19	0.19	0.21	0.19	0.15	0.15	0.19	0.19	0.23	0.19
AH-Q21	0.09	0.10	0.10	0.09	0.10	0.09	0.10	0.10	0.10	0.09	0.10	0.09	0.09	0.09	0.10	0.10	0.09	0.07	0.09	0.08	0.10	0.09	0.10	0.10	0.07	0.07	0.09	0.09	0.13	0.12
AH-Q22	168.08	145.88	212.37	200.50	210.94	202.47	226.19	216.98	204.00	200.00	182.65	168.02	206.90	196.75	202.58	200.50	208.97	192.45	181.86	201.35	208.88	200.50	205.92	196.59	146.61	151.05	204.32	201.18	236.19	232.17
AH-Q23	0.30	0.28	0.30	0.29	0.30	0.30	0.28	0.27	0.30	0.30	0.31	0.29	0.28	0.28	0.31	0.29	0.29	0.27	0.34	0.30	0.29	0.28	0.30	0.29	0.32	0.33	0.31	0.28	0.27	0.27
AH-Q24	0.48	0.53	0.45	0.38	0.47	0.46	0.44	0.42	0.47	0.45	0.45	0.45	0.48	0.43	0.46	0.46	0.46	0.44	0.43	0.45	0.48	0.46	0.41	0.35	0.33	0.33	0.48	0.46	0.45	0.44
AI-Q1	3.65	4.02	3.87	3.28	3.38	2.91	3.24	2.98	3.70	3.28	4.22	4.07	3.24	3.22	3.84	3.26	3.56	3.94	4.16	3.83	3.59	3.29	3.80	2.79	4.18	3.62	3.82	3.61	2.91	3.00
AI-Q2	0.60	0.65	0.39	0.29	0.33	0.28	0.48	0.44	0.37	0.28	0.49	0.48	0.41	0.32	0.40	0.30	0.48	0.49	0.38	0.28	0.43	0.33	0.38	0.31	0.48	0.45	0.43	0.37	0.30	0.27
AI-Q3	2.88	2.93	2.40	2.23	2.27	2.46	2.74	2.55	2.32	2.23	2.65	2.55	2.25	2.22	2.41	2.37	2.82	2.83	2.13	2.21	2.60	2.46	2.17	2.24	2.62	2.41	2.45	2.35	2.40	2.48
AI-Q4	0.44	0.45	0.34	0.36	0.40	0.43	0.42	0.46	0.35	0.39	0.38	0.42	0.43	0.45	0.35	0.40	0.39	0.43	0.27	0.27	0.38	0.40	0.40	0.43	0.39	0.41	0.36	0.40	0.41	0.43
AI-Q5	6.85	6.30	5.53	5.38	5.72	5.75	6.71	6.24	5.70	5.47	5.32	5.74	7.24	7.67	5.68	5.62	5.21	5.67	4.35	3.77	6.25	5.77	5.45	5.46	5.23	5.24	5.77	5.74	6.36	6.17
AI-Q6	0.38	0.36	0.34	0.35	0.37	0.38	0.39	0.40	0.35	0.35	0.34	0.34	0.35	0.34	0.35	0.35	0.36	0.32	0.29	0.30	0.36	0.35	0.38	0.36	0.36	0.35	0.35	0.35	0.38	0.35
AI-Q7	0.55	0.55	0.44	0.40	0.49	0.49	0.56	0.56	0.45	0.44	0.46	0.49	0.55	0.58	0.45	0.44	0.47	0.52	0.36	0.39	0.50	0.52	0.44	0.40	0.44	0.43	0.46	0.46	0.54	0.55
AI-Q8	0.09	0.08	0.09	0.09	0.09	0.09	0.10	0.08	0.09	0.09	0.09	0.09	0.09	0.08	0.09	0.09	0.12	0.11	0.11	0.10	0.09	0.09	0.10	0.09	0.11	0.11	0.09	0.09	0.09	0.09
AI-Q9	9.49	8.49	9.15	9.25	9.64	8.86	9.84	9.69	9.20	8.96	9.30	9.50	7.73	8.07	9.70	9.33	9.01	8.81	8.81	8.86	9.63	9.33	8.66	8.95	9.73	8.77	8.93	8.96	11.05	10.08
AI-Q10	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.02	0.03
AI-Q11	88.99	80.54	76.61	71.19	80.39	76.79	97.17	89.47	76.93	76.52	72.44	72.54	89.30	90.03	74.62	68.95	94.91	91.18	59.96	56.98	84.98	79.92	77.36	78.94	82.40	80.50	76.33	68.95	94.74	90.11
AJ-Q1	4.56	3.68	4.33	4.44	4.01	3.83	4.47	3.85	4.30	3.92	4.09	3.72	4.61	4.09	4.11	3.85	4.89	5.41	4.69	4.46	4.20	3.84	4.32	3.86	4.28	4.27	4.23	3.83	4.64	4.49
AJ-Q2	0.50	0.45	0.50	0.45	0.49	0.45	0.54	0.49	0.47	0.44	0.56	0.54	0.39	0.32	0.51	0.45	0.54	0.58	0.46	0.45	0.48	0.45	0.59	0.54	0.56	0.51	0.47	0.42	0.60	0.66
AJ-Q3	2.76	2.62	2.71	2.46	2.45	2.35	2.66	2.45	2.57	2.41	2.97	2.93	2.74	2.48	2.67	2.49	2.53	2.37	2.41	2.25	2.63	2.45	2.96	2.93	3.19	3.32	2.65	2.40	2.40	2.57
AJ-Q4	0.31	0.30	0.33	0.34	0.34	0.39	0.33	0.35	0.32	0.30	0.38	0.40	0.32	0.34	0.33	0.35	0.31	0.30	0.25	0.23	0.33	0.37	0.37	0.37	0.38	0.38	0.32	0.31	0.34	0.36
AJ-Q5	2.37	2.10	2.54	2.32	2.84	2.57	2.41	2.06	2.48	2.26	3.13	3.07	2.32	2.18	2.70	2.42	2.28	2.36	2.29	2.23	2.65	2.62	2.59	2.06	3.09	2.87	2.51	2.25	2.63	2.36
AJ-Q6	3.18	2.71	3.71	3.07	3.79	3.41	3.51	3.32	3.57	2.90	3.97	3.57	3.14	2.68	3.85	3.37	3.06	2.26	2.77	2.55	3.78	3.37	3.82	3.18	3.44	3.15	3.62	3.07	3.78	2.52
AJ-Q7	0.56	0.53	0.52	0.51	0.59	0.47	0.55	0.53	0.55	0.53	0.53	0.46	0.56	0.50	0.55	0.52	0.50	0.55	0.52	0.56	0.54	0.50	0.59	0.60	0.48	0.49	0.55	0.54	0.55	0.47
AJ-Q8	0.44	0.45	0.48	0.44	0.54	0.63	0.50	0.56	0.46	0.44	0.56	0.60	0.41	0.39	0.50	0.45	0.48	0.42	0.40	0.42	0.49	0.45	0.55	0.51	0.61	0.60	0.48	0.45	0.46	0.42
AJ-Q9	0.12	0.12	0.11	0.10	0.10	0.09	0.11	0.10	0.11	0.10	0.11	0.10	0.11	0.11	0.10	0.09	0.12	0.11	0.11	0.09	0.11	0.11	0.10	0.09	0.13	0.12	0.11	0.10	0.10	0.10
AJ-Q10	12.29	12.67	13.85	13.11	12.82	12.27	11.56	12.45	13.93	13.37	12.91	12.15	12.68	13.63	13.87	12.84	11.36	12.48	14.14	12.87	12.78	13.11	14.65	12.37	13.72	11.31	13.42	13.11	12.64	12.27
AJ-Q11	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.03	0.03
AJ-Q12	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
AJ-Q13	58.28	47.57	70.59	67.64	69.84	69.03	63.45	61.40	68.60	67.69	71.62	70.99	59.52	64.82	70.47	67.70	65.40	67.38	57.71	67.59	69.29	67.87	73.39	67.65	76.47	80.31	65.78	67.61	75.34	69.03
AK-Q1	1.82	1.62	2.10	2.03	2.21	2.10	2.06	2.14	2.01	1.97	2.36	2.30	1.84	1.61	2.09	2.03	2.24	2.29	2.13	2.28	2.05	2.03	2.14	1.95	2.35	2.36	2.04	2.03	2.09	2.00
AK-Q2	0.53	0.49	0.56	0.51	0.57	0.50	0.51	0.52	0.52	0.42	0.74	0.87	0.53	0.41	0.56	0.51	0.55	0.52	0.51	0.50	0.54	0.46	0.66	0.63	0.57	0.54	0.54	0.49	0.64	0.53
AK-Q3	2.03	1.98	2.18	2.16	2.18	2.19	2.10	2.17	2.06	2.09	2.54	2.51	2.00	2.07	2.22	2.17	1.96	2.10	2.17	2.19	2.12	2.10	2.27	2.21	2.10	2.10	2.17	2.18	2.12	2.09
AK-Q4	0.67	0.69	0.65	0.65	0.63	0.69	0.61	0.59	0.66	0.69	0.65	0.66	0.70	0.74	0.65	0.68	0.57	0.63	0.65	0.63	0.66	0.68	0.61	0.57	0.54	0.49	0.64	0.63	0.76	0.79
AK-Q5	30.09	23.16	28.99	28.14	24.36	21.67	23.82	23.16	29.86	28.00	25.72	24.69	35.17	30.28	27.33	27.28	25.27	24.90	25.57	19.08	29.28	28.00	25.63	26.72	20.97	18.17	28.69	27.78	29.00	28.56
AK-Q6	5.80	5.99	5.22	4.69	4.87	4.49	5.28	4.52	5.19	4.67	5.34	4.74	5.36	4.92	5.31	4.69	4.80	4.26	5.72	6.40	5.01	4.60	5.65	5.26	5.69	5.70	5.12	4.60	5.54	5.10
AK-Q7	0.61	0.61	0.61	0.59	0.56	0.56	0.56	0.56	0.60	0.58	0.64	0.63	0.69	0.70	0.58	0.57	0.62	0.63	0.53	0.56	0.60	0.58	0.65	0.64	0.61	0.53	0.58	0.59	0.68	0.66
AK-Q8	0.55	0.52	0.53	0.49	0.46	0.47	0.50	0.49	0.54	0.49	0.48	0.48	0.50	0.48	0.55	0.50	0.43	0.42	0.53	0.49	0.51	0.49	0.54	0.48	0.44	0.40	0.53	0.49	0.52	0.55
AK-Q9	0.34	0.30	0.31	0.30	0.36	0.36	0.33	0.32	0.32	0.31	0.35	0.33	0.38	0.34	0.31	0.31	0.36	0.41	0.31	0.30	0.34	0.32	0.32	0.29	0.27	0.23	0.34	0.31	0.31	0.32
AK-Q10	0.28	0.28	0.28	0.27	0.30	0.30	0.30	0.30	0.27	0.26	0.31	0.31	0.30	0.33	0.28	0.26	0.29	0.29	0.31	0.32	0.28	0.27	0.28	0.29	0.30	0.32	0.28	0.28	0.27	0.28
AK-Q11	6.53	6.39	9.60	9.06	9.64	9.66	8.32	8.63	9.44	9.08	8.44	7.43	8.02	8.33	9.27	9.07	8.99	9.08	9.35	9.20	8.83	8.88	9.66	9.21	9.69	8.87	8.81	8.61	9.93	9.45
AK-Q12	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
AK-Q13	98.77	89.10	115.26	96.76	100.65	87.31	117.40	99.10	110.22	96.76	94.81	92.56	93.73	88.04	112.46	96.76	104.70	108.44	95.90	87.31	112.69	107.52	105.26	90.38	109.97	101.60	105.41	94.26	124.31	126.79
AL-Q1	2.53	2.32	2.94	2.69	2.68	2.65	2.40	2.60	2.88	2.73	2.94	2.41	2.82	2.64	2.88	2.66	2.45	2.59	2.61	2.62	2.67	2.57	3.49	3.35	3.45	3.46	2.79	2.60	2.51	2.59
AL-Q2	0.31	0.27	0.29	0.25	0.31	0.32	0.30	0.28	0.29	0.32	0.31	0.24	0.31	0.24	0.30	0.27	0.29	0.33	0.27	0.25	0.30	0.27	0.33	0.28	0.42	0.39	0.29	0.25	0.28	0.24
AL-Q3	2.34	2.20	1.97	1.88	2.09	1.75	2.48	2.67	1.93	1.85	2.15	1.95	2.22	1.98	2.07	1.93	1.91	1.76	1.74	1.68	2.09	2.00	2.23	1.88	2.45	2.35	2.04	1.94	1.98	1.80
AL-Q4	0.74	0.77	0.64	0.63	0.69	0.68	0.77	0.79	0.66	0.68	0.60	0.54	0.64	0.70	0.65	0.60	0.81	0.81	0.66	0.73	0.69	0.69	0.59	0.51	0.71	0.73	0.65	0.63	0.73	0.70
AL-Q5	1.22	1.18	1.17	1.07	1.22	1.08	1.34	1.29	1.12	1.05	1.28	1.07	1.01	1.07	1.21	1.07	1.25	1.24	0.98	0.87	1.26	1.11	1.11	1.04	1.12	1.09	1.17	1.06	1.35	1.20
AL-Q6	2.81	2.95	2.55	2.44	2.87	2.58	2.81	2.56	2.70	2.50	2.46	2.25	3.28	3.64	2.57	2.44	2.66	1.89	3.22	3.50	2.68	2.50	2.20	2.02	2.51	2.15	2.74	2.58	2.46	2.00
AL-Q7	3.14	3.03	2.81	2.68	3.23	2.95	3.50	3.62	2.80	2.66	3.05	3.08	3.24	3.16	2.89	2.67	3.11	2.80	2.90	2.64	3.15	2.94	2.38	2.31	2.76	2.36	2.97	2.75	3.12	2.77
AL-Q8	0.54	0.52	0.46	0.45	0.45	0.43	0.54	0.44	0.45	0.45	0.48	0.39	0.55	0.56	0.45	0.44	0.50	0.46	0.42	0.43	0.50	0.45	0.43	0.34	0.36	0.34	0.48	0.45	0.51	0.48
AL-Q9	0.50	0.47	0.46	0.47	0.49	0.44	0.56	0.53	0.45	0.45	0.49	0.48	0.45	0.40	0.47	0.45	0.55	0.49	0.46	0.45	0.48	0.47	0.47	0.45	0.51	0.48	0.45	0.45	0.58	0.47
AL-Q10	0.15	0.14	0.15	0.15	0.18	0.18	0.13	0.14	0.17	0.15	0.14	0.13	0.17	0.14	0.16	0.15	0.13	0.14	0.21	0.17	0.15	0.14	0.14	0.14	0.13	0.13	0.16	0.14	0.15	0.16
AL-Q11	0.36	0.34	0.33	0.32	0.32	0.29	0.32	0.32	0.35	0.33	0.30	0.29	0.36	0.31	0.32	0.32	0.36	0.32	0.32	0.32	0.34	0.33	0.32	0.31	0.36	0.35	0.33	0.32	0.34	0.32
AL-Q12	0.68	0.72	0.71	0.71	0.65	0.60	0.71	0.70	0.70	0.70	0.63	0.61	0.66	0.66	0.68	0.68	0.75	0.80	0.59	0.57	0.71	0.71	0.69	0.66	0.74	0.66	0.69	0.69	0.67	0.65
AL-Q13	12.56	10.29	10.35	10.40	10.91	10.62	11.95	10.72	11.24	11.09	8.49	8.88	13.32	14.02	10.08	9.63	12.45	11.90	12.37	11.50	11.02	10.44	9.04	9.05	12.82	11.18	10.69	10.24	10.68	10.73
AL-Q14	8.95	9.03	8.88	8.81	9.73	8.68	10.21	10.56	8.38	8.04	10.60	9.65	8.70	9.06	9.19	8.64	9.02	8.81	8.73	7.84	9.06	8.89	9.58	8.36	7.54	7.53	9.15	8.89	9.74	8.63
AL-Q15	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
AL-Q16	1.38	1.38	1.50	1.40	1.53	1.54	1.47	1.47	1.44	1.37	1.67	1.68	1.40	1.36	1.55	1.51	1.24	1.33	1.49	1.62	1.45	1.37	1.60	1.56	1.41	1.53	1.50	1.45	1.47	1.37
AL-Q17	476.21	462.50	500.58	478.86	537.63	460.78	618.88	626.62	476.25	475.00	497.06	460.02	594.53	590.14	484.14	467.62	525.58	479.03	535.72	463.64	520.32	478.86	422.37	445.11	492.73	469.15	515.13	477.52	464.77	440.23
AM-Q1	3.50	3.63	4.09	3.79	3.52	3.63	4.36	4.30	3.86	3.72	3.28	3.26	3.77	4.09	3.90	3.74	3.68	3.61	4.18	3.98	3.75	3.71	3.91	3.26	4.14	3.94	3.72	3.68	4.28	3.80
AM-Q2	0.56	0.56	0.60	0.57	0.68	0.70	0.56	0.48	0.62	0.58	0.61	0.62	0.61	0.59	0.62	0.60	0.55	0.48	0.63	0.62	0.61	0.56	0.60	0.60	0.56	0.59	0.59	0.56	0.74	0.75
AM-Q3	1.16	1.20	1.12	1.10	1.21	1.17	1.34	1.25	1.11	1.14	1.09	1.07	1.09	1.14	1.14	1.14	1.24	1.19	1.17	1.15	1.13	1.14	1.19	1.15	1.18	1.22	1.11	1.14	1.32	1.17

ADDENDUM G

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AM-Q4	0.72	0.68	0.55	0.58	0.69	0.65	0.56	0.61	0.61	0.60	0.68	0.69	0.58	0.60	0.61	0.62	0.65	0.66	0.64	0.61	0.62	0.62	0.58	0.61	0.54	0.51	0.63	0.64	0.58	0.60
AM-Q5	2.47	1.83	2.36	2.00	2.62	2.66	1.72	1.77	2.56	2.35	2.74	2.73	2.48	2.04	2.44	1.98	2.42	2.01	2.31	1.93	2.47	2.05	2.44	1.92	1.77	1.76	2.49	2.19	2.61	2.05
AM-Q6	0.96	0.90	0.78	0.71	0.91	0.83	1.16	1.13	0.75	0.73	0.86	0.80	0.79	0.74	0.84	0.78	0.93	0.85	0.89	0.88	0.82	0.80	0.91	0.79	1.12	1.14	0.83	0.78	0.76	0.83
AM-Q7	1.98	1.91	1.53	1.55	1.80	1.85	1.56	1.65	1.68	1.60	1.79	1.85	1.83	1.70	1.65	1.65	1.68	1.62	1.48	1.53	1.75	1.76	1.57	1.55	1.49	1.59	1.70	1.69	1.69	1.66
AM-Q8	2.92	2.53	2.36	2.14	2.50	2.26	3.12	2.84	2.34	2.14	2.42	2.07	2.36	2.11	2.49	2.27	2.64	1.89	2.70	2.58	2.30	2.11	3.04	2.53	2.55	2.20	2.56	2.19	2.13	2.08
AM-Q9	1.37	1.45	0.99	0.93	1.18	1.25	1.26	1.38	1.07	0.96	1.09	1.08	1.29	1.19	1.07	0.95	1.09	1.11	1.29	1.39	1.08	0.95	1.05	0.94	1.21	1.34	1.13	0.98	0.91	0.84
AM-Q10	0.71	0.77	0.61	0.58	0.64	0.60	0.62	0.64	0.64	0.60	0.63	0.59	0.62	0.60	0.62	0.59	0.73	0.71	0.57	0.59	0.63	0.58	0.70	0.74	0.65	0.70	0.62	0.59	0.70	0.71
AM-Q11	0.49	0.49	0.37	0.35	0.46	0.48	0.43	0.40	0.40	0.39	0.44	0.47	0.43	0.39	0.42	0.41	0.37	0.33	0.39	0.38	0.43	0.41	0.37	0.38	0.30	0.32	0.43	0.41	0.40	0.44
AM-Q12	0.15	0.15	0.17	0.15	0.19	0.20	0.20	0.19	0.16	0.15	0.17	0.13	0.19	0.17	0.17	0.15	0.16	0.17	0.15	0.15	0.17	0.16	0.19	0.16	0.21	0.19	0.17	0.15	0.15	0.14
AM-Q13	0.29	0.29	0.31	0.29	0.27	0.24	0.24	0.23	0.31	0.29	0.32	0.34	0.30	0.28	0.30	0.29	0.29	0.27	0.29	0.29	0.31	0.30	0.26	0.27	0.23	0.23	0.30	0.29	0.32	0.29
AM-Q14	0.85	0.76	0.82	0.82	0.85	0.72	0.64	0.64	0.88	0.87	0.85	0.79	1.04	0.86	0.81	0.79	0.79	0.88	0.82	0.59	0.83	0.83	0.85	0.79	0.62	0.49	0.87	0.80	0.80	0.78
AM-Q15	0.28	0.28	0.32	0.30	0.31	0.31	0.27	0.27	0.32	0.30	0.32	0.31	0.31	0.29	0.31	0.30	0.32	0.30	0.34	0.30	0.30	0.28	0.31	0.31	0.30	0.31	0.32	0.30	0.25	0.25
AM-Q16	27.43	24.83	26.40	24.90	26.24	27.60	31.30	34.25	25.06	23.75	27.17	28.55	24.74	24.04	26.91	25.73	26.42	24.33	23.96	24.80	27.47	25.29	25.36	24.00	26.93	25.97	26.96	25.29	24.33	21.20
AM-Q17	0.13	0.11	0.13	0.12	0.13	0.13	0.14	0.13	0.13	0.12	0.12	0.11	0.15	0.16	0.12	0.12	0.15	0.15	0.13	0.12	0.14	0.13	0.10	0.09	0.15	0.16	0.13	0.12	0.14	0.14
AM-Q18	9.53	9.64	8.63	8.19	8.96	9.08	9.11	9.01	8.70	8.32	9.26	10.39	8.16	8.47	8.98	8.62	8.99	9.45	8.05	7.53	8.84	8.47	9.73	10.83	8.71	8.49	8.94	8.47	8.62	9.64
AM-Q19	0.20	0.20	0.23	0.21	0.22	0.22	0.23	0.22	0.22	0.20	0.22	0.21	0.21	0.20	0.22	0.21	0.23	0.24	0.20	0.19	0.22	0.21	0.25	0.22	0.25	0.24	0.22	0.20	0.23	0.24
AM-Q20	0.55	0.53	0.38	0.35	0.38	0.32	0.43	0.42	0.41	0.39	0.39	0.30	0.37	0.37	0.40	0.37	0.50	0.52	0.38	0.34	0.41	0.39	0.46	0.49	0.43	0.44	0.41	0.39	0.41	0.32
AM-Q21	2.66	2.49	2.61	2.48	2.45	2.38	2.36	2.53	2.67	2.47	2.51	2.56	2.57	2.54	2.61	2.49	2.45	2.47	2.50	2.31	2.57	2.49	2.69	2.63	2.63	2.38	2.61	2.49	2.42	2.38
AM-Q22	1234.19	1187.52	1016.76	980.21	951.12	878.83	1037.77	1110.61	1059.36	994.87	968.50	908.48	1074.60	1022.50	1045.96	980.21	979.04	922.07	949.92	900.00	1045.09	1036.19	1096.19	939.52	858.09	799.79	1046.36	981.28	1108.97	1100.99
AN-Q1	1.09	1.09	1.33	1.50	1.12	1.22	1.16	1.09	1.36	1.50	0.83	1.04	1.84	1.91	1.10	1.19	1.31	1.31	1.48	1.50	1.22	1.41	1.08	1.10	1.19	1.21	1.22	1.50	1.34	1.17
AN-Q2	8.13	7.86	7.98	7.17	7.61	8.27	7.53	6.96	8.51	8.67	6.15	6.45	10.77	10.68	7.52	7.06	7.29	6.45	9.63	9.80	7.52	6.96	7.91	7.13	8.54	8.41	7.71	7.67	8.55	6.74
AN-Q3	3.77	3.64	4.45	4.82	3.66	4.46	4.25	4.16	4.32	4.72	3.34	4.48	5.07	4.75	4.07	4.70	3.64	3.71	5.19	5.07	3.85	4.47	4.29	4.57	5.13	5.38	3.91	4.56	4.66	4.61
AN-Q4	1.33	1.41	0.96	1.15	1.07	1.22	1.41	1.66	0.99	1.16	0.93	1.30	1.19	1.19	1.03	1.21	1.04	1.22	1.31	1.22	0.91	1.00	1.37	1.55	1.58	1.63	0.99	1.18	1.07	0.92
AN-Q5																														
AN-Q6	28.05	28.31	24.83	27.79	28.54	30.06	35.55	37.86	24.67	27.12	23.02	22.11	27.16	24.75	26.69	27.79	23.83	30.06	28.92	28.46	23.88	24.92	33.16	30.87	48.20	44.08	23.24	23.97	28.72	30.06
AN-Q7	1.54	1.50	1.37	1.32	1.49	1.42	1.63	1.42	1.44	1.46	1.20	1.12	1.67	1.46	1.33	1.20	1.70	1.47	2.11	1.93	1.26	1.40	1.50	1.45	1.16	1.12	1.45	1.46	1.49	1.42
AN-Q8	11.04	11.56	10.21	11.37	10.41	10.76	11.86	10.91	10.17	11.19	9.83	13.17	11.76	11.56	10.41	11.41	9.26	7.89	13.20	12.20	8.86	9.40	13.78	15.21	16.31	18.62	9.36	11.15	12.12	14.64
AN-Q9	11.18	11.60	10.94	12.00	10.70	11.00	13.27	12.50	11.03	12.00	8.18	8.75	13.28	13.10	10.03	10.50	12.98	13.25	13.51	12.00	10.15	11.28	11.56	12.42	10.09	9.80	10.75	11.60	12.26	12.75
AN-Q10	0.93	1.03	0.77	0.87	0.85	0.79	1.10	1.03	0.77	0.79	0.70	0.88	0.83	0.71	0.84	0.89	0.71	0.81	0.92	0.88	0.75	0.83	1.00	1.02	1.22	1.22	0.74	0.82	0.95	0.97
AN-Q11	9.12	9.95	7.64	7.92	10.08	8.96	10.78	11.54	7.80	7.91	8.75	8.45	8.49	7.09	8.64	8.84	7.86	8.96	9.55	9.69	7.06	7.15	12.98	12.49	14.18	12.93	7.35	7.35	10.85	8.96
AN-Q12	0.18	0.20	0.13	0.15	0.13	0.15	0.18	0.16	0.13	0.15	0.11	0.12	0.18	0.19	0.12	0.13	0.17	0.17	0.17	0.16	0.12	0.14	0.17	0.17	0.15	0.14	0.14	0.15	0.13	0.15
AN-Q13	0.19	0.21	0.17	0.18	0.15	0.15	0.19	0.19	0.18	0.20	0.11	0.15	0.23	0.23	0.16	0.16	0.17	0.19	0.18	0.16	0.16	0.18	0.18	0.18	0.20	0.22	0.16	0.17	0.18	0.19
AN-Q14	0.56	0.50	0.50	0.59	0.45	0.48	0.68	0.64	0.48	0.48	0.39	0.36	0.53	0.50	0.49	0.59	0.50	0.45	0.55	0.44	0.48	0.57	0.53	0.53	0.81	0.76	0.46	0.47	0.50	0.51
AN-Q15	0.16	0.16	0.12	0.13	0.12	0.13	0.14	0.14	0.13	0.14	0.11	0.13	0.15	0.15	0.13	0.14	0.12	0.13	0.19	0.17	0.11	0.13	0.13	0.15	0.14	0.12	0.13	0.14	0.12	0.13
AN-Q16	547.13	543.78	388.38	417.13	396.11	383.25	581.00	543.78	403.02	426.00	312.08	331.85	571.14	548.50	397.54	417.13	383.44	396.25	497.60	516.00	387.43	417.13	465.77	564.53	581.60	585.38	391.85	438.00	454.70	383.25
AN-Q17	0.11	0.11	0.09	0.11	0.11	0.12	0.13	0.12	0.10	0.11	0.07	0.09	0.13	0.12	0.09	0.10	0.11	0.12	0.11	0.10	0.10	0.12	0.09	0.10	0.12	0.10	0.10	0.11	0.11	0.12
AN-Q18	4.97	5.14	3.68	3.76	4.28	4.58	5.35	4.84	3.68	3.79	4.10	4.49	4.90	4.83	4.06	4.31	3.31	3.79	4.56	4.58	3.85	4.10	4.38	4.32	4.76	3.76	3.91	4.32	4.34	5.01
AN-Q19	0.15	0.15	0.15	0.16	0.13	0.16	0.21	0.22	0.14	0.16	0.13	0.18	0.18	0.15	0.14	0.16	0.17	0.14	0.14	0.14	0.15	0.16	0.16	0.15	0.23	0.24	0.14	0.16	0.17	0.21
AN-Q20	0.22	0.24	0.21	0.24	0.23	0.25	0.28	0.27	0.20	0.23	0.21	0.27	0.25	0.24	0.20	0.24	0.24	0.27	0.22	0.19	0.21	0.24	0.24	0.26	0.31	0.32	0.20	0.23	0.25	0.29
AN-Q21	19.32	19.30	17.02	18.75	15.87	18.82	21.43	20.98	17.33	18.82	12.21	16.77	24.36	20.50	15.70	18.74	17.56	19.05	17.25	18.33	17.28	19.19	16.57	18.90	18.63	19.75	16.52	18.80	19.36	21.15
AN-Q22	845.79	924.98	664.48	779.88	970.23	751.47	1023.93	1020.95	705.54	822.89	757.90	708.40	855.59	865.25	763.47	809.66	735.83	776.22	842.03	869.19	705.77	757.40	956.02	852.90	1116.16	1053.51	681.29	769.78	1012.41	898.16
AO-Q1	1.83	1.90	1.54	1.32	1.49	1.49	1.92	2.01	1.46	1.30	1.67	1.55	1.74	1.60	1.51	1.47	1.73	1.53	1.40	1.42	1.65	1.51	1.46	1.30	1.42	1.31	1.64	1.53	1.37	1.29
AO-Q2	0.46	0.39	0.42	0.39	0.37	0.31	0.48	0.42	0.40	0.39	0.40	0.33	0.39	0.37	0.41	0.38	0.46	0.37	0.49	0.44	0.43	0.39	0.32	0.30	0.45	0.32	0.42	0.39	0.36	0.31
AO-Q3	2.24	1.96	2.02	1.99	1.95	1.82	2.02	1.98	1.96	1.96	2.34	2.42	1.90	1.98	2.10	2.00	1.91	1.82	2.07	1.96	1.96	1.99	2.33	2.22	2.19	2.07	2.10	2.00	1.68	1.82
AO-Q4	3.82	3.59	5.11	4.74	4.87	4.87	4.18	3.98	4.96	4.74	4.96	4.96	4.20	3.26	5.12	4.88	3.97	3.55	5.07	4.74	4.57	4.47	5.54	6.26	5.04	4.95	4.69	4.68	5.32	6.29
AO-Q5	5.42	4.54	7.28	6.22	6.12	5.58	5.85	5.50	6.89	6.11	6.69	6.16	6.16	5.77	6.84	6.07	6.31	5.22	6.67	6.82	6.58	5.90	6.99	6.98	7.76	7.08	6.54	6.07	6.67	5.28
AO-Q6	2.27	2.30	1.85	1.64	2.12	1.73	1.85	1.64	2.08	1.79	1.82	1.70	2.04	1.89	2.00	1.68	1.91	1.78	2.15	1.78	1.96	1.70	1.96	1.75	1.89	1.72	1.95	1.71	2.23	2.00
AO-Q7	28.12	26.58	39.68	35.73	32.41	28.20	27.63	29.23	38.31	38.00	35.18	32.97	31.33	29.50	37.29	34.77	33.15	32.33	44.82	44.67	32.97	31.20	38.81	42.58	38.67	37.88	35.29	33.17	36.96	33.00
AO-Q8	26.38	26.50	24.31	24.00	24.59	24.00	28.13	28.50	25.16	24.00	19.88	20.00	25.50	25.00	24.42	23.00	25.57	27.00	23.21	23.00	25.13	24.50	24.63	22.00	20.75	20.00	24.66	24.00	27.43	30.00
AO-Q9	4.40	3.50	4.87	4.75	4.99	4.57	3.72	3.54	5.05	4.74	5.06	4.61	4.21	4.32	5.13	4.75	3.89	4.15	5.07	4.62	4.68	4.54	5.12	4.82	5.91	5.96	4.66	4.59	4.98	4.71
AO-Q10	1.37	1.44	1.48	1.46	1.40	1.32	1.38	1.32	1.48	1.46	1.39	1.34	1.34	1.37	1.49	1.43	1.31	1.32	1.58	1.47	1.40	1.35	1.49	1.50	1.39	1.31	1.41	1.43	1.63	1.29
AO-Q11	0.14	0.12	0.15	0.14	0.14	0.11	0.13	0.14	0.15	0.12	0.13	0.12	0.13	0.11	0.14	0.12	0.17	0.15	0.14	0.16	0.14	0.11	0.17	0.18	0.15	0.14	0.14	0.12	0.16	0.15
AO-Q12	0.20	0.21	0.25	0.25	0.22	0.22	0.22	0.21	0.23	0.23	0.27	0.26	0.21	0.21	0.24	0.23	0.24	0.23	0.21	0.20	0.23	0.23	0.26	0.26	0.22	0.21	0.23	0.23	0.24	0.22
AO-Q13	0.68	0.63	0.74	0.68	0.81	0.87	0.81	0.83	0.74	0.68	0.73	0.70	0.74	0.72	0.75	0.69	0.76	0.80	0.90	0.91	0.73	0.67	0.70	0.68	0.72	0.75	0.76	0.75	0.70	0.67
AO-Q14	0.23	0.25	0.20	0.20	0.23	0.25	0.19	0.20	0.22	0.25	0.23	0.23	0.20	0.21	0.22	0.23	0.20	0.20	0.26	0.25	0.21	0.20	0.20	0.23	0.23	0.20	0.21	0.20	0.22	0.25
AO-Q15	2.43	2.48	3.27	3.00	3.14	2.77	2.85	2.59	3.17	2.86	3.04	3.17	3.15	2.84	3.19	2.89	2.56	2.41	3.49	3.35	2.91	2.84	3.39	3.61	3.37	3.23	3.10	2.86	2.87	2.76
AO-Q16	0.33	0.32	0.27	0.28	0.33	0.31	0.32	0.32	0.28	0.29	0.33	0.31	0.30	0.29	0.30	0.29	0.27	0.29	0.26	0.29	0.31	0.29	0.27	0.29	0.30	0.29	0.30	0.29	0.24	0.23
AO-Q17	6.37	6.56	7.61	7.27	7.30	7.16	7.09	6.99	7.38	7.10	7.28	7.15	7.87	7.45	7.21	7.07	7.30	6.30	8.27	8.63	7.27	7.13	6.65	6.68	7.02	6.85	7.38	7.16	7.14	6.87
AO-Q18	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.02	0.02	0.02
AO-Q19	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AO-Q20	3.57	3.51	4.09	3.81	3.97	3.56	3.50	3.51	4.25	4.00	3.43	3.47	4.78	4.81	3.87	3.60	3.73	3.50	4.38	4.55	3.94	3.67	3.73	3.60	4.09	4.16	4.03	3.73	3.63	3.45
AO-Q21	41.23	39.16	44.63	43.16	36.67	38.96	35.34	37.09	43.51	40.85	43.63	40.16	35.37	35.53	44.09	41.03	38.66	39.38	42.42	41.28	42.35	39.75	40.76	40.09	48.52	48.94	41.73	40.16	40.08	31.50
AP-Q1	1.77	1.85	1.90	1.81	1.66	1.66	1.80	1.86	1.93	1.73	1.43	1.36	2.41	2.48	1.66	1.59	2.06	1.88	1.69	1.73	1.82	1.72	1.92	1.79	2.26	2.06	1.74	1.74	1.96	1.69
AP-Q2	2.55	2.25	2.54	2.28	2.38	2.26	2.31	2.23	2.67	2.39	2.10	2.09	3.41	3.24	2.35	2.14	2.41	2.39	2.40	2.02	2.48	2.25	2.67	2.31	2.45	2.41	2.42	2.18	2.93	2.76
AP-Q3	1.28	1.30	1.28	1.16	1.15	1.26	1.28	1.32	1.28	1.17	1.08	1.03	1.58	1.54	1.17	1.14	1.34	1.29	1.20	1.26	1.22	1.20	1.39	1.24	1.53	1.52	1.20	1.16	1.34	1.29
AP-Q4	4.09	4.68	3.79	3.82	3.89	3.87	4.04	4.22	3.71	3.80	4.26	4.09	3.62	3.85	4.03	3.96	3.29	3.06	3.78	3.82	3.93	3.84	3.67	3.76	3.43	2.95	3.97	3.86	3.58	3.06
AP-Q5	0.59	0.58	0.49	0.38	0.49	0.40	0.58	0.50	0.48	0.40	0.55	0.44	0.37	0.36	0.53	0.45	0.54	0.40	0.56	0.37	0.51	0.42	0.45	0.37	0.55	0.42	0.51	0.43	0.48	0.40
AP-Q6	3.42	3.04	2.88	2.67	3.34	2.79	2.84	2.62	2.89	2.69	4.04	4.44	2.70	2.22	3.29	2.92	2.47	2.39	3.47	3.82	2.94	2.63	3.30	3.21	3.03	3.16	3.11	2.71	3.03	2.77
AP-Q7	0.55	0.54	0.57	0.56	0.60	0.59	0.54	0.39	0.56	0.56	0.64	0.63	0.56	0.62	0.59	0.58	0.50	0.46	0.62	0.64	0.57	0.56	0.52	0.55	0.52	0.48	0.59	0.59	0.50	0.54
AP-Q8	0.22	0.22	0.23	0.23	0.24	0.23	0.26	0.24	0.22	0.21	0.26	0.24	0.23	0.23	0.23	0.23	0.22	0.21	0.25	0.25	0.23	0.22	0.21	0.23	0.20	0.19	0.23	0.22	0.24	0.23
AP-Q9	5.58	5.34	4.78	4.51	4.97	4.90	4.95	4.59	4.99	4.66	4.90	4.83	4.36	4.28	5.13	4.81	4.72	4.37	4.73	4.04	5.08	4.81	4.73	3.97	4.82	4.33	5.04	4.64	4.69	4.42
AP-Q10	16.39	14.63	15.36	14.95	14.63	14.70	14.51	13.56	15.34	15.09	16.29	14.84	13.64	13.58	16.19	15.14	13.05	13.65	16.57	16.17	14.95	14.56	15.85	14.24	10.80	10.81	15.63	14.95	16.65	14.87
AP-Q11	2.40	2.34	2.26	2.26	2.52	2.48	2.50	2.56	2.25	2.26	2.54	2.55	1.92	1.82	2.50	2.45	2.02	2.03	2.35	2.42	2.40	2.26	2.16	2.25	2.15	2.01	2.40	2.36	2.20	2.19
AP-Q12	1034.52	817.35	829.63	792.50	898.45	834.15	1032.06	852.70	829.15	793.18	928.46	825.93	845.12	898.29	902.05	810.36	827.62	603.28	951.93	885.26	865.57	796.59	887.37	840.64	983.64	823.03	882.99	826.21	824.75	741.90
AP-Q13	0.55	0.52	0.50	0.47	0.44	0.45	0.50	0.47	0.49	0.46	0.53	0.54	0.45	0.46	0.50	0.46	0.50	0.47	0.51	0.45	0.51	0.47	0.44	0.43	0.45	0.34	0.51	0.47	0.47	0.46
AP-Q14	4.42	4.80	4.57	4.41	4.27	4.16	4.19	4.25	4.60	4.50	4.29	3.98	4.91	4.94	4.30	4.32	4.91	4.81	4.01	3.81	4.53	4.46	4.67	4.54	4.66	4.44	4.29	4.32	5.24	4.81
AP-Q15	2.78	2.39	2.13	2.00	2.02	1.85	1.92	1.87	2.24	2.00	2.45	2.01	2.39	2.32	2.18	1.96	2.27	2.23	1.96	1.84	2.30	1.99	2.13	2.03	2.08	2.10	2.17	1.98	2.54	2.70
AP-Q16	2.24	2.03	2.03	2.00	1.92	1.99	1.91	1.99	2.04	1.96	2.17	2.07	2.36	2.23	2.08	2.01	1.60	1.57	1.95	2.07	2.08	2.00	1.96	1.94	1.56	1.49	2.08	2.01	2.10	2.12
AP-Q17	1.05	1.07	0.94	0.95	1.04	0.99	1.01	0.99	0.96	0.95	1.06	1.08	0.98	0.97	0.96	0.97	1.09	1.03	0.93	0.97	1.02	1.00	0.88	0.82	1.00	1.01	0.95	0.97	1.12	1.03
AP-Q18	477.46	438.48	488.52	431.36	439.99	410.67	433.01	421.22	474.33	434.63	517.66	488.40	513.69	454.14	473.89	422.33	444.90	435.11	451.87	435.11	465.98	415.27	527.30	536.61	443.74	434.87	471.85	422.33	506.15	560.67

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AP-Q19	1.12	1.05	1.05	1.00	0.91	0.97	0.97	0.95	1.04	0.97	1.05	1.08	1.05	1.10	1.04	0.99	0.98	0.88	1.04	1.01	1.07	1.00	0.85	0.84	0.82	0.82	1.04	1.00	1.07	1.11
AP-Q20	1.10	1.09	1.03	1.00	1.00	0.91	0.97	1.02	1.02	1.00	1.17	1.10	1.13	1.09	1.02	0.99	1.00	1.05	0.90	0.73	1.07	1.05	1.03	0.98	0.85	0.79	1.02	1.01	1.24	1.34
AP-Q21	10.01	10.03	8.77	8.32	9.83	9.25	9.51	9.06	9.00	8.39	9.87	10.21	7.63	6.79	9.87	9.03	7.79	6.79	10.49	9.75	9.13	8.64	8.61	8.13	8.90	8.35	9.64	9.07	7.53	6.79
AQ-Q1	2.83	3.14	2.29	2.24	2.21	2.13	2.81	3.14	2.20	2.22	2.53	2.78	1.96	1.70	2.32	2.24	2.91	3.03	2.21	2.16	2.45	2.49	2.17	2.10	2.21	2.05	2.39	2.31	2.35	2.22
AQ-Q2	8.54	8.72	8.97	8.23	8.69	7.85	8.24	8.69	9.52	8.65	6.87	7.35	10.29	10.81	8.64	7.85	8.42	8.65	10.02	9.80	8.66	8.39	8.37	7.98	9.93	9.23	8.67	8.23	8.91	8.11
AQ-Q3	0.13	0.11	0.11	0.10	0.11	0.12	0.10	0.11	0.12	0.11	0.12	0.10	0.13	0.15	0.12	0.11	0.10	0.10	0.11	0.11	0.12	0.11	0.12	0.11	0.14	0.14	0.11	0.11	0.11	0.12
AQ-Q4	0.38	0.36	0.39	0.38	0.44	0.42	0.32	0.28	0.43	0.41	0.38	0.31	0.46	0.49	0.40	0.36	0.37	0.40	0.40	0.40	0.41	0.40	0.36	0.31	0.42	0.43	0.40	0.38	0.40	0.41
AQ-Q5	5.88	5.81	6.27	5.65	5.91	5.82	6.29	5.51	6.04	5.59	6.22	5.95	5.44	5.62	6.41	5.94	5.33	5.45	5.60	5.56	6.19	5.94	6.28	5.65	4.52	4.29	6.21	5.81	6.57	6.12
AQ-Q6	0.79	0.78	0.89	0.85	0.87	0.88	0.83	0.80	0.87	0.83	0.87	0.89	1.06	1.18	0.85	0.83	0.77	0.77	0.81	0.88	0.90	0.83	0.80	0.84	0.78	0.80	0.88	0.85	0.86	0.77
AQ-Q7	17.82	16.47	19.09	17.61	18.94	18.03	19.34	20.94	18.81	17.93	18.39	16.42	21.19	21.00	18.97	17.80	16.19	14.26	14.33	15.87	20.18	18.70	17.72	16.42	10.76	10.26	20.07	18.43	17.44	17.95
AQ-Q8	1.45	1.41	1.55	1.50	1.59	1.53	1.55	1.51	1.49	1.45	1.70	1.61	1.53	1.43	1.57	1.52	1.43	1.47	1.25	1.12	1.63	1.59	1.48	1.52	1.29	1.46	1.58	1.50	1.49	1.65
AQ-Q9	375.40	344.50	412.72	383.83	412.11	343.50	399.60	411.92	395.84	371.00	448.88	331.75	427.06	379.17	415.89	358.92	342.36	281.67	337.17	327.00	411.08	383.83	446.81	380.00	279.88	274.08	419.08	383.83	414.12	374.33
AQ-Q10	20.94	15.69	22.15	20.61	22.18	22.32	23.16	23.32	20.98	20.34	24.23	21.38	26.04	25.38	21.71	20.56	19.53	20.34	16.76	15.29	23.76	22.68	19.69	20.56	16.63	16.78	22.89	21.70	20.38	21.30
AQ-Q11	0.77	0.71	0.92	1.08	0.91	0.88	0.85	0.72	0.88	0.88	0.98	1.02	1.02	1.18	0.90	0.89	0.75	0.65	0.72	0.69	0.92	0.93	0.94	1.03	0.60	0.54	0.92	0.93	0.91	0.90
AR-Q1	2.41	2.46	3.25	2.87	3.34	3.02	2.83	2.37	3.38	2.96	2.47	2.38	3.28	2.38	3.01	2.78	3.49	2.98	3.38	2.60	3.06	2.86	3.14	2.69	2.50	2.58	3.10	2.67	3.57	3.59
AR-Q2	12.32	13.37	11.68	10.13	10.17	9.94	11.66	11.73	11.45	10.55	11.09	10.22	13.85	15.11	11.54	10.73	8.79	8.73	9.08	9.42	12.29	12.08	10.20	8.29	12.91	13.70	11.67	11.49	9.36	8.73
AR-Q3	0.13	0.13	0.12	0.11	0.12	0.11	0.13	0.12	0.12	0.11	0.13	0.11	0.15	0.16	0.12	0.11	0.10	0.10	0.11	0.11	0.13	0.11	0.12	0.11	0.17	0.17	0.12	0.11	0.11	0.10
AR-Q4	0.47	0.46	0.47	0.41	0.37	0.36	0.49	0.54	0.44	0.40	0.43	0.44	0.46	0.43	0.45	0.41	0.41	0.32	0.33	0.31	0.47	0.44	0.45	0.45	0.43	0.42	0.46	0.41	0.39	0.34
AR-Q5	5.74	5.58	5.73	5.44	6.58	6.44	5.42	5.79	6.10	5.94	5.85	4.69	5.20	4.66	5.86	5.49	6.92	6.40	6.75	6.36	5.94	5.67	5.23	5.38	6.48	6.96	5.96	5.72	5.54	5.43
AR-Q6	1.07	1.11	1.07	1.05	1.26	1.18	1.00	1.04	1.13	1.10	1.21	1.15	1.29	1.29	1.06	1.00	1.25	1.22	1.21	1.18	1.14	1.09	0.96	1.01	1.10	1.02	1.13	1.09	1.08	1.10
AR-Q7	14.42	14.08	13.76	13.88	17.19	18.05	14.68	14.49	14.77	14.89	14.55	15.08	15.33	14.83	14.45	14.82	15.42	15.27	15.78	17.66	14.31	14.14	15.31	15.85	17.89	17.65	14.36	14.49	14.64	15.39
AR-Q8	2.84	2.66	2.85	2.53	2.43	2.19	2.60	2.34	2.78	2.53	2.75	2.58	2.88	2.18	2.66	2.53	3.00	2.60	2.39	1.94	2.90	2.59	2.48	2.28	2.30	2.26	2.73	2.53	3.05	2.60
AR-Q9	0.72	0.72	0.77	0.76	0.66	0.69	0.76	0.73	0.74	0.72	0.71	0.73	0.77	0.74	0.72	0.72	0.79	0.72	0.68	0.72	0.77	0.73	0.64	0.60	0.59	0.47	0.76	0.73	0.71	0.70
AR-Q10	0.72	0.69	0.79	0.74	0.70	0.72	0.73	0.71	0.78	0.73	0.69	0.72	0.86	0.87	0.71	0.72	0.90	0.85	0.76	0.72	0.79	0.74	0.64	0.64	0.65	0.64	0.77	0.73	0.73	0.75
AR-Q11	0.97	0.92	0.84	0.82	1.02	0.89	0.87	0.90	0.93	0.83	0.86	0.88	0.94	0.79	0.88	0.85	1.03	0.93	1.08	0.91	0.88	0.84	0.86	0.90	1.18	1.06	0.90	0.85	0.81	0.88
AR-Q12	4.16	3.49	4.51	4.39	5.77	5.75	3.99	3.26	4.84	4.70	5.23	4.90	5.43	4.96	4.52	4.39	5.27	5.00	4.81	4.17	4.91	4.76	4.13	3.67	4.88	4.48	4.70	4.71	4.95	3.96
AR-Q13	1.25	1.25	1.08	1.07	0.99	0.93	1.13	1.05	1.07	1.06	1.14	1.10	1.07	1.08	1.07	1.06	1.18	1.08	0.98	1.06	1.15	1.07	0.97	0.94	0.94	0.96	1.10	1.06	1.15	1.04
AS-Q1	3.93	3.92	3.41	3.34	2.58	3.08	3.64	3.54	3.01	3.08	4.02	3.50	3.57	3.54	3.13	3.13	3.87	3.70	3.66	3.71	3.25	3.34	3.20	2.73	2.68	3.35	3.37	3.50	3.34	3.39
AS-Q2	0.59	0.62	0.49	0.48	0.35	0.47	0.43	0.43	0.46	0.48	0.55	0.55	0.66	0.77	0.43	0.48	0.53	0.55	0.36	0.46	0.50	0.52	0.45	0.47	0.39	0.42	0.47	0.47	0.54	0.63
AS-Q3	10.95	10.92	7.63	6.50	6.59	8.38	6.51	5.53	8.18	8.06	8.64	8.44	12.43	12.58	7.19	7.31	7.71	7.88	5.38	5.18	8.61	8.03	7.81	6.76	6.71	7.90	7.93	7.94	8.83	8.45
AS-Q4	0.65	0.69	0.50	0.48	0.34	0.47	0.51	0.59	0.47	0.49	0.53	0.48	0.69	0.74	0.44	0.48	0.57	0.59	0.39	0.49	0.52	0.49	0.47	0.52	0.41	0.47	0.49	0.49	0.54	0.60
AS-Q5	0.41	0.38	0.32	0.34	0.23	0.24	0.29	0.34	0.31	0.34	0.34	0.36	0.36	0.40	0.30	0.33	0.34	0.36	0.24	0.32	0.33	0.36	0.30	0.36	0.29	0.34	0.31	0.34	0.32	0.36
AS-Q6	0.50	0.45	0.47	0.47	0.34	0.43	0.37	0.39	0.44	0.46	0.54	0.53	0.61	0.68	0.40	0.45	0.50	0.45	0.27	0.34	0.49	0.48	0.41	0.47	0.42	0.53	0.43	0.44	0.52	0.54
AS-Q7	3.19	3.06	2.59	2.58	1.61	2.14	2.75	2.57	2.39	2.74	2.39	2.34	3.00	2.88	2.16	2.43	3.35	2.75	2.28	2.48	2.53	2.68	2.32	2.34	2.63	2.35	2.42	2.58	2.51	2.74
AS-Q8	0.11	0.11	0.09	0.09	0.07	0.07	0.08	0.08	0.08	0.09	0.11	0.09	0.11	0.13	0.08	0.09	0.10	0.10	0.06	0.06	0.09	0.09	0.08	0.09	0.10	0.11	0.08	0.09	0.08	0.09
AS-Q9	101.40	98.17	67.98	70.65	56.36	51.75	67.85	72.50	70.98	72.15	74.69	71.34	96.99	98.37	63.26	72.08	84.66	69.29	55.65	58.76	76.18	72.52	65.47	74.56	66.25	80.37	70.80	72.29	75.21	65.66
AS-Q10	0.23	0.22	0.26	0.28	0.18	0.23	0.25	0.23	0.21	0.24	0.31	0.29	0.25	0.23	0.22	0.25	0.30	0.27	0.19	0.25	0.25	0.25	0.22	0.25	0.21	0.24	0.24	0.25	0.23	0.24
AS-Q11	2.52	2.42	2.98	3.00	2.34	3.00	2.78	3.00	2.53	2.75	3.48	3.50	3.46	2.88	2.54	2.88	3.06	3.00	2.61	2.50	2.85	3.00	2.45	3.13	2.31	2.63	2.79	3.00	2.75	3.00
AS-Q12	2.95	2.92	2.79	3.01	1.85	2.70	2.54	2.90	2.50	2.93	2.94	3.16	3.41	3.41	2.28	2.70	3.29	3.02	1.99	2.70	2.95	3.03	1.76	2.16	2.28	3.01	2.64	2.91	2.50	2.98
AS-Q13	0.12	0.12	0.11	0.11	0.10	0.12	0.09	0.09	0.10	0.11	0.12	0.12	0.13	0.13	0.10	0.11	0.12	0.11	0.08	0.08	0.11	0.11	0.12	0.13	0.09	0.10	0.10	0.11	0.13	0.12
AS-Q14	4.22	3.88	4.27	4.57	3.18	4.59	3.83	3.74	3.76	4.50	5.01	5.10	4.68	5.20	3.72	4.42	4.64	4.44	4.20	5.06	4.05	4.47	3.58	4.06	3.50	4.25	4.16	4.59	3.47	4.00
AS-Q15	141.44	135.25	145.53	154.32	90.39	107.69	125.68	121.23	127.53	150.00	150.74	141.08	168.55	196.47	119.82	131.63	152.00	153.47	86.49	94.67	148.04	152.16	107.88	131.63	95.56	110.36	134.74	144.58	135.14	154.32
AT-Q1	10.23	11.33	8.21	8.32	8.30	7.67	5.72	3.34	8.98	10.00	10.06	7.22	4.25	3.60	9.73	10.23	7.10	6.68	11.18	12.71	8.28	7.76	7.50	3.39	5.31	6.73	9.32	10.23	6.96	8.88
AT-Q2	0.64	0.59	0.80	0.92	0.57	0.68	0.54	0.24	0.76	0.86	0.72	0.73	0.47	0.41	0.73	0.82	0.85	1.20	0.83	0.92	0.73	0.82	0.56	0.31	1.06	1.36	0.71	0.84	0.53	0.62
AT-Q3	5.78	5.39	6.32	7.25	4.37	4.92	3.58	2.59	6.33	6.77	5.82	5.98	5.08	3.57	5.69	5.69	6.57	6.77	6.67	6.98	6.15	6.94	3.44	2.33	9.87	11.54	5.67	5.94	3.79	4.65
AT-Q4	0.07	0.07	0.07	0.09	0.05	0.06	0.05	0.04	0.07	0.08	0.07	0.07	0.05	0.04	0.07	0.07	0.07	0.09	0.07	0.06	0.07	0.07	0.04	0.02	0.09	0.10	0.07	0.07	0.04	0.05
AT-Q5	0.33	0.39	0.32	0.37	0.26	0.30	0.25	0.21	0.32	0.35	0.32	0.32	0.23	0.19	0.31	0.34	0.37	0.45	0.40	0.46	0.32	0.37	0.19	0.11	0.40	0.49	0.32	0.35	0.21	0.22
AT-Q6	0.40	0.47	0.46	0.51	0.32	0.35	0.30	0.17	0.45	0.48	0.43	0.51	0.28	0.20	0.44	0.51	0.42	0.34	0.48	0.55	0.45	0.48	0.23	0.17	0.61	0.64	0.43	0.49	0.26	0.33
AT-Q7	23.88	26.46	25.35	29.63	19.72	20.59	15.60	6.74	25.88	30.00	23.97	26.51	18.43	14.58	24.09	28.25	26.53	36.59	25.26	29.27	25.70	29.58	14.92	6.56	30.44	35.88	24.16	29.22	17.70	13.11
AT-Q8	24.57	22.99	22.24	25.43	20.56	25.49	17.96	9.26	22.25	27.66	26.47	20.84	14.89	9.86	23.20	26.08	24.14	27.66	28.56	31.37	22.74	23.86	14.84	9.26	33.47	39.44	22.21	22.99	15.98	25.49
AT-Q9	129.79	164.29	111.73	130.77	90.88	108.33	88.29	73.68	110.16	118.18	130.28	161.90	84.26	58.33	111.56	122.25	123.95	138.46	129.09	123.08	116.61	139.23	67.67	30.77	158.33	200.00	112.73	130.77	68.13	61.54
AT-Q10	37.47	42.95	37.47	43.31	30.78	44.87	28.20	19.86	38.78	43.75	32.82	43.43	28.62	16.30	38.66	44.17	29.14	39.73	36.56	43.33	37.46	43.93	29.12	19.86	35.43	46.58	37.78	43.31	26.65	27.27
AT-Q11	20.35	22.85	20.79	26.32	18.04	24.14	15.09	10.78	21.03	25.75	21.40	21.89	15.53	14.02	20.73	23.93	20.75	24.37	24.59	26.00	20.82	24.74	13.14	8.93	18.73	18.81	21.27	24.48	14.79	17.86
AT-Q12	0.53	0.61	0.51	0.60	0.40	0.45	0.34	0.20	0.53	0.60	0.50	0.60	0.42	0.22	0.51	0.60	0.44	0.45	0.50	0.43	0.54	0.64	0.28	0.20	0.55	0.64	0.51	0.60	0.35	0.45
AT-Q13	1.44	1.44	1.47	1.83	1.44	2.00	1.03	0.50	1.57	1.88	1.47	1.55	1.25	1.20	1.53	1.83	1.28	1.32	1.59	1.76	1.56	1.94	0.94	0.50	1.76	2.20	1.49	1.77	1.14	1.88
AU-Q1	0.86	0.84	0.81	0.87	0.71	0.95	0.77	0.82	0.85	0.99	0.64	0.70	1.04	0.84	0.70	0.87	1.00	0.96	0.95	1.07	0.73	0.71	0.90	0.93	1.16	1.04	0.76	0.87	0.74	0.70
AU-Q2	1.11	1.21	1.28	1.46	0.96	1.05	1.51	1.65	1.06	1.05	1.22	1.28	1.40	1.73	1.05	1.07	1.54	1.69	1.17	1.15	1.16	1.45	1.22	1.03	1.25	1.19	1.20	1.45	0.96	1.09
AU-Q3	5.96	6.21	6.37	6.17	4.70	5.11	7.21	7.49	5.15	5.26	7.23	6.90	7.27	5.79	5.53	5.68	6.35	6.88	5.33	6.02	5.67	5.52	7.20	6.33	5.82	5.77	6.10	6.17	4.91	5.27
AU-Q4	0.18	0.22	0.22	0.26	0.18	0.20	0.26	0.29	0.18	0.18	0.24	0.27	0.23	0.22	0.20	0.20	0.22	0.26	0.20	0.20	0.20	0.22	0.24	0.25	0.27	0.26	0.21	0.20	0.17	0.20
AU-Q5	1.59	1.68	1.77	1.98	1.25	1.64	2.11	2.14	1.43	1.72	1.76	2.02	1.78	2.03	1.49	1.73	2.00	1.99	1.46	1.68	1.56	1.89	1.94	2.28	1.97	2.03	1.62	1.93	1.36	1.24
AU-Q6	0.13	0.15	0.14	0.15	0.12	0.16	0.19	0.19	0.12	0.14	0.13	0.16	0.13	0.14	0.13	0.15	0.18	0.16	0.15	0.16	0.13	0.15	0.16	0.16	0.16	0.15	0.13	0.15	0.16	0.20
AU-Q7	0.34	0.35	0.41	0.39	0.28	0.36	0.48	0.48	0.32	0.36	0.42	0.44	0.41	0.44	0.33	0.37	0.48	0.47	0.37	0.38	0.35	0.38	0.43	0.44	0.42	0.43	0.36	0.37	0.35	0.39
AU-Q8	6.43	7.95	6.54	7.34	4.97	6.86	8.47	8.40	5.45	6.98	6.29	7.33	6.46	7.00	5.84	7.22	7.22	8.27	5.30	5.71	6.21	7.58	6.57	7.33	7.32	7.30	6.03	7.22	5.97	7.53
AU-Q9	87.65	86.06	96.35	99.69	72.53	81.21	96.66	99.69	84.25	85.59	98.46	105.38	99.45	92.79	86.28	88.87	92.37	96.91	94.63	86.54	81.88	91.40	110.69	105.17	90.65	90.41	92.97	98.15	68.66	73.28
AU-Q10	28.73	36.94	33.77	37.61	23.11	28.85	43.98	41.81	26.65	33.38	29.69	36.24	35.47	40.99	27.08	34.23	40.40	40.50	30.35	29.38	30.06	37.07	31.00	36.22	44.67	40.90	28.70	36.56	29.67	27.89
AU-Q11	7.13	8.02	8.49	9.74	6.64	8.21	9.44	9.88	7.11	8.41	8.62	10.76	9.19	10.22	7.09	8.15	9.80	9.48	8.74	10.42	7.35	8.64	8.64	9.60	7.58	7.69	7.89	9.76	7.47	8.08
AV-Q1	0.54	0.62	0.56	0.60	0.51	0.70	0.36	0.29	0.57	0.65	0.64	0.84	0.36	0.27	0.60	0.68	0.46	0.59	0.67	0.71	0.57	0.67	0.33	0.28	0.48	0.58	0.56	0.67	0.51	0.55
AV-Q2	0.82	0.94	0.72	0.81	0.56	0.75	0.49	0.36	0.76	0.87	0.68	0.80	0.59	0.48	0.70	0.80	0.77	0.92	0.81	0.92	0.74	0.89	0.44	0.31	0.55	0.64	0.74	0.88	0.60	0.78
AV-Q3	0.80	1.00	0.64	0.72	0.54	0.63	0.51	0.42	0.67	0.70	0.71	0.89	0.44	0.32	0.68	0.88	0.67	0.85	0.71	0.70	0.68	0.88	0.46	0.28	0.65	0.79	0.67	0.86	0.55	0.55
AV-Q4	28.66	30.46	27.41	29.61	29.88	25.66	20.03	14.22	30.12	33.20	29.60	26.89	21.63	19.20	28.76	28.69	31.47	29.24	34.37	33.77	29.56	29.10	17.89	13.63	21.58	28.55	29.50	32.58	25.91	25.66
AV-Q5	19.67	23.25	16.74	17.34	13.49	11.67	11.33	8.71	16.69	17.00	20.78	23.04	9.85	6.00	17.68	18.09	16.60	20.00	16.77	15.00	17.45	18.09	12.50	9.50	21.21	27.17	16.17	17.13	15.19	13.60
AV-Q6	2.68	3.02	2.55	2.95	1.97	1.86	1.69	1.11	2.52	3.04	2.84	2.84	1.28	0.99	2.70	3.02	2.17	3.04	2.70	3.16	2.60	3.04	1.56	1.11	2.29	2.97	2.58	2.93	1.80	2.36
AV-Q7	0.11	0.11	0.08	0.08	0.08	0.07	0.06	0.04	0.09	0.10	0.10	0.10	0.07	0.05	0.09	0.09	0.09	0.11	0.09	0.10	0.09	0.09	0.07	0.03	0.13	0.14	0.08	0.10	0.06	0.07
AV-Q8	0.88	1.00	0.72	0.85	0.52	0.61	0.55	0.29	0.74	0.89	0.69	0.78	0.65	0.50	0.69	0.76	0.79	1.00	0.82	0.93	0.69	0.78	0.61	0.28	0.97	1.18	0.70	0.76	0.52	0.51
AV-Q9	4.64	5.55	4.84	5.77	4.35	4.37	3.47	3.16	4.86	5.63	5.29	5.31	3.28	2.39	5.03	5.77	4.33	5.63	5.76	6.32	4.62	5.62	4.00	2.75	5.70	5.67	4.87	5.80	3.21	5.15
AW-Q1	5.73	6.59	6.68	7.06	4.76	6.33	8.07	7.16	4.95	5.76	8.00	7.39	2.13	0.00	6.79	7.24	5.98	8.42	4.13	0.00	5.94	6.66	8.09	9.12	9.08	11.03	5.70	6.46	6.00	7.13
AW-Q2	0.80	0.94	0.89	0.97	0.77	0.86	1.09	1.06	0.75	0.70	0.96	1.02	0.38	0.00	0.96	1.15	0.72	0.92	0.56	0.00	0.84	0.92	1.12	1.18	0.92	0.89	0.81	0.88	0.99	1.30
AW-Q3	4.14	4.29	4.95	4.47	3.76	4.31	5.28	4.80	4.16	4.34	5.04	4.73	1.91	0.00	5.02	4.50	4.44	4.28	2.64	0.00	4.46	4.39	6.36	6.25	5.38	4.52	3.90	4.33	7.02	8.84
AW-Q4	0.97	1.03	0.98	1.16	0.68	0.61	1.20	1.08	0.78	1.12	1.06	1.23	0.48	0.00	1.00	1.17	0.82	0.94	0.52	0.00	0.94	1.13	1.11	1.16	1.00	0.92	0.87	1.10	1.00	1.17
AW-Q5	0.17	0.19	0.15	0.15	0.13	0.11	0.24	0.25	0.12	0.15	0.16	0.15	0.08	0.00	0.17	0.16	0.14	0.17	0.10	0.00	0.15	0.17	0.19	0.17	0.16	0.14	0.14	0.15	0.18	0.18

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AW-Q6	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.01	0.00	0.03	0.03	0.02	0.03	0.01	0.00	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
AW-Q7	10.19	10.96	11.99	14.45	9.82	9.49	13.45	13.65	9.83	12.42	13.57	17.88	3.86	0.00	12.45	13.90	11.38	16.29	5.74	0.00	11.12	13.85	15.92	20.17	14.05	18.04	10.10	11.93	14.50	20.21
BA-Q1	10.15	8.83	8.74	8.41	11.15	9.58	10.20	9.02	9.02	8.45	10.98	9.37	7.47	6.55	9.79	9.06	10.42	8.43	8.30	7.11	9.59	9.15	10.65	8.88	9.52	8.72	9.43	8.60	10.34	9.22
BA-Q2	1.60	1.64	1.39	1.40	1.48	1.41	1.67	1.68	1.39	1.41	1.44	1.29	1.77	1.83	1.40	1.38	1.39	1.28	1.29	1.41	1.46	1.40	1.53	1.57	1.29	1.18	1.44	1.43	1.60	1.57
BA-Q3	2.11	2.12	1.86	1.77	1.90	1.95	2.01	1.91	1.78	1.77	2.28	2.22	1.78	1.78	1.90	1.80	2.06	2.15	1.63	1.56	1.90	1.80	2.21	2.25	2.10	2.00	1.89	1.80	1.92	1.77
BA-Q4	1.76	1.73	1.68	1.64	1.72	1.69	1.72	1.52	1.67	1.64	1.80	1.71	1.60	1.64	1.71	1.65	1.78	1.55	1.51	1.29	1.71	1.63	1.88	1.71	1.55	1.51	1.67	1.64	1.98	1.85
BA-Q5	6.55	5.67	6.75	5.90	6.76	5.75	7.78	7.33	6.64	5.75	5.95	4.95	5.97	5.00	7.02	5.90	6.01	6.80	6.94	5.75	6.85	6.00	6.02	5.78	7.20	6.57	6.75	5.88	6.29	5.75
BB-Q1	28.16	27.77	28.28	25.20	26.66	21.64	23.89	21.00	30.52	27.17	22.19	21.00	33.60	27.12	26.01	21.77	31.41	30.19	33.02	27.83	27.02	24.73	26.52	20.23	27.19	19.36	28.74	26.01	24.01	21.91
BB-Q2	12.69	12.78	14.03	12.68	12.28	12.08	12.81	12.38	13.66	12.55	12.84	13.05	12.59	11.03	13.69	12.76	12.55	11.47	13.19	11.65	13.33	12.64	13.64	13.27	14.17	13.02	13.90	12.77	10.32	11.47
BB-Q3	13.30	11.94	12.60	12.36	11.56	11.80	11.16	11.16	12.60	12.31	13.31	13.57	14.87	14.01	12.16	12.32	11.82	12.05	12.55	12.40	12.12	11.76	13.71	13.06	13.75	13.38	12.82	12.37	10.06	8.73
BB-Q4	14.75	12.79	12.88	12.29	13.43	11.97	12.42	12.37	14.12	12.52	11.48	11.82	14.20	14.62	12.91	12.36	14.61	12.76	14.29	11.42	13.29	12.45	12.72	13.06	13.36	12.39	13.44	12.64	12.90	12.20
BB-Q5	107.21	97.37	98.07	97.93	94.62	92.55	95.18	94.63	102.55	108.75	89.12	90.85	113.70	110.94	94.30	93.42	106.96	101.58	105.87	113.00	100.99	101.42	84.70	82.99	100.48	95.51	102.09	100.54	82.19	76.83
BC-Q1	75.81	67.21	78.35	67.68	72.36	63.17	98.53	108.43	72.12	63.17	69.98	60.22	90.50	99.85	71.14	63.17	88.58	79.39	68.75	63.17	79.29	70.40	72.43	56.89	72.70	73.53	76.10	63.71	80.19	57.27
BC-Q2	31.57	29.96	31.29	29.63	30.95	29.15	34.58	39.49	30.32	28.44	31.32	30.49	36.61	39.74	29.26	28.17	35.78	40.34	24.78	25.13	32.88	31.51	30.82	29.65	30.81	30.95	30.73	28.18	34.05	35.68
BC-Q3	4.46	3.89	3.87	3.71	3.32	3.34	4.90	4.80	3.68	3.67	3.34	3.18	4.50	4.63	3.75	3.48	3.69	3.72	3.72	3.72	3.98	3.72	3.44	3.37	3.53	3.56	3.89	3.61	3.78	4.04
BC-Q4	32.56	31.33	34.41	33.45	34.41	30.49	34.90	31.37	33.33	32.29	35.98	32.96	36.03	37.77	33.11	32.30	36.83	30.99	36.17	33.80	32.03	30.72	39.93	40.64	39.78	39.78	32.44	30.74	38.76	35.83
BC-Q5	257.10	292.89	229.36	215.10	212.97	222.08	278.81	295.43	217.76	214.92	227.16	227.92	290.18	289.42	221.85	212.65	217.46	222.85	192.29	187.80	241.27	229.62	222.33	212.65	236.15	222.46	232.25	219.53	217.37	214.92
BC-Q6	243.16	233.38	241.89	230.18	225.57	227.26	269.67	276.43	237.11	228.25	210.30	221.80	274.98	265.60	222.99	226.70	275.75	300.27	233.28	248.81	243.12	228.09	223.65	217.67	258.74	261.27	237.82	228.59	227.83	203.93
BD-Q1	25.53	19.85	25.23	21.98	26.16	24.23	28.66	24.89	25.69	21.21	21.70	20.38	26.78	28.26	25.21	21.69	25.76	21.08	20.44	18.50	27.44	23.64	22.71	22.45	22.63	22.45	24.03	21.15	34.35	25.75
BD-Q2	45.97	43.51	46.89	46.45	43.27	42.46	52.84	47.89	44.72	43.00	42.93	46.42	50.57	44.23	44.23	45.06	49.18	45.50	38.78	36.00	49.39	47.12	38.71	35.03	49.08	47.81	44.46	44.96	50.70	51.10
BD-Q3	64.21	54.81	61.28	59.06	56.95	52.38	61.57	52.57	61.55	59.00	57.00	50.19	73.61	61.06	58.79	55.55	58.63	60.75	56.72	58.13	62.19	58.06	58.83	55.69	69.07	75.30	60.03	57.56	59.43	55.64
BD-Q4	41.94	35.17	49.37	44.80	43.00	42.58	58.38	63.86	44.85	42.58	40.55	41.92	47.48	41.04	46.25	42.43	46.74	43.93	34.38	33.60	49.96	45.13	44.10	44.19	38.19	39.59	44.93	41.38	58.84	52.44
BD-Q5	19.40	19.65	21.33	20.59	18.73	18.75	20.35	21.26	20.84	19.44	18.59	17.38	21.30	21.25	20.29	19.11	19.80	20.55	14.96	15.60	22.03	20.59	18.76	18.10	20.15	19.19	19.52	19.24	24.50	20.55
BE-Q1	15.83	13.61	16.83	13.90	16.35	12.88	18.89	17.68	15.96	12.88	16.25	13.65	12.41	9.99	16.91	13.90	18.38	18.15	18.10	16.43	15.71	13.23	18.29	13.27	16.86	15.71	16.41	13.90	16.98	12.88
BE-Q2	1.18	1.30	1.12	1.04	0.99	1.02	1.19	1.26	1.12	1.04	0.94	0.96	1.12	1.03	1.11	1.06	1.04	0.93	1.14	1.32	1.11	1.11	1.03	1.01	0.88	0.83	1.14	1.18	1.01	0.93
BE-Q3	1.88	1.84	2.10	1.98	1.77	1.81	2.14	2.01	1.99	1.95	1.75	1.50	1.68	1.69	2.03	1.95	2.00	2.03	2.05	2.00	2.00	1.86	1.81	1.92	1.62	1.63	2.00	1.86	2.08	2.03
BE-Q4	1.26	1.24	1.16	1.09	1.11	0.93	1.25	1.36	1.12	1.05	1.22	1.21	1.19	1.08	1.16	1.08	1.18	1.04	1.18	0.93	1.17	1.08	1.14	1.11	1.06	1.12	1.17	1.06	1.20	1.10
BE-Q5	5.70	5.65	6.22	5.66	6.11	5.38	6.89	6.65	6.07	5.43	5.42	4.97	5.61	5.43	6.23	5.66	5.95	5.27	6.58	6.00	5.99	5.59	6.10	4.69	5.06	4.65	6.23	5.66	6.08	5.38
BF-Q1	11.80	10.48	12.51	11.92	13.93	15.84	12.69	10.48	12.68	11.98	12.95	13.94	11.90	11.20	12.71	11.92	13.56	13.63	13.86	16.08	12.50	12.14	12.60	11.64	12.44	12.88	12.95	12.41	11.82	9.45
BF-Q2	23.48	19.31	25.36	22.30	25.65	23.68	24.43	22.00	25.86	23.68	23.02	20.83	25.95	24.88	25.58	21.88	22.20	22.00	29.78	30.56	24.70	22.30	22.52	20.48	19.59	20.01	26.57	23.12	21.11	20.83
BF-Q3	7.47	7.57	7.50	7.18	7.34	7.32	7.40	7.59	7.56	7.24	7.12	6.44	7.14	6.74	7.34	6.96	8.24	7.78	8.29	8.26	7.30	6.96	7.31	6.95	7.47	7.47	7.54	7.34	7.03	6.80
BF-Q4	20.72	21.08	21.93	22.51	26.54	27.00	22.54	22.51	22.43	22.43	24.65	24.77	25.04	24.33	22.68	22.02	21.68	20.89	21.56	22.59	23.07	22.71	23.10	22.39	20.62	20.86	22.61	23.17	25.22	21.46
BF-Q5	20.42	18.77	19.66	18.34	22.46	24.81	18.93	19.94	19.92	18.14	24.07	24.16	18.59	16.15	20.61	19.28	21.52	21.81	22.66	24.81	20.06	18.62	20.15	17.27	24.36	25.08	20.65	18.98	17.44	15.63
C-Q1	0.35	0.33	0.33	0.32	0.32	0.29	0.39	0.42	0.32	0.28	0.30	0.28	0.28	0.26	0.33	0.30	0.40	0.43	0.27	0.25	0.34	0.30	0.36	0.32	0.39	0.38	0.31	0.26	0.39	0.40
C-Q2	2.65	2.42	2.81	2.62	2.11	1.64	3.17	2.76	2.54	2.49	2.30	2.00	2.34	2.31	2.62	2.47	2.81	2.90	2.70	2.70	2.58	2.43	2.67	2.53	2.66	2.92	2.64	2.47	2.43	2.32
C-Q3	0.17	0.18	0.16	0.15	0.16	0.15	0.18	0.18	0.16	0.16	0.16	0.13	0.17	0.16	0.15	0.13	0.21	0.23	0.13	0.11	0.17	0.17	0.15	0.15	0.18	0.19	0.15	0.14	0.19	0.19
C-Q4	0.59	0.56	0.59	0.56	0.67	0.63	0.56	0.52	0.61	0.56	0.64	0.60	0.61	0.59	0.60	0.56	0.61	0.49	0.59	0.56	0.60	0.57	0.63	0.54	0.57	0.55	0.61	0.57	0.61	0.43
C-Q5	0.38	0.37	0.37	0.35	0.40	0.41	0.35	0.34	0.37	0.36	0.43	0.43	0.37	0.38	0.38	0.35	0.41	0.43	0.39	0.42	0.38	0.38	0.38	0.35	0.42	0.42	0.38	0.38	0.35	0.35
C-Q6	0.35	0.37	0.34	0.35	0.35	0.35	0.34	0.34	0.35	0.35	0.33	0.33	0.36	0.33	0.37	0.36	0.22	0.19	0.27	0.29	0.36	0.36	0.34	0.32	0.23	0.22	0.35	0.35	0.36	0.35
C-Q7	0.17	0.17	0.20	0.21	0.17	0.15	0.17	0.18	0.20	0.20	0.18	0.17	0.20	0.21	0.18	0.18	0.20	0.20	0.20	0.19	0.18	0.18	0.21	0.21	0.18	0.19	0.19	0.19	0.19	0.17
DA-Q1	58.74	50.81	62.24	55.71	55.54	54.30	54.43	49.65	62.33	56.43	56.98	56.00	58.27	55.42	62.53	56.41	49.78	42.73	67.52	71.18	58.11	54.30	60.40	57.90	44.95	43.59	62.69	56.11	55.41	55.28
DB-Q1	161.88	162.34	177.40	175.54	151.64	157.36	156.48	159.95	174.00	168.81	159.72	163.50	174.23	160.77	171.22	166.89	150.17	160.74	182.94	168.81	166.05	164.06	164.18	165.01	143.96	139.13	174.73	164.57	151.28	165.26
DC-Q1	328.14	329.10	307.83	279.57	264.71	254.61	312.47	271.26	309.38	281.72	258.60	215.45	326.04	363.48	303.00	273.18	269.76	265.66	358.97	355.83	299.95	274.96	253.62	264.13	232.65	245.19	316.48	292.53	264.21	265.66
DD-Q1	51.14	47.80	55.06	46.59	49.29	42.95	53.43	46.25	51.69	46.41	57.05	53.43	53.79	56.99	53.59	46.45	49.35	41.02	55.89	63.00	52.29	46.14	52.89	46.45	52.00	49.96	54.51	46.14	45.94	46.41
DE-Q1	120.75	102.35	116.40	110.96	106.83	103.25	122.99	107.85	114.50	103.50	107.88	113.65	118.30	102.99	113.44	103.96	118.24	109.04	124.04	113.98	116.31	103.96	101.27	86.66	81.26	75.99	120.28	107.65	107.56	100.74
E-Q1	225.85	219.19	278.57	244.79	247.35	233.79	247.68	228.81	270.98	243.05	241.33	218.22	251.55	234.50	254.54	234.74	302.29	250.76	340.37	339.33	258.33	235.06	204.77	203.10	229.20	208.72	271.29	243.49	232.83	236.32
E-Q2	217.59	214.60	224.58	195.35	203.10	179.85	207.07	191.02	223.19	197.71	210.62	194.60	227.65	251.08	221.04	200.97	196.42	183.84	260.15	265.34	213.72	191.02	197.69	186.61	184.23	188.66	229.12	238.03	183.86	183.83
F-Q1	17.63	16.49	19.15	17.58	15.06	15.74	18.66	16.80	17.95	16.80	16.83	15.68	15.33	15.03	18.47	16.80	17.39	17.42	21.45	17.42	17.62	16.80	15.72	16.74	18.28	17.80	18.34	16.80	15.41	15.88
F-Q2	55.13	52.14	52.66	50.01	46.83	37.25	50.87	37.41	53.14	50.61	47.18	44.25	54.49	56.63	52.89	48.81	43.69	36.29	68.65	69.18	48.86	41.36	47.37	45.16	36.61	32.41	56.60	53.11	36.35	36.29
F-Q3	0.20	0.18	0.26	0.23	0.26	0.27	0.28	0.26	0.25	0.23	0.22	0.17	0.26	0.27	0.24	0.22	0.27	0.24	0.22	0.21	0.25	0.23	0.24	0.23	0.23	0.22	0.23	0.21	0.33	0.29
F-Q4	0.64	0.65	0.73	0.68	0.67	0.70	0.76	0.74	0.68	0.67	0.70	0.68	0.70	0.70	0.70	0.68	0.72	0.64	0.66	0.67	0.71	0.67	0.69	0.66	0.61	0.62	0.70	0.67	0.78	0.76
G-Q1	27.88	23.70	24.29	23.14	25.28	22.74	29.56	26.33	24.85	22.73	21.92	18.81	34.53	28.98	23.55	21.47	24.54	25.75	21.35	22.73	26.33	23.70	24.16	22.08	28.16	27.96	25.52	22.74	21.74	23.55
G-Q2	333.13	278.91	291.72	267.32	341.48	287.08	376.35	372.80	299.51	267.86	288.67	271.86	330.05	381.34	318.50	276.85	261.99	253.35	296.96	220.33	324.38	276.85	274.49	275.17	275.58	247.59	319.21	273.11	292.95	287.08
G-Q3	10.01	8.63	8.93	8.31	8.64	7.75	7.54	6.31	9.77	8.69	7.95	8.24	11.10	8.73	8.44	8.00	10.08	9.92	10.64	10.07	8.74	8.11	8.83	8.49	9.85	9.18	8.89	8.00	9.40	8.69
G-Q4	6.86	6.20	6.15	5.49	6.64	6.44	7.52	7.23	6.23	5.74	5.87	5.41	6.31	6.13	6.48	5.62	6.06	5.74	7.64	8.56	6.25	5.96	5.85	5.27	6.36	6.52	6.55	6.01	5.66	4.68
G-Q5	0.72	0.67	0.73	0.59	0.58	0.55	0.65	0.67	0.70	0.58	0.66	0.63	0.82	0.71	0.67	0.58	0.65	0.59	0.52	0.50	0.74	0.65	0.63	0.63	0.63	0.61	0.70	0.58	0.65	0.63
G-Q6	1.66	1.47	1.34	1.28	1.44	1.34	1.75	1.42	1.40	1.37	1.17	1.21	1.56	1.45	1.41	1.31	1.38	1.37	1.43	1.51	1.48	1.35	1.21	1.21	1.21	1.16	1.45	1.37	1.41	1.34
G-Q7	20.33	17.83	28.67	24.08	29.65	29.53	24.93	21.54	27.56	23.39	29.44	28.94	24.26	22.53	28.76	24.24	24.03	18.66	29.82	31.49	27.84	24.08	23.80	20.90	28.72	28.16	27.98	24.24	24.00	22.91
G-Q8	0.82	0.72	0.54	0.42	0.50	0.43	0.73	0.64	0.55	0.42	0.53	0.52	0.66	0.75	0.53	0.43	0.75	0.66	0.50	0.42	0.56	0.44	0.72	0.66	0.50	0.48	0.59	0.44	0.59	0.52
G-Q9	4.01	3.98	3.80	3.52	4.40	3.92	4.09	3.80	3.91	3.52	4.12	4.05	3.96	3.80	4.21	3.87	2.96	2.97	3.71	2.91	3.89	3.55	4.57	4.30	4.16	4.08	3.96	3.74	4.01	3.52
G-Q10	10.58	10.34	10.64	10.20	9.13	9.87	11.74	12.77	9.94	9.97	9.92	9.70	11.42	10.57	10.17	9.92	9.68	9.97	9.35	10.42	10.59	9.90	9.81	10.34	7.79	6.81	10.57	10.42	10.17	9.87
G-Q11	4.79	4.33	3.94	3.83	4.09	4.02	4.42	4.15	4.06	3.96	4.06	4.15	4.21	4.07	3.96	3.97	4.81	4.35	3.76	3.96	4.00	3.85	4.93	4.99	4.39	4.27	4.02	3.96	4.51	4.22

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
RATE RATI																														
AB-R1	4.48	4.57	4.13	4.05	4.55	4.53	4.36	4.48	4.21	4.05	4.54	4.57	4.08	4.11	4.36	4.12	4.20	4.61	4.46	4.61	4.18	4.17	4.58	4.30	4.61	4.18	4.39	4.48	3.67	3.78
AB-R2	0.89	0.86	1.01	0.97	0.98	0.96	0.94	0.96	1.00	0.96	0.98	0.88	0.99	0.99	0.99	0.95	0.97	0.90	1.14	1.01	0.93	0.94	1.07	0.96	1.20	1.24	0.99	0.95	0.84	0.90
AB-R3	11.02	11.19	11.04	11.34	12.29	11.91	10.45	10.07	11.37	11.35	12.11	12.04	10.49	11.74	11.58	11.35	10.94	10.45	10.80	11.31	11.31	11.65	11.91	11.35	11.10	10.92	11.32	11.63	11.53	10.69
AB-R4	7.63	8.50	8.15	8.50	8.45	8.86	7.85	8.61	8.14	8.51	8.40	8.49	7.98	9.17	8.15	8.49	8.20	8.72	7.99	8.51	7.95	8.48	8.97	9.27	9.15	8.86	8.14	8.51	7.52	7.93
AC-R1	198.90	199.97	190.23	192.39	192.40	192.39	192.68	192.39	190.41	192.39	198.75	199.96	196.78	196.18	192.43	192.39	187.86	192.38	198.21	192.39	189.77	192.39	196.60	198.52	200.92	198.52	193.78	192.39	180.20	192.39
AC-R2	24.30	24.20	23.80	24.25	23.82	24.95	23.93	23.45	23.92	24.25	23.77	23.73	23.48	23.44	24.00	24.25	23.74	24.25	25.04	25.98	23.92	24.25	22.79	22.20	24.39	24.85	24.23	24.25	21.96	21.88
AC-R3	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.19	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19	0.17	0.19	0.18	0.19	0.18	0.19
AC-R4	0.32	0.35	0.27	0.24	0.27	0.24	0.30	0.33	0.27	0.24	0.29	0.28	0.33	0.37	0.27	0.24	0.29	0.25	0.27	0.24	0.28	0.25	0.27	0.23	0.25	0.23	0.28	0.24	0.30	0.35
AC-R5	0.88	0.58	0.89	0.71	0.91	0.95	0.90	0.58	0.92	0.80	0.79	0.77	0.73	0.54	0.93	0.87	0.84	0.60	0.99	1.09	0.91	0.61	0.75	0.72	0.83	0.77	0.95	0.84	0.66	0.60
AC-R6	0.22	0.22	0.22	0.22	0.22	0.23	0.22	0.22	0.22	0.22	0.21	0.22	0.22	0.22	0.22	0.22	0.21	0.22	0.22	0.21	0.22	0.22	0.21	0.22	0.22	0.23	0.22	0.22	0.21	0.22
AC-R7	0.48	0.49	0.51	0.54	0.49	0.51	0.51	0.51	0.51	0.54	0.47	0.50	0.54	0.55	0.49	0.51	0.50	0.52	0.54	0.55	0.50	0.52	0.46	0.50	0.48	0.51	0.51	0.52	0.49	0.51
AC-R8	0.25	0.25	0.23	0.23	0.23	0.21	0.25	0.25	0.23	0.23	0.24	0.22	0.23	0.24	0.24	0.23	0.23	0.24	0.24	0.23	0.24	0.24	0.23	0.23	0.26	0.27	0.24	0.24	0.19	0.20
AC-R9	0.39	0.42	0.34	0.30	0.36	0.31	0.39	0.41	0.35	0.31	0.35	0.29	0.37	0.37	0.35	0.30	0.38	0.33	0.37	0.31	0.36	0.31	0.33	0.29	0.42	0.46	0.36	0.31	0.29	0.29
AC-R10	0.52	0.57	0.50	0.51	0.51	0.57	0.49	0.53	0.50	0.57	0.54	0.57	0.58	0.58	0.49	0.55	0.50	0.57	0.52	0.57	0.51	0.57	0.49	0.53	0.51	0.58	0.51	0.57	0.50	0.57
AC-R11	1.13	0.70	0.90	0.70	0.88	0.70	0.92	0.70	0.88	0.70	1.15	0.70	0.70	0.70	1.02	0.70	0.72	0.68	0.91	0.68	0.94	0.70	0.92	0.70	0.72	0.70	1.00	0.70	0.74	0.70
AC-R12	7.20	7.51	7.24	7.51	7.24	7.26	7.37	7.51	7.29	7.77	6.90	7.26	7.82	7.77	6.99	7.26	7.82	8.37	7.61	8.37	7.21	7.51	7.00	7.26	7.83	7.79	7.21	7.77	7.02	7.26
AC-R13	1.04	1.05	1.08	1.08	1.06	1.08	1.06	1.08	1.07	1.08	1.04	1.05	1.08	1.08	1.07	1.08	1.01	1.01	1.10	1.01	1.06	1.08	1.05	1.08	1.08	1.08	1.07	1.08	1.01	1.08
AC-R14	126.86	134.17	109.36	107.31	102.22	87.34	126.81	134.17	108.14	97.34	104.01	101.44	118.56	134.17	108.43	109.60	114.53	127.88	108.57	87.34	112.38	116.51	106.41	105.67	94.13	82.98	112.84	116.51	109.95	127.88
AC-R15	23.91	20.82	27.79	24.16	27.65	26.09	23.55	19.22	27.72	23.74	28.23	26.82	25.30	18.12	27.58	24.92	26.26	21.33	29.41	26.09	26.56	21.33	26.91	26.82	31.62	32.60	27.44	22.16	22.66	21.33
AC-R16	48.05	47.71	48.78	49.06	49.36	50.88	50.14	49.37	48.34	49.96	49.08	50.17	49.15	49.96	49.28	50.02	46.29	46.63	50.73	50.88	48.30	49.06	48.95	49.13	48.78	49.18	49.07	49.96	47.45	50.88
AC-R17	0.29	0.30	0.27	0.25	0.27	0.26	0.28	0.26	0.27	0.26	0.28	0.27	0.28	0.25	0.27	0.26	0.26	0.25	0.28	0.26	0.27	0.25	0.29	0.27	0.28	0.27	0.28	0.26	0.25	0.24
AD-R1	0.94	0.92	0.95	0.93	1.02	0.93	0.94	0.92	0.96	0.93	1.02	0.96	0.96	0.81	0.97	0.93	0.93	0.93	0.92	0.93	0.92	0.93	1.16	1.20	1.03	0.96	0.96	0.93	0.97	0.93
AD-R2	5.35	3.85	6.02	4.99	5.72	4.45	5.87	4.10	5.67	4.45	6.36	5.71	6.89	7.28	5.83	4.45	4.88	3.95	4.52	3.95	5.75	4.99	7.24	7.24	6.15	5.13	5.55	4.45	7.01	6.67
AD-R3	4.96	4.51	4.99	4.38	5.00	3.85	4.98	4.09	4.81	4.30	5.62	5.10	5.96	6.22	4.97	4.36	4.23	3.74	3.66	3.60	5.11	4.46	5.69	4.91	4.93	4.00	4.99	4.37	5.02	5.35
AD-R4	0.51	0.44	0.55	0.46	0.51	0.48	0.45	0.43	0.55	0.46	0.55	0.52	0.52	0.41	0.55	0.46	0.46	0.46	0.43	0.43	0.57	0.46	0.48	0.51	0.46	0.47	0.54	0.46	0.52	0.40
AD-R5	0.37	0.32	0.42	0.33	0.33	0.28	0.39	0.32	0.40	0.33	0.33	0.29	0.47	0.38	0.38	0.31	0.37	0.26	0.35	0.35	0.41	0.33	0.33	0.28	0.42	0.36	0.39	0.33	0.36	0.27
AD-R6	0.21	0.21	0.35	0.20	0.18	0.19	0.17	0.17	0.34	0.20	0.19	0.19	0.22	0.21	0.32	0.20	0.18	0.17	0.17	0.17	0.34	0.20	0.19	0.19	0.19	0.19	0.32	0.20	0.18	0.19
AD-R7	1.38	1.44	1.48	1.47	1.50	1.55	1.52	1.51	1.43	1.40	1.53	1.58	1.26	1.07	1.49	1.47	1.53	1.55	1.33	1.52	1.48	1.47	1.52	1.54	1.49	1.50	1.47	1.47	1.45	1.55
AD-R8	0.12	0.11	0.27	0.11	0.10	0.10	0.12	0.11	0.25	0.10	0.11	0.10	0.12	0.10	0.23	0.10	0.13	0.11	0.12	0.10	0.25	0.11	0.10	0.10	0.14	0.13	0.23	0.11	0.11	0.10
AD-R9	3.93	3.69	4.02	3.92	4.77	4.28	4.39	4.16	4.02	4.06	4.62	3.99	4.45	4.46	4.19	4.06	3.94	4.06	3.86	4.06	4.20	4.06	4.45	4.65	4.10	3.84	4.18	4.10	4.31	4.06
AD-R10	0.67	0.65	0.87	0.80	0.74	0.70	0.81	0.79	0.84	0.79	0.68	0.68	0.81	0.88	0.82	0.72	0.75	0.78	0.89	0.86	0.78	0.76	0.82	0.74	0.73	0.72	0.77	0.78	1.02	1.04
AD-R11	0.08	0.08	0.13	0.08	0.09	0.09	0.08	0.08	0.12	0.09	0.10	0.09	0.09	0.10	0.12	0.08	0.08	0.08	0.07	0.08	0.12	0.09	0.09	0.09	0.09	0.09	0.12	0.09	0.07	0.08
AD-R12	0.04	0.04	0.06	0.03	0.04	0.03	0.03	0.03	0.06	0.03	0.04	0.04	0.04	0.04	0.06	0.03	0.04	0.04	0.03	0.03	0.06	0.04	0.03	0.03	0.04	0.03	0.06	0.04	0.03	0.03
AD-R13	4.74	4.28	4.33	4.28	4.63	4.28	4.37	4.28	4.43	4.28	4.77	4.28	5.02	4.58	4.32	4.28	4.72	4.28	4.26	4.28	4.59	4.28	4.26	4.28	5.05	4.28	4.53	4.28	3.92	4.28
AD-R14	1.87	1.98	1.25	1.13	1.48	1.33	1.53	1.82	1.26	1.17	1.86	1.87	1.44	1.36	1.36	1.33	1.63	1.73	1.22	1.17	1.54	1.70	1.12	1.13	1.75	1.53	1.46	1.56	1.00	0.83
AD-R15	1.62	1.64	1.45	1.38	1.63	1.80	1.47	1.51	1.49	1.48	1.69	1.69	1.70	1.85	1.46	1.47	1.67	1.71	1.42	1.48	1.55	1.64	1.51	1.56	1.71	1.72	1.54	1.56	1.35	1.09
AD-R16	2.19	1.95	1.81	1.78	2.06	1.94	1.93	1.86	1.88	1.82	2.15	1.91	2.39	2.63	1.85	1.81	1.95	2.03	1.66	1.76	2.01	1.85	1.91	1.93	2.09	2.22	1.93	1.82	1.88	1.84
AD-R17	0.04	0.03	0.07	0.03	0.04	0.04	0.03	0.03	0.07	0.03	0.04	0.04	0.03	0.03	0.06	0.03	0.04	0.03	0.03	0.03	0.07	0.03	0.03	0.03	0.04	0.03	0.06	0.03	0.02	0.02
AE-R1	0.73	0.68	0.76	0.75	0.72	0.75	0.71	0.67	0.75	0.75	0.77	0.81	0.69	0.65	0.77	0.75	0.69	0.68	0.74	0.75	0.74	0.70	0.77	0.81	0.68	0.65	0.76	0.75	0.71	0.75
AE-R2	190.86	212.30	184.48	187.62	190.95	193.57	194.47	211.87	187.28	187.62	179.61	193.58	192.35	199.81	184.22	193.40	196.38	210.85	184.67	187.62	187.67	202.22	187.62	193.36	212.81	212.10	186.83	197.11	174.35	160.43
AE-R3	0.11	0.10	0.13	0.13	0.12	0.12	0.11	0.11	0.13	0.11	0.12	0.12	0.13	0.12	0.12	0.11	0.13	0.12	0.13	0.12	0.12	0.11	0.13	0.14	0.11	0.11	0.12	0.11	0.14	0.15
AE-R4	0.14	0.14	0.15	0.15	0.15	0.16	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.14	0.15	0.15	0.15	0.14	0.14	0.15	0.15	0.14	0.15	0.15	0.14	0.13	0.14	0.14	0.18	0.18
AE-R5	41.51	40.48	52.24	46.11	54.98	58.28	42.38	41.92	52.57	47.00	53.94	53.09	47.38	43.37	52.76	46.11	46.07	39.81	53.84	58.28	49.72	43.37	53.32	49.39	61.67	67.84	50.31	43.37	48.25	40.47
AE-R6	0.04	0.03	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.06	0.04	0.05	0.04	0.05	0.05	0.05	0.06	0.05	0.04	0.05	0.05
AE-R7	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.08	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.07	0.06	0.07	0.07	0.09	0.09
AF-R1	0.76	0.66	0.62	0.61	0.61	0.68	0.72	0.64	0.60	0.63	0.70	0.63	0.64	0.65	0.67	0.64	0.52	0.51	0.60	0.64	0.67	0.63	0.56	0.51	0.57	0.59	0.65	0.64	0.62	0.51
AF-R2	1.51	1.41	1.46	1.40	1.29	1.30	1.48	1.28	1.43	1.40	1.36	1.31	1.29	1.13	1.41	1.36	1.65	1.60	1.50	1.35	1.44	1.29	1.34	1.42	1.24	1.30	1.40	1.30	1.66	1.47
AF-R3	26.14	24.27	24.61	22.47	26.07	25.12	23.10	21.36	25.61	24.26	26.05	25.09	28.02	24.38	24.92	23.99	24.31	23.01	27.19	25.13	24.50	23.25	26.32	26.16	29.81	28.39	24.33	23.01	27.04	25.12
AF-R4	23.05	22.95	20.81	18.89	19.46	16.77	19.64	17.51	20.78	19.17	22.46	19.76	25.77	23.86	20.25	18.89	19.55	18.61	19.85	18.61	20.98	19.17	21.39	18.71	21.15	20.39	20.24	18.29	23.80	20.36
AF-R5	31.70	34.40	28.79	29.46	29.62	32.29	31.37	32.13	29.05	30.20	29.34	28.32	30.77	32.84	28.49	29.74	33.09	32.89	27.85	29.18	29.60	32.08	30.65	33.51	29.86	30.21	30.22	32.29	25.90	23.77
AF-R6	0.81	0.75	0.95	0.85	0.92	0.98	0.97	0.96	0.89	0.89	0.94	0.75	0.84	0.76	0.92	0.81	0.94	0.98	0.90	0.89	0.93	0.85	0.89	0.79	0.87	0.79	0.93	0.84	0.87	0.98
AF-R7	0.03	0.03	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.04
AF-R8	165.54	129.93	155.92	123.57	158.94	132.32	140.80	119.30	157.68	123.90	178.42	138.37	188.80	151.63	157.63	126.15	135.65	120.86	162.31	126.04	158.57	125.08	154.13	116.13	150.72	131.12	151.65	123.77	195.37	138.83
AF-R9	0.12	0.12	0.13	0.12	0.12	0.12	0.13	0.14	0.12	0.12	0.13	0.13	0.11	0.11	0.12	0.12	0.13	0.13	0.10	0.10	0.13	0.13	0.12	0.12	0.10	0.11	0.13	0.12	0.11	0.13
AF-R10	0.11	0.11	0.13	0.12	0.13	0.10	0.10	0.10	0.13	0.12	0.12	0.13	0.12	0.12	0.12	0.10	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.10	0.13	0.13	0.12	0.10	0.14	0.14
AF-R11	0.18	0.18	0.19	0.17	0.17	0.16	0.17	0.17	0.19	0.18	0.16	0.15	0.18	0.17	0.18	0.17	0.19	0.20	0.20	0.18	0.18	0.17	0.20	0.20	0.17	0.17	0.19	0.17	0.18	0.18
AF-R12	1.29	0.92	1.29	0.99	0.87	0.75	1.15	0.82	1.20	0.92	1.18	0.99	1.13	1.04	1.21	0.95	1.13	0.75	1.18	0.75	1.23	0.99	1.03	0.83	1.01	0.83	1.25	0.99	1.00	0.80
AF-R13	36.52	33.94	33.17	32.84	34.51	33.56	31.58	30.65	34.16	33.55	36.38	33.82	36.45	32.95	34.25	33.55	31.36	31.38	34.48	33.69	34.92	33.16	30.69	30.24	30.74	27.99	34.49	33.81	34.11	32.14
AF-R14	9.32	9.48	7.96	8.29	7.54	8.37	8.99	8.56	7.73	8.29	8.55	8.79	7.43	6.97	7.94	8.33	9.41	8.37	7.37	8.29	8.25	8.38	8.17	8.61	8.25	8.58	8.25	8.40	7.28	7.46
AF-R15	2.78	2.64	2.64	2.73	2.68	2.75	2.57	2.27	2.64	2.72	2.90	2.93	2.64	2.69	2.72	2.74	2.52	2.60	2.80	2.87	2.68	2.69	2.55	2.49	2.85	2.88	2.65	2.73	2.68	2.60
AF-R16	0.13	0.13	0.13	0.12	0.12	0.11	0.12	0.12	0.13	0.12	0.12	0.12	0.14	0.14	0.12	0.12	0.13	0.13	0.14	0.13	0.12	0.12	0.14	0.15	0.13	0.14	0.13	0.12	0.11	0.11
AG-R1	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.05	0.06	0.05	0.05	0.04	0.05	0.05	0.05	0.05
AG-R2	0.61	0.64	0.71	0.73	0.61	0.56	0.68	0.77	0.67	0.68	0.63	0.63	0.63	0.66	0.65	0.67	0.77	0.80	0.70	0.71	0.65	0.65	0.68	0.77	0.80	0.85	0.64	0.65	0.73	0.80
AG-R3	1.43	1.38	1.39	1.28	1.06	1.00	1.49	1.40	1.31	1.27	1.16	1.03	1.12	1.11	1.28	1.22	1.63	1.47	1.20	1.34	1.34	1.27	1.30	1.18	1.77	1.71	1.30	1.27	1.15	1.01
AG-R4	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.04	0.06	0.06	0.05	0.05	0.06	0.06	0.07	0.08	0.05	0.05	0.06	0.05
AG-R5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
AG-R6	0.11	0.10	0.14	0.13	0.13	0.13	0.14	0.12	0.13	0.13	0.12	0.11	0.14	0.13	0.13	0.13	0.13	0.12	0.13	0.12	0.13	0.13	0.14	0.12	0.13	0.13	0.13	0.12	0.13	0.13
AG-R7	0.13	0.13	0.12	0.12	0.13	0.12	0.13	0.13	0.11	0.12	0.14	0.13	0.12	0.13	0.12	0.12	0.12	0.12	0.09	0.09	0.13	0.13	0.11	0.12	0.11	0.12	0.12	0.13	0.11	0.12
AG-R8	6.62	6.19	7.05	6.53	7.77	7.05	6.98	6.71	7.22	6.57	7.07	7.12	6.60	5.92	7.24	6.72	7.20	6.77	7.47	6.78	6.76	6.43	8.34	7.65	9.24	8.70	6.92	6.55	7.05	6.58
AG-R9	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.02	0.03	0.03
AG-R10	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.03	0.03	0.03	0.03
AG-R11	6.05	5.74	6.56	6.12	6.78	5.98	7.14	7.12	6.39	5.98	6.38	5.98	6.23	6.59	6.76	5.98	5.68	5.76	6.03	5.98	6.23	5.98	8.08	6.86	8.28	7.64	6.31	5.98	6.57	5.98
AH-R1	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.04
AH-R2	1.58	1.58	1.62	1.49	1.71	1.48	1.62	1.48	1.64	1.56	1.61	1.44	1.42	1.36	1.66	1.51	1.67	1.57	1.66	1.57	1.66	1.56	1.50	1.41	1.29	1.27	1.69	1.58	1.57	1.56
AH-R3	0.69	0.75	0.77	0.79	0.64	0.53	0.76	0.79	0.73	0.75	0.68	0.68	0.67	0.57	0.70	0.75	0.86	0.86	0.72	0.75	0.73	0.76	0.72	0.77	0.88	0.84	0.73	0.77	0.63	0.55
AH-R4	22.72	21.36	20.60	19.38	20.90	20.33	22.56	22.20	20.71	19.35	20.78	20.19	21.23	19.15	21.45	19.94	19.07	18.92	21.71	22.57	21.15	19.58	20.08	19.70	21.18	20.17	21.60	20.02	18.33	19.35
AH-R5	171.50	171.03	155.14	158.38	182.58	174.71	175.55	180.55	158.09	157.14	178.14	175.23	143.90	145.32	167.57	160.09	169.74	153.76	166.00	160.09	161.86	159.45	174.52	172.45	170.40	172.45	164.25	159.93	163.96	154.70
AH-R6	1.12	1.09	1.07	0.95	1.20	1.04	1.18	1.20	1.07	0.92	1.19	1.04	1.00	0.84	1.10	0.99	1.26	1.19	1.12	1.19	1.10	0.98	1.13	1.01	1.21	1.06	1.10	0.99	1.13	0.92

ADDENDUM G

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AH-R7	0.99	1.07	1.05	1.06	1.10	1.00	1.24	1.20	1.03	1.00	0.95	0.79	1.02	0.97	1.04	1.03	1.12	1.16	1.11	1.13	1.02	1.01	1.12	1.22	1.26	1.25	1.05	1.01	0.96	0.63
AH-R8	1.13	1.07	1.08	0.99	1.21	1.31	1.15	1.12	1.09	0.98	1.21	1.12	1.26	1.24	1.08	1.01	1.21	1.08	1.15	1.05	1.12	1.05	1.10	0.97	1.09	0.93	1.13	1.05	1.13	0.96
AH-R9	1.03	0.97	1.13	1.03	1.23	1.15	1.12	1.07	1.13	1.03	1.17	1.10	1.00	1.02	1.15	1.05	1.17	1.08	1.33	1.33	1.05	1.00	1.30	1.37	1.26	1.36	1.15	1.03	1.01	1.05
AH-R10	6.68	6.27	8.31	7.65	8.73	8.05	7.90	7.49	8.13	7.56	8.34	7.76	9.28	11.21	8.00	7.46	7.71	7.56	8.76	8.60	7.83	7.37	8.65	8.08	8.32	7.58	8.25	7.62	7.39	6.73
AH-R11	7.44	6.86	7.70	7.58	7.61	7.04	7.93	7.10	7.63	7.36	7.35	6.67	6.68	6.79	7.89	7.40	7.29	6.83	8.97	7.97	7.14	7.14	8.32	8.20	9.93	9.68	7.51	7.21	6.91	6.75
AH-R12	6.65	6.52	7.21	7.11	7.18	6.68	7.20	6.88	7.10	6.68	7.02	7.37	8.49	8.81	6.96	6.70	6.57	6.57	6.12	6.18	7.54	7.28	6.32	5.44	7.96	7.74	6.89	6.61	7.66	7.36
AH-R13	7.01	7.02	7.33	7.28	7.53	7.51	7.75	7.52	7.32	7.32	6.90	6.62	7.32	7.75	7.18	7.16	7.97	7.50	7.65	7.51	7.22	7.05	7.41	7.42	7.98	6.78	7.46	7.50	6.26	5.97
AH-R14	8.53	8.22	8.31	8.04	7.74	6.33	8.02	8.04	8.17	7.84	8.55	8.61	8.01	7.84	7.99	7.94	9.38	8.14	7.69	6.75	8.46	8.05	7.73	6.99	7.03	6.99	8.27	8.05	8.57	8.10
AH-R15	23.74	20.54	23.21	21.23	24.25	24.24	21.26	19.36	23.39	22.00	26.45	26.53	22.52	24.06	24.89	23.16	18.35	18.44	24.68	22.54	23.62	21.86	22.34	20.49	17.43	17.48	23.98	22.27	25.01	23.78
AH-R16	1.06	0.93	1.05	0.92	0.94	0.87	1.08	1.10	1.02	0.87	1.00	0.95	1.07	0.88	1.05	0.99	0.89	0.78	0.90	0.85	1.05	0.95	1.02	0.97	1.15	1.17	1.03	0.93	0.92	0.77
AH-R17	60.37	59.05	61.84	54.28	60.10	54.63	66.14	61.64	62.52	54.63	51.20	44.28	58.98	49.20	61.65	55.18	60.77	66.35	67.72	48.38	60.65	56.57	57.28	45.08	46.37	46.08	60.81	55.59	71.27	66.35
AH-R18	226.46	233.77	210.58	212.13	215.86	218.75	235.56	228.00	216.44	213.92	187.51	205.46	213.04	212.74	212.43	216.34	226.48	236.13	208.93	196.74	216.18	218.75	214.15	220.31	169.00	168.13	216.90	216.34	230.12	236.13
AH-R19	196.68	191.77	204.93	200.44	219.49	219.12	180.37	182.66	212.34	200.42	214.39	196.38	207.02	197.88	208.08	199.45	202.21	186.41	237.01	232.13	201.21	198.00	202.59	189.84	172.01	176.62	205.20	199.45	235.88	254.09
AH-R20	0.17	0.16	0.17	0.16	0.18	0.16	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.14	0.17	0.16	0.18	0.16	0.18	0.17	0.16	0.16	0.18	0.16	0.17	0.17	0.17	0.16	0.16	0.14
AH-R21	26.17	27.10	25.53	23.77	22.46	23.58	22.21	23.18	25.16	23.97	26.61	27.23	23.39	22.07	25.13	24.44	25.09	23.97	27.22	25.11	24.69	23.68	23.60	24.34	21.11	22.45	25.05	24.11	26.30	23.97
AH-R22	17.54	20.89	17.09	15.76	15.90	14.96	15.41	15.34	16.74	15.71	18.88	18.73	18.86	19.58	16.93	15.37	14.96	11.31	15.70	14.13	17.34	16.87	16.21	12.31	10.81	10.74	17.42	16.87	17.73	15.71
AI-R1	0.06	0.06	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.06	0.06	0.05	0.05	0.04	0.03
AI-R2	2.82	2.72	1.89	1.46	1.60	1.35	2.71	2.72	1.75	1.46	2.12	1.93	1.99	1.64	1.87	1.41	2.52	2.45	1.80	1.36	2.05	1.60	1.89	1.77	2.33	2.00	2.02	1.63	1.59	1.27
AI-R3	1.04	1.09	0.84	0.78	0.84	0.74	1.02	0.99	0.80	0.74	0.98	1.09	0.86	0.74	0.86	0.80	0.96	0.79	0.77	0.74	0.94	0.86	0.73	0.71	0.86	0.72	0.87	0.79	0.89	0.86
AI-R4	23.44	25.23	21.77	21.47	22.27	25.11	25.70	25.23	20.67	20.97	24.18	27.51	23.12	24.80	22.50	24.74	19.98	24.22	17.54	20.00	22.55	25.17	24.90	25.06	20.00	21.07	21.94	24.37	24.66	28.57
AI-R5	1.42	1.40	1.36	1.24	1.23	1.35	1.59	1.51	1.27	1.19	1.33	1.40	1.55	1.60	1.31	1.31	1.28	0.92	1.07	0.86	1.43	1.40	1.23	1.16	1.00	0.94	1.34	1.28	1.52	1.61
AI-R6	144.97	141.53	178.97	189.48	179.28	182.21	168.51	167.29	169.79	182.61	189.16	187.14	161.14	167.91	182.83	190.05	138.23	140.80	157.67	140.80	170.36	183.78	196.32	187.39	148.98	148.32	170.69	183.02	197.96	184.14
AI-R7	10.19	11.13	9.58	10.23	9.34	10.38	12.05	11.84	8.79	7.97	10.27	11.64	9.29	10.05	9.84	11.10	8.96	7.64	7.65	7.22	10.21	11.43	9.19	8.82	7.46	6.84	9.52	9.83	11.39	11.80
AI-R8	6.97	6.46	6.83	6.95	7.39	7.51	6.71	6.08	7.06	7.28	7.04	6.78	6.89	6.50	6.97	7.05	7.15	6.94	7.59	7.44	6.50	6.46	8.30	7.74	7.96	7.48	7.00	6.80	6.42	6.80
AI-R9	211.55	189.95	236.84	232.52	209.66	185.37	270.83	276.05	219.67	198.55	202.46	181.03	191.35	168.76	225.98	211.11	253.88	242.92	190.37	176.71	226.64	196.50	253.10	240.67	265.54	214.72	229.38	199.39	185.09	188.51
AI-R10	0.18	0.17	0.18	0.17	0.18	0.17	0.21	0.22	0.17	0.16	0.20	0.18	0.21	0.23	0.18	0.17	0.16	0.15	0.15	0.14	0.19	0.18	0.20	0.17	0.15	0.15	0.18	0.17	0.20	0.19
AJ-R1	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.07	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.05	0.06	0.06
AJ-R2	1.65	1.14	1.92	1.89	2.04	2.06	1.57	1.33	2.03	1.94	1.76	1.88	1.86	1.82	1.90	1.82	1.93	2.08	2.27	2.36	1.83	1.79	1.84	1.92	1.86	1.63	1.91	1.80	1.88	2.08
AJ-R3	0.90	0.91	0.81	0.78	0.72	0.67	0.83	0.83	0.80	0.78	0.78	0.75	0.84	0.84	0.80	0.77	0.79	0.80	0.82	0.86	0.82	0.79	0.73	0.71	0.69	0.71	0.83	0.79	0.74	0.72
AJ-R4	19.71	20.32	22.26	25.27	20.56	21.10	21.36	21.04	21.41	23.16	21.38	21.28	20.92	21.87	21.92	22.86	19.41	20.97	21.71	20.98	21.33	21.31	21.37	23.84	21.29	22.87	21.37	21.31	21.58	22.57
AJ-R5	175.34	157.29	159.78	150.14	156.63	150.23	161.84	133.50	164.66	156.05	151.24	145.18	144.73	133.14	164.77	157.04	162.69	156.05	177.98	170.16	158.39	154.90	160.29	148.53	138.56	142.42	165.79	152.26	155.51	158.20
AJ-R6	7.09	7.14	8.75	8.44	8.19	8.06	7.84	7.84	8.42	8.00	8.42	8.40	7.45	6.71	8.45	8.17	8.47	7.87	7.71	8.00	8.46	7.97	8.32	7.92	10.30	9.65	8.30	8.17	7.27	7.20
AJ-R7	9.38	10.56	8.22	7.61	7.85	7.57	8.61	8.76	8.11	7.43	8.92	9.80	9.64	10.42	8.05	7.10	8.56	8.29	8.73	7.35	8.22	7.95	8.44	7.97	10.97	10.96	8.18	7.58	7.60	7.57
AJ-R8	282.79	273.34	200.03	181.02	212.31	185.38	213.23	213.16	206.14	188.50	264.31	200.68	246.35	258.44	217.60	186.94	193.85	202.10	201.41	188.50	211.16	194.69	256.70	226.32	229.26	232.21	218.95	194.69	205.30	149.98
AJ-R9	266.28	252.09	229.29	214.12	250.64	225.21	210.10	207.87	237.86	220.36	283.79	309.44	269.91	264.74	242.92	228.65	208.02	208.39	256.31	262.62	231.18	219.56	264.92	273.24	238.03	234.86	248.18	235.69	208.36	208.39
AJ-R10	0.15	0.15	0.17	0.17	0.16	0.17	0.16	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.17	0.16	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.19	0.20	0.16	0.17	0.16	0.17
AK-R1	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.06	0.06	0.05	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.07	0.05	0.05	0.05	0.05
AK-R2	1.58	1.62	1.61	1.64	1.85	1.69	1.61	1.63	1.56	1.49	2.10	1.96	1.60	1.32	1.67	1.67	1.67	1.57	1.63	1.69	1.60	1.52	1.95	1.66	1.71	1.75	1.62	1.64	1.83	1.69
AK-R3	0.63	0.65	0.81	0.77	0.86	0.86	0.81	0.80	0.78	0.76	0.83	0.83	0.77	0.74	0.82	0.77	0.67	0.69	0.84	0.86	0.77	0.75	0.83	0.75	0.77	0.73	0.78	0.75	0.86	0.85
AK-R4	18.82	18.49	21.09	23.49	19.74	20.25	15.85	16.53	21.87	24.38	19.38	17.02	21.28	22.44	20.70	21.72	18.03	19.65	22.46	23.71	19.84	19.95	20.48	19.59	18.47	17.78	20.44	19.95	21.02	24.38
AK-R5	150.25	158.15	163.54	158.11	154.00	151.62	149.87	147.83	166.28	159.07	140.88	146.66	166.01	158.13	159.73	153.57	148.66	159.22	155.46	159.20	160.97	155.98	153.87	159.56	139.15	159.22	163.10	158.11	149.46	141.02
AK-R6	7.89	7.58	8.78	8.20	7.17	6.50	7.59	7.14	8.69	8.20	7.22	5.61	6.95	7.07	8.77	8.61	6.87	7.38	8.75	8.20	8.09	7.68	8.30	7.88	7.74	6.70	8.32	7.90	8.06	6.90
AK-R7	7.71	7.55	7.45	7.16	7.21	7.47	6.62	6.30	7.32	7.13	8.67	8.11	9.22	9.05	7.54	7.45	5.45	5.16	6.82	6.47	7.25	7.45	8.68	7.78	6.25	6.31	7.69	7.43	6.90	7.62
AK-R8	8.37	7.69	8.22	7.97	7.56	7.45	9.44	9.10	7.97	7.75	7.14	7.02	9.04	9.41	7.89	7.63	8.17	7.45	8.01	7.34	8.03	7.63	8.38	8.67	7.54	7.72	8.21	7.82	7.79	6.85
AK-R9	249.60	253.94	203.82	188.84	192.47	200.18	228.86	239.26	207.76	190.91	194.68	175.48	256.66	253.95	198.91	195.54	215.45	188.60	189.83	188.60	208.61	195.57	228.25	204.91	179.04	182.69	209.11	200.18	226.77	237.99
AK-R10	0.17	0.15	0.17	0.16	0.15	0.15	0.15	0.14	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.14	0.12	0.14	0.14	0.17	0.17	0.17	0.15	0.15	0.14	0.16	0.15	0.21	0.22
AL-R1	0.07	0.07	0.05	0.05	0.06	0.05	0.06	0.07	0.05	0.05	0.06	0.06	0.07	0.07	0.06	0.05	0.06	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.07	0.07	0.06	0.05	0.05	0.05
AL-R2	2.60	2.47	2.04	1.99	1.94	1.74	2.54	2.55	1.87	1.84	2.57	2.53	2.06	2.02	2.06	1.99	2.41	2.38	2.14	2.05	2.10	2.02	2.16	1.93	2.69	2.67	2.14	2.03	1.69	1.66
AL-R3	0.99	1.00	0.76	0.78	0.83	0.83	0.97	0.91	0.73	0.78	0.98	1.00	0.80	0.82	0.83	0.79	0.80	0.76	0.79	0.79	0.82	0.79	0.86	0.81	0.95	0.97	0.83	0.79	0.70	0.72
AL-R4	20.40	21.72	19.99	19.83	19.69	19.66	20.72	20.13	20.40	20.97	17.75	16.89	17.43	16.82	20.00	19.93	22.15	22.47	21.73	20.97	18.73	19.56	23.19	25.86	20.87	22.26	20.15	20.01	18.71	19.46
AL-R5	162.75	170.39	152.80	143.29	139.56	145.29	152.01	143.50	153.48	157.14	142.86	128.25	155.58	160.32	148.42	145.38	160.98	132.14	129.02	112.52	153.28	157.11	163.54	172.61	106.22	108.07	151.01	148.16	178.66	201.50
AL-R6	1.15	0.84	0.96	0.97	0.78	0.75	1.02	0.86	0.94	0.93	0.91	0.81	0.87	0.90	0.93	0.88	1.08	1.09	0.85	0.78	0.95	0.94	1.03	0.88	0.74	0.72	0.97	0.88	0.98	1.00
AL-R7	1.15	0.84	0.96	0.97	0.78	0.75	1.02	0.86	0.94	0.93	0.91	0.81	0.87	0.90	0.93	0.88	1.08	1.09	0.85	0.78	0.95	0.94	1.03	0.88	0.74	0.72	0.97	0.88	0.98	1.00
AL-R8	8.07	7.46	7.55	7.50	6.98	7.28	8.39	7.84	7.35	7.28	7.16	7.04	7.51	8.03	7.19	7.06	8.94	7.88	7.28	7.80	7.65	7.56	7.15	6.74	7.03	7.62	7.53	7.44	7.64	6.73
AL-R9	6.37	6.33	6.54	6.31	6.68	6.47	6.29	6.26	6.34	6.41	7.56	6.81	6.70	6.49	6.63	6.30	6.04	6.41	6.14	6.45	6.35	6.23	7.63	6.74	6.50	6.32	6.63	6.43	6.17	6.08
AL-R10	6.29	6.82	7.98	7.29	9.22	9.01	7.18	6.82	8.21	7.29	7.95	7.41	7.08	5.48	8.37	7.55	6.95	7.02	9.10	9.39	7.54	7.32	8.63	7.47	8.27	7.68	8.10	7.36	7.21	7.11
AL-R11	6.08	6.26	6.09	5.83	6.19	5.98	6.24	6.03	5.94	5.79	6.58	6.79	5.75	4.26	6.18	5.90	6.07	5.98	5.70	5.78	6.23	5.94	6.03	5.92	5.37	5.00	6.20	5.90	6.08	5.98
AL-R12	6.37	6.33	6.54	6.31	6.68	6.47	6.29	6.26	6.34	6.41	7.56	6.81	6.70	6.49	6.63	6.30	6.04	6.41	6.14	6.45	6.35	6.23	7.63	6.74	6.50	6.32	6.63	6.43	6.17	6.08
AL-R13	5.30	5.16	5.32	4.90	5.54	4.71	5.54	5.08	4.87	4.74	6.99	6.62	5.56	5.76	5.37	4.85	5.22	4.57	4.76	4.71	5.23	4.90	6.40	5.63	6.18	5.60	5.16	4.80	5.92	4.94
AL-R14	252.10	261.05	273.89	259.66	243.71	206.08	249.82	242.20	276.79	265.08	224.16	216.63	270.06	278.16	252.13	237.17	304.31	322.60	341.32	322.60	251.88	257.63	234.16	219.78	272.64	298.22	268.70	260.98	227.49	212.38
AL-R15	214.14	219.22	217.08	199.11	211.86	199.28	195.90	186.71	224.95	217.03	199.62	195.47	211.73	213.75	216.57	196.37	212.42	217.03	263.90	277.85	201.84	193.41	223.13	201.53	232.17	236.14	213.72	207.32	213.20	195.60
AL-R16	0.17	0.17	0.16	0.16	0.15	0.13	0.17	0.15	0.16	0.16	0.17	0.18	0.14	0.15	0.16	0.16	0.17	0.18	0.15	0.13	0.16	0.17	0.17	0.17	0.13	0.13	0.16	0.16	0.18	0.19
AM-R1	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.05
AM-R2	1.61	1.45	1.87	1.69	1.75	1.67	1.75	1.72	1.85	1.69	1.64	1.58	2.03	1.96	1.77	1.68	1.70	1.47	1.80	1.63	1.88	1.73	1.48	1.45	1.41	1.41	1.80	1.69	1.99	2.21
AM-R3	0.90	0.80	0.77	0.76	0.76	0.75	0.77	0.78	0.74	0.76	1.01	0.93	0.78	0.77	0.79	0.77	0.83	0.79	0.84	0.85	0.79	0.78	0.77	0.78	0.85	0.80	0.81	0.78	0.69	0.69
AM-R4	18.16	17.98	19.78	19.53	22.10	20.97	18.58	17.54	20.77	20.59	18.93	19.74	17.12	15.88	20.42	19.77	20.91	19.17	26.95	28.70	18.78	18.73	18.80	20.01	16.43	14.96	20.63	19.65	19.34	19.66
AM-R5	0.98	0.81	0.94	0.90	1.05	1.03	0.83	0.75	1.04	1.00	0.87	0.86	1.01	0.77	0.97	0.91	0.93	0.84	1.23	1.19	0.91	0.82	0.97	0.87	0.85	0.83	0.99	0.91	0.95	0.84
AM-R6	0.99	0.90	1.06	1.04	1.17	1.16	1.07	1.06	1.08	1.07	1.03	1.03	0.93	0.97	1.09	1.06	1.12	1.14	1.12	1.10	1.05	1.04	1.11	1.17	0.86	0.92	1.08	1.06	1.16	1.20
AM-R7	1.00	0.83	0.98	0.93	1.14	1.12	0.96	0.86	1.03	1.01	1.04	0.93	1.04	0.87	1.03	1.01	0.96	0.88	1.01	1.05	1.03	1.00	0.99	0.90	0.84	0.83	1.05	1.03	1.01	1.01
AM-R8	0.90	0.81	0.96	0.89	1.07	1.00	0.94	0.94	1.04	1.00	0.79	0.78	1.10	0.79	0.96	0.98	0.92	0.92	1.28	1.08	0.90	0.86	0.97	0.90	0.68	0.67	1.03	1.00	0.88	0.88
AM-R9	1.14	1.16	1.02	0.98	1.06	1.00	0.92	0.85	1.11	1.01	0.95	0.91	1.12	1.08	1.07	1.00	0.92	0.78	1.36	1.43	1.00	1.00	0.95	0.81	0.84	0.80	1.10	1.02	0.91	0.79
AM-R10	165.88	146.56	160.01	148.61	193.84	217.80	160.04	153.74	171.58	152.77	170.39	144.06	162.59	148.09	168.41	151.24	179.27	179.97	190.98	217.80	163.30	151.24	172.96	145.36	123.18	125.26	173.12	156.42	177.21	138.93
AM-R11	7.30	7.76	7.31	6.55	8.69	9.05	8.33	7.45	7.45	7.51	7.68	8.02	7.08	7.05	7.95	7.76	6.76	6.12	8.32	8.05	7.54	7.21	7.45	7.52	5.05	4.86	8.03	7.76	7.28	6.35
AM-R12	6.47	6.17	6.25	6.17	6.46	6.26	5.11	4.98	6.49	6.23	7.05	7.91	6.53	6.38	6.30	6.17	6.37	5.67	7.41	7.42	6.14	5.90	6.17	5.85	6.17	5.90	6.31	6.17	6.61	6.26
AM-R13	5.73	5.40	4.83	4.64	5.48	5.26	4.45	4.24	5.14	4.84	5.89	5.78	5.41	4.78	5.29	4.94	4.27	4.13	5.13	4.92	5.09	4.61	5.37	4.94	4.76	4.30	5.25	4.92	4.85	4.16
AM-R14	7.13	7.15	7.53	7.07	7.96	7.98	8.50	9.34	7.25	6.92	7.79	7.62	8.35	8.48	7.61	7.16	6.69	6.73	5.70	4.98	8.08	7.53	7.27	7.10	7.86	7.27	7.37	7.08	8.34	7.98
AM-R15	3.23	2.72	3.33	3.22	2.98	2.88	2.91	2.98	3.38	3.16	3.02	2.69	3.50	3.27	3.22	2.97	3.06	3.22	4.01	3.61	3.17	3.00	2.78	2.75	3.24	3.21	3.28	3.13	3.00	2.88
AM-R16	5.10	4.13	5.95	5.71	5.78	5.74	6.46	7.07	5.58	5.65	5.67	5.51	5.42	4.98	5.51	5.48	7.16	7.78	5.24	5.65	5.67	5.48	6.52	6.13	6.67	6.13	5.58	5.47	6.08	6.06
AM-R17	8.93	8.40	7.71	7.50	8.38	9.04	8.63	8.73	7.62	7.48	9.24	9.35	7.72	7.35	7.91	7.62	9.20	9.23	6.41	7.27	8.35	8.40	8.56	8.22	8.96	9.20	7.64	7.62	9.74	10.10
AM-R18	222.61	216.18	263.53	243.88	260.83	266.82	262.92	277.96	269.06	260.97	199.47	164.58	253.37	256.09	251.60	218.28	275.78	279.64	261.17	260.97	260.51	259.65	232.28	176.36	278.87	314.16	254.67	239.74	246.76	252.47

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AM-R19	194.30	174.70	207.65	215.97	191.72	187.51	193.74	201.97	216.82	225.89	153.06	159.49	209.61	219.31	200.19	191.68	199.78	225.89	182.66	176.12	209.14	225.92	188.69	186.92	198.68	209.09	201.91	202.17	200.36	187.52
AM-R20	10.39	9.90	9.52	8.39	9.70	9.30	10.74	10.71	9.94	9.50	7.89	6.87	9.30	9.40	9.82	9.32	9.60	8.53	9.64	8.62	9.79	9.90	9.48	7.66	9.31	8.46	9.81	9.40	9.48	10.57
AM-R21	0.16	0.12	0.18	0.18	0.19	0.19	0.15	0.12	0.19	0.19	0.18	0.18	0.17	0.17	0.18	0.17	0.18	0.19	0.21	0.21	0.17	0.17	0.18	0.19	0.14	0.12	0.19	0.17	0.18	0.19
AN-R1	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.02	0.03	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.06	0.06	0.04	0.04	0.03	0.03
AN-R2	1.31	1.37	1.48	1.32	1.38	1.49	1.33	1.27	1.60	1.68	0.87	1.23	1.48	1.27	1.35	1.43	1.72	1.69	1.94	1.68	1.23	1.27	1.71	1.63	2.15	2.01	1.39	1.43	1.15	1.27
AN-R3	0.57	0.55	0.65	0.74	0.63	0.79	0.71	0.66	0.64	0.74	0.51	0.60	0.67	0.65	0.61	0.73	0.70	0.74	0.73	0.79	0.59	0.66	0.72	0.77	0.83	0.79	0.61	0.73	0.61	0.69
AN-R4	21.38	23.63	17.89	19.76	15.59	17.88	21.84	22.77	17.89	19.45	14.28	18.94	22.43	20.31	16.90	19.04	18.90	24.22	23.25	21.30	15.89	17.29	21.03	20.49	22.46	22.84	17.43	19.43	17.89	17.88
AN-R5	126.97	139.41	135.31	161.27	154.04	174.02	166.36	166.57	136.70	157.22	116.66	151.18	140.23	131.76	137.08	162.81	142.90	161.62	160.89	166.77	127.88	157.16	158.22	167.36	163.58	161.27	127.20	157.08	178.48	184.17
AN-R6	7.11	6.73	6.77	6.57	7.23	7.05	7.09	6.36	6.93	7.05	6.84	7.45	7.01	6.03	6.87	6.84	7.23	8.16	7.77	7.68	5.70	5.89	10.89	12.07	9.95	9.38	6.22	6.37	8.72	9.91
AN-R7	5.44	6.36	5.99	6.15	4.92	5.30	6.01	6.10	5.97	6.11	4.03	5.86	6.98	6.78	5.52	5.86	4.99	5.51	6.77	7.22	5.48	5.88	5.19	5.86	5.97	6.12	5.39	6.03	6.58	5.78
AN-R8	4.56	4.27	4.70	5.15	4.91	4.46	5.49	4.65	4.72	5.05	3.97	4.99	4.93	4.11	4.75	5.12	4.44	4.21	6.51	7.01	4.21	4.61	5.08	5.15	6.69	6.67	4.44	4.65	5.00	4.77
AN-R9	7.05	7.97	5.50	5.50	7.67	6.95	9.18	9.03	6.31	6.36	3.41	4.52	9.46	9.55	5.78	5.92	6.00	5.50	8.48	7.33	5.98	6.51	5.61	5.45	8.36	8.65	6.23	6.35	5.50	4.94
AN-R10	3.19	3.22	3.08	3.33	2.59	2.40	3.54	3.22	3.03	3.22	2.24	2.63	4.26	3.92	2.70	3.04	3.17	3.22	3.33	3.01	2.92	3.29	2.88	2.90	4.31	4.22	2.68	3.04	3.66	4.70
AN-R11	5.50	5.41	4.81	5.47	4.47	4.83	6.39	5.89	4.83	5.39	3.38	3.91	5.60	5.08	4.63	5.06	5.21	5.48	6.21	5.48	4.61	5.15	4.55	5.09	5.04	5.15	4.90	5.43	4.47	3.69
AN-R12	7.59	7.18	5.86	6.39	6.74	7.84	7.04	6.71	6.35	6.85	5.84	8.73	8.19	7.10	6.03	7.04	6.44	6.85	6.79	6.31	5.95	7.04	7.63	9.07	7.31	6.97	6.17	6.84	6.88	7.84
AN-R13	207.52	179.02	198.82	217.43	197.65	205.79	233.86	216.53	188.83	205.79	207.09	267.86	295.58	327.16	182.51	207.72	198.54	164.93	236.97	209.64	182.84	200.66	232.46	197.14	311.23	333.99	180.63	179.02	231.02	231.43
AN-R14	171.17	140.62	149.43	168.72	209.23	218.57	193.45	190.24	165.50	171.78	151.11	157.43	219.48	223.28	154.86	171.78	183.37	180.77	202.91	209.64	156.45	168.72	180.27	181.03	251.35	277.81	152.14	170.24	196.84	180.77
AN-R15	0.15	0.15	0.15	0.17	0.15	0.17	0.16	0.15	0.15	0.17	0.13	0.17	0.15	0.15	0.15	0.17	0.16	0.16	0.17	0.17	0.13	0.15	0.22	0.22	0.20	0.21	0.14	0.16	0.19	0.18
AN-R16	5.88	6.56	5.27	6.07	5.34	5.93	6.48	6.73	5.24	5.93	4.90	6.44	7.51	7.76	4.97	5.85	5.55	6.76	6.44	6.20	4.90	5.49	6.35	7.32	6.66	6.83	5.05	5.49	6.36	6.76
AO-R1	0.06	0.06	0.05	0.05	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.07	0.07	0.06	0.05	0.05	0.05	0.04	0.04	0.05	0.06	0.05	0.05	0.06	0.05
AO-R2	1.75	1.60	1.74	1.56	1.83	1.40	1.94	1.92	1.79	1.53	1.46	1.48	1.86	1.76	1.59	1.49	2.46	2.44	1.93	1.84	1.83	1.65	1.36	1.32	2.04	2.05	1.66	1.56	2.09	1.46
AO-R3	0.82	0.76	0.75	0.74	0.91	0.89	0.83	0.75	0.79	0.78	0.82	0.86	0.81	0.80	0.79	0.75	0.86	0.78	0.81	0.82	0.82	0.77	0.72	0.70	0.90	0.90	0.80	0.78	0.76	0.76
AO-R4	18.82	16.82	22.00	21.45	19.30	18.56	16.85	16.82	21.73	22.43	21.25	21.30	22.65	22.68	20.76	21.06	19.25	18.56	17.84	14.38	21.60	21.45	20.25	20.43	23.39	25.81	20.96	21.06	18.38	14.65
AO-R5	162.12	150.75	165.06	157.11	157.59	150.18	139.55	143.28	170.92	158.95	156.11	136.89	171.46	166.07	165.99	153.48	140.24	143.45	145.09	143.27	168.61	157.11	156.00	151.05	177.84	150.09	164.21	156.09	146.79	151.91
AO-R6	7.81	7.32	8.09	7.66	8.67	7.20	7.36	6.35	8.26	7.69	8.72	9.50	8.47	8.19	8.41	7.78	6.93	6.58	7.85	7.69	8.32	7.07	7.98	8.10	8.53	8.56	8.39	7.74	7.01	5.82
AO-R7	7.01	6.21	6.82	6.93	7.34	8.21	7.15	7.01	6.70	6.74	7.81	8.39	6.29	6.97	7.29	7.68	6.16	6.08	6.67	7.18	6.88	6.80	7.61	8.05	6.53	6.37	6.82	6.93	8.00	8.69
AO-R8	6.06	5.62	6.31	5.85	6.61	6.95	6.22	6.21	6.47	5.94	5.99	5.93	5.82	5.29	6.38	5.87	6.61	6.95	5.94	5.61	6.39	6.40	6.49	5.57	6.28	6.64	6.28	5.71	6.67	6.95
AO-R9	6.02	5.16	7.61	7.24	5.68	5.28	6.22	5.35	7.32	7.02	5.80	4.86	9.26	8.97	6.40	6.20	6.86	5.47	7.00	6.50	6.93	6.27	6.44	4.88	6.30	5.17	7.06	6.58	6.16	5.47
AO-R10	3.87	4.15	3.76	3.57	4.13	3.73	4.32	4.51	3.66	3.37	4.18	3.82	3.60	3.42	3.81	3.57	4.35	4.01	3.35	3.31	3.99	3.75	3.85	3.67	4.08	3.31	3.89	3.63	3.64	3.73
AO-R11	6.30	6.83	6.43	5.75	5.47	5.22	7.08	7.17	5.98	5.67	5.96	4.68	5.08	5.12	6.24	5.75	6.81	7.33	6.31	6.47	5.92	5.64	7.00	7.40	7.50	8.78	5.89	5.45	6.80	6.18
AO-R12	6.76	6.94	7.70	7.48	7.73	7.00	6.10	5.59	7.75	7.51	8.23	7.13	7.00	7.07	7.87	7.50	6.47	6.02	7.08	7.51	7.35	7.29	8.66	8.01	7.31	6.98	7.60	7.44	7.36	7.00
AO-R13	239.83	239.25	201.05	174.22	220.36	202.54	192.64	176.92	224.53	202.49	189.68	171.63	195.97	168.26	212.62	188.35	227.20	200.37	267.57	218.88	204.28	181.60	196.05	174.20	189.37	164.07	219.75	202.52	191.55	174.20
AO-R14	224.30	197.85	208.09	194.14	198.33	202.92	183.29	184.97	216.03	205.30	206.91	197.46	220.40	233.89	204.30	190.66	218.07	210.40	236.13	258.03	199.80	190.92	217.43	214.45	186.96	184.41	212.69	201.20	201.01	187.48
AO-R15	0.21	0.19	0.19	0.18	0.17	0.16	0.16	0.15	0.20	0.17	0.17	0.17	0.21	0.21	0.19	0.17	0.16	0.17	0.19	0.17	0.19	0.18	0.18	0.15	0.24	0.22	0.19	0.18	0.16	0.12
AO-R16	5.95	6.01	6.53	5.96	6.28	6.48	5.36	5.53	6.78	6.33	5.89	5.63	6.34	6.30	6.11	5.90	7.57	7.06	6.57	6.54	6.32	5.89	6.38	6.61	6.60	6.11	6.26	5.96	6.77	6.96
AP-R1	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.06	0.05	0.06	0.07	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05
AP-R2	1.89	1.81	1.79	1.69	1.95	1.67	1.71	1.54	1.83	1.69	2.04	1.77	2.16	2.28	1.87	1.69	1.47	1.35	1.70	1.27	1.78	1.73	2.21	2.19	1.91	2.06	1.77	1.68	2.15	1.79
AP-R3	0.93	0.93	0.77	0.71	0.72	0.70	0.81	0.79	0.78	0.73	0.79	0.80	0.94	0.95	0.77	0.73	0.75	0.74	0.86	0.84	0.74	0.72	0.88	0.92	0.87	0.86	0.77	0.77	0.82	0.70
AP-R4	20.63	19.52	20.06	19.66	20.65	22.47	21.64	22.89	20.40	19.66	18.62	16.78	19.87	19.36	19.96	19.66	22.27	20.97	19.57	19.60	19.85	19.66	22.66	24.94	22.72	24.49	20.00	19.66	20.39	22.57
AP-R5	62.48	60.27	64.08	60.89	72.14	67.97	80.42	86.42	63.92	59.81	57.81	61.39	48.70	40.85	66.57	62.46	76.76	76.02	74.14	76.02	61.80	59.90	73.33	79.12	61.61	61.42	63.07	60.37	81.27	76.73
AP-R6	9.74	9.25	8.02	7.67	9.20	8.00	8.46	7.97	8.80	7.94	8.07	7.77	9.54	9.86	8.45	7.83	8.56	8.04	8.70	7.88	8.56	7.97	8.74	8.02	9.64	9.38	8.50	7.97	8.57	7.94
AP-R7	7.66	7.61	6.72	6.98	6.39	5.85	7.11	6.10	6.95	7.09	5.98	5.16	6.98	7.14	6.58	6.70	7.66	7.78	7.35	7.51	6.65	6.45	6.90	6.98	8.65	8.83	6.64	6.76	6.52	5.85
AP-R8	115.12	116.56	104.25	102.13	101.05	110.66	127.17	118.48	100.09	83.49	102.87	111.05	96.56	91.14	102.02	107.17	128.45	116.96	124.45	128.21	100.73	102.13	106.24	110.14	115.73	95.37	103.12	110.33	110.59	98.05
AP-R9	23.64	19.56	20.19	19.01	22.15	20.22	24.49	25.14	20.42	19.41	21.21	19.09	17.90	19.56	21.25	19.34	24.37	27.91	19.09	18.49	21.83	19.56	21.19	21.84	25.51	24.68	20.17	18.94	24.30	26.58
AP-R10	18.92	20.56	16.82	15.62	16.47	14.75	18.23	18.54	17.57	16.19	14.32	11.56	16.99	17.06	16.52	15.46	19.93	18.04	18.67	19.67	16.57	15.60	17.78	17.56	19.51	21.28	16.86	15.62	16.97	14.75
AP-R11	199.48	216.53	234.63	224.93	252.44	241.01	240.18	223.85	230.28	228.44	234.21	214.59	199.05	209.56	235.63	220.08	248.37	241.01	243.06	228.85	220.08	218.74	271.17	265.37	295.99	285.41	220.45	218.74	256.25	241.01
AP-R12	0.20	0.17	0.17	0.17	0.17	0.16	0.20	0.17	0.18	0.16	0.15	0.15	0.16	0.15	0.17	0.17	0.20	0.18	0.17	0.11	0.19	0.17	0.15	0.13	0.20	0.20	0.17	0.16	0.19	0.18
AP-R13	14.13	12.83	11.68	11.06	11.31	11.27	12.43	10.97	11.76	11.27	12.61	10.92	11.09	10.58	12.27	11.24	11.71	11.03	12.70	14.64	12.06	11.24	11.33	10.61	13.49	14.07	12.08	10.97	10.93	11.21
AP-R14	28.97	30.19	39.32	34.45	42.36	45.51	37.63	31.93	39.46	36.84	34.33	33.25	31.82	30.84	39.16	34.32	39.44	37.56	36.29	36.84	38.40	32.61	39.27	40.53	35.88	38.84	35.60	32.61	52.30	52.12
AP-R15																														
AP-R16	0.16	0.16	0.17	0.15	0.17	0.17	0.15	0.15	0.17	0.15	0.18	0.17	0.16	0.15	0.17	0.16	0.15	0.14	0.15	0.15	0.16	0.15	0.20	0.21	0.15	0.13	0.17	0.15	0.17	0.15
AP-R17	0.78	0.79	0.83	0.77	0.72	0.71	0.78	0.76	0.81	0.77	0.73	0.78	0.67	0.69	0.81	0.77	0.81	0.79	0.81	0.71	0.77	0.77	0.84	0.81	0.80	0.80	0.79	0.76	0.81	0.78
AP-R18	1.51	1.48	1.43	1.35	1.53	1.27	1.54	1.41	1.41	1.37	1.60	1.69	1.53	1.42	1.48	1.40	1.36	1.21	1.35	1.15	1.46	1.39	1.61	1.71	1.37	1.26	1.47	1.42	1.52	1.34
AP-R19	5.17	5.02	4.27	4.46	4.33	4.22	4.65	4.85	4.29	4.36	4.79	4.84	5.21	5.00	4.35	4.46	4.20	4.56	4.15	4.22	4.64	4.77	3.95	3.52	3.95	3.67	4.67	4.77	3.64	3.21
AP-R20	13.38	12.99	11.04	11.55	11.22	10.93	12.05	12.57	11.10	11.28	12.41	12.54	13.49	12.94	11.27	11.55	10.87	11.81	10.75	10.93	12.02	12.36	10.23	9.12	10.24	9.51	12.08	12.36	9.42	8.31
AP-R21	8.52	8.27	7.03	7.35	7.15	6.96	7.67	8.00	7.07	7.18	7.90	7.98	8.59	8.24	7.18	7.35	6.92	7.52	6.84	6.96	7.65	7.87	6.51	5.81	6.52	6.05	7.69	7.87	6.00	5.29
AP-R22	72.60	70.48	59.91	62.63	60.87	59.31	65.38	68.17	60.22	61.20	67.31	68.01	73.19	70.20	61.13	62.63	58.97	64.07	58.30	59.31	65.20	67.06	55.49	49.49	55.52	51.58	65.53	67.06	51.11	45.08
AP-R23	169.98	159.38	181.09	191.08	177.65	189.05	166.07	155.63	177.06	191.08	194.91	196.39	178.26	187.67	182.40	192.59	159.45	170.57	169.44	166.48	181.12	192.01	175.35	185.95	154.42	150.92	181.57	191.08	175.93	193.51
AQ-R1	0.16	0.15	0.18	0.16	0.17	0.15	0.16	0.15	0.19	0.18	0.13	0.13	0.22	0.22	0.16	0.15	0.17	0.16	0.19	0.18	0.18	0.16	0.14	0.14	0.17	0.17	0.17	0.15	0.17	0.17
AQ-R2	7.76	7.19	9.29	8.16	9.74	8.84	7.49	7.14	9.77	8.84	8.42	8.22	11.64	10.54	8.99	8.21	7.62	7.53	9.70	7.42	9.57	9.11	6.97	6.79	8.49	8.95	9.48	8.03	7.79	8.70
AQ-R3	10.19	10.00	9.93	9.12	11.11	9.53	8.60	8.52	10.46	9.53	11.25	9.02	9.68	9.46	10.36	9.32	10.32	9.11	9.48	9.43	11.08	9.46	7.90	7.66	11.48	9.45	10.27	9.32	9.55	9.13
AQ-R4	7.96	7.34	8.12	7.47	8.00	6.99	6.70	7.01	8.49	7.65	7.87	7.96	9.58	9.25	7.95	7.45	7.29	6.99	8.05	6.86	8.58	7.72	6.15	6.00	7.38	6.18	8.32	7.57	7.19	6.19
AQ-R5	5.85	5.60	6.12	5.62	6.18	5.85	5.02	4.78	6.43	5.91	5.89	5.60	6.22	5.78	6.27	5.76	5.10	5.23	6.48	5.89	6.15	5.73	5.49	5.49	6.45	5.88	6.07	5.65	5.95	5.65
AQ-R6	222.12	212.52	203.28	202.01	210.86	197.45	187.20	184.83	208.93	197.45	228.14	225.04	207.98	190.17	205.87	199.73	220.85	208.67	177.62	173.80	198.00	196.53	274.79	286.92	260.50	257.85	201.44	195.63	212.98	202.02
AQ-R7	0.92	0.89	0.97	0.96	1.04	0.97	1.01	0.91	0.99	0.96	0.89	0.90	1.02	1.09	0.94	0.92	1.13	1.12	0.84	0.89	1.02	0.96	0.94	0.89	1.00	0.99	0.98	0.95	0.97	0.85
AQ-R8	0.49	0.49	0.50	0.47	0.54	0.60	0.50	0.49	0.52	0.50	0.48	0.44	0.58	0.58	0.49	0.45	0.53	0.50	0.57	0.60	0.52	0.50	0.42	0.41	0.41	0.44	0.53	0.50	0.47	0.50
AQ-R9	10.21	10.37	12.01	11.20	11.13	10.86	10.40	9.94	11.88	10.86	11.09	11.38	11.84	11.40	11.24	10.37	12.24	11.14	9.26	8.94	11.52	10.53	13.24	13.25	12.45	12.63	11.34	10.39	11.57	13.05
AQ-R10	1.68	1.67	1.83	1.77	1.88	1.79	2.12	1.71	1.74	1.77	1.78	1.76	2.06	1.78	1.84	1.77	1.49	1.67	2.18	1.82	1.77	1.72	1.64	1.72	1.38	1.28	1.86	1.72	1.82	1.80
AR-R1	0.13	0.13	0.13	0.11	0.13	0.13	0.10	0.09	0.13	0.13	0.12	0.12	0.17	0.15	0.12	0.11	0.13	0.13	0.12	0.10	0.13	0.12	0.11	0.11	0.12	0.11	0.13	0.12	0.13	0.13
AR-R2	0.20	0.20	0.19	0.16	0.17	0.16	0.23	0.22	0.18	0.16	0.17	0.17	0.19	0.19	0.19	0.16	0.17	0.15	0.17	0.16	0.19	0.17	0.19	0.14	0.17	0.17	0.19	0.16	0.17	0.13
AR-R3	11.23	10.64	9.89	9.55	10.23	10.19	12.33	12.46	9.71	9.54	9.93	10.29	9.79	9.75	10.51	10.06	9.19	9.42	9.90	11.16	9.87	9.58	11.76	11.74	10.46	10.48	10.16	9.77	10.35	10.19
AR-R4	8.55	8.36	8.73	7.93	7.97	8.17	8.95	8.57	8.13	7.65	9.46	9.44	7.74	7.45	8.73	8.34	8.19	7.57	8.27	8.17	8.68	7.93	8.10	8.05	7.98	7.79	8.83	8.11	7.26	7.57
AR-R5	6.32	6.24	6.14	5.74	5.07	4.81	7.25	7.90	5.63	5.59	5.56	4.78	5.46	6.05	6.01	5.55	5.84	5.21	6.62	5.69	5.87	5.74	5.41	5.01	6.29	5.74	5.97	5.64	5.41	4.75
AR-R6	44.60	45.49	44.78	40.71	38.15	38.91	51.19	52.69	40.03	38.91	46.32	42.72	44.86	35.32	44.21	40.16	36.73	40.54	40.08	39.96	43.09	39.39	45.96	42.54	44.60	45.82	44.07	40.20	37.73	38.66
AR-R7	10.00	11.09	9.73	9.35	9.25	10.86	10.71	10.61	8.92	8.46	11.28	11.38	7.36	7.49	9.97	10.39	10.22	8.19	8.92	10.86	9.99	9.67	9.08	8.34	9.76	9.96	9.17	9.02	11.97	11.40
AR-R8	28.01	25.62	28.16	27.02	25.13	26.56	29.95	27.08	26.51	26.02	28.03	26.07	29.18	27.69	26.48	26.05	30.04	26.40	24.55	25.27	29.16	27.08	23.28	24.94	27.43	25.99	27.13	26.05	28.67	27.42
AR-R9	2.68	2.81	2.70	2.56	2.97	3.18	2.87	2.60	2.59	2.56	3.28	3.29	2.04	1.99	2.88	2.68	2.83	2.76	2.61	2.09	2.73	2.66	2.99	2.60	2.51	2.22	2.69	2.64	3.23	3.19
AR-R10	223.91	234.29	191.25	192.99	184.75	184.72	202.85	205.42	186.25	192.82	221.51	235.34	187.38	206.75	198.15	192.99	190.14	196.47	174.45	184.72	205.20	206.75	177.35	162.27	184.10	181.87	192.97	193.17	214.10	205.34
AR-R11	1.03	1.15	0.89	0.90	0.93	0.93	0.90	0.84	0.93	0.92	0.94	0.93	0.91	0.83	0.94	0.93	0.87	0.70	0.84	0.81	0.95	0.92	0.93	0.81	1.05	1.14	0.91	0.92	0.92	0.72
AR-R12	16.83	15.53	18.29	16.44	15.27	15.09	17.58	15.89	16.65	15.64	19.31	20.10	13.77	13.28	17.81	16.95	17.93	15.42	14.07	14.60	18.67	17.48	14.95	14.75	16.50	14.03	17.00	15.53	19.16	17.49

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
AS-R1	9.27	8.09	8.25	7.78	6.57	9.96	8.24	7.58	7.26	7.70	10.56	10.24	8.27	6.46	7.56	7.87	9.90	10.63	7.13	7.11	8.13	7.87	8.41	10.24	8.08	8.99	8.05	7.87	7.85	10.04
AS-R2	25.15	25.28	18.92	20.38	13.56	17.79	17.70	19.96	17.55	20.45	23.98	26.40	21.12	24.78	17.63	19.53	21.65	20.45	13.46	19.27	19.62	20.71	19.94	24.15	14.64	16.89	19.17	20.72	18.87	20.31
AS-R3	56.39	45.16	55.10	54.71	34.24	44.96	47.38	45.16	47.84	48.38	61.73	58.54	64.08	62.23	45.47	45.15	60.12	63.00	41.64	38.38	55.34	54.71	38.59	43.56	50.49	57.34	48.67	46.77	57.65	63.00
AS-R4	9.12	9.17	7.58	7.88	6.46	7.47	7.71	6.46	6.90	7.78	9.94	10.08	7.51	6.60	7.28	7.88	9.05	7.78	6.03	7.04	8.09	7.88	7.05	8.83	5.61	5.92	7.66	7.91	8.34	7.97
AS-R5	116.55	114.15	107.22	107.46	85.84	101.16	107.01	106.43	94.24	104.92	134.42	146.80	115.43	116.24	100.35	107.94	108.66	104.62	74.14	95.47	110.79	111.10	102.68	124.92	90.07	104.59	104.42	110.01	107.67	104.92
AS-R6	21.20	18.40	15.72	15.71	10.24	14.55	15.53	15.53	15.42	15.71	14.92	15.65	18.94	14.23	13.69	15.65	19.90	17.26	11.21	11.91	16.60	15.71	14.31	16.17	13.02	15.95	15.61	15.02	15.47	16.82
AS-R7	207.64	160.93	194.41	215.03	123.66	180.08	140.59	155.79	179.05	216.57	219.87	215.18	213.47	180.09	170.78	205.54	190.04	218.15	141.35	180.08	203.97	218.45	120.92	128.15	148.48	182.97	182.09	205.54	184.43	200.75
AS-R8	3.37	3.56	2.46	2.61	2.10	2.54	2.59	2.60	2.40	2.61	2.99	3.13	2.74	2.58	2.39	2.72	3.01	2.65	2.29	2.82	2.62	2.61	2.44	2.97	2.10	2.53	2.56	2.70	2.67	2.61
AS-R9	0.21	0.21	0.15	0.15	0.13	0.15	0.16	0.16	0.14	0.16	0.21	0.21	0.16	0.15	0.15	0.16	0.18	0.17	0.12	0.16	0.16	0.16	0.17	0.20	0.13	0.16	0.16	0.17	0.16	0.16
AS-R10	0.30	0.25	0.27	0.29	0.19	0.22	0.26	0.25	0.24	0.28	0.30	0.22	0.28	0.30	0.24	0.25	0.30	0.29	0.26	0.30	0.27	0.28	0.21	0.17	0.28	0.34	0.24	0.24	0.31	0.30
AS-R11	0.21	0.21	0.24	0.25	0.15	0.15	0.19	0.21	0.21	0.22	0.26	0.25	0.24	0.23	0.21	0.22	0.22	0.23	0.17	0.22	0.23	0.24	0.18	0.19	0.18	0.23	0.21	0.22	0.25	0.25
AS-R12	0.11	0.09	0.09	0.09	0.06	0.06	0.10	0.09	0.08	0.07	0.08	0.08	0.09	0.06	0.08	0.08	0.12	0.11	0.09	0.06	0.09	0.09	0.05	0.06	0.11	0.12	0.09	0.08	0.07	0.07
AT-R1	5.34	5.50	6.41	7.07	5.79	8.05	3.74	2.21	6.81	7.49	5.73	7.25	2.78	2.59	6.49	7.68	7.00	6.10	7.91	8.26	6.06	6.12	4.50	2.41	8.96	10.68	5.57	6.12	6.83	11.00
AT-R2	12.33	14.82	15.26	19.70	14.28	16.27	9.58	4.06	15.77	19.41	14.82	16.09	7.20	4.06	15.37	16.15	16.80	22.21	17.37	20.55	15.06	16.15	9.90	4.06	20.09	25.73	13.49	14.82	16.22	24.78
AT-R3	4.63	5.56	6.13	5.95	5.54	5.75	3.43	1.96	6.63	6.15	4.70	5.44	3.20	2.46	5.88	5.95	7.11	8.04	6.63	5.92	6.05	6.08	3.69	1.96	6.85	7.63	5.40	5.55	6.59	6.82
AT-R4	68.63	66.12	83.86	90.81	70.77	72.69	47.19	25.55	84.98	85.77	83.27	96.89	30.67	24.18	82.44	85.20	98.01	122.44	102.32	116.98	80.16	81.42	48.38	25.55	117.57	144.59	72.18	79.52	83.35	110.02
AT-R5	11.14	12.06	13.40	15.57	11.18	15.87	7.96	3.96	13.92	15.71	11.66	14.76	5.68	5.17	13.91	16.01	11.62	13.72	16.27	16.79	12.58	15.30	8.67	3.96	13.91	15.88	12.23	15.16	12.74	17.68
AT-R6	182.88	200.59	169.18	183.84	134.64	163.92	92.25	71.44	175.61	175.26	189.00	211.16	89.83	76.25	175.17	196.27	171.22	147.81	194.08	163.92	173.91	196.27	95.86	80.29	125.20	145.35	173.94	196.27	132.60	157.22
AT-R7	0.57	0.54	0.64	0.81	0.60	0.89	0.48	0.42	0.65	0.73	0.62	0.83	0.58	0.26	0.62	0.81	0.63	0.83	0.81	0.79	0.60	0.72	0.51	0.42	0.75	0.87	0.62	0.67	0.52	0.86
AT-R8	0.12	0.12	0.13	0.15	0.13	0.17	0.09	0.04	0.13	0.17	0.13	0.17	0.05	0.04	0.14	0.17	0.15	0.18	0.17	0.18	0.13	0.15	0.09	0.04	0.18	0.19	0.12	0.15	0.12	0.15
AT-R9	0.22	0.27	0.23	0.23	0.19	0.24	0.17	0.14	0.23	0.24	0.24	0.27	0.14	0.11	0.24	0.27	0.22	0.27	0.27	0.28	0.23	0.27	0.13	0.09	0.19	0.24	0.24	0.27	0.15	0.17
AT-R10	0.21	0.24	0.18	0.19	0.15	0.16	0.13	0.09	0.19	0.17	0.21	0.22	0.12	0.10	0.19	0.18	0.19	0.18	0.19	0.17	0.20	0.22	0.11	0.08	0.13	0.14	0.19	0.19	0.15	0.17
AT-R11	3.63	3.94	4.44	4.92	4.19	6.16	2.54	1.79	4.76	5.59	4.05	4.82	2.58	1.98	4.53	5.33	4.33	4.42	5.53	6.01	4.32	4.76	2.78	1.79	5.65	6.91	4.18	4.45	3.69	5.06
AT-R12	1.23	1.41	1.26	1.32	1.13	1.24	0.82	0.59	1.29	1.32	1.39	1.61	0.68	0.58	1.32	1.34	1.26	1.40	1.41	1.24	1.29	1.39	0.80	0.59	1.40	1.75	1.20	1.28	1.23	1.35
AU-R1	6.30	7.40	6.49	7.35	5.05	5.63	7.14	8.53	5.63	6.12	6.75	7.45	6.87	6.84	5.84	7.01	6.65	8.50	6.16	6.92	5.68	6.96	7.64	8.62	7.46	7.18	6.00	7.20	5.79	6.12
AU-R2	15.09	17.10	17.44	20.31	14.18	18.51	19.28	20.00	15.46	17.88	15.95	19.97	17.74	20.42	15.57	19.10	17.93	19.02	17.71	19.02	15.84	19.53	16.36	17.39	19.31	18.76	15.91	19.10	16.01	19.66
AU-R3	5.19	5.77	6.65	7.31	5.23	5.69	6.74	7.15	5.85	6.49	6.03	7.20	6.24	7.06	6.10	6.75	5.62	7.06	6.27	6.49	5.78	7.15	6.84	6.58	7.85	7.44	5.86	6.68	5.89	7.01
AU-R4	0.10	0.12	0.14	0.14	0.09	0.11	0.15	0.13	0.11	0.12	0.11	0.14	0.12	0.12	0.11	0.12	0.15	0.15	0.14	0.14	0.11	0.12	0.14	0.14	0.14	0.13	0.12	0.13	0.12	0.12
AU-R5	13.26	15.37	13.72	14.79	10.63	12.56	17.93	19.16	11.50	14.09	12.85	14.24	12.95	13.76	11.64	14.79	18.47	15.73	12.49	13.72	12.30	13.95	15.41	16.08	16.43	16.06	12.38	13.76	13.28	14.92
AU-R6	204.20	202.17	204.46	216.46	170.69	162.98	220.41	226.72	193.75	218.73	180.64	201.21	222.77	207.36	190.37	215.29	199.82	214.19	191.67	206.74	199.55	216.47	187.39	204.65	245.54	252.30	188.72	209.29	204.06	214.19
AU-R7	0.24	0.25	0.22	0.25	0.23	0.25	0.27	0.23	0.20	0.25	0.27	0.35	0.25	0.28	0.22	0.25	0.23	0.24	0.22	0.25	0.22	0.26	0.25	0.23	0.27	0.24	0.22	0.25	0.21	0.26
AU-R8	164.31	178.09	172.77	185.87	136.57	155.21	193.07	201.95	147.41	172.18	186.16	182.45	173.40	181.54	158.14	166.84	172.56	180.93	143.72	167.93	158.77	185.91	192.45	187.72	211.10	213.56	153.01	166.61	180.29	221.80
AU-R9	32.61	40.02	37.46	42.54	34.93	39.29	40.35	43.53	33.11	39.29	41.98	38.71	37.23	41.46	36.44	41.95	32.78	40.85	36.34	40.85	33.27	38.04	45.82	48.84	52.55	47.09	34.40	39.24	34.15	43.51
AU-R10	0.24	0.28	0.33	0.37	0.26	0.34	0.35	0.38	0.28	0.34	0.31	0.39	0.32	0.33	0.29	0.36	0.33	0.36	0.39	0.50	0.27	0.35	0.32	0.36	0.40	0.36	0.29	0.35	0.26	0.35
AU-R11	4.25	4.98	4.53	5.05	4.07	3.79	5.20	5.98	4.24	5.20	3.98	3.98	5.43	5.78	4.06	4.56	4.85	5.33	5.12	5.78	4.21	4.98	4.32	4.26	4.24	3.74	4.30	4.98	4.78	5.92
AV-R1	1.85	2.13	1.74	1.68	1.42	1.64	1.04	0.85	1.87	1.79	1.64	1.60	1.54	1.19	1.69	1.68	1.76	1.87	2.41	2.20	1.70	1.68	0.96	0.85	1.76	2.00	1.79	1.69	1.12	1.64
AV-R2	1.28	1.44	1.17	1.44	1.04	1.59	0.73	0.53	1.27	1.58	1.19	1.45	0.95	0.70	1.19	1.54	1.20	1.55	1.54	1.69	1.14	1.33	0.89	0.75	1.39	1.61	1.18	1.52	0.91	1.00
AV-R3	0.52	0.64	0.54	0.54	0.51	0.52	0.36	0.21	0.55	0.59	0.60	0.66	0.32	0.21	0.57	0.64	0.50	0.72	0.62	0.69	0.53	0.54	0.46	0.41	0.60	0.74	0.53	0.55	0.46	0.49
AV-R4	0.27	0.32	0.25	0.27	0.20	0.24	0.16	0.12	0.26	0.33	0.22	0.23	0.19	0.18	0.24	0.25	0.26	0.35	0.28	0.27	0.25	0.31	0.16	0.10	0.24	0.25	0.24	0.25	0.22	0.32
AV-R5	0.09	0.10	0.11	0.13	0.10	0.09	0.07	0.05	0.11	0.11	0.12	0.15	0.05	0.04	0.11	0.13	0.10	0.10	0.14	0.16	0.11	0.11	0.07	0.04	0.12	0.15	0.11	0.12	0.07	0.08
AV-R6	0.04	0.04	0.05	0.05	0.04	0.05	0.03	0.02	0.05	0.05	0.05	0.05	0.03	0.03	0.05	0.05	0.04	0.04	0.05	0.04	0.04	0.05	0.04	0.02	0.03	0.04	0.05	0.05	0.04	0.04
AV-R7	6.70	7.27	5.85	5.64	5.22	5.46	4.66	3.06	5.89	5.80	6.89	6.32	3.15	2.74	6.15	5.82	6.78	7.20	5.93	5.25	6.27	6.16	4.19	2.72	9.90	12.27	5.66	5.82	4.47	5.44
AV-R8	7.73	9.31	6.50	6.94	6.20	6.97	4.34	3.03	7.11	7.51	7.25	7.05	4.99	3.75	6.81	7.02	7.30	9.70	6.83	8.64	7.17	7.86	4.50	2.59	9.29	11.71	6.74	7.86	4.66	5.17
AV-R9	0.11	0.13	0.12	0.14	0.12	0.14	0.09	0.06	0.12	0.14	0.13	0.14	0.07	0.05	0.13	0.14	0.11	0.14	0.12	0.14	0.12	0.14	0.08	0.06	0.14	0.15	0.12	0.14	0.09	0.11
AW-R1	5.26	5.17	6.17	7.40	4.36	3.75	7.88	7.60	5.01	5.91	5.24	5.24	4.11	0.00	5.94	6.05	5.09	5.04	2.60	0.00	6.17	6.75	5.88	6.55	4.65	5.17	5.41	5.88	6.81	8.22
AW-R2	13.29	13.08	14.76	14.17	10.63	12.98	20.16	23.27	11.48	12.04	14.10	14.46	9.54	0.00	14.22	14.17	13.51	13.17	8.33	0.00	14.12	14.17	15.64	14.18	17.09	19.39	13.06	13.62	13.49	13.72
AW-R3	35.00	38.84	43.64	45.76	29.31	40.58	46.88	41.14	34.16	39.16	46.43	43.19	14.24	0.00	45.43	45.76	28.29	39.81	32.15	0.00	38.03	41.27	46.41	43.80	38.90	49.11	39.83	40.44	32.48	41.22
AW-R4	4.60	5.32	5.86	6.13	4.71	3.75	6.82	6.61	4.80	5.41	5.93	5.86	3.34	0.00	5.87	6.01	4.75	5.14	2.67	0.00	5.79	7.54	6.08	5.78	4.54	4.63	5.20	5.73	6.61	6.19
AW-R5	153.10	189.74	151.82	164.04	103.16	139.45	199.31	220.13	116.83	134.04	165.54	179.46	61.42	0.00	162.13	198.84	107.18	134.04	83.53	0.00	134.74	150.52	210.00	227.13	147.95	180.13	140.97	157.22	131.75	162.42
AW-R6	0.18	0.19	0.16	0.18	0.16	0.24	0.22	0.24	0.13	0.18	0.21	0.27	0.07	0.00	0.18	0.18	0.14	0.23	0.12	0.00	0.15	0.18	0.23	0.25	0.18	0.23	0.16	0.18	0.17	0.18
BA-R1	27.99	23.93	29.53	26.58	27.38	20.76	32.18	31.08	28.65	25.58	25.59	20.39	38.23	29.18	27.79	23.59	24.93	23.21	29.40	32.05	27.76	23.59	31.82	27.84	19.16	20.59	28.88	26.29	33.48	32.05
BA-R2	15.38	14.58	17.28	16.03	17.41	16.37	16.14	15.55	17.60	16.21	15.53	15.28	19.25	19.74	16.75	16.29	16.05	14.16	19.25	18.67	16.36	15.80	17.29	14.88	13.99	14.77	16.88	16.04	19.12	17.32
BA-R3	65.69	61.67	80.72	77.34	76.17	67.28	72.81	68.37	81.29	78.17	65.30	55.79	84.41	80.36	78.23	76.16	64.63	56.30	86.52	78.17	72.68	74.27	84.52	81.40	64.32	65.14	75.08	75.44	93.18	92.37
BA-R4	88.73	64.87	97.13	91.67	98.47	94.62	105.82	99.04	94.17	84.66	92.62	83.06	106.66	74.16	98.42	91.96	75.57	71.61	104.29	92.23	96.88	80.60	85.25	93.11	56.94	57.36	102.79	93.08	85.13	90.17
BB-R1	27.23	27.88	32.33	34.29	28.27	20.76	33.39	32.13	29.61	29.85	30.42	25.41	26.41	25.46	31.49	29.95	29.03	30.04	25.48	20.22	33.05	32.13	24.94	23.11	24.06	25.08	31.02	30.31	31.19	24.56
BB-R2	18.23	17.39	19.67	18.94	16.12	15.68	20.33	20.10	18.01	15.88	18.72	17.39	18.21	17.99	18.01	16.23	21.28	16.99	14.91	14.22	19.52	17.39	18.10	16.31	19.96	19.99	18.11	16.54	19.84	16.37
BB-R3	71.51	72.29	90.38	89.79	81.68	74.02	88.91	85.96	84.71	77.41	81.55	85.74	75.60	71.14	85.33	81.63	90.89	86.62	62.72	59.02	87.39	77.41	94.95	102.64	90.29	89.81	82.17	77.41	95.08	90.72
BB-R4	8.32	8.41	9.47	9.98	8.95	7.50	9.01	9.52	9.26	8.41	8.83	8.75	9.18	9.48	9.00	8.61	9.72	8.53	6.91	6.16	9.80	10.05	8.59	9.44	9.98	9.32	9.00	8.47	9.33	10.35
BC-R1	29.53	30.78	29.94	27.20	33.92	31.82	28.54	28.28	31.18	27.84	31.87	28.83	29.53	27.61	31.38	28.83	29.47	28.53	28.78	27.84	29.72	28.10	36.82	37.67	37.07	40.13	28.74	27.60	37.45	30.77
BC-R2	16.95	17.47	15.44	15.65	17.02	17.32	14.96	16.50	15.92	15.96	17.87	19.02	14.44	14.89	16.59	16.18	15.27	15.98	16.00	16.40	14.98	15.68	20.37	21.52	18.99	20.82	15.37	15.82	17.96	15.98
BC-R3	80.23	78.79	83.57	76.48	84.37	82.63	74.57	68.84	86.54	77.71	79.56	78.20	85.49	76.01	81.91	77.56	86.97	81.11	77.66	72.16	83.01	76.02	88.62	80.48	85.65	79.41	80.80	75.55	93.30	95.22
BC-R4	111.21	107.81	100.69	92.90	98.02	91.69	116.38	110.49	96.22	91.01	108.04	112.80	105.32	94.83	99.41	91.35	110.37	96.37	88.86	82.63	98.63	91.78	125.59	116.42	150.72	151.20	96.80	91.35	98.80	96.24
BC-R5	9.14	9.43	7.92	7.67	8.90	8.99	8.21	8.75	8.52	7.71	8.03	8.53	9.09	9.14	8.06	7.73	9.22	9.65	8.87	8.07	7.74	7.91	10.36	9.32	10.35	11.29	7.93	7.73	9.44	8.30
BD-R1	30.72	26.09	29.61	25.92	30.86	21.66	32.98	25.29	30.09	26.10	27.32	28.25	40.58	35.82	27.75	24.94	31.95	26.10	33.32	26.08	30.96	26.46	24.13	23.57	24.38	26.45	31.75	26.10	25.41	21.66
BD-R2	18.62	18.14	16.35	15.65	17.59	18.16	18.72	20.08	17.01	15.86	15.56	15.65	21.14	21.52	16.27	15.65	17.17	15.62	19.27	18.16	17.14	15.65	14.83	16.15	15.43	13.45	17.41	17.14	16.25	15.62
BD-R3	83.57	82.11	77.47	70.27	83.28	80.39	95.27	85.98	75.95	70.27	79.27	76.44	90.43	82.55	79.95	78.27	71.14	68.41	85.35	87.53	81.14	77.72	70.90	72.81	77.68	76.41	81.77	77.72	72.58	54.27
BD-R4	7.85	7.03	8.55	8.09	9.42	10.93	8.50	7.86	8.95	8.66	7.63	7.43	10.88	12.14	8.38	8.09	7.89	7.41	9.67	11.75	8.66	8.39	7.64	7.86	6.76	6.54	8.99	8.77	7.98	7.41
BE-R1	29.84	23.81	32.39	27.27	30.24	23.47	40.16	37.77	30.41	26.86	26.29	23.09	25.82	26.53	30.79	26.48	39.05	40.43	31.90	26.09	30.40	26.98	34.77	26.30	31.78	24.78	31.18	26.98	32.34	25.75
BE-R2	19.21	18.33	17.08	15.74	15.01	14.85	18.99	18.16	17.03	15.68	14.64	13.39	17.88	17.56	16.30	15.24	19.14	19.91	18.90	20.12	16.59	15.54	16.64	15.53	19.24	20.02	17.13	15.74	14.77	13.86
BE-R3	77.96	74.76	79.28	77.41	84.95	73.13	89.26	90.03	78.86	76.30	77.31	71.64	88.98	87.95	77.72	76.16	85.49	77.41	82.31	74.76	79.76	76.16	81.31	88.75	79.50	80.33	81.32	76.85	76.63	73.13
BE-R4	119.20	104.71	108.59	98.13	94.33	88.20	139.30	117.95	104.58	93.97	83.43	86.26	92.59	93.10	104.47	94.54	130.85	124.79	114.25	97.05	106.10	95.13	104.00	86.26	118.99	109.96	104.46	94.55	112.41	99.20
BF-R1	23.60	20.49	33.99	28.54	33.58	27.63	26.49	22.89	33.72	27.63	31.55	31.64	29.62	21.80	33.40	27.77	27.92	20.76	40.36	29.17	29.64	25.50	33.79	28.43	35.59	30.01	32.39	26.37	28.37	26.10
BF-R2	16.21	15.63	19.17	16.78	15.17	14.10	19.30	18.60	17.16	15.96	17.86	16.10	18.97	16.11	17.00	15.82	19.58	20.80	18.72	22.25	18.12	16.38	15.01	13.89	16.78	16.22	18.30	16.57	15.09	14.10
BF-R3	82.47	80.39	83.70	77.41	87.69	81.11	78.92	77.46	84.96	77.74	88.17	94.87	86.66	89.35	84.06	79.06	84.36	75.56	94.84	102.67	84.20	79.06	76.33	68.94	87.99	87.03	83.41	79.03	87.51	78.04
BF-R4	7.56	7.61	9.31	8.57	8.72	8.15	7.78	7.61	9.29	8.48	8.32	7.97	9.10	8.30	8.82	8.23	8.78	7.71	9.12	8.44	8.86	8.18	8.61	8.34	8.30	8.28	8.84	8.21	9.23	9.26
DA-R1	6.43	6.14	6.05	5.51	5.30	4.96	5.56	5.10	5.95	5.49	6.25	6.06	6.35	5.74	5.89	5.55	5.76	5.24	5.74	5.15	5.92	5.50	6.17	5.91	7.45	7.59	5.98	5.55	4.83	4.83
DB-R1	3.29	3.15	3.12	3.04	14.27	2.90	2.88	3.10	3.20	3.03	18.59	2.87	3.70	3.54	6.85	3.00	3.27	3.15	3.07	3.01	7.13	3.02	3.65	3.46	4.84	5.07	6.66	3.01	2.68	2.85
DC-R1	2.05	1.81	2.15	1.91	2.09	1.94	1.93	1.79	2.08	1.89	2.43	2.21	2.10	1.75	2.12	1.94	2.10	1.89	2.26	2.30	2.00	1.85	2.40	1.99	3.05	3.23	2.06	1.87	1.87	1.83
DD-R1	7.33	6.29	7.19	7.51	6.04	5.71	7.55	6.01	6.74	6.69	7.02	7.04	6.84	6.82	6.85	6.27	7.40	7.02	7.49	6.69	6.90	6.50	6.59	6.76	9.55	8.72	6.85	6.29	5.85	6.05
DE-R1	2.83	2.52	5.30	2.36	2.40	2.39	2.64	2.39	4.91	2.36	2.93	3.22	2.38	2.34	4.82	2.46	2.62	2.34	2.51	2.26	2.51	2.39	11.74	3.08	21.04	3.48	2.57	2.39	2.21	2.30

ADDENDUM G

	Access						Project size						Project conditions						Complexity						Repitition					
	Good		Normal		Poor		Large		Medium		Small		Good		Normal		Poor		Simple		Normal		Complex		Repitition		Occasional		None	
Quantity ratios	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
E-R1	0.77	0.65	0.78	0.75	0.64	0.60	0.84	0.77	0.72	0.73	0.74	0.74	0.77	0.73	0.71	0.72	0.90	0.79	0.87	0.75	0.72	0.69	0.74	0.75	1.13	0.98	0.72	0.72	0.66	0.60
E-R2	53.94	41.22	56.18	59.01	48.69	44.88	59.88	59.73	53.45	55.87	49.85	53.67	53.16	56.15	52.60	53.67	60.79	59.51	59.93	58.09	53.65	56.39	49.83	48.19	59.03	52.11	53.15	54.54	54.94	55.88
F-R1	0.36	0.24	0.33	0.33	0.34	0.33	0.32	0.28	0.34	0.33	0.33	0.29	0.43	0.37	0.34	0.32	0.24	0.23	0.32	0.33	0.34	0.30	0.32	0.32	0.27	0.23	0.35	0.34	0.29	0.29
F-R2	2.84	2.89	2.58	2.33	2.48	2.28	2.77	2.85	2.52	2.28	2.73	2.68	2.35	2.26	2.48	2.30	3.35	3.41	2.62	2.31	2.56	2.33	2.74	2.69	3.89	3.81	2.51	2.31	2.30	2.23
F-R3	0.93	0.81	0.81	0.82	0.78	0.82	0.82	0.80	0.82	0.82	0.85	0.85	0.98	0.85	0.81	0.82	0.76	0.77	0.80	0.82	0.82	0.80	0.85	0.86	1.01	0.99	0.84	0.81	0.64	0.56
F-R4	3.58	3.32	3.83	3.40	3.44	2.71	4.24	4.53	3.61	3.37	3.42	2.96	3.23	2.91	3.82	3.40	3.48	3.48	3.66	3.06	3.89	3.47	2.96	2.50	2.60	2.35	3.78	3.38	3.88	3.43
F-R5	1.15	1.17	1.20	1.16	1.10	1.14	1.35	1.42	1.16	1.16	1.02	0.93	1.15	1.23	1.17	1.15	1.16	1.14	1.08	1.06	1.22	1.18	1.04	0.93	0.90	0.90	1.18	1.16	1.26	1.22
G-R1	0.43	0.37	0.41	0.38	0.48	0.42	0.43	0.38	0.44	0.40	0.38	0.39	0.46	0.42	0.41	0.39	0.48	0.38	0.38	0.38	0.46	0.42	0.37	0.35	0.37	0.39	0.42	0.39	0.48	0.35
G-R2	0.11	0.10	0.11	0.10	0.11	0.10	0.14	0.13	0.11	0.10	0.10	0.10	0.10	0.09	0.11	0.10	0.11	0.11	0.10	0.07	0.11	0.10	0.11	0.10	0.11	0.12	0.11	0.10	0.11	0.10
G-R3	0.33	0.27	0.31	0.28	0.34	0.28	0.24	0.24	0.34	0.30	0.31	0.29	0.38	0.26	0.31	0.28	0.33	0.28	0.40	0.43	0.31	0.28	0.28	0.28	0.31	0.25	0.33	0.30	0.27	0.28
G-R4	1.72	1.63	1.68	1.65	1.51	1.32	1.63	1.60	1.65	1.61	1.67	1.74	1.55	1.38	1.66	1.66	1.67	1.65	1.62	1.61	1.68	1.65	1.55	1.61	1.39	1.36	1.65	1.66	1.78	1.69
G-R5	2.39	2.06	1.95	1.98	2.35	2.22	2.19	2.26	2.07	1.98	2.27	2.04	2.57	2.26	2.01	1.96	2.32	2.32	1.97	1.84	2.22	2.13	1.95	1.79	2.04	2.17	2.13	1.98	2.16	1.99
G-R6	0.32	0.31	0.34	0.32	0.38	0.34	0.34	0.32	0.35	0.32	0.33	0.33	0.34	0.37	0.34	0.32	0.39	0.31	0.34	0.31	0.36	0.35	0.30	0.30	0.36	0.38	0.33	0.31	0.41	0.38
G-R7	0.16	0.16	0.18	0.16	0.19	0.17	0.19	0.20	0.18	0.15	0.17	0.16	0.16	0.16	0.17	0.15	0.20	0.18	0.21	0.18	0.18	0.16	0.15	0.15	0.16	0.17	0.18	0.16	0.19	0.16
G-R8	0.18	0.18	0.15	0.14	0.17	0.16	0.19	0.20	0.15	0.14	0.17	0.17	0.16	0.16	0.16	0.16	0.16	0.15	0.16	0.14	0.16	0.15	0.18	0.18	0.17	0.18	0.16	0.16	0.15	0.15
G-R9	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
G-R10	0.13	0.10	0.12	0.11	0.13	0.12	0.13	0.11	0.13	0.12	0.12	0.12	0.11	0.10	0.12	0.11	0.15	0.13	0.14	0.13	0.12	0.11	0.13	0.11	0.15	0.16	0.12	0.11	0.12	0.12

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project A				
Location:	South Africa				
Client:				Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,500	R	4.68
2	Concrete demolitions	m3	30	R	1,657.50
3	Bulk excavation	m3	5,500	R	38.25
4	Vertical piles	No	206		
5	Raking piles	No	15		
6	Concrete in piles	m3	ratio	R	1,572.50
7	Auger pile	m	ratio	R	340.00
8	Total paving and asphalt to road works	m2	4,550		
9	Grey paving to road works	m2	485	R	148.75
10	Asphalt to road surface	m2	4,065		
11	Rip bed of road works	m2	4,550	R	12.75
12	Total concrete in paving and bunding	m3	430	R	1,572.50
13	Concrete in paving	m3	259		
14	Rod reinforcement	t		R	12,325.00
15	Concrete in plinths and bases on area finishing	m3	190		
16	Stormwater pipe to drain surface run-off	m	92		
17	Machine excavation	m3		R	72.25
18	Concrete in pump and pipe support bases	m3	255	R	1,572.50
19	Concrete in tank bases	m3	95	R	1,572.50
20	Concrete in pipe and cable rack foundations	m3	105	R	1,572.50
21	Concrete to simple structural foundations	m3	135	R	1,572.50
22	Complex structural foundations - bases	m3	249	R	1,572.50
23	Concrete pipe racks - bases	m3	199	R	1,572.50
24	Concrete structure including concrete columns and beams - bases	m3	330	R	1,572.50
25	Major equipment bases with blast proof walls - bases	m3	2,700	R	1,572.50
26	Major equipment bases and elevated concrete structure - bases	m3	123	R	1,572.50
27	Concrete frame buildings with brick in-fill - all concrete	m3	798	R	1,572.50
28	One brick wall	m2		R	382.50
29	Concrete in structual steel buildings - all concrete	m3	88	R	1,572.50
30	Total building area - Structural steel buildings	m2	873		
31	Ceiling	m2		R	301.75
32	Structural steel	t		R	46,750.00
33	Steel canopy - concrete	m3	65	R	1,572.50
34	Steel canopy - area	m2	545		
35	Concrete in weighbridge - all concrete	m3	75	R	1,572.50
36	Total weighbridge area	m2	155		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	15	R	1,572.50
39	Total pump house area	m2	29		
40	Concrete in cooling tower	m3	544	R	1,572.50
41	Total cooling tower area	m2	403		
42	Emergency earth dam area - top of berm	m2	4,621		
43	Concrete in cable tunnel	m3	137	R	1,572.50
44	Total lengh of cable tunnel	m	65		
45	Total volume of basic steel platform	m3	48		
46	Total volume of steel pipe rack	m3	1,697		
47	Total volume of steel complex steel structure	m3	12,149		
48	Total volume of steel in stack	m3	405		
49	Total volume of steel in walkway	m3	45		
50	Total volume of steel in cable gantry	m3	506		
51	Piping work unit cost	WU		R	370.60
52	Total process pipe length	m	39,216		
53	Total electrical cable - installation only	m	38,480	R	66.30
54	Total instrumentation cable - installation only	m	29,023	R	44.20

Ratio: Project Ratio Mean

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Simple	Mean
Current economic conditions	Volatile	Mean
Current economic factors	Good	Mean
Level of scope definition	Good	Mean
Rework	Little	Mean
Scope change	Few	Mean
Weather	Good	Mean
Access	Good	Mean
Project size	Medium	Mean
Project conditions	Good	Mean
Complexity	Simple	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project A			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 99,535,694.20
A	SITE CLEARANCE AND DEMOLITIONS		R	126,945.00	
B	BULK EARTHWORKS		R	444,746.29	
C	PILING		R	7,238,666.70	
D	ROAD WORKS		R	2,541,578.00	
E	GENERAL PAVING AND BUNDED AREAS		R	1,441,594.02	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	977,727.57	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,695,366.95	
H	TANK BASES AND BUNDING		R	1,562,528.46	
I	RACK FOUNDATIONS		R	856,144.46	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,386,908.98	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,644,824.05	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,622,543.55	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,574,014.68	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	18,829,367.58	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,323,005.98	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	9,752,172.73	
Q	BUILDINGS - STEEL		R	3,281,641.43	
R	CANOPIES - STEEL		R	2,539,578.82	
S	WEIGHBRIDGE		R	823,963.56	
T	PUMP HOUSE		R	336,421.80	
U	COOLING TOWER		R	3,725,506.78	
V	EMERGENCY DAM		R	2,794,701.55	
W	HEAVY DUTY CABLE TUNNEL		R	2,210,194.90	
	Preliminaries and General	35.00%	R	25,805,550.35	
	STRUCTURAL STEEL				R 35,015,562.92
A	STRUCTURAL STEEL - BASIC PLATFORM		R	377,872.08	
B	STRUCTURAL STEEL - PIPERACK		R	3,543,393.13	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	17,716,349.70	
D	STRUCTURAL STEEL - STACK		R	886,977.03	
E	STRUCTURAL STEEL - WALKWAY		R	276,536.25	
F	STRUCTURAL STEEL - CABLE GANTRY		R	2,209,988.18	
	Preliminaries and General	40.00%	R	10,004,446.55	
	MECHANICAL AND PIPING				R 62,601,057.69
A	PIPING INSTALLATION		R	44,040,756.36	
B	RADIOGRAPHIC EXAMINATION (RT)		R	123,820.80	
C	DYE PENETRATION TESTING (DP)		R	44,492.84	
D	MAGNETIC PARTICLE TESTING (MPI)		R	69,039.35	
E	POST WELD HEAT TREATMENT		R	120,020.54	
F	MATERIAL HARDNESS TEST (HT)		R	92,416.88	
H	MECHANICAL INSTALLATION		R	224,494.43	
	Preliminaries and General	40.00%	R	17,886,016.48	
	PAINTING AND INSULATION				R 3,582,235.09
A	PAINTING AND INSULATION		R	2,653,507.48	
	Preliminaries and General	35.00%	R	928,727.62	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 8,526,888.08
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	6,316,213.39	
	Preliminaries and General	35.00%	R	2,210,674.69	

TOTAL COST	R	209,261,437.98

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,500		R 4.68	R 77,220.00	R 126,945.00
	Concrete demolitions	m3		30		R 1,657.50	R 49,725.00	
BULK EARTHWORKS	Bulk excavation	m3		5,500		R 38.25	R 210,375.00	R 444,746.29
	Trimming of sides	m2	2.18	2,523	4.30	R 8.90	R 22,442.39	
	Back fill and compact	m3	1.15	4,783	0.98	R 39.03	R 186,668.15	
	Overhaul	m3/km	1.73	3,179	11.34	R 3.37	R 10,723.46	
	Rip bed	m2	1.78	3,090	8.13	R 4.70	R 14,537.29	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 302,391.75	R 302,391.75	R 7,238,666.70
	EO for raking equipment	Item	0.00	1	23.89	R 37,567.03	R 37,567.03	
	Number of piles	No	0.00	206	0.00		R -	
	Move rig to new position	No	1.50	137	0.18	R 283.05	R 38,872.20	
	Number of raking piles	No	18.41	11	0.00		R -	
	EO for setting up raking piles	No	0.93	12	0.28	R 440.30	R 5,297.60	
	EO for raking drilling	m	0.15	75	0.89	R 302.60	R 22,573.09	
	Auger quantity	m	0.05	4,120	0.00	R 340.00	R 1,400,800.00	
	EO for drilling in coarse gravel	m	0.53	389	0.22	R 345.95	R 134,463.58	
	EO for drilling in boulders	m	1.84	112	0.50	R 786.25	R 88,025.82	
	EO for drilling in soft rock	m	1.63	126	0.24	R 377.40	R 47,695.95	
	Temporary casings	m	0.36	572	0.36	R 566.10	R 323,935.00	
	EO casing to raking pile	m	0.18	62	0.51	R 1,462.43	R 90,910.60	
	Mild steel rod reinforcement	t	14.29	14.416	0.93	R 10,573.33	R 152,421.73	
	High tensile rod reinforcement	t	1.32	156.061	7.23	R 11,369.18	R 1,774,280.34	
	Concrete to piles and bases	m3	0.15	1,373	0.00	R 1,572.50	R 2,159,566.67	
	Concrete to raking piles	m3	0.07	160	1.06	R 1,666.85	R 266,447.66	
	Site establishment of test equipment	Item	0.00	1	110.73	R 174,122.93	R 174,122.93	
	Load test to pile	No	99.34	2	27.07	R 42,567.58	R 88,271.80	
	Site establishment of intergity testing	No	258.87	1	48.79	R 76,722.28	R 61,052.99	
	Integrity testing of piles	No	1.25	165	0.27	R 424.58	R 69,969.96	
ROAD WORKS	Red paving	m2	0.15	73	0.97	R 144.29	R 10,496.92	R 2,541,578.00
	Grey paving	m2	0.00	485	0.00	R 148.75	R 72,143.75	
	Kerbing	m	0.13	592	0.00	R 249.32	R 147,472.15	
	Total paving and asphalt	m2	0.00	4,550	0.00		R -	
	Remove top soil	m3	0.55	651	5.83	R 74.33	R 48,364.44	
	Asphalt	m2	0.26	1,183	0.00	R 176.46	R 208,755.03	
	Rip bed	m2	0.00	4,550	0.00	R 12.75	R 58,012.50	
	Reduce levels	m3	0.42	1,911	4.99	R 63.62	R 121,582.60	
	Selected fill	m3	1.65	1,158	0.53	R 120.04	R 139,030.99	
	Imported fill	m3	2.23	519	0.39	R 307.80	R 159,860.86	
	Wearing course	m3	3.86	495	0.29	R 219.39	R 108,614.08	
	Prime	m2	4.74	5,490	1.47	R 61.56	R 337,952.24	
	Three line road marking	m	0.83	4,557	0.20	R 49.86	R 227,205.29	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.02	603	4.19	R 12.47	R 7,521.08	
		1m Wide concrete V-drain	m	0.97	574	0.81	R 1,116.95	R 640,854.99	
		200mm Diameter PVC pipe	m	0.96	568	0.11	R 354.03	R 201,034.04	
		Road marking - STOP	No	0.15	89	0.05	R 378.96	R 33,623.65	
		Standard signage	No	0.01	6	4.48	R 483.68	R 2,860.96	
		100mm Painted line	m	1.83	1,082	1.42	R 14.96	R 16,192.44	
				0.00		1.52			
				0.00		1.94			
				0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	259	0.74	R 1,572.50	R 407,277.50	R 1,441,594.02
		Concrete in plinths	m3	0.00	52	0.00	R 1,572.50	R 81,130.98	
		Total concrete	m3	0.00	430	0.00		R -	
		Rip and compact	m2	0.13	1,992	187.19	R 8.40	R 16,736.49	
		Formwork to plinth	m2	7.26	375	0.12	R 188.70	R 70,681.31	
		Formwork to slab	m2	0.83	215	0.15	R 235.88	R 50,706.05	
		High tensile steel	t	0.01	4.300	0.00	R 12,325.00	R 52,997.50	
		Mesh	m2	585.35	2,517	51.00	R 241.67	R 608,276.21	
		Construction joint	m	4.00	1,036	0.05	R 78.63	R 81,455.50	
		Expansion joint	m	2.22	575	0.08	R 125.80	R 72,332.48	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	6,542	0.00		R -	R 977,727.57
		Base excavation	m3	1.50	422	0.00	R 72.25	R 30,505.56	
		Backfill	m3	0.59	281	0.64	R 112.89	R 31,776.62	
		Working space	m2	0.45	716	1.43	R 78.94	R 56,495.12	
		Concrete in bases	m3	0.04	190	25.24	R 1,572.50	R 298,775.00	
		Blinding	m2	0.83	256	20.88	R 75.31	R 19,308.73	
		Concrete in sump walls	m3	0.10	19	29.51	R 1,572.50	R 29,877.50	
		Concrete in slabs	m3	0.02	4	0.91	R 1,572.50	R 5,975.50	
		Total concrete	m3	0.00	213	0.04		R -	
		Wood float	m2	0.70	304	158.37	R 9.93	R 3,018.50	
		Formwork to bases	m2	1.69	321	0.12	R 188.70	R 60,591.57	
		Formwork to sump walls	m2	12.63	240	0.12	R 188.70	R 45,282.34	
		Formwork to sides of slab	m2	5.81	22	0.18	R 283.05	R 6,249.18	
		Mild steel reinforcement	t	0.12	2.391	0.00	R 12,325.00	R 29,469.21	
		High tensile reinforcement	t	10.68	19.925	1.19	R 12,325.00	R 245,576.78	
		Cast in steel	kg	0.46	413	34.10	R 46.11	R 19,047.24	
		Waterstop	m	0.43	44	8.10	R 194.14	R 8,578.09	
		Manhole	No	0.08	7	2.68	R 4,513.49	R 33,219.29	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	92	0.13	R 586.75	R 53,981.34	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	431	0.05	R 72.25	R 31,136.14	R 1,695,366.95
		Working space	m2	0.38	1,134	0.67	R 48.41	R 54,897.93	
		Backfill	m3	4.42	98	1.32	R 95.37	R 9,298.58	
		Concrete bases	m3	1.01	255	0.00	R 1,572.50	R 400,987.50	
		Concrete plinth	m3	2.29	111	0.00	R 1,572.50	R 175,103.71	
		Total concrete	m3	0.00	366	0.00		R -	
		Wood float	m2	0.47	237	0.05	R 15.73	R 3,725.61	
		Blinding	m2	1.01	252	0.01	R 78.63	R 19,850.87	
		Formwork bases	m2	0.49	520	0.13	R 204.43	R 106,384.44	
		Formwork plinth	m2	0.58	192	0.12	R 188.70	R 36,228.35	
		High tensile reinforcement	t	10.00	36.635	7.15	R 12,325.00	R 451,530.95	
		Cast in steel	kg	0.11	3,330	0.03	R 47.18	R 157,115.79	
		HD Bolts	kg	0.08	4,579	0.03	R 47.18	R 216,034.20	
		Grout	m3	34.52	3.226	6.52	R 10,252.70	R 33,072.89	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.84	555	0.05	R 78.63	R 43,621.15	R 1,562,528.46
		Working space	m2	4.36	127	1.63	R 48.24	R 6,137.95	
		Backfill	m3	1.38	402	0.72	R 109.20	R 43,902.12	
		Concrete bases	m3	0.75	95	0.00	R 1,572.50	R 149,387.50	
		Concrete sump wall	m3	2.86	33	0.00	R 1,572.50	R 52,233.39	
		Concrete slab	m3	0.57	167	0.00	R 1,572.50	R 262,083.33	
		Concrete plinth	m3	4.11	23	21.05	R 1,572.50	R 36,347.32	
		Concrete column	m3	19.22	5	164.76	R 1,572.50	R 7,772.50	
		Total concrete	m3	0.00	323	1.11		R -	
		Blinding	m2	2.67	121	1.05	R 74.70	R 9,035.45	
		Wood float	m2	0.25	1,292	1.12	R 9.54	R 12,328.82	
		Formwork to bases	m2	0.42	226	1.14	R 193.66	R 43,803.51	
		Formwork to plinths	m2	0.35	66	8.12	R 206.09	R 13,610.68	
		Formwork to columns	m2	0.12	41	7.63	R 221.48	R 9,122.66	
		Formwork to sumps	m2	0.11	302	7.10	R 214.82	R 64,870.08	
		Formwork to slabs	m2	4.07	41	7.32	R 191.53	R 7,843.35	
		Formwork to slabs n/e 300mm	m	2.17	77	8.21	R 66.74	R 5,126.30	
		Mild steel reinforcement	t	0.23	3.217	23.56	R 12,325.00	R 39,647.28	
		High tensile reinforcement	t	23.09	13.986	1.02	R 12,325.00	R 172,379.50	
		Mesh	m2	0.16	1,042	61.15	R 201.55	R 209,951.62	
		Cast in items	kg	0.19	1,700	214.69	R 57.41	R 97,576.25	
		HD Bolts	kg	0.10	3,229	207.02	R 59.54	R 192,263.67	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	1.582	0.17	R 9,250.00	R 14,632.38	
	Construction joint	m	0.30	556	24.89	R 63.18	R 35,098.88	
	Expansion joint	m	0.46	362	16.88	R 93.16	R 33,752.75	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	390	0.05	R 78.63	R 30,628.37	R 856,144.46
	Working space	m2	0.41	950	1.98	R 155.68	R 147,912.61	
	Backfill	m3	2.45	159	0.87	R 90.37	R 14,369.40	
	Blinding	m2	0.37	284	22.19	R 70.87	R 20,110.41	
	Concrete bases	m3	5.81	105	0.00	R 1,572.50	R 165,112.50	
	Concrete plinth	m3	0.00	18	0.00	R 1,572.50	R 28,418.67	
	Total concrete	m3	0.00	123	1.34		R -	
	Wood float	m2	0.35	300	173.00	R 9.09	R 2,726.88	
	Formwork bases	m2	0.47	223	9.63	R 163.29	R 36,480.08	
	Formwork plinths	m2	0.09	201	6.99	R 224.96	R 45,173.54	
	High tensile reinforcement	t	9.33	13.191	0.00	R 12,325.00	R 162,579.42	
	HD Bolts	kg	0.03	3,500	225.70	R 54.61	R 191,127.60	
	Grout	m3	79.73	1.317	0.18	R 8,736.11	R 11,504.98	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	579	0.06	R 94.35	R 54,642.80	R 1,386,908.98
	Working space	m2	0.50	1,158	1.90	R 49.66	R 57,518.74	
	Backfill	m3	2.66	218	0.80	R 117.94	R 25,678.01	
	Blinding	m2	0.33	409	21.39	R 73.52	R 30,074.59	
	Concrete bases	m3	0.00	135	0.00	R 1,572.50	R 212,287.50	
	Concrete plinth	m3	2.58	37	0.00	R 1,572.50	R 58,481.40	
	Concrete slab	m3	3.63	52	0.00	R 1,572.50	R 82,281.98	
	Total concrete	m3	0.00	225	0.00		R -	
	Wood float	m2	0.55	408	161.77	R 9.72	R 3,968.05	
	Formwork bases	m2	0.49	276	8.32	R 189.00	R 52,072.09	
	Formwork plinths	m2	0.11	338	8.34	R 188.55	R 63,746.90	
	High tensile reinforcement	t	13.32	16.856	0.00	R 12,325.00	R 207,744.41	
	HD Bolts	kg	0.02	6,750	217.74	R 56.60	R 382,078.40	
	Cast in items	kg	0.05	2,700	241.09	R 51.12	R 138,029.37	
	Grout	m3	68.22	1.979	0.17	R 9,250.00	R 18,304.75	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	518	0.05	R 78.63	R 40,721.46	R 1,644,824.05
	Working space	m2	0.56	925	1.66	R 47.36	R 43,805.36	
	Backfill	m3	2.15	241	0.79	R 99.53	R 23,974.95	
	Blinding	m2	0.65	383	20.36	R 77.23	R 29,586.86	
	Concrete bases	m3	0.00	249	0.00	R 1,572.50	R 391,552.50	
	Concrete column	m3	28.05	9	0.00	R 1,572.50	R 13,959.09	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	5.23	48	0.00	R 1,572.50	R 74,866.63	
		Total concrete	m3	0.00	305	0.00		R -	
		Wood float	m2	0.60	509	158.85	R 9.90	R 5,040.17	
		Formwork bases	m2	0.52	479	8.23	R 191.07	R 91,492.78	
		Formwork plinths	m2	0.33	144	7.44	R 211.36	R 30,493.09	
		Formwork to columns	m2	0.28	32	8.09	R 194.38	R 6,162.41	
		High tensile reinforcement	t	9.06	33.718	0.00	R 12,325.00	R 415,576.89	
		HD bolts	kg	0.04	7,637	209.18	R 58.92	R 449,986.45	
		Grout	m3	108.76	2.809	0.16	R 9,828.13	R 27,605.41	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	557	0.06	R 94.35	R 52,571.82	R 2,622,543.55
		Working space	m2	0.30	1,857	2.12	R 44.50	R 82,660.09	
		Backfill	m3	2.06	270	0.82	R 115.06	R 31,122.32	
		Blinding	m2	0.67	297	19.99	R 78.66	R 23,364.48	
		Concrete bases	m3	0.00	199	0.00	R 1,572.50	R 312,927.50	
		Concrete column	m3	1.19	180	151.33	R 1,572.50	R 282,372.29	
		Concrete beam	m3	2.68	67	0.95	R 1,572.50	R 105,362.79	
		Total concrete	m3	2.97	446	0.95		R -	
		Wood float	m2	0.47	423	7.50	R 10.39	R 4,399.68	
		Formwork bases	m2	0.48	415	6.55	R 209.67	R 86,924.31	
		Formwork to columns	m2	0.15	1,197	7.98	R 197.06	R 235,899.99	
		Formwork to sides beams	m2	0.33	203	6.11	R 240.08	R 48,745.22	
		Formwork to soffits beams	m2	0.69	97	6.55	R 257.36	R 24,991.77	
		Formwork corbels	m2	10.88	17	5.37	R 292.83	R 4,833.02	
		High tensile reinforcement	t	9.10	48.964	0.00	R 12,325.00	R 603,481.29	
		Cast in steel	kg	0.03	14,852	262.64	R 46.93	R 696,984.43	
		HD bolts	kg	1.48	301	215.28	R 57.25	R 17,236.13	
		Grout	m3	505.30	0.882	0.16	R 9,828.13	R 8,666.42	
		Restricted excavation	m3	3.84	1,267	0.05	R 78.63	R 99,633.60	R 4,574,014.68
		Working space	m2	0.61	2,077	1.79	R 43.92	R 91,247.92	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	1,102	0.79	R 99.53	R 109,668.24	
		Blinding	m2	0.61	541	20.06	R 78.39	R 42,407.61	
		Concrete bases	m3	0.00	330	0.97	R 1,572.50	R 518,925.00	
		Concrete column	m3	2.44	135	1.07	R 1,572.50	R 212,674.18	
		Concrete beam	m3	0.84	161	1.02	R 1,572.50	R 253,183.55	
		Concrete surface slab	m3	1.68	196	0.97	R 1,572.50	R 308,883.93	
		Concrete wall	m3	2.50	54	1.05	R 1,572.50	R 85,069.67	
		Concrete elevated slab	m3	1.10	123	0.00	R 1,572.50	R 193,340.16	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,000	0.00		R -	
		Wood float	m2	0.64	1,562	169.32	R 9.29	R 14,507.26	
		Formwork bases	m2	0.41	805	7.65	R 205.56	R 165,447.15	
		Formwork to columns	m2	0.17	796	6.34	R 248.03	R 197,322.49	
		Formwork to sides beams	m2	0.30	537	5.15	R 305.34	R 163,872.85	
		Formwork to soffits beams	m2	0.84	192	7.57	R 207.73	R 39,816.25	
		Formwork to soffts of slabs	m2	0.31	634	3.23	R 273.48	R 173,286.92	
		Formwork to pockets	m2	26.55	5	5.75	R 486.84	R 2,479.98	
		Formwork wall	m2	0.13	416	8.09	R 194.38	R 80,887.77	
		High tensile reinforcement	t	8.87	112.709	0.00	R 12,325.00	R 1,389,140.99	
		Cast in steel	kg	0.22	4,544	255.59	R 48.22	R 219,130.79	
		HD bolts	kg	0.41	2,438	201.38	R 61.20	R 149,234.68	
		Steel handrailing	m	2.58	44	9.71	R 1,269.31	R 55,450.75	
		Grout	m3	1,039.37	0.962	0.18	R 8,736.11	R 8,402.93	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	2,195	0.04	R 62.90	R 138,073.17	R 18,829,367.58
		Working space	m2	7.92	277	1.42	R 44.30	R 12,277.10	
		Backfill	m3	4.13	532	0.63	R 39.63	R 21,062.01	
		Blinding	m2	1.05	2,571	17.95	R 87.60	R 225,268.60	
		Concrete bases	m3	0.00	2,700	0.00	R 1,572.50	R 4,245,750.00	
		Concrete column	m3	26.31	103	0.00	R 1,572.50	R 161,374.00	
		Concrete beam	m3	1.43	72	0.00	R 1,572.50	R 112,848.95	
		Concrete wall	m3	10.41	259	0.00	R 1,572.50	R 407,853.03	
		Concrete elevated slabs	m3	10.92	9	0.00	R 1,572.50	R 14,777.84	
		Total concrete	m3	0.00	3,143	0.00		R -	
		Wood float	m2	0.82	3,833	138.41	R 11.36	R 43,548.63	
		Formwork bases	m2	8.50	318	6.94	R 226.59	R 71,974.06	
		Formwork to columns	m2	0.14	733	5.63	R 249.60	R 182,963.72	
		Formwork to sides beams	m2	0.17	422	4.72	R 279.31	R 117,907.17	
		Formwork to soffits beams	m2	0.50	144	6.30	R 333.16	R 47,817.35	
		Formwork to soffts of slabs	m2	0.13	72	2.98	R 324.23	R 23,438.29	
		Formwork to pockets	m2	418.49	6	4.85	R 527.68	R 3,404.50	
		Formwork wall	m2	0.10	2,594	6.38	R 246.47	R 639,268.07	
		High tensile reinforcement	t	4.05	776.086	0.00	R 12,325.00	R 9,565,265.98	
		Cast in steel	kg	0.15	20,954	200.08	R 61.60	R 1,290,794.59	
		HD bolts	kg	0.22	14,287	167.91	R 73.40	R 1,048,703.78	
		Galvanised grating	m2	17.15	183	0.15	R 2,282.41	R 418,306.09	
		Grout	m3	771.45	3.500	5.40	R 10,483.33	R 36,690.65	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	194	0.05	R 78.63	R 15,279.98	R 2,323,005.98
	Working space	m2	0.42	463	1.76	R 44.67	R 20,670.97	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	95	0.80	R 98.28	R 9,362.73	
	Blinding	m2	4.82	26	20.78	R 75.67	R 1,931.09	
	Concrete bases	m3	0.00	123	0.00	R 1,572.50	R 193,417.50	
	Concrete column	m3	6.67	18	0.00	R 1,572.50	R 28,998.13	
	Concrete beam	m3	1.99	9	0.00	R 1,572.50	R 14,571.92	
	Concrete wall	m3	35.85	3	0.00	R 1,572.50	R 5,395.19	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,572.50	R 1,172.12	
	Total concrete	m3	0.00	155	0.00		R -	
	Wood float	m2	4.82	26	162.71	R 9.66	R 246.62	
	Formwork bases	m2	1.44	85	8.18	R 192.24	R 16,420.26	
	Formwork to columns	m2	0.14	132	6.98	R 229.56	R 30,237.88	
	Formwork to sides beams	m2	0.23	40	6.34	R 225.29	R 9,076.82	
	Formwork to soffits beams	m2	0.75	12	6.85	R 248.03	R 3,064.55	
	Formwork to soffts of slabs	m2	0.22	3	3.87	R 254.86	R 863.50	
	Formwork to pockets	m2	3.09	40	6.17	R 406.33	R 16,174.33	
	Formwork wall	m2	0.29	12	7.54	R 208.55	R 2,467.39	
	High tensile reinforcement	t	7.31	21.188	0.00	R 12,325.00	R 261,141.37	
	Cast in steel	kg	0.02	7,744	212.67	R 57.95	R 448,804.12	
	HD bolts	kg	0.01	15,488	208.59	R 59.09	R 915,165.36	
	Galvanised grating	m2	3.97	39	0.19	R 8,276.32	R 322,888.57	
	Grout	m3	42.08	2.923	6.37	R 1,934.85	R 5,655.58	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	1,452	0.05	R 78.63	R 114,191.81	R 9,752,172.73
	Working space	m2	2.50	581	1.84	R 42.73	R 24,824.31	
	Backfill	m3	1.25	1,162	0.79	R 99.53	R 115,637.27	
	Blinding	m2	3.86	207	20.30	R 77.46	R 16,014.38	
	Concrete	m3	0.00	798	0.00	R 1,572.50	R 1,254,855.00	
	Mesh reinforcement	m2	0.51	1,565	65.77	R 187.40	R 293,218.79	
	Rough formwork	m2	3.09	258	8.61	R 182.64	R 47,166.31	
	Smooth formwork	m2	0.57	1,400	6.80	R 231.25	R 323,750.00	
	Finish to concrete	m2	0.23	3,470	105.40	R 14.92	R 51,763.67	
	Construction joints	m	4.97	161	21.29	R 73.86	R 11,859.37	
	Movement joints	m	15.36	52	17.11	R 91.91	R 4,774.77	
	Cast in steel	kg	2.35	340	232.74	R 52.96	R 17,982.54	
	Grout	m3	882.88	0.904	0.18	R 8,736.11	R 7,896.22	
	Brick walls	m2	0.50	1,596	0.00	R 382.50	R 610,470.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	3,567	0.00		R -	
	Waterproofing membrane	m2	2.22	1,607	12.03	R 130.71	R 210,030.55	
	Roof construction	m2	2.04	1,749	38.22	R 322.48	R 563,866.76	
	Ceiling	m2	0.98	3,640	0.00	R 301.75	R 1,098,326.89	
	Doors and windows	No	474.69	8	0.17	R 2,250.00	R 16,907.63	
	Floor finish	m2	1.03	3,463	0.79	R 484.18	R 1,676,785.61	
	Wall finsih	m2	1.04	3,430	1.47	R 260.20	R 892,464.97	
	Rod reinforcement	t	9.25	86	0.00	R 12,325.00	R 1,063,281.08	
	Metalwork	Item	0.00	1	4.44	R 54,723.00	R 54,723.00	
	Structural steel	Item	0.00	1	11.50	R 141,737.50	R 141,737.50	
	Plumbing and drainage	Item	0.00	1	7.32	R 90,219.00	R 90,219.00	
	Small power and lighting	Item	0.00	1	62.40	R 769,080.00	R 769,080.00	
	External works	Item	0.00	1	178.28	R 280,345.30	R 280,345.30	
BUILDINGS - STEEL	Concrete	m3	0.00	88	0.17	R 1,572.50	R 138,380.00	R 3,281,641.43
	Earthworks	m3	2.37	209	9.13	R 172.23	R 35,921.20	
	Reinforcement	t	8.82	10	0.00	R 12,325.00	R 122,970.52	
	Mesh	m2	0.12	733	10.27	R 153.12	R 112,284.97	
	Formwork	m2	0.40	220	8.06	R 195.10	R 42,921.84	
	Brickwork	m2	6.11	143	6.08	R 258.63	R 36,953.89	
	Roof covering	m2	0.87	1,003	208.48	R 224.24	R 225,015.38	
	Structural steel	t	18.83	46	0.00	R 46,750.00	R 2,167,432.29	
	Side cladding	m2	1.54	567	0.98	R 219.76	R 124,576.70	
	Doors	No	405.94	2	0.51	R 23,842.50	R 51,274.83	
	Ridge ventilator	m	21.95	40	11.48	R 2,574.30	R 102,385.59	
	Aluminium insulation	m2	0.89	981	1.81	R 123.89	R 121,524.23	
	Total building area	m2	0.00	873	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	203	0.13	R 204.43	R 41,457.39	R 2,539,578.82
	Concrete	m3	0.00	65	0.00	R 1,572.50	R 102,212.50	
	Reinforcement	t	11.42	6	0.18	R 12,325.00	R 70,151.05	
	Mesh	m2	0.12	542	10.21	R 154.02	R 83,425.16	
	Formwork	m2	0.45	144	8.51	R 184.78	R 26,690.82	
	Brickwork	m2	5.94	92	5.91	R 266.07	R 24,412.55	
	Screed	m2	1.12	487	43.13	R 36.46	R 17,741.47	
	Structural steel	t	14.72	37	0.00	R 46,750.00	R 1,730,893.34	
	Cat ladders	m	2.74	14	9.66	R 4,839.54	R 65,394.71	
	Hand rail	m	0.73	51	27.40	R 1,706.20	R 86,536.01	
	Kick plates	m	0.76	49	2.76	R 618.19	R 30,115.98	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	599	195.47	R 239.17	R 143,237.46	
		Side cladding	m2	4.76	114	0.93	R 222.43	R 25,466.78	
		Floor grating	m2	1.09	34	17.29	R 2,703.88	R 91,843.58	
		Total buiding area	m2	0.00	545	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	248	8.02	R 196.07	R 48,527.90	R 823,963.56
		Blinding	m2	0.47	160	18.72	R 84.00	R 13,404.43	
		Concrete	m3	0.00	75	0.00	R 1,572.50	R 117,937.50	
		Reinforcement	t	7.97	9	0.00	R 12,325.00	R 115,981.81	
		Mesh	m2	0.49	153	50.23	R 245.37	R 37,556.83	
		Formwork	m2	0.31	242	7.58	R 207.45	R 50,190.44	
		Finish to concrete	m2	0.44	170	103.65	R 15.17	R 2,586.01	
		Movement joints	m	2.46	30	15.35	R 102.44	R 3,123.26	
		Cast in steel	kg	0.09	833	179.47	R 68.67	R 57,228.69	
		Grout	m3	71.08	1.055	2.53	R 10,483.33	R 11,061.48	
		Brickwork	m2	0.24	58	0.15	R 382.50	R 22,312.50	
		Doors and windows	No	2.74	5	0.26	R 4,781.25	R 24,429.74	
		Pipework	m	2.59	60	0.21	R 621.54	R 37,196.50	
		Bolts	kg	0.11	682	0.08	R 68.67	R 46,823.48	
		Structural steel	t	3.99	4	0.00	R 47,403.85	R 166,329.28	
		Miscellaneous steel	t	131.32	1	0.00	R 58,690.48	R 69,273.71	
		Total bridge area	m2	0.00	155	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	129	6.07	R 259.06	R 33,380.00	R 336,421.80
		Blinding	m2	0.71	21	14.50	R 108.45	R 2,291.16	
		Concrete	m3	0.00	15	0.00	R 1,572.50	R 23,587.50	
		Reinforcement	t	5.75	3	0.00	R 12,325.00	R 32,152.17	
		Formwork	m2	0.07	214	5.72	R 274.91	R 58,909.84	
		Finish to concrete	m2	0.31	48	77.96	R 20.17	R 976.00	
		Movement joints	m	0.42	36	12.46	R 126.20	R 4,507.28	
		Cast in steel	kg	23.71	0.633	163.17	R 75.53	R 47.79	
		Grout	m3	22.24	0.674	0.62	R 12,096.15	R 8,158.38	
		Bolts	kg	109.85	0.137	0.13	R 46.83	R 6.39	
		Structural steel	t	35.84	0.809	0.22	R 56,022.73	R 45,330.89	
		Miscellaneous steel	t	20.04	1.447	0.18	R 68,472.22	R 99,086.55	
		Brickwork	m2	0.49	59	4.24	R 370.87	R 21,949.61	
		Roof covering	m2	1.46	20	1.22	R 303.99	R 6,038.24	
		Total pump house area	m2	0.00	29	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	430	6.10	R 257.79	R 110,786.49	R 3,725,506.78
	Blinding	m2	1.17	465	16.23	R 96.89	R 45,049.00	
	Concrete	m3	0.00	544	0.00	R 1,572.50	R 855,440.00	
	Reinforcement	t	5.89	92.360	0.00	R 12,325.00	R 1,138,336.16	
	Formwork	m2	0.21	2,590	6.04	R 260.35	R 674,424.47	
	Movement joint	m	1.61	338	0.12	R 122.09	R 41,252.27	
	Cast in steel	kg	0.13	4,185	12.88	R 62.83	R 262,925.08	
	Bolts	kg	0.37	1,470	196.16	R 75.88	R 111,569.27	
	Chemical anchors	No	6.13	89	0.22	R 342.55	R 30,399.34	
	Miscellaneous steelwork	t	88.98	6.114	162.42	R 56,022.73	R 342,508.02	
	Pre-cast concrete	m3	30.27	18	35.98	R 5,241.67	R 94,201.08	
	Brickwork	m2	7.79	52	0.30	R 359.84	R 18,615.59	
	Total area	m2	0.00	403	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	8,402	1.68	R 105.67	R 887,836.93	R 2,794,701.55
	Lining	m2	0.70	6,601	1.16	R 62.90	R 415,229.86	
	Paving	m2	0.65	7,109	0.53	R 118.68	R 843,718.14	
	Pipework	m	28.23	164	0.24	R 440.30	R 72,073.20	
	Manholes	No	16.47	10	0.10	R 4,403.00	R 43,760.29	
	Concrete	m3	2.43	67	0.04	R 1,572.50	R 105,927.68	
	Formwork	m2	0.08	842	5.85	R 268.80	R 226,341.20	
	Mesh	m2	0.70	96	6.64	R 236.82	R 22,789.95	
	Reinforcement	t	4.69	14.363	0.12	R 12,325.00	R 177,024.31	
	Dam area (to top of berm)	m2	0.00	4,621	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	827	5.56	R 282.82	R 234,030.99	R 2,210,194.90
	Blinding	m2	0.85	161	13.49	R 116.57	R 18,787.99	
	Concrete	m3	0.00	137	0.00	R 1,572.50	R 215,432.50	
	Reinforcement	t	4.52	30.310	0.00	R 12,325.00	R 373,567.48	
	Mesh	m2	0.90	152	38.60	R 319.30	R 48,604.63	
	Formwork	m2	0.15	913	5.36	R 293.38	R 267,950.87	
	Cast in steel	kg	0.02	6,850	140.16	R 87.94	R 602,356.24	
	Miscellaneous steelwork	t	11.14	5.835	0.16	R 77,031.25	R 449,464.21	
	Total tunnel length	m	0.00	65	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	48	0.00		R -	R 377,872.08
	Steel	t	9.58	5.010	0.00	R 46,750.00	R 234,238.00	
	Handrail	m	1.45	33	28.73	R 1,627.22	R 53,866.56	
	Grating	m2	1.91	25	16.97	R 2,754.86	R 69,232.12	
	Kick flats	m	1.71	28	76.94	R 607.62	R 17,055.90	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	7	95.97	R 487.13	R 3,479.51	
	STRUCTURAL STEEL - PIPERACK Total volume	m3	0.00	1,697	0.00		R -	R 3,543,393.13
	Steel	t	27.86	60.912	0.00	R 46,750.00	R 2,847,622.04	
	Handrail	m	13.37	127	30.43	R 1,536.31	R 194,997.97	
	Grating	m2	12.47	136	18.55	R 2,520.22	R 342,967.60	
	Kick flats	m	13.35	127	84.90	R 550.65	R 69,996.21	
	Cat ladder	m	98.85	17	9.14	R 5,114.88	R 87,809.31	
	STRUCTURAL STEEL - COMPLEX STRUCTURES Total volume	m3	0.00	12,149	0.00		R -	R 17,716,349.70
	Steel	t	76.43	158.956	0.00	R 46,750.00	R 7,431,188.67	
	Handrail	m	31.26	389	30.84	R 1,515.89	R 589,140.40	
	Grating	m2	3.84	3,164	16.10	R 2,903.73	R 9,186,816.61	
	Kick flats	m	34.08	356	83.17	R 562.10	R 200,380.69	
	Stair treads	No	230.28	53	101.90	R 458.78	R 24,204.26	
	Cat ladder	m	238.13	51	8.38	R 5,578.76	R 284,619.08	
	STRUCTURAL STEEL - STACK Total volume	m3	0.00	405	0.00		R -	R 886,977.03
	Steel	t	25.51	15.876	0.00	R 46,750.00	R 742,208.94	
	Handrail	m	45.84	9	30.11	R 1,552.64	R 13,717.70	
	Grating	m2	60.74	7	17.06	R 2,740.33	R 18,271.86	
	Kick flats	m	46.49	9	79.97	R 584.59	R 5,092.72	
	Cat ladder	m	20.35	20	8.64	R 5,410.88	R 107,685.81	
	STRUCTURAL STEEL - WALKWAY Total volume	m3	0.00	45	0.00		R -	R 276,536.25
	Steel	t	16.54	2.721	0.00	R 46,750.00	R 127,191.66	
	Handrail	m	1.10	41	31.41	R 1,488.38	R 60,888.25	
	Grating	m2	1.98	23	16.95	R 2,758.11	R 62,684.37	
	Kick flats	m	1.16	39	80.43	R 581.25	R 22,548.52	
	Stair treads	No	6.10	7	106.99	R 436.96	R 3,223.45	
	STRUCTURAL STEEL - CABLE GANTRY Total volume	m3	0.00	506	0.00		R -	R 2,209,988.18
	Steel	t	12.73	39.749	0.00	R 46,750.00	R 1,858,248.23	
	Handrail	m	25.10	20	32.05	R 1,458.66	R 29,405.62	
	Grating	m2	7.46	68	17.66	R 2,647.23	R 179,557.11	
	Kick flats	m	22.84	22	84.46	R 553.52	R 12,262.67	
	Cat ladder	m	20.48	25	8.85	R 5,282.49	R 130,514.54	
	Pipe length	m	0.00	39,216	0.00		R -	R 44,040,756.36
	PIPING INSTALLATION Total work units	WU	0.33	118,836	0.00	R 370.60	R 44,040,756.36	
	Pipe supports	kg	2.61	15,025	0.00		R -	
	WU for pipe supports	WU	0.16	19,014	0.00		R -	
	Number of welds	No	0.61	23,922	0.00		R -	
	Total fittings	No	0.38	14,902	0.00		R -	
	Stud bolts	No	0.34	5,067	0.00		R -	
	Support number	No	0.19	2,855	0.00		R -	
	RADIOGRAPHIC Total work units	WU	0.00	118,836	0.00	R 370.60		R 123,820.80

	Item description		Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	EXAMINATION (RT)	Number of examinations	No	59.98	1,981	5.93	R 62.50	R 123,820.80	
	DYE PENETRATION	Total work units	WU	0.00	118,836	0.00	R 370.60		R 44,492.84
	TESTING (DP)	Number of examinations	No	168.34	706	5.88	R 63.03	R 44,492.84	
	MAGNETIC PARTICLE	Total work units	WU	0.00	118,836	0.00	R 370.60		R 69,039.35
	TESTING (MPI)	Number of examinations	No	300.90	395	2.12	R 174.81	R 69,039.35	
	POST WELD HEAT	Total work units	WU	0.00	118,836	0.00	R 370.60		R 120,020.54
	TREATMENT	Number of examinations	No	52.95	2,244	6.93	R 53.48	R 120,020.54	
	MATERIAL HARDNESS	Total work units	WU	0.00	118,836	0.00	R 370.60		R 92,416.88
	TEST (HT)	Number of examinations	No	114.83	1,035	4.15	R 89.30	R 92,416.88	
	MECHANICAL	Total work units	WU	0.00	118,836	0.00	R 370.60		R 224,494.43
	INSTALLATION	Mechanical equipment	t	261.57	454	0.75	R 494.13	R 224,494.43	
		Structural steel	t	218.09	545	53.95			
		Total work units	WU	0.00	118,836	0.00	R 370.60		R 2,653,507.48
	PAINTING & INSULATION	Painting to piping	m2	17.88	6,646	0.34	R 142.54	R 947,357.52	
		Insulation to piping	m2	51.67	2,300	2.60	R 419.23	R 964,193.15	
		Mechanical equipment received	t	0.00	454	0.82	R 494.13	R 224,494.43	
		Painting to mechanical equipment	m2	0.25	1,817	3.69	R 133.91	R 243,354.40	
		Insulation to mechanical equipment	m2	0.70	649	1.17	R 422.34	R 274,107.98	
	ELECTRICAL &	Electrical cable	m	25.17	38,480	0.00	R 66.30	R 2,551,224.00	R 6,316,213.39
	INSTRUMENTATION -	Electrical cable terminations	No	311.25	1,529	0.43	R 154.19	R 235,720.26	
	INSTALLATION ONLY	Electrical equipment	No	9.05	124	0.11	R 602.73	R 74,515.49	
		DB's	No	6.39	14	0.32	R 1,883.52	R 25,730.49	
		Rack	m	0.69	6,022	1.65	R 189.43	R 1,140,721.66	
		Support steel	kg	1.42	8,727	2.13	R 31.13	R 271,655.84	
		Instrumentation cable	m	27.43	29,023	0.35	R 28.50	R 827,155.50	
		Instruments	No	0.58	1,058	0.18	R 158.33	R 167,528.56	
		Hook-ups	No	3.98	1,824	0.16	R 178.13	R 324,947.63	
		Light fittings	No	10.26	492	0.02	R 368.33	R 181,238.22	
		Conduit	m	4.13	3,750	0.13	R 40.18	R 150,701.40	
		Instrument stands	No	0.00	256		R 1,425.00	R 365,074.34	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project A			
Location:	South Africa			
Client:			Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,500	R	4.68
2	Concrete demolitions	m3	30	R	1,657.50
3	Bulk excavation	m3	5,500	R	38.25
4	Vertical piles	No	206		
5	Raking piles	No	15		
6	Concrete in piles	m3	ratio	R	1,572.50
7	Auger pile	m	ratio	R	340.00
8	Total paving and asphalt to road works	m2	4,550		
9	Grey paving to road works	m2	485	R	148.75
10	Asphalt to road surface	m2	4,065		
11	Rip bed of road works	m2	4,550	R	12.75
12	Total concrete in paving and bunding	m3	430	R	1,572.50
13	Concrete in paving	m3	259		
14	Rod reinforcement	t		R	12,325.00
15	Concrete in plinths and bases on area finishing	m3	190		
16	Stormwater pipe to drain surface run-off	m	92		
17	Machine excavation	m3		R	72.25
18	Concrete in pump and pipe support bases	m3	255	R	1,572.50
19	Concrete in tank bases	m3	95	R	1,572.50
20	Concrete in pipe and cable rack foundations	m3	105	R	1,572.50
21	Concrete to simple structural foundations	m3	135	R	1,572.50
22	Complex structural foundations - bases	m3	249	R	1,572.50
23	Concrete pipe racks - bases	m3	199	R	1,572.50
24	Concrete structure including concrete columns and beams - bases	m3	330	R	1,572.50
25	Major equipment bases with blast proof walls - bases	m3	2,700	R	1,572.50
26	Major equipment bases and elevated concrete structure - bases	m3	123	R	1,572.50
27	Concrete frame buildings with brick in-fill - all concrete	m3	798	R	1,572.50
28	One brick wall	m2		R	382.50
29	Concrete in structual steel buildings - all concrete	m3	88	R	1,572.50
30	Total building area - Structural steel buildings	m2	873		
31	Ceiling	m2		R	301.75
32	Structural steel	t		R	46,750.00
33	Steel canopy - concrete	m3	65	R	1,572.50
34	Steel canopy - area	m2	545		
35	Concrete in weighbridge - all concrete	m3	75	R	1,572.50
36	Total weighbridge area	m2	155		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	15	R	1,572.50
39	Total pump house area	m2	29		
40	Concrete in cooling tower	m3	544	R	1,572.50
41	Total cooling tower area	m2	403		
42	Emergency earth dam area - top of berm	m2	4,621		
43	Concrete in cable tunnel	m3	137	R	1,572.50
44	Total lengh of cable tunnel	m	65		
45	Total volume of basic steel platform	m3	48		
46	Total volume of steel pipe rack	m3	1,697		
47	Total volume of steel complex steel structure	m3	12,149		
48	Total volume of steel in stack	m3	405		
49	Total volume of steel in walkway	m3	45		
50	Total volume of steel in cable gantry	m3	506		
51	Piping work unit cost	WU		R	370.60
52	Total process pipe length	m	39,216		
53	Total electrical cable - installation only	m	38,480	R	66.30
54	Total instrumentation cable - installation only	m	29,023	R	44.20

Ratio: Project Ratio Median

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Simple	Mean
Current economic conditions	Volatile	Mean
Current economic factors	Good	Mean
Level of scope definition	Good	Mean
Rework	Little	Mean
Scope change	Few	Mean
Weather	Good	Mean
Access	Good	Mean
Project size	Medium	Mean
Project conditions	Good	Mean
Complexity	Simple	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

Project name:	Project A				
Location:	South Africa				
Client:	0	Date of estimate:	2009		

	CIVIL CONSTRUCTION COST				R 99,637,315.39
A	SITE CLEARANCE AND DEMOLITIONS		R	126,945.00	
B	BULK EARTHWORKS		R	456,870.84	
C	PILING		R	7,195,566.89	
D	ROAD WORKS		R	1,929,552.79	
E	GENERAL PAVING AND BUNDED AREAS		R	1,547,892.81	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,035,766.09	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,778,527.73	
H	TANK BASES AND BUNDING		R	1,708,374.30	
I	RACK FOUNDATIONS		R	871,386.14	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,499,183.38	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,720,876.76	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,715,936.03	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	5,364,953.06	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	17,891,298.02	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,604,497.00	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	10,308,086.69	
Q	BUILDINGS - STEEL		R	3,470,332.34	
R	CANOPIES - STEEL		R	2,570,954.75	
S	WEIGHBRIDGE		R	753,914.87	
T	PUMP HOUSE		R	287,613.16	
U	COOLING TOWER		R	3,503,430.32	
V	EMERGENCY DAM		R	2,615,642.04	
W	HEAVY DUTY CABLE TUNNEL		R	1,847,817.79	
	Preliminaries and General	35.00%	R	25,831,896.58	
	STRUCTURAL STEEL				R 39,231,082.12
A	STRUCTURAL STEEL - BASIC PLATFORM		R	418,235.99	
B	STRUCTURAL STEEL - PIPERACK		R	4,161,322.60	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	19,712,976.89	
D	STRUCTURAL STEEL - STACK		R	1,016,879.39	
E	STRUCTURAL STEEL - WALKWAY		R	328,725.81	
F	STRUCTURAL STEEL - CABLE GANTRY		R	2,384,060.83	
	Preliminaries and General	40.00%	R	11,208,880.61	
	MECHANICAL AND PIPING				R 69,194,776.73
A	PIPING INSTALLATION		R	48,444,832.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	157,846.00	
C	DYE PENETRATION TESTING (DP)		R	97,389.25	
D	MAGNETIC PARTICLE TESTING (MPI)		R	93,599.37	
E	POST WELD HEAT TREATMENT		R	160,315.14	
F	MATERIAL HARDNESS TEST (HT)		R	190,041.29	
H	MECHANICAL INSTALLATION		R	280,817.47	
	Preliminaries and General	40.00%	R	19,769,936.21	
	PAINTING AND INSULATION				R 4,816,493.11
A	PAINTING AND INSULATION		R	3,567,772.68	
	Preliminaries and General	35.00%	R	1,248,720.44	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 9,525,051.72
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	7,055,593.87	
	Preliminaries and General	35.00%	R	2,469,457.85	

TOTAL COST	R 222,404,719.07

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,500		R 4.68	R 77,220.00	R 126,945.00
	Concrete demolitions	m3		30		R 1,657.50	R 49,725.00	
BULK EARTHWORKS	Bulk excavation	m3		5,500		R 38.25	R 210,375.00	R 456,870.84
	Trimming of sides	m2	2.20	2,500	4.18	R 9.15	R 22,876.79	
	Back fill and compact	m3	1.12	4,911	0.95	R 40.26	R 197,720.86	
	Overhaul	m3/km	1.62	3,395	11.35	R 3.37	R 11,441.51	
	Rip bed	m2	1.71	3,216	8.51	R 4.49	R 14,456.68	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 302,533.28	R 302,533.28	R 7,195,566.89
	EO for raking equipment	Item	0.00	1	24.25	R 38,133.13	R 38,133.13	
	Number of piles	No	0.00	206	0.00		R -	
	Move rig to new position	No	1.48	139	0.19	R 298.78	R 41,586.25	
	Number of raking piles	No	19.43	11	0.00		R -	
	EO for setting up raking piles	No	0.93	11	0.24	R 377.40	R 4,302.43	
	EO for raking drilling	m	0.14	76	0.61	R 207.40	R 15,706.35	
	Auger quantity	m	0.05	4,120	0.00	R 340.00	R 1,400,800.00	
	EO for drilling in coarse gravel	m	0.55	375	0.22	R 345.95	R 129,574.00	
	EO for drilling in boulders	m	1.65	125	0.51	R 801.98	R 100,125.36	
	EO for drilling in soft rock	m	1.57	131	0.23	R 361.68	R 47,455.45	
	Temporary casings	m	0.38	542	0.31	R 487.48	R 264,262.76	
	EO casing to raking pile	m	0.17	62	0.57	R 1,100.75	R 68,649.00	
	Mild steel rod reinforcement	t	14.65	14.061	0.70	R 7,991.45	R 112,371.17	
	High tensile rod reinforcement	t	1.16	177.586	7.26	R 11,416.35	R 2,027,386.29	
	Concrete to piles and bases	m3	0.16	1,288	0.00	R 1,572.50	R 2,024,593.75	
	Concrete to raking piles	m3	0.08	133	1.08	R 1,698.30	R 225,070.64	
	Site establishment of test equipment	Item	0.00	1	115.74	R 182,001.15	R 182,001.15	
	Load test to pile	No	93.50	2	22.16	R 34,846.60	R 76,774.33	
	Site establishment of intergity testing	No	255.00	1	49.96	R 78,562.10	R 63,465.85	
	Integrity testing of piles	No	1.19	173	0.26	R 408.85	R 70,775.71	
ROAD WORKS	Red paving	m2	0.14	68	0.93	R 138.34	R 9,393.12	R 1,929,552.79
	Grey paving	m2	0.00	485	0.00	R 148.75	R 72,143.75	
	Kerbing	m	0.09	410	0.00	R 281.71	R 115,360.03	
	Total paving and asphalt	m2	0.00	4,550	0.00		R -	
	Remove top soil	m3	0.49	446	4.45	R 56.74	R 25,299.25	
	Asphalt	m2	0.20	910	0.00	R 175.20	R 159,433.48	
	Rip bed	m2	0.00	4,550	0.00	R 12.75	R 58,012.50	
	Reduce levels	m3	0.36	1,638	4.30	R 54.83	R 89,803.35	
	Selected fill	m3	1.50	1,092	0.46	R 119.18	R 130,149.78	
	Imported fill	m3	1.94	563	0.33	R 361.17	R 203,295.51	
	Wearing course	m3	3.89	421	0.20	R 274.13	R 115,428.47	
	Prime	m2	4.34	4,739	1.47	R 36.12	R 171,166.68	
	Three line road marking	m	0.78	3,697	0.10	R 28.17	R 104,137.81	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	405	4.06	R 8.45	R 3,426.19	
		1m Wide concrete V-drain	m	1.00	410	0.78	R 1,205.72	R 493,740.95	
		200mm Diameter PVC pipe	m	0.93	381	0.09	R 374.67	R 142,688.83	
		Road marking - STOP	No	0.15	61	0.03	R 462.00	R 28,378.57	
		Standard signage	No	0.01	4	4.28	R 518.35	R 2,122.62	
		100mm Painted line	m	1.61	659	1.33	R 8.45	R 5,571.89	
				0.00		1.64			
				0.00		1.84			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	259	0.75	R 1,572.50	R 407,277.50	R 1,547,892.81
		Concrete in plinths	m3	0.00	53	0.00	R 1,572.50	R 83,458.50	
		Total concrete	m3	0.00	430	0.00		R -	
		Rip and compact	m2	0.13	1,992	193.57	R 8.12	R 16,184.86	
		Formwork to plinth	m2	6.92	367	0.12	R 188.70	R 69,303.94	
		Formwork to slab	m2	0.80	207	0.15	R 235.88	R 48,873.30	
		High tensile steel	t	0.01	4.300	0.00	R 12,325.00	R 52,997.50	
		Mesh	m2	607.27	2,611	43.37	R 284.18	R 742,074.98	
		Construction joint	m	3.64	943	0.04	R 62.90	R 59,299.60	
		Expansion joint	m	2.10	544	0.08	R 125.80	R 68,422.62	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	6,542	0.00		R -	R 1,035,766.09
		Base excavation	m3	1.42	442	0.00	R 72.25	R 31,924.42	
		Backfill	m3	0.56	311	0.63	R 114.68	R 35,685.69	
		Working space	m2	0.43	789	1.35	R 84.95	R 67,028.68	
		Concrete in bases	m3	0.04	190	23.71	R 1,572.50	R 298,775.00	
		Blinding	m2	0.71	302	19.17	R 82.03	R 24,805.17	
		Concrete in sump walls	m3	0.11	21	31.87	R 1,572.50	R 32,865.25	
		Concrete in slabs	m3	0.02	4	0.81	R 1,572.50	R 5,975.50	
		Total concrete	m3	0.00	215	0.03		R -	
		Wood float	m2	0.61	352	123.90	R 12.69	R 4,467.06	
		Formwork to bases	m2	1.73	329	0.12	R 188.70	R 62,025.69	
		Formwork to sump walls	m2	11.18	234	0.12	R 188.70	R 44,092.02	
		Formwork to sides of slab	m2	5.67	22	0.17	R 267.33	R 5,759.78	
		Mild steel reinforcement	t	0.08	1.833	0.00	R 12,325.00	R 22,592.76	
		High tensile reinforcement	t	9.37	22.914	0.92	R 12,325.00	R 282,409.55	
		Cast in steel	kg	0.45	422	33.55	R 46.87	R 19,789.70	
		Waterstop	m	0.44	48	8.37	R 187.87	R 8,923.98	
		Manhole	No	0.08	7	2.72	R 4,817.71	R 35,458.33	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	92	0.12	R 578.13	R 53,187.50	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	411	0.05	R 72.25	R 29,662.24	R 1,778,527.73
		Working space	m2	0.33	1,244	0.68	R 49.13	R 61,122.19	
		Backfill	m3	3.97	103	1.27	R 91.76	R 9,488.93	
		Concrete bases	m3	0.93	255	0.00	R 1,572.50	R 400,987.50	
		Concrete plinth	m3	2.01	127	0.00	R 1,572.50	R 199,496.27	
		Total concrete	m3	0.00	382	0.00		R -	
		Wood float	m2	0.46	276	0.05	R 15.73	R 4,336.88	
		Blinding	m2	0.93	274	0.01	R 78.63	R 21,558.47	
		Formwork bases	m2	0.47	543	0.12	R 188.70	R 102,379.79	
		Formwork plinth	m2	0.53	239	0.12	R 188.70	R 45,168.97	
		High tensile reinforcement	t	10.15	37.622	6.60	R 12,325.00	R 463,694.03	
		Cast in steel	kg	0.10	3,819	0.03	R 47.18	R 180,145.13	
		HD Bolts	kg	0.08	4,773	0.03	R 47.18	R 225,181.41	
		Grout	m3	33.79	3.755	5.98	R 9,403.55	R 35,305.94	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.54	526	0.05	R 78.63	R 41,380.34	R 1,708,374.30
		Working space	m2	3.95	133	1.56	R 50.40	R 6,715.41	
		Backfill	m3	1.34	393	0.75	R 104.83	R 41,174.47	
		Concrete bases	m3	0.70	95	0.00	R 1,572.50	R 149,387.50	
		Concrete sump wall	m3	2.55	37	0.00	R 1,572.50	R 58,583.33	
		Concrete slab	m3	0.56	170	0.00	R 1,572.50	R 266,763.39	
		Concrete plinth	m3	3.73	25	19.74	R 1,572.50	R 40,050.27	
		Concrete column	m3	19.00	5	160.09	R 1,572.50	R 7,862.50	
		Total concrete	m3	0.00	332	0.99		R -	
		Blinding	m2	2.44	136	1.05	R 79.66	R 10,851.04	
		Wood float	m2	0.25	1,329	1.05	R 9.82	R 13,058.83	
		Formwork to bases	m2	0.39	244	1.05	R 208.00	R 50,667.31	
		Formwork to plinths	m2	0.34	75	7.56	R 217.80	R 16,315.08	
		Formwork to columns	m2	0.11	45	7.22	R 229.56	R 10,434.64	
		Formwork to sumps	m2	0.10	373	6.85	R 214.82	R 80,031.88	
		Formwork to slabs	m2	3.83	44	7.32	R 195.34	R 8,652.30	
		Formwork to slabs n/e 300mm	m	2.05	83	8.05	R 71.48	R 5,914.93	
		Mild steel reinforcement	t	0.22	3.306	22.00	R 12,325.00	R 40,741.99	
		High tensile reinforcement	t	22.12	15.026	0.90	R 12,325.00	R 185,190.89	
		Mesh	m2	0.15	1,131	54.97	R 224.21	R 253,574.46	
		Cast in items	kg	0.19	1,749	218.75	R 56.34	R 98,560.54	
		HD Bolts	kg	0.09	3,693	198.48	R 62.10	R 229,321.87	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	200.00	1.662	0.16	R 9,828.13	R 16,332.72	
		Construction joint	m	0.29	585	24.07	R 65.33	R 38,216.61	
		Expansion joint	m	0.44	386	15.71	R 100.10	R 38,592.01	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	344	0.05	R 78.63	R 27,078.45	R 871,386.14
		Working space	m2	0.30	1,148	1.58	R 124.23	R 142,613.17	
		Backfill	m3	2.36	146	0.78	R 100.80	R 14,710.15	
		Blinding	m2	0.40	263	24.38	R 64.50	R 16,931.14	
		Concrete bases	m3	5.73	105	0.00	R 1,572.50	R 165,112.50	
		Concrete plinth	m3	0.00	18	0.00	R 1,572.50	R 28,815.45	
		Total concrete	m3	0.00	123	1.35		R -	
		Wood float	m2	0.35	300	182.61	R 8.61	R 2,583.37	
		Formwork bases	m2	0.49	214	11.01	R 142.82	R 30,605.29	
		Formwork plinths	m2	0.09	204	6.94	R 226.59	R 46,134.24	
		High tensile reinforcement	t	9.11	13.537	0.00	R 12,325.00	R 166,846.96	
		HD Bolts	kg	0.03	3,500	198.55	R 62.08	R 217,262.65	
		Grout	m3	76.52	1.372	0.17	R 9,250.00	R 12,692.76	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	525	0.05	R 78.63	R 41,289.92	R 1,499,183.38
		Working space	m2	0.45	1,167	1.88	R 41.82	R 48,806.05	
		Backfill	m3	2.48	212	0.78	R 100.80	R 21,345.08	
		Blinding	m2	0.35	386	21.52	R 73.07	R 28,184.75	
		Concrete bases	m3	0.00	135	0.00	R 1,572.50	R 212,287.50	
		Concrete plinth	m3	2.36	46	0.00	R 1,572.50	R 71,718.75	
		Concrete slab	m3	2.96	57	0.00	R 1,572.50	R 89,952.33	
		Total concrete	m3	0.00	238	0.00		R -	
		Wood float	m2	0.51	466	155.50	R 10.11	R 4,715.45	
		Formwork bases	m2	0.45	300	8.00	R 196.56	R 58,968.75	
		Formwork plinths	m2	0.10	456	7.78	R 202.12	R 92,183.48	
		High tensile reinforcement	t	12.87	18.478	0.00	R 12,325.00	R 227,741.00	
		HD Bolts	kg	0.02	6,750	190.91	R 64.56	R 435,774.71	
		Cast in items	kg	0.05	2,700	225.21	R 54.73	R 147,762.09	
		Grout	m3	67.67	1.995	0.17	R 9,250.00	R 18,453.52	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	505	0.05	R 78.63	R 39,742.58	R 1,720,876.76
		Working space	m2	0.50	1,011	1.64	R 47.94	R 48,466.56	
		Backfill	m3	2.15	235	0.76	R 103.45	R 24,322.26	
		Blinding	m2	0.66	377	20.25	R 77.65	R 29,296.86	
		Concrete bases	m3	0.00	249	0.00	R 1,572.50	R 391,552.50	
		Concrete column	m3	27.56	9	0.00	R 1,572.50	R 14,207.28	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	4.67	53	0.00	R 1,572.50	R 83,844.22	
		Total concrete	m3	0.00	311	0.00		R -	
		Wood float	m2	0.59	528	157.14	R 10.01	R 5,280.88	
		Formwork bases	m2	0.49	508	7.78	R 202.12	R 102,710.38	
		Formwork plinths	m2	0.31	172	7.42	R 211.93	R 36,450.84	
		Formwork to columns	m2	0.29	31	7.75	R 202.90	R 6,321.37	
		High tensile reinforcement	t	8.97	34.711	0.00	R 12,325.00	R 427,807.88	
		HD bolts	kg	0.04	7,784	200.18	R 61.57	R 479,248.26	
		Grout	m3	96.76	3.218	0.16	R 9,828.13	R 31,624.90	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	521	0.05	R 78.63	R 40,993.50	R 2,715,936.03
		Working space	m2	0.25	2,086	2.02	R 38.92	R 81,175.25	
		Backfill	m3	1.91	273	0.79	R 99.53	R 27,167.81	
		Blinding	m2	0.68	293	20.00	R 78.63	R 23,009.38	
		Concrete bases	m3	0.00	199	0.00	R 1,572.50	R 312,927.50	
		Concrete column	m3	1.08	180	145.46	R 1,572.50	R 283,448.82	
		Concrete beam	m3	2.50	72	0.88	R 1,572.50	R 113,379.53	
		Total concrete	m3	2.76	451	0.88		R -	
		Wood float	m2	0.44	452	7.44	R 10.81	R 4,889.31	
		Formwork bases	m2	0.45	442	6.41	R 211.36	R 93,467.00	
		Formwork to columns	m2	0.14	1,288	7.35	R 213.95	R 275,460.47	
		Formwork to sides beams	m2	0.32	225	5.90	R 245.32	R 55,274.73	
		Formwork to soffits beams	m2	0.68	106	6.41	R 266.53	R 28,260.10	
		Formwork corbels	m2	10.42	17	4.87	R 322.90	R 5,585.70	
		High tensile reinforcement	t	8.81	51.232	0.00	R 12,325.00	R 631,436.01	
		Cast in steel	kg	0.03	15,045	260.94	R 47.23	R 710,629.68	
		HD bolts	kg	1.43	316	199.28	R 61.85	R 19,521.15	
		Grout	m3	476.47	0.947	0.16	R 9,828.13	R 9,310.08	
		Restricted excavation	m3	3.71	1,224	0.05	R 78.63	R 96,260.59	R 5,364,953.06
		Working space	m2	0.58	2,111	1.69	R 46.52	R 98,205.05	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	1,065	0.78	R 100.80	R 107,313.92	
		Blinding	m2	0.62	532	19.41	R 81.01	R 43,120.86	
		Concrete bases	m3	0.00	330	0.88	R 1,572.50	R 518,925.00	
		Concrete column	m3	2.01	164	1.07	R 1,572.50	R 258,171.64	
		Concrete beam	m3	0.83	198	1.00	R 1,572.50	R 311,050.17	
		Concrete surface slab	m3	1.64	201	0.92	R 1,572.50	R 316,417.68	
		Concrete wall	m3	2.14	77	1.00	R 1,572.50	R 120,640.95	
		Concrete elevated slab	m3	0.97	169	0.00	R 1,572.50	R 266,156.33	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,139	0.00		R -	
		Wood float	m2	0.60	1,899	152.05	R 10.34	R 19,635.67	
		Formwork bases	m2	0.39	846	7.60	R 206.91	R 175,075.91	
		Formwork to columns	m2	0.15	1,095	6.20	R 253.63	R 277,603.92	
		Formwork to sides beams	m2	0.29	682	4.91	R 320.26	R 218,449.45	
		Formwork to soffits beams	m2	0.79	250	7.19	R 218.71	R 54,761.39	
		Formwork to soffts of slabs	m2	0.30	671	3.11	R 278.32	R 186,677.10	
		Formwork to pockets	m2	25.00	7	5.65	R 505.63	R 3,320.54	
		Formwork wall	m2	0.12	639	7.88	R 199.56	R 127,581.38	
		High tensile reinforcement	t	8.60	132.463	0.00	R 12,325.00	R 1,632,605.02	
		Cast in steel	kg	0.21	5,425	251.20	R 49.06	R 266,158.69	
		HD bolts	kg	0.39	2,921	193.52	R 63.69	R 186,032.63	
		Steel handrailing	m	2.48	53	9.30	R 1,325.27	R 70,785.86	
		Grout	m3	994.87	1.145	0.18	R 8,736.11	R 10,003.33	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	2,061	0.04	R 62.90	R 129,641.22	R 17,891,298.02
		Working space	m2	7.47	276	1.41	R 44.61	R 12,308.45	
		Backfill	m3	4.63	445	0.74	R 46.55	R 20,720.20	
		Blinding	m2	1.22	2,213	19.45	R 80.85	R 178,926.63	
		Concrete bases	m3	0.00	2,700	0.00	R 1,572.50	R 4,245,750.00	
		Concrete column	m3	28.46	95	0.00	R 1,572.50	R 149,183.06	
		Concrete beam	m3	1.44	66	0.00	R 1,572.50	R 103,599.35	
		Concrete wall	m3	11.19	241	0.00	R 1,572.50	R 379,423.59	
		Concrete elevated slabs	m3	11.80	8	0.00	R 1,572.50	R 12,642.63	
		Total concrete	m3	0.00	3,110	0.00		R -	
		Wood float	m2	0.88	3,534	160.92	R 9.77	R 34,535.78	
		Formwork bases	m2	8.70	310	6.92	R 227.24	R 70,522.72	
		Formwork to columns	m2	0.15	632	5.95	R 247.25	R 156,376.38	
		Formwork to sides beams	m2	0.17	388	5.05	R 264.29	R 102,421.50	
		Formwork to soffits beams	m2	0.51	129	6.36	R 311.39	R 40,224.95	
		Formwork to soffts of slabs	m2	0.14	57	3.22	R 293.93	R 16,879.35	
		Formwork to pockets	m2	450.00	6	5.35	R 488.35	R 2,930.12	
		Formwork wall	m2	0.11	2,194	6.97	R 225.61	R 494,878.82	
		High tensile reinforcement	t	4.12	754.873	0.00	R 12,325.00	R 9,303,815.31	
		Cast in steel	kg	0.16	19,438	209.64	R 58.79	R 1,142,784.03	
		HD bolts	kg	0.24	12,959	171.78	R 71.75	R 929,767.70	
		Galvanised grating	m2	18.82	165	0.16	R 2,007.33	R 331,718.97	
		Grout	m3	822.89	3.281	6.14	R 9,828.13	R 32,247.25	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.48	182	0.05	R 78.63	R 14,312.90	R 2,604,497.00
	Working space	m2	0.38	479	1.56	R 50.40	R 24,144.56	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.98	92	0.78	R 100.80	R 9,267.61	
	Blinding	m2	4.71	26	21.03	R 74.77	R 1,952.70	
	Concrete bases	m3	0.00	123	0.00	R 1,572.50	R 193,417.50	
	Concrete column	m3	6.03	20	0.00	R 1,572.50	R 32,075.87	
	Concrete beam	m3	1.73	12	0.00	R 1,572.50	R 18,540.97	
	Concrete wall	m3	33.33	4	0.00	R 1,572.50	R 5,803.11	
	Concrete elevated slabs	m3	24.00	1	0.00	R 1,572.50	R 1,336.49	
	Total concrete	m3	0.00	160	0.00		R -	
	Wood float	m2	4.62	27	151.91	R 10.35	R 275.59	
	Formwork bases	m2	1.43	86	7.62	R 206.36	R 17,750.26	
	Formwork to columns	m2	0.13	157	6.99	R 251.20	R 39,414.93	
	Formwork to sides beams	m2	0.23	51	5.94	R 224.96	R 11,532.60	
	Formwork to soffits beams	m2	0.69	17	6.26	R 264.73	R 4,523.73	
	Formwork to soffts of slabs	m2	0.20	4	3.67	R 274.91	R 1,168.26	
	Formwork to pockets	m2	2.86	43	5.72	R 428.47	R 18,427.38	
	Formwork wall	m2	0.29	13	7.33	R 214.53	R 2,729.97	
	High tensile reinforcement	t	7.10	22.497	0.00	R 12,325.00	R 277,276.14	
	Cast in steel	kg	0.02	7,986	188.96	R 65.23	R 520,919.93	
	HD bolts	kg	0.01	15,973	197.35	R 62.45	R 997,547.80	
	Galvanised grating	m2	3.64	44	0.17	R 9,250.00	R 405,904.87	
	Grout	m3	40.32	3.051	6.09	R 2,023.81	R 6,173.82	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	1,381	0.05	R 78.63	R 108,544.96	R 10,308,086.69
	Working space	m2	2.26	611	1.69	R 46.52	R 28,419.37	
	Backfill	m3	1.23	1,122	0.76	R 103.45	R 116,115.70	
	Blinding	m2	3.82	209	19.66	R 79.98	R 16,708.85	
	Concrete	m3	0.00	798	0.00	R 1,572.50	R 1,254,855.00	
	Mesh reinforcement	m2	0.40	1,995	61.78	R 199.50	R 397,998.95	
	Rough formwork	m2	2.73	292	7.94	R 198.05	R 57,890.91	
	Smooth formwork	m2	0.56	1,425	6.78	R 231.93	R 330,503.32	
	Finish to concrete	m2	0.22	3,627	108.86	R 14.45	R 52,396.53	
	Construction joints	m	4.61	173	19.60	R 80.23	R 13,887.90	
	Movement joints	m	14.81	54	15.71	R 100.10	R 5,393.40	
	Cast in steel	kg	2.30	347	221.43	R 55.66	R 19,311.92	
	Grout	m3	803.00	0.994	0.16	R 9,828.13	R 9,766.93	
	Brick walls	m2	0.46	1,735	0.00	R 382.50	R 663,554.35	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	3,511	0.00		R -	
	Waterproofing membrane	m2	2.00	1,756	11.21	R 140.28	R 246,269.49	
	Roof construction	m2	1.99	1,764	34.10	R 361.44	R 637,727.35	
	Ceiling	m2	0.97	3,620	0.00	R 301.75	R 1,092,272.78	
	Doors and windows	No	434.63	8	0.15	R 2,550.00	R 20,600.42	
	Floor finish	m2	1.00	3,511	0.77	R 496.75	R 1,744,200.00	
	Wall finsih	m2	1.01	3,476	1.37	R 279.20	R 970,610.68	
	Rod reinforcement	t	8.63	92	0.00	R 12,325.00	R 1,139,669.76	
	Metalwork	Item	0.00	1	4.56	R 56,202.00	R 56,202.00	
	Structural steel	Item	0.00	1	11.81	R 145,558.25	R 145,558.25	
	Plumbing and drainage	Item	0.00	1	7.52	R 92,684.00	R 92,684.00	
	Small power and lighting	Item	0.00	1	64.07	R 789,662.75	R 789,662.75	
	External works	Item	0.00	1	189.05	R 297,281.13	R 297,281.13	
BUILDINGS - STEEL	Concrete	m3	0.00	88	0.16	R 1,572.50	R 138,380.00	R 3,470,332.34
	Earthworks	m3	2.30	202	8.34	R 188.55	R 38,162.35	
	Reinforcement	t	8.29	11	0.00	R 12,325.00	R 130,832.33	
	Mesh	m2	0.11	800	9.20	R 170.92	R 136,739.13	
	Formwork	m2	0.40	220	7.44	R 211.36	R 46,498.66	
	Brickwork	m2	5.73	152	5.65	R 278.32	R 42,403.51	
	Roof covering	m2	0.83	1,052	202.02	R 231.41	R 243,401.58	
	Structural steel	t	17.93	49	0.00	R 46,750.00	R 2,276,226.99	
	Side cladding	m2	1.49	586	0.95	R 219.84	R 128,806.81	
	Doors	No	371.00	2	0.49	R 22,907.50	R 53,903.63	
	Ridge ventilator	m	20.62	42	10.67	R 2,469.17	R 104,538.74	
	Aluminium insulation	m2	0.88	992	1.76	R 131.48	R 130,438.61	
	Total building area	m2	0.00	873	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	179	0.12	R 188.70	R 33,852.78	R 2,570,954.75
	Concrete	m3	0.00	65	0.00	R 1,572.50	R 102,212.50	
	Reinforcement	t	10.55	6	0.16	R 12,325.00	R 75,936.02	
	Mesh	m2	0.11	591	9.84	R 159.81	R 94,431.36	
	Formwork	m2	0.41	159	8.08	R 194.62	R 30,853.81	
	Brickwork	m2	5.78	94	5.59	R 281.31	R 26,524.52	
	Screed	m2	1.10	495	39.96	R 39.35	R 19,497.05	
	Structural steel	t	14.85	37	0.00	R 46,750.00	R 1,715,740.74	
	Cat ladders	m	2.52	15	9.58	R 4,879.96	R 71,069.89	
	Hand rail	m	0.72	51	26.40	R 1,770.83	R 90,264.14	
	Kick plates	m	0.73	50	2.64	R 670.77	R 33,722.59	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	626	193.17	R 242.01	R 151,606.98	
		Side cladding	m2	4.70	116	0.92	R 222.65	R 25,818.35	
		Floor grating	m2	1.06	35	16.28	R 2,871.62	R 99,424.04	
		Total buiding area	m2	0.00	545	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	254	7.88	R 199.56	R 50,737.07	R 753,914.87
		Blinding	m2	0.48	156	20.45	R 76.89	R 12,014.82	
		Concrete	m3	0.00	75	0.00	R 1,572.50	R 117,937.50	
		Reinforcement	t	8.00	9	0.00	R 12,325.00	R 115,546.88	
		Mesh	m2	0.50	150	48.38	R 254.75	R 38,213.10	
		Formwork	m2	0.35	214	7.78	R 202.12	R 43,311.60	
		Finish to concrete	m2	0.46	163	108.02	R 14.56	R 2,373.50	
		Movement joints	m	2.57	29	15.71	R 100.10	R 2,921.07	
		Cast in steel	kg	0.09	833	204.99	R 60.12	R 50,104.07	
		Grout	m3	72.28	1.038	2.62	R 9,250.00	R 9,598.09	
		Brickwork	m2	0.25	56	0.17	R 382.50	R 21,420.00	
		Doors and windows	No	3.00	5	0.28	R 4,250.00	R 19,833.33	
		Pipework	m	2.93	53	0.22	R 600.19	R 31,750.71	
		Bolts	kg	0.11	682	0.09	R 60.12	R 40,994.24	
		Structural steel	t	4.50	3	0.00	R 44,017.86	R 136,944.44	
		Miscellaneous steel	t	144.21	1	0.00	R 56,022.73	R 60,214.43	
		Total bridge area	m2	0.00	155	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.76	116	6.28	R 250.40	R 29,146.34	R 287,613.16
		Blinding	m2	0.82	18	15.92	R 98.78	R 1,806.86	
		Concrete	m3	0.00	15	0.00	R 1,572.50	R 23,587.50	
		Reinforcement	t	5.77	3	0.00	R 12,325.00	R 32,040.73	
		Formwork	m2	0.07	214	5.92	R 265.63	R 56,919.64	
		Finish to concrete	m2	0.34	44	81.15	R 19.38	R 854.90	
		Movement joints	m	0.46	33	15.43	R 101.91	R 3,323.21	
		Cast in steel	kg	28.85	0.520	181.80	R 67.79	R 35.25	
		Grout	m3	24.19	0.620	0.79	R 9,828.13	R 6,094.33	
		Bolts	kg	121.43	0.124	0.16	R 53.56	R 6.62	
		Structural steel	t	43.33	0.669	0.26	R 47,403.85	R 31,726.55	
		Miscellaneous steel	t	24.14	1.201	0.18	R 68,472.22	R 82,257.43	
		Brickwork	m2	0.60	48	4.81	R 326.92	R 15,801.28	
		Roof covering	m2	1.79	16	1.32	R 247.67	R 4,012.51	
		Total pump house area	m2	0.00	29	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	495	7.10	R 221.48	R 109,640.90	R 3,503,430.32
	Blinding	m2	1.40	389	19.02	R 82.68	R 32,125.58	
	Concrete	m3	0.00	544	0.00	R 1,572.50	R 855,440.00	
	Reinforcement	t	5.77	94.281	0.00	R 12,325.00	R 1,162,010.40	
	Formwork	m2	0.20	2,720	7.01	R 224.32	R 610,156.92	
	Movement joint	m	1.86	292	0.13	R 107.19	R 31,350.65	
	Cast in steel	kg	0.15	3,627	14.67	R 57.54	R 208,686.99	
	Bolts	kg	0.39	1,395	214.19	R 71.58	R 99,847.80	
	Chemical anchors	No	7.24	75	0.25	R 300.24	R 22,559.74	
	Miscellaneous steelwork	t	91.86	5.922	172.18	R 49,300.00	R 291,957.33	
	Pre-cast concrete	m3	36.75	15	41.05	R 4,368.06	R 64,659.11	
	Brickwork	m2	8.86	45	0.36	R 329.66	R 14,994.90	
	Total area	m2	0.00	403	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	7,109	1.69	R 132.88	R 944,647.93	R 2,615,642.04
	Lining	m2	0.82	5,635	1.50	R 78.63	R 443,080.64	
	Paving	m2	0.84	5,501	0.59	R 133.26	R 733,103.56	
	Pipework	m	28.97	160	0.26	R 511.06	R 81,519.50	
	Manholes	No	17.25	9	0.11	R 4,646.02	R 42,961.53	
	Concrete	m3	2.90	55	0.05	R 1,572.50	R 86,492.83	
	Formwork	m2	0.10	550	5.83	R 269.73	R 148,358.21	
	Mesh	m2	0.78	71	7.36	R 213.65	R 15,066.34	
	Reinforcement	t	5.63	9.770	0.14	R 12,325.00	R 120,411.51	
	Dam area (to top of berm)	m2	0.00	4,621	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	940	5.85	R 268.80	R 252,626.83	R 1,847,817.79
	Blinding	m2	0.92	149	13.72	R 114.61	R 17,067.48	
	Concrete	m3	0.00	137	0.00	R 1,572.50	R 215,432.50	
	Reinforcement	t	4.44	30.856	0.00	R 12,325.00	R 380,298.42	
	Mesh	m2	1.14	120	41.22	R 299.01	R 35,933.10	
	Formwork	m2	0.15	913	5.63	R 279.31	R 255,100.65	
	Cast in steel	kg	0.03	4,567	157.23	R 78.39	R 357,973.46	
	Miscellaneous steelwork	t	13.35	4.869	0.18	R 68,472.22	R 333,385.35	
	Total tunnel length	m	0.00	65	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	48	0.00		R -	R 418,235.99
	Steel	t	8.75	5.486	0.00	R 46,750.00	R 256,457.14	
	Handrail	m	1.45	33	25.58	R 1,827.60	R 60,499.85	
	Grating	m2	1.79	27	15.88	R 2,943.95	R 78,944.04	
	Kick flats	m	1.64	29	75.83	R 616.51	R 18,044.21	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stair treads	No	5.80	8	90.17	R 518.47	R 4,290.75	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,697	0.00		R -	R 4,161,322.60
		Steel	t	23.48	72.274	0.00	R 46,750.00	R 3,378,822.40	
		Handrail	m	12.68	134	29.85	R 1,566.16	R 209,604.15	
		Grating	m2	12.33	138	16.37	R 2,855.83	R 393,053.53	
		Kick flats	m	12.52	136	77.41	R 603.93	R 81,858.18	
		Cat ladder	m	94.92	18	8.53	R 5,480.66	R 97,984.35	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	12,149	0.00		R -	R 19,712,976.89
		Steel	t	64.24	189.119	0.00	R 46,750.00	R 8,841,309.93	
		Handrail	m	29.15	417	28.17	R 1,659.57	R 691,666.50	
		Grating	m2	3.70	3,284	15.96	R 2,929.20	R 9,618,061.20	
		Kick flats	m	32.29	376	77.41	R 603.93	R 227,225.48	
		Stair treads	No	217.41	56	91.87	R 508.87	R 28,436.03	
		Cat ladder	m	228.94	53	8.10	R 5,771.60	R 306,277.75	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	405	0.00		R -	R 1,016,879.39
		Steel	t	22.16	18.276	0.00	R 46,750.00	R 854,411.10	
		Handrail	m	45.11	9	26.08	R 1,792.56	R 16,093.71	
		Grating	m2	58.13	7	15.86	R 2,947.67	R 20,536.82	
		Kick flats	m	42.58	10	77.41	R 603.93	R 5,744.26	
		Cat ladder	m	19.44	21	8.11	R 5,764.49	R 120,093.51	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	45	0.00		R -	R 328,725.81
		Steel	t	13.69	3.287	0.00	R 46,750.00	R 153,670.56	
		Handrail	m	1.04	43	26.86	R 1,740.51	R 75,310.37	
		Grating	m2	1.91	24	15.68	R 2,981.51	R 70,244.88	
		Kick flats	m	1.08	42	76.30	R 612.71	R 25,529.71	
		Stair treads	No	5.57	8	95.13	R 491.43	R 3,970.28	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	506	0.00		R -	R 2,384,060.83
		Steel	t	11.98	42.237	0.00	R 46,750.00	R 1,974,582.64	
		Handrail	m	22.00	23	26.10	R 1,791.19	R 41,197.32	
		Grating	m2	7.32	69	15.97	R 2,927.36	R 202,356.02	
		Kick flats	m	22.59	22	78.04	R 599.05	R 13,418.34	
		Cat ladder	m	18.87	27	8.22	R 5,687.35	R 152,506.52	
	PIPING INSTALLATION	Pipe length	m	0.00	39,216	0.00		R -	R 48,444,832.00
		Total work units	WU	0.30	130,720	0.00	R 370.60	R 48,444,832.00	
		Pipe supports	kg	2.49	15,749	0.00		R -	
		WU for pipe supports	WU	0.16	20,915	0.00		R -	
		Number of welds	No	0.56	21,961	0.00		R -	
		Total fittings	No	0.39	15,294	0.00		R -	
		Stud bolts	No	0.35	5,353	0.00		R -	
		Support number	No	0.19	2,992	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	130,720	0.00	R 370.60		R 157,846.00

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	2,351	5.52	R 67.14	R 157,846.00	
DYE PENETRATION	Total work units	WU	0.00	130,720	0.00	R 370.60		R 97,389.25
TESTING (DP)	Number of examinations	No	164.17	796	3.03	R 122.31	R 97,389.25	
MAGNETIC PARTICLE	Total work units	WU	0.00	130,720	0.00	R 370.60		R 93,599.37
TESTING (MPI)	Number of examinations	No	273.85	477	1.89	R 196.08	R 93,599.37	
POST WELD HEAT	Total work units	WU	0.00	130,720	0.00	R 370.60		R 160,315.14
TREATMENT	Number of examinations	No	46.49	2,812	6.50	R 57.02	R 160,315.14	
MATERIAL HARDNESS	Total work units	WU	0.00	130,720	0.00	R 370.60		R 190,041.29
TEST (HT)	Number of examinations	No	106.66	1,226	2.39	R 155.06	R 190,041.29	
MECHANICAL	Total work units	WU	0.00	130,720	0.00	R 370.60		R 280,817.47
INSTALLATION	Mechanical equipment	t	236.32	553	0.73	R 507.67	R 280,817.47	
	Structural steel	t	192.98	677	54.54			
	Total work units	WU	0.00	130,720	0.00	R 370.60		R 3,567,772.68
PAINTING & INSULATION	Painting to piping	m2	16.80	7,781	0.32	R 157.70	R 1,227,072.75	
	Insulation to piping	m2	48.21	2,711	2.35	R 492.82	R 1,336,264.66	
	Mechanical equipment received	t	0.00	553	0.81	R 507.67	R 280,817.47	
	Painting to mechanical equipment	m2	0.23	2,405	3.37	R 150.64	R 362,298.37	
	Insulation to mechanical equipment	m2	0.67	826	1.16	R 437.65	R 361,319.44	
ELECTRICAL &	Electrical cable	m	22.74	38,480	0.00	R 66.30	R 2,551,224.00	R 7,055,593.87
INSTRUMENTATION -	Electrical cable terminations	No	276.76	1,692	0.38	R 174.47	R 295,239.55	
INSTALLATION ONLY	Electrical equipment	No	8.25	139	0.10	R 663.00	R 92,181.82	
	DB's	No	5.97	17	0.28	R 2,367.86	R 39,905.55	
	Rack	m	0.59	6,446	1.65	R 207.19	R 1,335,439.70	
	Support steel	kg	1.34	10,925	1.99	R 33.32	R 363,973.00	
	Instrumentation cable	m	23.73	29,023	0.32	R 28.50	R 827,155.50	
	Instruments	No	0.44	1,223	0.16	R 178.13	R 217,855.96	
	Hook-ups	No	3.69	2,780	0.15	R 190.00	R 528,135.65	
	Light fittings	No	9.97	513	0.02	R 414.38	R 212,594.32	
	Conduit	m	3.99	3,860	0.11	R 40.18	R 155,084.89	
	Instrument stands	No	0.00	307		R 1,425.00	R 436,803.93	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project A				
Location:	South Africa				
Client:				Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,500	R	4.68
2	Concrete demolitions	m3	30	R	1,657.50
3	Bulk excavation	m3	5,500	R	38.25
4	Vertical piles	No	206		
5	Raking piles	No	15		
6	Concrete in piles	m3	ratio	R	1,572.50
7	Auger pile	m	ratio	R	340.00
8	Total paving and asphalt to road works	m2	4,550		
9	Grey paving to road works	m2	485	R	148.75
10	Asphalt to road surface	m2	4,065		
11	Rip bed of road works	m2	4,550	R	12.75
12	Total concrete in paving and bunding	m3	430	R	1,572.50
13	Concrete in paving	m3	259		
14	Rod reinforcement	t		R	12,325.00
15	Concrete in plinths and bases on area finishing	m3	190		
16	Stormwater pipe to drain surface run-off	m	92		
17	Machine excavation	m3		R	72.25
18	Concrete in pump and pipe support bases	m3	255	R	1,572.50
19	Concrete in tank bases	m3	95	R	1,572.50
20	Concrete in pipe and cable rack foundations	m3	105	R	1,572.50
21	Concrete to simple structural foundations	m3	135	R	1,572.50
22	Complex structural foundations - bases	m3	249	R	1,572.50
23	Concrete pipe racks - bases	m3	199	R	1,572.50
24	Concrete structure including concrete columns and beams - bases	m3	330	R	1,572.50
25	Major equipment bases with blast proof walls - bases	m3	2,700	R	1,572.50
26	Major equipment bases and elevated concrete structure - bases	m3	123	R	1,572.50
27	Concrete frame buildings with brick in-fill - all concrete	m3	798	R	1,572.50
28	One brick wall	m2		R	382.50
29	Concrete in structual steel buildings - all concrete	m3	88	R	1,572.50
30	Total building area - Structural steel buildings	m2	873		
31	Ceiling	m2		R	301.75
32	Structural steel	t		R	46,750.00
33	Steel canopy - concrete	m3	65	R	1,572.50
34	Steel canopy - area	m2	545		
35	Concrete in weighbridge - all concrete	m3	75	R	1,572.50
36	Total weighbridge area	m2	155		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	15	R	1,572.50
39	Total pump house area	m2	29		
40	Concrete in cooling tower	m3	544	R	1,572.50
41	Total cooling tower area	m2	403		
42	Emergency earth dam area - top of berm	m2	4,621		
43	Concrete in cable tunnel	m3	137	R	1,572.50
44	Total lengh of cable tunnel	m	65		
45	Total volume of basic steel platform	m3	48		
46	Total volume of steel pipe rack	m3	1,697		
47	Total volume of steel complex steel structure	m3	12,149		
48	Total volume of steel in stack	m3	405		
49	Total volume of steel in walkway	m3	45		
50	Total volume of steel in cable gantry	m3	506		
51	Piping work unit cost	WU		R	370.60
52	Total process pipe length	m	39,216		
53	Total electrical cable - installation only	m	38,480	R	66.30
54	Total instrumentation cable - installation only	m	29,023	R	44.20

Ratio: Variable ratio

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Simple	Mean
Current economic conditions	Volatile	Mean
Current economic factors	Good	Mean
Level of scope definition	Good	Mean
Rework	Little	Mean
Scope change	Few	Mean
Weather	Good	Mean
Access	Good	Mean
Project size	Medium	Mean
Project conditions	Good	Mean
Complexity	Simple	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project A			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 97,760,697.32
A	SITE CLEARANCE AND DEMOLITIONS		R	126,945.00	
B	BULK EARTHWORKS		R	439,997.47	
C	PILING		R	7,271,760.73	
D	ROAD WORKS		R	2,427,378.16	
E	GENERAL PAVING AND BUNDED AREAS		R	1,464,439.74	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	963,790.66	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,762,754.56	
H	TANK BASES AND BUNDING		R	1,535,747.48	
I	RACK FOUNDATIONS		R	889,200.45	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,346,471.69	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,599,049.52	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,641,028.60	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,715,404.69	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	17,595,272.66	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,974,101.99	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	9,713,490.45	
Q	BUILDINGS - STEEL		R	3,357,271.39	
R	CANOPIES - STEEL		R	2,489,334.95	
S	WEIGHBRIDGE		R	911,483.07	
T	PUMP HOUSE		R	350,344.73	
U	COOLING TOWER		R	3,547,291.76	
V	EMERGENCY DAM		R	3,143,339.26	
W	HEAVY DUTY CABLE TUNNEL		R	2,149,432.33	
	Preliminaries and General	35.00%	R	25,345,365.97	
	STRUCTURAL STEEL				R 35,008,362.12
A	STRUCTURAL STEEL - BASIC PLATFORM		R	398,747.39	
B	STRUCTURAL STEEL - PIPERACK		R	3,493,270.78	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	17,693,769.31	
D	STRUCTURAL STEEL - STACK		R	876,257.40	
E	STRUCTURAL STEEL - WALKWAY		R	285,075.24	
F	STRUCTURAL STEEL - CABLE GANTRY		R	2,258,852.83	
	Preliminaries and General	40.00%	R	10,002,389.18	
	MECHANICAL AND PIPING				R 64,357,793.57
A	PIPING INSTALLATION		R	45,315,878.49	
B	RADIOGRAPHIC EXAMINATION (RT)		R	120,794.91	
C	DYE PENETRATION TESTING (DP)		R	53,836.85	
D	MAGNETIC PARTICLE TESTING (MPI)		R	67,424.12	
E	POST WELD HEAT TREATMENT		R	114,754.06	
F	MATERIAL HARDNESS TEST (HT)		R	77,039.91	
H	MECHANICAL INSTALLATION		R	220,124.22	
	Preliminaries and General	40.00%	R	18,387,941.02	
	PAINTING AND INSULATION				R 3,499,059.58
A	PAINTING AND INSULATION		R	2,591,895.99	
	Preliminaries and General	35.00%	R	907,163.60	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 8,492,388.00
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	6,290,657.78	
	Preliminaries and General	35.00%	R	2,201,730.22	

TOTAL COST	R	209,118,300.59

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,500		R 4.68	R 77,220.00	R 126,945.00
	Concrete demolitions	m3		30		R 1,657.50	R 49,725.00	
BULK EARTHWORKS	Bulk excavation	m3		5,500		R 38.25	R 210,375.00	R 439,997.47
	Trimming of sides	m2	2.19	2,512	4.42	R 8.65	R 21,736.98	
	Back fill and compact	m3	1.15	4,792	1.01	R 38.03	R 182,234.95	
	Overhaul	m3/km	1.69	3,259	11.18	R 3.42	R 11,146.37	
	Rip bed	m2	1.76	3,128	8.25	R 4.64	R 14,504.17	
PILING	Site establishment of rig	Item	0.00	1	195.73	R 307,779.81	R 307,779.81	R 7,271,760.73
	EO for raking equipment	Item	0.00	1	24.21	R 38,062.36	R 38,062.36	
	Number of piles	No	0.00	206	0.00		R -	
	Move rig to new position	No	1.52	136	0.18	R 284.17	R 38,512.95	
	Number of raking piles	No	18.34	11	0.00		R -	
	EO for setting up raking piles	No	0.98	11	0.28	R 447.04	R 5,121.01	
	EO for raking drilling	m	0.15	74	0.91	R 310.86	R 23,062.45	
	Auger quantity	m	0.05	4,180	0.00	R 340.00	R 1,421,101.45	
	EO for drilling in coarse gravel	m	0.53	390	0.22	R 342.58	R 133,694.42	
	EO for drilling in boulders	m	1.84	112	0.52	R 810.96	R 91,039.73	
	EO for drilling in soft rock	m	1.61	128	0.24	R 374.03	R 47,942.38	
	Temporary casings	m	0.35	586	0.36	R 571.72	R 335,127.88	
	EO casing to raking pile	m	0.19	60	0.53	R 1,413.00	R 85,149.73	
	Mild steel rod reinforcement	t	14.60	14.107	0.90	R 10,589.45	R 149,383.59	
	High tensile rod reinforcement	t	1.31	157.424	7.49	R 11,784.76	R 1,855,199.79	
	Concrete to piles and bases	m3	0.16	1,323	0.00	R 1,572.50	R 2,080,316.51	
	Concrete to raking piles	m3	0.07	157	1.07	R 1,680.33	R 264,286.34	
	Site establishment of test equipment	Item	0.00	1	112.00	R 176,120.00	R 176,120.00	
	Load test to pile	No	99.85	2	27.67	R 43,505.46	R 89,755.88	
	Site establishment of intergity testing	No	264.78	1	49.21	R 77,388.34	R 60,207.49	
	Integrity testing of piles	No	1.27	162	0.27	R 430.19	R 69,896.96	
ROAD WORKS	Red paving	m2	0.15	72	0.97	R 144.71	R 10,377.44	R 2,427,378.16
	Grey paving	m2	0.00	485	0.00	R 148.75	R 72,143.75	
	Kerbing	m	0.13	582	0.00	R 266.53	R 155,052.33	
	Total paving and asphalt	m2	0.00	4,550	0.00		R -	
	Remove top soil	m3	0.56	628	5.67	R 72.26	R 45,385.02	
	Asphalt	m2	0.25	1,125	0.00	R 168.60	R 189,595.64	
	Rip bed	m2	0.00	4,550	0.00	R 12.75	R 58,012.50	
	Reduce levels	m3	0.39	1,788	4.72	R 60.23	R 107,669.42	
	Selected fill	m3	1.58	1,134	0.49	R 122.75	R 139,247.12	
	Imported fill	m3	2.27	499	0.38	R 320.02	R 159,622.81	
	Wearing course	m3	3.82	467	0.22	R 273.79	R 127,973.30	
	Prime	m2	4.67	5,298	1.37	R 46.17	R 244,650.78	
	Three line road marking	m	0.84	4,432	0.14	R 38.46	R 170,429.97	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.03	601	4.06	R 10.47	R 6,291.49	
		1m Wide concrete V-drain	m	0.99	573	0.83	R 1,189.85	R 682,309.36	
		200mm Diameter PVC pipe	m	0.96	561	0.09	R 369.90	R 207,351.40	
		Road marking - STOP	No	0.16	91	0.04	R 401.12	R 36,336.51	
		Standard signage	No	0.01	6	4.46	R 510.97	R 2,972.57	
		100mm Painted line	m	1.93	1,122	1.39	R 10.66	R 11,956.75	
				0.00		1.51			
				0.00		1.92			
				0.00		0.04			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.96	259	0.74	R 1,572.50	R 407,277.50	R 1,464,439.74
		Concrete in plinths	m3	0.00	52	0.00	R 1,572.50	R 82,112.40	
		Total concrete	m3	0.00	430	0.00		R -	
		Rip and compact	m2	0.13	1,929	188.06	R 8.36	R 16,127.76	
		Formwork to plinth	m2	7.12	372	0.13	R 197.69	R 73,519.76	
		Formwork to slab	m2	0.82	211	0.15	R 231.38	R 48,841.30	
		High tensile steel	t	0.01	4.607	0.00	R 12,325.00	R 56,783.04	
		Mesh	m2	560.59	2,583	50.53	R 243.89	R 629,909.01	
		Construction joint	m	4.04	1,046	0.05	R 79.75	R 83,415.83	
		Expansion joint	m	2.16	558	0.08	R 119.06	R 66,453.14	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.78	6,479	0.00		R -	R 963,790.66
		Base excavation	m3	1.56	419	0.00	R 72.25	R 30,265.35	
		Backfill	m3	0.59	269	0.65	R 110.43	R 29,679.16	
		Working space	m2	0.45	715	1.44	R 76.68	R 54,844.11	
		Concrete in bases	m3	0.04	190	25.34	R 1,572.50	R 298,775.00	
		Blinding	m2	0.85	250	20.96	R 75.01	R 18,724.46	
		Concrete in sump walls	m3	0.10	19	29.15	R 1,572.50	R 29,450.68	
		Concrete in slabs	m3	0.02	4	0.91	R 1,572.50	R 5,975.50	
		Total concrete	m3	0.00	213	0.04		R -	
		Wood float	m2	0.72	295	160.01	R 9.83	R 2,903.73	
		Formwork to bases	m2	1.68	319	0.12	R 184.21	R 58,848.92	
		Formwork to sump walls	m2	12.38	232	0.12	R 194.32	R 45,067.07	
		Formwork to sides of slab	m2	5.89	22	0.19	R 293.16	R 6,565.46	
		Mild steel reinforcement	t	0.13	2.462	0.00	R 12,325.00	R 30,343.98	
		High tensile reinforcement	t	11.04	19.256	1.24	R 12,325.00	R 237,327.24	
		Cast in steel	kg	0.47	404	34.67	R 45.36	R 18,309.18	
		Waterstop	m	0.42	45	7.88	R 199.66	R 8,979.76	
		Manhole	No	0.08	7	2.67	R 4,525.55	R 33,605.46	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	92	0.13	R 588.32	R 54,125.60	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.76	450	0.05	R 72.25	R 32,478.44	R 1,762,754.56
		Working space	m2	0.38	1,179	0.66	R 47.69	R 56,198.65	
		Backfill	m3	4.43	102	1.35	R 97.54	R 9,907.08	
		Concrete bases	m3	0.96	255	0.00	R 1,572.50	R 400,987.50	
		Concrete plinth	m3	2.17	117	0.00	R 1,572.50	R 184,543.89	
		Total concrete	m3	0.00	372	0.00		R -	
		Wood float	m2	0.47	251	0.06	R 15.73	R 3,944.45	
		Blinding	m2	0.96	266	0.01	R 87.61	R 23,306.28	
		Formwork bases	m2	0.47	543	0.13	R 211.16	R 114,742.24	
		Formwork plinth	m2	0.60	195	0.11	R 176.34	R 34,328.66	
		High tensile reinforcement	t	9.68	38.458	7.35	R 12,325.00	R 473,996.32	
		Cast in steel	kg	0.11	3,452	0.03	R 47.18	R 162,863.03	
		HD Bolts	kg	0.08	4,783	0.03	R 48.30	R 230,989.45	
		Grout	m3	34.46	3.405	6.44	R 10,122.41	R 34,468.59	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.90	561	0.05	R 79.75	R 44,725.93	R 1,535,747.48
		Working space	m2	4.52	124	1.69	R 47.07	R 5,835.68	
		Backfill	m3	1.46	383	0.76	R 105.63	R 40,495.85	
		Concrete bases	m3	0.76	95	0.00	R 1,572.50	R 149,387.50	
		Concrete sump wall	m3	3.01	32	0.00	R 1,572.50	R 49,642.18	
		Concrete slab	m3	0.58	164	0.00	R 1,572.50	R 257,564.66	
		Concrete plinth	m3	4.17	23	21.33	R 1,572.50	R 35,836.62	
		Concrete column	m3	19.78	5	161.94	R 1,572.50	R 7,551.63	
		Total concrete	m3	0.00	318	1.08		R -	
		Blinding	m2	2.60	122	1.07	R 73.71	R 9,001.95	
		Wood float	m2	0.25	1,287	1.12	R 9.71	R 12,492.76	
		Formwork to bases	m2	0.44	217	1.16	R 197.92	R 43,012.73	
		Formwork to plinths	m2	0.36	64	7.95	R 198.26	R 12,727.62	
		Formwork to columns	m2	0.13	37	7.93	R 222.35	R 8,259.23	
		Formwork to sumps	m2	0.11	283	7.07	R 213.30	R 60,431.10	
		Formwork to slabs	m2	3.96	41	7.37	R 192.74	R 7,966.43	
		Formwork to slabs n/e 300mm	m	2.23	73	8.16	R 68.29	R 5,017.42	
		Mild steel reinforcement	t	0.22	3.147	23.03	R 12,325.00	R 38,787.56	
		High tensile reinforcement	t	22.59	14.076	1.05	R 12,325.00	R 173,490.67	
		Mesh	m2	0.16	997	62.70	R 196.58	R 195,994.95	
		Cast in items	kg	0.19	1,637	219.18	R 56.23	R 92,024.25	
		HD Bolts	kg	0.09	3,424	208.96	R 58.98	R 201,965.47	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	199.97	1.590	0.17	R 9,448.50	R 15,022.97	
		Construction joint	m	0.31	533	25.51	R 61.63	R 32,867.18	
		Expansion joint	m	0.45	365	16.08	R 97.77	R 35,645.15	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	389	0.05	R 80.87	R 31,461.01	R 889,200.45
		Working space	m2	0.42	934	2.02	R 163.13	R 152,394.31	
		Backfill	m3	2.50	156	0.87	R 93.49	R 14,548.44	
		Blinding	m2	0.37	285	21.05	R 74.72	R 21,327.36	
		Concrete bases	m3	5.80	105	0.00	R 1,572.50	R 165,112.50	
		Concrete plinth	m3	0.00	18	0.00	R 1,572.50	R 28,446.65	
		Total concrete	m3	0.00	123	1.27		R -	
		Wood float	m2	0.35	300	165.38	R 9.51	R 2,852.47	
		Formwork bases	m2	0.47	223	9.19	R 171.03	R 38,150.88	
		Formwork plinths	m2	0.09	196	7.12	R 220.95	R 43,377.43	
		High tensile reinforcement	t	9.16	13.445	0.00	R 12,325.00	R 165,711.11	
		HD Bolts	kg	0.03	3,973	228.64	R 53.91	R 214,165.90	
		Grout	m3	80.32	1.307	0.18	R 8,912.96	R 11,652.37	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.30	581	0.06	R 89.86	R 52,188.07	R 1,346,471.69
		Working space	m2	0.48	1,212	1.92	R 46.92	R 56,860.14	
		Backfill	m3	2.69	216	0.81	R 111.52	R 24,098.16	
		Blinding	m2	0.33	414	21.07	R 74.64	R 30,935.17	
		Concrete bases	m3	0.00	135	0.00	R 1,572.50	R 212,287.50	
		Concrete plinth	m3	2.53	39	0.00	R 1,572.50	R 61,316.79	
		Concrete slab	m3	3.46	53	0.00	R 1,572.50	R 83,837.09	
		Total concrete	m3	0.00	227	0.00		R -	
		Wood float	m2	0.56	407	159.89	R 9.83	R 4,002.17	
		Formwork bases	m2	0.48	281	8.15	R 192.88	R 54,166.10	
		Formwork plinths	m2	0.11	362	8.52	R 184.61	R 66,742.15	
		High tensile reinforcement	t	13.93	16.323	0.00	R 12,325.00	R 201,179.46	
		HD Bolts	kg	0.02	6,097	221.05	R 55.76	R 339,930.01	
		Cast in items	kg	0.05	2,700	239.28	R 51.51	R 139,075.96	
		Grout	m3	66.53	2.029	0.16	R 9,784.44	R 19,852.92	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.04	507	0.05	R 84.24	R 42,716.18	R 1,599,049.52
		Working space	m2	0.54	947	1.58	R 53.20	R 50,352.56	
		Backfill	m3	2.12	239	0.80	R 105.40	R 25,191.96	
		Blinding	m2	0.64	390	20.63	R 76.23	R 29,757.57	
		Concrete bases	m3	0.00	249	0.00	R 1,572.50	R 391,552.50	
		Concrete column	m3	27.91	9	0.00	R 1,572.50	R 14,031.27	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	5.53	45	0.00	R 1,572.50	R 70,796.01	
		Total concrete	m3	0.00	303	0.00		R -	
		Wood float	m2	0.59	517	158.64	R 9.91	R 5,127.06	
		Formwork bases	m2	0.55	453	8.31	R 189.31	R 85,817.80	
		Formwork plinths	m2	0.32	141	7.64	R 205.82	R 29,022.57	
		Formwork to columns	m2	0.29	31	8.18	R 192.15	R 5,941.56	
		High tensile reinforcement	t	8.97	33.786	0.00	R 12,325.00	R 416,418.58	
		HD bolts	kg	0.04	7,069	215.71	R 57.14	R 403,875.46	
		Grout	m3	104.66	2.895	0.16	R 9,828.13	R 28,448.44	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.79	555	0.06	R 92.10	R 51,123.73	R 2,641,028.60
		Working space	m2	0.30	1,864	2.14	R 43.07	R 80,258.45	
		Backfill	m3	2.08	266	0.81	R 113.81	R 30,318.82	
		Blinding	m2	0.67	295	20.85	R 75.42	R 22,257.63	
		Concrete bases	m3	0.00	199	0.00	R 1,572.50	R 312,927.50	
		Concrete column	m3	1.18	184	151.24	R 1,572.50	R 289,405.54	
		Concrete beam	m3	2.66	69	0.91	R 1,572.50	R 108,682.34	
		Total concrete	m3	2.88	452	0.91		R -	
		Wood float	m2	0.46	435	7.35	R 10.40	R 4,518.94	
		Formwork bases	m2	0.47	425	6.33	R 213.97	R 91,009.21	
		Formwork to columns	m2	0.16	1,161	8.30	R 189.49	R 219,927.01	
		Formwork to sides beams	m2	0.35	200	5.83	R 248.56	R 49,691.61	
		Formwork to soffits beams	m2	0.68	102	6.33	R 269.92	R 27,405.95	
		Formwork corbels	m2	11.28	16	5.22	R 301.53	R 4,918.82	
		High tensile reinforcement	t	8.69	52.010	0.00	R 12,325.00	R 641,028.06	
		Cast in steel	kg	0.03	15,439	279.16	R 44.15	R 681,647.09	
		HD bolts	kg	1.43	317	223.95	R 55.03	R 17,418.91	
		Grout	m3	509.83	0.887	0.16	R 9,571.74	R 8,489.01	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.92	1,293	0.05	R 84.24	R 108,914.68	R 4,715,404.69
		Working space	m2	0.60	2,165	1.75	R 48.24	R 104,437.71	
		Backfill	m3	1.15	1,126	0.80	R 105.77	R 119,138.40	
		Blinding	m2	0.59	557	19.37	R 81.18	R 45,241.03	
		Concrete bases	m3	0.00	330	0.99	R 1,572.50	R 518,925.00	
		Concrete column	m3	2.35	140	1.02	R 1,572.50	R 220,417.17	
		Concrete beam	m3	0.85	166	1.01	R 1,572.50	R 260,848.72	
		Concrete surface slab	m3	1.67	197	1.01	R 1,572.50	R 310,467.95	
		Concrete wall	m3	2.52	56	1.09	R 1,572.50	R 87,591.27	
		Concrete elevated slab	m3	1.15	122	0.00	R 1,572.50	R 192,144.48	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,011	0.00		R -	
		Wood float	m2	0.63	1,607	166.50	R 9.44	R 15,179.12	
		Formwork bases	m2	0.39	845	7.27	R 216.26	R 182,652.47	
		Formwork to columns	m2	0.17	821	6.47	R 243.10	R 199,603.05	
		Formwork to sides beams	m2	0.29	573	5.27	R 298.27	R 171,030.89	
		Formwork to soffits beams	m2	0.88	190	7.52	R 209.05	R 39,631.37	
		Formwork to soffts of slabs	m2	0.31	643	3.42	R 278.99	R 179,338.01	
		Formwork to pockets	m2	25.12	6	5.64	R 459.89	R 2,566.56	
		Formwork wall	m2	0.14	413	7.87	R 199.79	R 82,435.24	
		High tensile reinforcement	t	8.54	118.369	0.00	R 12,325.00	R 1,458,899.59	
		Cast in steel	kg	0.22	4,582	273.17	R 45.12	R 206,747.91	
		HD bolts	kg	0.41	2,471	207.84	R 59.30	R 146,533.35	
		Steel handrailing	m	2.60	46	10.43	R 1,182.01	R 53,798.16	
		Grout	m3	1,021.27	0.990	0.18	R 8,949.19	R 8,862.54	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.34	2,020	0.04	R 69.64	R 140,692.94	R 17,595,272.66
		Working space	m2	8.68	233	1.59	R 43.74	R 10,179.70	
		Backfill	m3	4.48	451	0.68	R 47.26	R 21,320.51	
		Blinding	m2	1.18	2,284	20.35	R 77.29	R 176,520.95	
		Concrete bases	m3	0.00	2,700	0.00	R 1,572.50	R 4,245,750.00	
		Concrete column	m3	29.78	91	0.00	R 1,572.50	R 142,560.26	
		Concrete beam	m3	1.46	62	0.00	R 1,572.50	R 97,596.27	
		Concrete wall	m3	11.47	235	0.00	R 1,572.50	R 370,276.58	
		Concrete elevated slabs	m3	11.11	8	0.00	R 1,572.50	R 12,836.66	
		Total concrete	m3	0.00	3,096	0.00		R -	
		Wood float	m2	0.88	3,513	146.07	R 10.77	R 37,818.29	
		Formwork bases	m2	9.41	287	7.68	R 204.85	R 58,749.99	
		Formwork to columns	m2	0.15	622	6.12	R 221.32	R 137,699.47	
		Formwork to sides beams	m2	0.18	337	5.06	R 256.94	R 86,534.66	
		Formwork to soffits beams	m2	0.55	113	7.11	R 310.99	R 35,184.89	
		Formwork to soffts of slabs	m2	0.14	57	3.36	R 304.96	R 17,339.44	
		Formwork to pockets	m2	466.62	6	5.16	R 468.40	R 2,710.32	
		Formwork wall	m2	0.11	2,212	6.55	R 240.26	R 531,567.43	
		High tensile reinforcement	t	4.27	724.778	0.00	R 12,325.00	R 8,932,891.21	
		Cast in steel	kg	0.15	20,162	211.02	R 58.41	R 1,177,592.28	
		HD bolts	kg	0.22	13,984	176.29	R 69.91	R 977,650.25	
		Galvanised grating	m2	18.54	167	0.17	R 2,104.78	R 351,545.60	
		Grout	m3	839.60	3.216	5.86	R 9,408.12	R 30,254.97	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.52	187	0.05	R 76.38	R 14,313.29	R 1,974,101.99
	Working space	m2	0.41	452	1.77	R 43.27	R 19,574.69	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.09	90	0.80	R 95.99	R 8,618.47	
	Blinding	m2	4.95	25	21.68	R 72.55	R 1,801.37	
	Concrete bases	m3	0.00	123	0.00	R 1,572.50	R 193,417.50	
	Concrete column	m3	6.85	18	0.00	R 1,572.50	R 28,236.13	
	Concrete beam	m3	2.02	9	0.00	R 1,572.50	R 13,983.23	
	Concrete wall	m3	37.25	3	0.00	R 1,572.50	R 5,193.11	
	Concrete elevated slabs	m3	24.65	1	0.00	R 1,572.50	R 1,145.28	
	Total concrete	m3	0.00	154	0.00		R -	
	Wood float	m2	4.96	25	167.42	R 9.39	R 233.03	
	Formwork bases	m2	1.52	81	8.68	R 181.22	R 14,630.40	
	Formwork to columns	m2	0.14	124	7.06	R 221.81	R 27,604.47	
	Formwork to sides beams	m2	0.23	39	6.48	R 222.60	R 8,579.55	
	Formwork to soffits beams	m2	0.75	12	7.09	R 242.62	R 2,879.32	
	Formwork to soffts of slabs	m2	0.22	3	3.92	R 254.98	R 849.64	
	Formwork to pockets	m2	3.29	37	6.17	R 401.00	R 15,014.68	
	Formwork wall	m2	0.29	11	7.47	R 210.47	R 2,390.88	
	High tensile reinforcement	t	7.36	20.905	0.00	R 12,325.00	R 257,660.16	
	Cast in steel	kg	0.02	7,429	219.45	R 56.16	R 417,220.77	
	HD bolts	kg	0.01	10,772	209.59	R 58.81	R 633,439.40	
	Galvanised grating	m2	4.06	38	0.20	R 7,976.45	R 301,999.12	
	Grout	m3	44.04	2.793	6.47	R 1,903.89	R 5,317.50	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.90	1,518	0.05	R 84.24	R 127,918.38	R 9,713,490.45
	Working space	m2	2.56	593	1.88	R 44.78	R 26,558.60	
	Backfill	m3	1.33	1,145	0.83	R 102.11	R 116,957.77	
	Blinding	m2	3.80	210	20.63	R 76.24	R 15,992.87	
	Concrete	m3	0.00	798	0.00	R 1,572.50	R 1,254,855.00	
	Mesh reinforcement	m2	0.53	1,510	69.07	R 178.45	R 269,416.15	
	Rough formwork	m2	3.04	263	8.39	R 187.51	R 49,289.63	
	Smooth formwork	m2	0.57	1,411	7.13	R 220.52	R 311,073.75	
	Finish to concrete	m2	0.23	3,459	104.92	R 14.99	R 51,841.26	
	Construction joints	m	5.01	159	21.77	R 72.22	R 11,498.86	
	Movement joints	m	15.71	51	17.68	R 88.93	R 4,516.72	
	Cast in steel	kg	2.32	345	241.28	R 51.08	R 17,602.87	
	Grout	m3	902.72	0.884	0.18	R 8,806.00	R 7,784.50	
	Brick walls	m2	0.50	1,591	0.00	R 382.50	R 608,730.77	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.36	3,476	0.00		R -	
	Waterproofing membrane	m2	2.11	1,645	12.24	R 128.51	R 211,411.26	
	Roof construction	m2	2.03	1,715	38.58	R 319.47	R 547,968.61	
	Ceiling	m2	0.97	3,570	0.00	R 301.75	R 1,077,312.59	
	Doors and windows	No	483.23	7	0.16	R 2,401.35	R 17,272.96	
	Floor finish	m2	0.99	3,503	0.79	R 482.00	R 1,688,626.04	
	Wall finsih	m2	1.00	3,476	1.44	R 264.84	R 920,535.62	
	Rod reinforcement	t	9.06	88	0.00	R 12,325.00	R 1,085,750.67	
	Metalwork	Item	0.00	1	4.27	R 52,680.57	R 52,680.57	
	Structural steel	Item	0.00	1	11.07	R 136,393.73	R 136,393.73	
	Plumbing and drainage	Item	0.00	1	7.05	R 86,838.43	R 86,838.43	
	Small power and lighting	Item	0.00	1	60.03	R 739,878.55	R 739,878.55	
	External works	Item	0.00	1	174.74	R 274,784.27	R 274,784.27	
BUILDINGS - STEEL	Concrete	m3	0.00	88	0.17	R 1,572.50	R 138,380.00	R 3,357,271.39
	Earthworks	m3	2.38	209	8.85	R 177.68	R 37,180.55	
	Reinforcement	t	9.03	10	0.00	R 12,325.00	R 120,072.75	
	Mesh	m2	0.12	756	9.80	R 160.39	R 121,226.56	
	Formwork	m2	0.39	224	8.05	R 195.27	R 43,741.00	
	Brickwork	m2	6.03	145	6.02	R 261.31	R 37,803.95	
	Roof covering	m2	0.85	1,026	210.56	R 222.03	R 227,847.94	
	Structural steel	t	18.49	47	0.00	R 46,750.00	R 2,207,628.85	
	Side cladding	m2	1.44	608	0.98	R 217.43	R 132,146.06	
	Doors	No	384.17	2	0.51	R 23,942.68	R 54,408.50	
	Ridge ventilator	m	21.29	41	11.94	R 2,650.90	R 108,696.85	
	Aluminium insulation	m2	0.85	1,031	1.79	R 124.24	R 128,138.38	
	Total building area	m2	0.00	873	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.10	201	0.12	R 190.95	R 38,466.84	R 2,489,334.95
	Concrete	m3	0.00	65	0.00	R 1,572.50	R 102,212.50	
	Reinforcement	t	11.81	6	0.19	R 12,325.00	R 67,818.06	
	Mesh	m2	0.13	508	10.56	R 148.95	R 75,723.84	
	Formwork	m2	0.44	148	8.49	R 185.19	R 27,491.02	
	Brickwork	m2	5.87	93	6.00	R 262.15	R 24,341.88	
	Screed	m2	1.10	494	44.16	R 35.61	R 17,584.77	
	Structural steel	t	15.12	36	0.00	R 46,750.00	R 1,684,704.58	
	Cat ladders	m	2.61	14	9.30	R 5,026.88	R 69,406.52	
	Hand rail	m	0.72	50	27.15	R 1,722.01	R 85,762.09	
	Kick plates	m	0.75	48	2.53	R 679.68	R 32,595.37	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.94	580	187.50	R 249.33	R 144,668.01	
		Side cladding	m2	4.78	114	0.88	R 219.59	R 25,029.24	
		Floor grating	m2	1.10	33	16.36	R 2,856.83	R 93,530.25	
		Total buiding area	m2	0.00	545	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.16	237	7.16	R 219.62	R 52,121.22	R 911,483.07
		Blinding	m2	0.45	168	16.65	R 94.46	R 15,894.14	
		Concrete	m3	0.00	75	0.00	R 1,572.50	R 117,937.50	
		Reinforcement	t	7.51	10	0.00	R 12,325.00	R 123,132.73	
		Mesh	m2	0.47	159	48.95	R 251.78	R 40,116.72	
		Formwork	m2	0.29	259	6.79	R 231.61	R 59,900.42	
		Finish to concrete	m2	0.41	185	91.57	R 17.17	R 3,180.15	
		Movement joints	m	2.35	32	14.10	R 111.51	R 3,562.01	
		Cast in steel	kg	0.08	921	171.73	R 71.77	R 66,104.99	
		Grout	m3	68.33	1.098	2.27	R 11,586.84	R 12,717.09	
		Brickwork	m2	0.21	67	0.14	R 382.50	R 25,500.00	
		Doors and windows	No	2.51	6	0.25	R 4,462.50	R 24,890.44	
		Pipework	m	2.48	63	0.20	R 691.43	R 43,239.02	
		Bolts	kg	0.10	778	0.09	R 71.77	R 55,821.99	
		Structural steel	t	3.66	4	0.00	R 49,869.94	R 190,722.12	
		Miscellaneous steel	t	122.87	1	0.00	R 60,757.04	R 76,642.53	
		Total bridge area	m2	0.00	155	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.18	123	5.94	R 264.83	R 32,477.15	R 350,344.73
		Blinding	m2	0.71	21	13.62	R 115.48	R 2,425.07	
		Concrete	m3	0.00	15	0.00	R 1,572.50	R 23,587.50	
		Reinforcement	t	5.65	3	0.00	R 12,325.00	R 32,721.24	
		Formwork	m2	0.07	228	5.43	R 289.82	R 66,155.38	
		Finish to concrete	m2	0.30	49	77.65	R 20.25	R 1,000.65	
		Movement joints	m	0.42	36	11.87	R 132.52	R 4,790.05	
		Cast in steel	kg	22.47	0.668	153.30	R 80.40	R 53.68	
		Grout	m3	22.08	0.679	0.64	R 12,652.30	R 8,593.64	
		Bolts	kg	108.05	0.139	0.12	R 51.74	R 7.18	
		Structural steel	t	36.08	0.804	0.21	R 58,097.64	R 46,691.56	
		Miscellaneous steel	t	20.04	1.447	0.18	R 69,297.19	R 100,305.39	
		Brickwork	m2	0.46	63	4.00	R 393.48	R 24,729.32	
		Roof covering	m2	1.41	21	1.19	R 330.45	R 6,806.92	
		Total pump house area	m2	0.00	29	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.87	476	6.38	R 246.31	R 117,146.85	R 3,547,291.76
	Blinding	m2	1.22	446	16.84	R 93.38	R 41,615.19	
	Concrete	m3	0.00	544	0.00	R 1,572.50	R 855,440.00	
	Reinforcement	t	6.04	90.088	0.00	R 12,325.00	R 1,110,328.84	
	Formwork	m2	0.21	2,564	6.41	R 245.29	R 629,005.90	
	Movement joint	m	1.64	332	0.12	R 120.87	R 40,145.44	
	Cast in steel	kg	0.14	3,866	13.01	R 57.39	R 221,869.26	
	Bolts	kg	0.38	1,421	214.76	R 71.69	R 101,859.38	
	Chemical anchors	No	6.42	85	0.24	R 319.67	R 27,105.17	
	Miscellaneous steelwork	t	92.64	5.872	171.93	R 51,201.78	R 300,669.08	
	Pre-cast concrete	m3	31.72	17	38.56	R 5,014.81	R 86,006.18	
	Brickwork	m2	8.42	48	0.31	R 336.36	R 16,100.48	
	Total area	m2	0.00	403	4.68		R -	
EMERGENCY DAM	Earthworks	m3	0.53	8,684	1.66	R 111.73	R 970,216.61	R 3,143,339.26
	Lining	m2	0.67	6,934	1.14	R 67.39	R 467,300.48	
	Paving	m2	0.64	7,245	0.50	R 133.64	R 968,165.83	
	Pipework	m	26.88	172	0.23	R 493.43	R 84,827.46	
	Manholes	No	15.16	11	0.10	R 5,042.40	R 57,193.55	
	Concrete	m3	2.32	74	0.04	R 1,572.50	R 116,522.39	
	Formwork	m2	0.08	918	5.59	R 281.56	R 258,485.26	
	Mesh	m2	0.69	107	6.47	R 243.21	R 25,957.01	
	Reinforcement	t	4.69	15.795	0.11	R 12,325.00	R 194,670.68	
	Dam area (to top of berm)	m2	0.00	4,621	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.00	822	5.47	R 287.51	R 236,421.48	R 2,149,432.33
	Blinding	m2	0.88	156	14.14	R 111.21	R 17,314.15	
	Concrete	m3	0.00	137	0.00	R 1,572.50	R 215,432.50	
	Reinforcement	t	4.44	30.891	0.00	R 12,325.00	R 380,727.17	
	Mesh	m2	0.91	151	36.35	R 339.02	R 51,039.98	
	Formwork	m2	0.15	892	5.71	R 275.46	R 245,738.59	
	Cast in steel	kg	0.02	5,994	133.56	R 92.28	R 553,109.94	
	Miscellaneous steelwork	t	11.55	5.629	0.15	R 79,884.26	R 449,648.52	
	Total tunnel length	m	0.00	65	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	48	0.00		R -	R 398,747.39
	Steel	t	8.90	5.394	0.00	R 46,750.00	R 252,155.07	
	Handrail	m	1.45	33	28.64	R 1,632.45	R 54,226.86	
	Grating	m2	1.87	26	16.94	R 2,759.51	R 71,022.18	
	Kick flats	m	1.65	29	77.29	R 604.84	R 17,557.25	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.49	7	91.28	R 512.18	R 3,786.03	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,697	0.00		R -	R 3,493,270.78
	Steel	t	28.36	59.838	0.00	R 46,750.00	R 2,797,417.14	
	Handrail	m	13.52	126	29.64	R 1,577.45	R 198,008.50	
	Grating	m2	12.68	134	18.34	R 2,548.78	R 341,148.18	
	Kick flats	m	13.63	124	86.20	R 542.35	R 67,517.82	
	Cat ladder	m	97.77	17	9.10	R 5,137.77	R 89,179.13	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	12,149	0.00		R -	R 17,693,769.31
	Steel	t	74.87	162.260	0.00	R 46,750.00	R 7,585,663.93	
	Handrail	m	30.47	399	30.80	R 1,517.96	R 605,341.52	
	Grating	m2	3.91	3,104	16.12	R 2,899.35	R 8,998,894.07	
	Kick flats	m	33.59	362	82.27	R 568.28	R 205,514.91	
	Stair treads	No	230.89	53	101.30	R 461.52	R 24,284.42	
	Cat ladder	m	242.66	50	8.54	R 5,474.24	R 274,070.47	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	405	0.00		R -	R 876,257.40
	Steel	t	25.59	15.829	0.00	R 46,750.00	R 739,991.90	
	Handrail	m	47.80	8	32.63	R 1,432.76	R 12,139.51	
	Grating	m2	61.52	7	18.18	R 2,571.71	R 16,929.75	
	Kick flats	m	47.62	9	81.87	R 571.01	R 4,856.32	
	Cat ladder	m	20.83	19	8.88	R 5,264.64	R 102,339.92	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	45	0.00		R -	R 285,075.24
	Steel	t	15.89	2.832	0.00	R 46,750.00	R 132,406.49	
	Handrail	m	1.07	42	31.12	R 1,502.08	R 62,961.31	
	Grating	m2	1.92	23	17.40	R 2,686.78	R 63,041.80	
	Kick flats	m	1.12	40	80.28	R 582.33	R 23,442.10	
	Stair treads	No	6.06	7	107.76	R 433.85	R 3,223.53	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	506	0.00		R -	R 2,258,852.83
	Steel	t	12.40	40.816	0.00	R 46,750.00	R 1,908,141.28	
	Handrail	m	25.41	20	33.02	R 1,415.93	R 28,199.99	
	Grating	m2	7.41	68	17.72	R 2,638.37	R 180,250.75	
	Kick flats	m	21.76	23	86.30	R 541.70	R 12,594.48	
	Cat ladder	m	20.38	25	8.95	R 5,221.80	R 129,666.32	
PIPING INSTALLATION	Pipe length	m	0.00	39,216	0.00		R -	R 45,315,878.49
	Total work units	WU	0.32	122,277	0.00	R 370.60	R 45,315,878.49	
	Pipe supports	kg	2.61	15,029	0.00		R -	
	WU for pipe supports	WU	0.16	19,128	0.00		R -	
	Number of welds	No	0.60	23,614	0.00		R -	
	Total fittings	No	0.38	14,874	0.00		R -	
	Stud bolts	No	0.34	5,057	0.00		R -	
	Support number	No	0.20	2,931	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	122,277	0.00	R 370.60		R 120,794.91

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	61.55	1,987	6.10	R 60.80	R 120,794.91	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	122,277	0.00	R 370.60		R 53,836.85
	Number of examinations	No	169.39	722	4.97	R 74.58	R 53,836.85	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	122,277	0.00	R 370.60		R 67,424.12
	Number of examinations	No	307.40	398	2.19	R 169.50	R 67,424.12	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	122,277	0.00	R 370.60		R 114,754.06
	Number of examinations	No	54.88	2,228	7.20	R 51.50	R 114,754.06	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	122,277	0.00	R 370.60		R 77,039.91
	Number of examinations	No	119.57	1,023	4.92	R 75.34	R 77,039.91	
MECHANICAL INSTALLATION	Total work units	WU	0.00	122,277	0.00	R 370.60		R 220,124.22
	Mechanical equipment	t	263.21	465	0.78	R 473.83	R 220,124.22	
	Structural steel	t	224.07	546	54.03			
PAINTING & INSULATION	Total work units	WU	0.00	122,277	0.00	R 370.60		R 2,591,895.99
	Painting to piping	m2	18.24	6,703	0.34	R 138.36	R 927,445.34	
	Insulation to piping	m2	54.39	2,248	2.68	R 406.08	R 912,978.57	
	Mechanical equipment received	t	0.00	465	0.85	R 473.83	R 220,124.22	
	Painting to mechanical equipment	m2	0.24	1,930	3.68	R 128.71	R 248,398.85	
	Insulation to mechanical equipment	m2	0.69	678	1.14	R 417.21	R 282,949.00	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.36	38,480	0.00	R 66.30	R 2,551,224.00	R 6,290,657.78
	Electrical cable terminations	No	306.32	1,518	0.43	R 153.68	R 233,205.81	
	Electrical equipment	No	9.59	126	0.11	R 627.16	R 78,783.91	
	DB's	No	6.65	13	0.34	R 1,864.18	R 24,427.99	
	Rack	m	0.64	5,791	1.65	R 191.38	R 1,108,255.52	
	Support steel	kg	1.45	9,058	2.07	R 31.96	R 289,527.64	
	Instrumentation cable	m	26.20	29,023	0.35	R 28.50	R 827,155.50	
	Instruments	No	0.62	1,108	0.17	R 164.20	R 181,864.71	
	Hook-ups	No	3.96	1,774	0.16	R 176.55	R 313,229.66	
	Light fittings	No	10.15	497	0.02	R 381.98	R 189,843.75	
	Conduit	m	4.19	3,790	0.13	R 40.25	R 152,555.91	
	Instrument stands	No	0.00	265		R 1,287.10	R 340,583.37	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project A				
Location:	South Africa				
Client:				Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,500	R	4.68
2	Concrete demolitions	m3	30	R	1,657.50
3	Bulk excavation	m3	5,500	R	38.25
4	Vertical piles	No	206		
5	Raking piles	No	15		
6	Concrete in piles	m3	ratio	R	1,572.50
7	Auger pile	m	ratio	R	340.00
8	Total paving and asphalt to road works	m2	4,550		
9	Grey paving to road works	m2	485	R	148.75
10	Asphalt to road surface	m2	4,065		
11	Rip bed of road works	m2	4,550	R	12.75
12	Total concrete in paving and bunding	m3	430	R	1,572.50
13	Concrete in paving	m3	259		
14	Rod reinforcement	t		R	12,325.00
15	Concrete in plinths and bases on area finishing	m3	190		
16	Stormwater pipe to drain surface run-off	m	92		
17	Machine excavation	m3		R	72.25
18	Concrete in pump and pipe support bases	m3	255	R	1,572.50
19	Concrete in tank bases	m3	95	R	1,572.50
20	Concrete in pipe and cable rack foundations	m3	105	R	1,572.50
21	Concrete to simple structural foundations	m3	135	R	1,572.50
22	Complex structural foundations - bases	m3	249	R	1,572.50
23	Concrete pipe racks - bases	m3	199	R	1,572.50
24	Concrete structure including concrete columns and beams - bases	m3	330	R	1,572.50
25	Major equipment bases with blast proof walls - bases	m3	2,700	R	1,572.50
26	Major equipment bases and elevated concrete structure - bases	m3	123	R	1,572.50
27	Concrete frame buildings with brick in-fill - all concrete	m3	798	R	1,572.50
28	One brick wall	m2		R	382.50
29	Concrete in structual steel buildings - all concrete	m3	88	R	1,572.50
30	Total building area - Structural steel buildings	m2	873		
31	Ceiling	m2		R	301.75
32	Structural steel	t		R	46,750.00
33	Steel canopy - concrete	m3	65	R	1,572.50
34	Steel canopy - area	m2	545		
35	Concrete in weighbridge - all concrete	m3	75	R	1,572.50
36	Total weighbridge area	m2	155		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	15	R	1,572.50
39	Total pump house area	m2	29		
40	Concrete in cooling tower	m3	544	R	1,572.50
41	Total cooling tower area	m2	403		
42	Emergency earth dam area - top of berm	m2	4,621		
43	Concrete in cable tunnel	m3	137	R	1,572.50
44	Total lengh of cable tunnel	m	65		
45	Total volume of basic steel platform	m3	48		
46	Total volume of steel pipe rack	m3	1,697		
47	Total volume of steel complex steel structure	m3	12,149		
48	Total volume of steel in stack	m3	405		
49	Total volume of steel in walkway	m3	45		
50	Total volume of steel in cable gantry	m3	506		
51	Piping work unit cost	WU		R	370.60
52	Total process pipe length	m	39,216		
53	Total electrical cable - installation only	m	38,480	R	66.30
54	Total instrumentation cable - installation only	m	29,023	R	44.20

Ratio: Variable ratio

Variables

Material	Normal	Median
Labour	Complex	Median
Engineering design	Normal	Median
Current economic conditions	Good	Median
Current economic factors	Good	Median
Level of scope definition	Normal	Median
Rework	Little	Median
Scope change	Extensive	Median
Weather	Good	Median
Access	Good	Median
Project size	Medium	Median
Project conditions	Good	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project A			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 98,438,153.00
A	SITE CLEARANCE AND DEMOLITIONS		R	126,945.00	
B	BULK EARTHWORKS		R	451,117.35	
C	PILING		R	7,530,708.51	
D	ROAD WORKS		R	2,254,196.25	
E	GENERAL PAVING AND BUNDED AREAS		R	1,580,292.92	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,013,951.68	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,778,269.60	
H	TANK BASES AND BUNDING		R	1,650,043.93	
I	RACK FOUNDATIONS		R	878,664.34	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,414,821.96	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,667,810.72	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,598,705.91	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	5,037,490.87	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	16,997,385.38	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,370,202.42	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	10,335,103.93	
Q	BUILDINGS - STEEL		R	3,280,131.98	
R	CANOPIES - STEEL		R	2,608,280.79	
S	WEIGHBRIDGE		R	794,854.92	
T	PUMP HOUSE		R	372,531.47	
U	COOLING TOWER		R	3,460,701.80	
V	EMERGENCY DAM		R	2,872,882.06	
W	HEAVY DUTY CABLE TUNNEL		R	1,842,056.55	
	Preliminaries and General	35.00%	R	25,521,002.63	
	STRUCTURAL STEEL				R 36,964,995.26
A	STRUCTURAL STEEL - BASIC PLATFORM		R	406,914.04	
B	STRUCTURAL STEEL - PIPERACK		R	3,820,065.67	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	18,526,206.19	
D	STRUCTURAL STEEL - STACK		R	928,990.81	
E	STRUCTURAL STEEL - WALKWAY		R	309,161.68	
F	STRUCTURAL STEEL - CABLE GANTRY		R	2,412,229.66	
	Preliminaries and General	40.00%	R	10,561,427.22	
	MECHANICAL AND PIPING				R 68,175,457.25
A	PIPING INSTALLATION		R	47,762,510.42	
B	RADIOGRAPHIC EXAMINATION (RT)		R	154,445.97	
C	DYE PENETRATION TESTING (DP)		R	93,815.70	
D	MAGNETIC PARTICLE TESTING (MPI)		R	89,360.12	
E	POST WELD HEAT TREATMENT		R	150,218.13	
F	MATERIAL HARDNESS TEST (HT)		R	171,424.40	
H	MECHANICAL INSTALLATION		R	274,980.45	
	Preliminaries and General	40.00%	R	19,478,702.07	
	PAINTING AND INSULATION				R 4,731,619.43
A	PAINTING AND INSULATION		R	3,504,903.28	
	Preliminaries and General	35.00%	R	1,226,716.15	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 9,014,575.15
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	6,677,463.07	
	Preliminaries and General	35.00%	R	2,337,112.08	

TOTAL COST	R	217,324,800.09

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,500		R 4.68	R 77,220.00	R 126,945.00
	Concrete demolitions	m3		30		R 1,657.50	R 49,725.00	
BULK EARTHWORKS	Bulk excavation	m3		5,500		R 38.25	R 210,375.00	R 451,117.35
	Trimming of sides	m2	2.19	2,509	4.30	R 8.90	R 22,340.35	
	Back fill and compact	m3	1.15	4,803	0.95	R 40.11	R 192,679.46	
	Overhaul	m3/km	1.61	3,421	11.55	R 3.31	R 11,328.30	
	Rip bed	m2	1.70	3,234	8.59	R 4.45	R 14,394.25	
PILING	Site establishment of rig	Item	0.00	1	193.91	R 304,923.48	R 304,923.48	R 7,530,708.51
	EO for raking equipment	Item	0.00	1	23.83	R 37,474.92	R 37,474.92	
	Number of piles	No	0.00	206	0.00		R -	
	Move rig to new position	No	1.48	139	0.19	R 298.78	R 41,666.69	
	Number of raking piles	No	18.66	11	0.00		R -	
	EO for setting up raking piles	No	0.90	12	0.29	R 449.29	R 5,484.74	
	EO for raking drilling	m	0.16	71	0.66	R 225.37	R 16,051.15	
	Auger quantity	m	0.05	4,506	0.00	R 340.00	R 1,532,125.00	
	EO for drilling in coarse gravel	m	0.54	385	0.22	R 343.70	R 132,341.94	
	EO for drilling in boulders	m	1.73	119	0.51	R 806.47	R 96,030.28	
	EO for drilling in soft rock	m	1.58	130	0.24	R 372.91	R 48,553.69	
	Temporary casings	m	0.34	603	0.34	R 527.91	R 318,513.49	
	EO casing to raking pile	m	0.18	61	0.55	R 1,115.35	R 67,864.89	
	Mild steel rod reinforcement	t	14.50	14.207	0.71	R 8,334.07	R 118,401.24	
	High tensile rod reinforcement	t	1.17	176.284	7.47	R 11,749.94	R 2,071,322.76	
	Concrete to piles and bases	m3	0.15	1,341	0.00	R 1,572.50	R 2,109,344.19	
	Concrete to raking piles	m3	0.08	146	1.07	R 1,683.70	R 245,485.24	
	Site establishment of test equipment	Item	0.00	1	118.31	R 186,042.48	R 186,042.48	
	Load test to pile	No	103.68	2	21.90	R 34,437.75	R 68,420.94	
	Site establishment of intergity testing	No	260.79	1	49.36	R 77,621.97	R 61,315.19	
	Integrity testing of piles	No	1.21	171	0.26	R 406.60	R 69,346.23	
ROAD WORKS	Red paving	m2	0.14	68	0.93	R 137.70	R 9,397.53	R 2,254,196.25
	Grey paving	m2	0.00	485	0.00	R 148.75	R 72,143.75	
	Kerbing	m	0.10	462	0.00	R 306.79	R 141,581.41	
	Total paving and asphalt	m2	0.00	4,550	0.00		R -	
	Remove top soil	m3	0.54	520	5.11	R 65.17	R 33,881.36	
	Asphalt	m2	0.21	972	0.00	R 178.53	R 173,482.62	
	Rip bed	m2	0.00	4,550	0.00	R 12.75	R 58,012.50	
	Reduce levels	m3	0.37	1,677	4.59	R 58.52	R 98,142.23	
	Selected fill	m3	1.43	1,171	0.45	R 129.43	R 151,563.25	
	Imported fill	m3	2.06	569	0.34	R 385.55	R 219,309.86	
	Wearing course	m3	3.92	428	0.20	R 299.02	R 127,876.02	
	Prime	m2	4.43	5,186	1.38	R 40.21	R 208,503.13	
	Three line road marking	m	0.78	4,060	0.10	R 31.99	R 129,882.98	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.00	462	4.11	R 10.74	R 4,955.35	
		1m Wide concrete V-drain	m	0.98	450	0.80	R 1,293.76	R 582,142.31	
		200mm Diameter PVC pipe	m	0.93	429	0.09	R 456.01	R 195,418.46	
		Road marking - STOP	No	0.16	76	0.04	R 493.71	R 37,431.67	
		Standard signage	No	0.01	5	4.22	R 602.61	R 2,781.06	
		100mm Painted line	m	1.77	816	1.49	R 9.42	R 7,690.76	
				0.00		1.61			
				0.00		1.96			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.85	259	0.71	R 1,572.50	R 407,277.50	R 1,580,292.92
		Concrete in plinths	m3	0.00	53	0.00	R 1,572.50	R 83,974.74	
		Total concrete	m3	0.00	430	0.00		R -	
		Rip and compact	m2	0.14	1,908	200.45	R 7.84	R 14,971.17	
		Formwork to plinth	m2	6.68	357	0.11	R 177.47	R 63,293.82	
		Formwork to slab	m2	0.80	207	0.15	R 228.01	R 47,286.37	
		High tensile steel	t	0.01	4.607	0.00	R 12,325.00	R 56,783.04	
		Mesh	m2	605.87	2,791	43.91	R 280.67	R 783,448.32	
		Construction joint	m	3.58	927	0.04	R 66.27	R 61,446.54	
		Expansion joint	m	2.06	534	0.07	R 115.69	R 61,811.43	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	11.94	6,458	0.00		R -	R 1,013,951.68
		Base excavation	m3	1.47	435	0.00	R 72.25	R 31,454.17	
		Backfill	m3	0.56	297	0.62	R 116.13	R 34,460.04	
		Working space	m2	0.44	783	1.34	R 86.99	R 68,148.35	
		Concrete in bases	m3	0.04	190	23.72	R 1,572.50	R 298,775.00	
		Blinding	m2	0.81	262	19.77	R 79.54	R 20,852.66	
		Concrete in sump walls	m3	0.11	21	31.76	R 1,572.50	R 32,438.43	
		Concrete in slabs	m3	0.02	3	0.86	R 1,572.50	R 4,481.63	
		Total concrete	m3	0.00	213	0.03		R -	
		Wood float	m2	0.66	325	132.16	R 11.90	R 3,865.34	
		Formwork to bases	m2	1.70	324	0.12	R 190.95	R 61,831.18	
		Formwork to sump walls	m2	10.98	226	0.11	R 175.22	R 39,672.46	
		Formwork to sides of slab	m2	5.50	16	0.17	R 269.57	R 4,223.34	
		Mild steel reinforcement	t	0.09	2.006	0.00	R 12,325.00	R 24,723.52	
		High tensile reinforcement	t	9.73	21.940	0.99	R 12,325.00	R 270,413.50	
		Cast in steel	kg	0.45	420	33.04	R 47.59	R 19,999.07	
		Waterstop	m	0.45	46	8.29	R 189.65	R 8,777.56	
		Manhole	No	0.08	7	2.66	R 4,899.86	R 35,418.99	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	92	0.12	R 591.48	R 54,416.44	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.62	414	0.05	R 72.25	R 29,925.43	R 1,778,269.60
	Working space	m2	0.34	1,206	0.70	R 50.32	R 60,659.66	
	Backfill	m3	4.04	103	1.27	R 92.02	R 9,443.73	
	Concrete bases	m3	0.92	255	0.00	R 1,572.50	R 400,987.50	
	Concrete plinth	m3	2.06	124	0.00	R 1,572.50	R 194,856.82	
	Total concrete	m3	0.00	379	0.00		R -	
	Wood float	m2	0.46	268	0.05	R 15.73	R 4,216.38	
	Blinding	m2	0.92	277	0.01	R 84.24	R 23,295.17	
	Formwork bases	m2	0.50	513	0.13	R 199.93	R 102,551.40	
	Formwork plinth	m2	0.56	221	0.12	R 193.19	R 42,749.20	
	High tensile reinforcement	t	9.89	38.330	6.69	R 12,325.00	R 472,412.11	
	Cast in steel	kg	0.11	3,560	0.03	R 46.05	R 163,957.16	
	HD Bolts	kg	0.08	5,005	0.03	R 47.18	R 236,089.26	
	Grout	m3	32.52	3.811	6.20	R 9,742.76	R 37,125.78	
TANK BASES AND BUNDING	Restricted excavation	m3	5.39	512	0.05	R 76.38	R 39,120.01	R 1,650,043.93
	Working space	m2	3.96	129	1.56	R 48.98	R 6,333.17	
	Backfill	m3	1.28	401	0.74	R 102.72	R 41,171.24	
	Concrete bases	m3	0.76	95	0.00	R 1,572.50	R 149,387.50	
	Concrete sump wall	m3	2.64	36	0.00	R 1,572.50	R 56,632.14	
	Concrete slab	m3	0.57	168	0.00	R 1,572.50	R 263,735.81	
	Concrete plinth	m3	3.63	26	20.06	R 1,572.50	R 41,145.48	
	Concrete column	m3	17.85	5	161.36	R 1,572.50	R 8,369.72	
	Total concrete	m3	0.00	330	0.98		R -	
	Blinding	m2	2.52	131	1.06	R 78.38	R 10,270.71	
	Wood float	m2	0.25	1,328	1.06	R 9.75	R 12,946.50	
	Formwork to bases	m2	0.42	226	1.04	R 193.86	R 43,849.80	
	Formwork to plinths	m2	0.35	75	8.11	R 211.40	R 15,803.91	
	Formwork to columns	m2	0.12	44	7.44	R 224.55	R 9,900.95	
	Formwork to sumps	m2	0.10	350	7.00	R 217.80	R 76,259.04	
	Formwork to slabs	m2	3.85	44	7.22	R 195.13	R 8,510.09	
	Formwork to slabs n/e 300mm	m	1.99	84	8.06	R 71.08	R 5,999.66	
	Mild steel reinforcement	t	0.22	3.128	22.12	R 12,325.00	R 38,552.05	
	High tensile reinforcement	t	23.00	14.358	0.94	R 12,325.00	R 176,960.24	
	Mesh	m2	0.15	1,108	56.55	R 217.96	R 241,402.30	
	Cast in items	kg	0.19	1,765	219.37	R 56.18	R 99,138.19	
	HD Bolts	kg	0.10	3,450	199.25	R 61.86	R 213,406.27	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	199.00	1.659	0.16	R 9,828.13	R 16,308.69	
	Construction joint	m	0.29	586	24.07	R 65.34	R 38,259.66	
	Expansion joint	m	0.43	388	16.68	R 94.25	R 36,580.76	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.44	362	0.05	R 77.50	R 28,016.90	R 878,664.34
	Working space	m2	0.38	957	1.85	R 143.66	R 137,436.38	
	Backfill	m3	2.47	146	0.87	R 89.60	R 13,124.53	
	Blinding	m2	0.41	257	24.91	R 63.12	R 16,249.81	
	Concrete bases	m3	6.13	105	0.00	R 1,572.50	R 165,112.50	
	Concrete plinth	m3	0.00	17	0.00	R 1,572.50	R 26,957.14	
	Total concrete	m3	0.00	122	1.36		R -	
	Wood float	m2	0.35	296	178.22	R 8.82	R 2,614.94	
	Formwork bases	m2	0.50	211	10.29	R 152.77	R 32,172.62	
	Formwork plinths	m2	0.09	197	6.73	R 233.53	R 45,940.59	
	High tensile reinforcement	t	8.95	13.644	0.00	R 12,325.00	R 168,162.05	
	HD Bolts	kg	0.03	3,973	211.63	R 58.24	R 231,385.20	
	Grout	m3	78.27	1.342	0.18	R 8,566.15	R 11,491.68	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.92	529	0.05	R 81.99	R 43,336.22	R 1,414,821.96
	Working space	m2	0.44	1,203	1.75	R 46.82	R 56,326.34	
	Backfill	m3	2.57	206	0.81	R 101.86	R 20,935.37	
	Blinding	m2	0.34	400	21.16	R 74.31	R 29,694.48	
	Concrete bases	m3	0.00	135	0.00	R 1,572.50	R 212,287.50	
	Concrete plinth	m3	2.29	43	0.00	R 1,572.50	R 67,561.38	
	Concrete slab	m3	3.14	59	0.00	R 1,572.50	R 92,615.30	
	Total concrete	m3	0.00	237	0.00		R -	
	Wood float	m2	0.53	449	144.43	R 10.89	R 4,892.24	
	Formwork bases	m2	0.46	295	7.97	R 197.25	R 58,159.32	
	Formwork plinths	m2	0.10	412	8.46	R 185.98	R 76,623.16	
	High tensile reinforcement	t	13.61	17.402	0.00	R 12,325.00	R 214,475.20	
	HD Bolts	kg	0.02	6,517	212.74	R 57.93	R 377,571.03	
	Cast in items	kg	0.05	2,662	233.02	R 52.89	R 140,797.36	
	Grout	m3	65.54	2.060	0.17	R 9,489.22	R 19,547.07	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	1.92	479	0.05	R 84.24	R 40,318.92	R 1,667,810.72
	Working space	m2	0.48	993	1.58	R 53.34	R 52,950.79	
	Backfill	m3	2.08	230	0.78	R 107.41	R 24,690.17	
	Blinding	m2	0.67	374	20.21	R 77.80	R 29,132.07	
	Concrete bases	m3	0.00	249	0.00	R 1,572.50	R 391,552.50	
	Concrete column	m3	28.28	9	0.00	R 1,572.50	R 13,845.21	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	4.98	50	0.00	R 1,572.50	R 78,557.39	
		Total concrete	m3	0.00	308	0.00		R -	
		Wood float	m2	0.63	491	156.07	R 10.08	R 4,944.55	
		Formwork bases	m2	0.50	494	7.66	R 205.17	R 101,307.51	
		Formwork plinths	m2	0.31	160	7.51	R 209.41	R 33,438.16	
		Formwork to columns	m2	0.28	31	8.05	R 195.41	R 6,082.62	
		High tensile reinforcement	t	8.76	35.121	0.00	R 12,325.00	R 432,868.14	
		HD bolts	kg	0.04	7,429	213.85	R 57.63	R 428,139.09	
		Grout	m3	102.25	3.010	0.16	R 9,961.54	R 29,983.59	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.66	528	0.06	R 87.61	R 46,301.14	R 2,598,705.91
		Working space	m2	0.29	1,850	2.09	R 41.95	R 77,590.82	
		Backfill	m3	2.01	263	0.81	R 108.35	R 28,478.88	
		Blinding	m2	0.69	290	19.93	R 78.89	R 22,871.49	
		Concrete bases	m3	0.00	199	0.00	R 1,572.50	R 312,927.50	
		Concrete column	m3	1.11	175	146.26	R 1,572.50	R 275,449.78	
		Concrete beam	m3	2.57	68	0.90	R 1,572.50	R 107,298.19	
		Total concrete	m3	2.92	442	0.90		R -	
		Wood float	m2	0.45	441	7.41	R 10.75	R 4,739.35	
		Formwork bases	m2	0.46	436	6.45	R 212.34	R 92,577.18	
		Formwork to columns	m2	0.15	1,208	7.42	R 211.93	R 256,018.01	
		Formwork to sides beams	m2	0.32	210	5.87	R 243.69	R 51,275.81	
		Formwork to soffits beams	m2	0.69	98	6.45	R 267.99	R 26,337.50	
		Formwork corbels	m2	10.80	16	4.94	R 318.27	R 5,161.45	
		High tensile reinforcement	t	8.94	49.462	0.00	R 12,325.00	R 609,617.32	
		Cast in steel	kg	0.03	14,076	264.89	R 46.53	R 654,967.55	
		HD bolts	kg	1.44	308	204.94	R 60.14	R 18,494.66	
		Grout	m3	510.17	0.867	0.16	R 9,916.67	R 8,599.30	
		Restricted excavation	m3	3.76	1,242	0.05	R 83.12	R 103,211.01	R 5,037,490.87
		Working space	m2	0.55	2,249	1.74	R 47.85	R 107,606.63	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.16	1,074	0.78	R 105.98	R 113,797.54	
		Blinding	m2	0.61	540	18.45	R 85.25	R 46,066.78	
		Concrete bases	m3	0.00	330	0.87	R 1,572.50	R 518,925.00	
		Concrete column	m3	2.16	153	1.04	R 1,572.50	R 240,004.96	
		Concrete beam	m3	0.80	192	0.96	R 1,572.50	R 301,622.03	
		Concrete surface slab	m3	1.73	191	0.91	R 1,572.50	R 300,701.57	
		Concrete wall	m3	2.27	67	1.00	R 1,572.50	R 105,762.33	
		Concrete elevated slab	m3	1.04	147	0.00	R 1,572.50	R 231,888.85	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,080	0.00		R -	
		Wood float	m2	0.63	1,727	158.74	R 9.91	R 17,104.35	
		Formwork bases	m2	0.40	835	7.18	R 218.99	R 182,953.13	
		Formwork to columns	m2	0.16	941	6.14	R 256.08	R 241,047.98	
		Formwork to sides beams	m2	0.30	644	4.91	R 320.03	R 206,090.40	
		Formwork to soffits beams	m2	0.84	228	7.61	R 206.64	R 47,024.53	
		Formwork to soffts of slabs	m2	0.30	644	3.14	R 275.12	R 177,051.62	
		Formwork to pockets	m2	25.68	6	5.72	R 500.45	R 2,974.81	
		Formwork wall	m2	0.13	520	7.75	R 202.83	R 105,516.09	
		High tensile reinforcement	t	8.70	124.141	0.00	R 12,325.00	R 1,530,042.33	
		Cast in steel	kg	0.22	5,008	272.06	R 45.30	R 226,894.51	
		HD bolts	kg	0.39	2,801	215.82	R 57.11	R 159,960.30	
		Steel handrailing	m	2.53	49	9.85	R 1,251.00	R 61,470.36	
		Grout	m3	1,039.96	1.039	0.17	R 9,408.12	R 9,773.78	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.39	1,940	0.04	R 68.52	R 132,952.13	R 16,997,385.38
		Working space	m2	8.20	237	1.42	R 48.37	R 11,450.86	
		Backfill	m3	4.59	423	0.69	R 47.23	R 19,987.35	
		Blinding	m2	1.23	2,191	20.22	R 77.79	R 170,458.87	
		Concrete bases	m3	0.00	2,700	0.00	R 1,572.50	R 4,245,750.00	
		Concrete column	m3	28.58	94	0.00	R 1,572.50	R 148,560.40	
		Concrete beam	m3	1.41	67	0.00	R 1,572.50	R 105,575.92	
		Concrete wall	m3	11.34	238	0.00	R 1,572.50	R 374,310.45	
		Concrete elevated slabs	m3	11.77	8	0.00	R 1,572.50	R 12,624.25	
		Total concrete	m3	0.00	3,108	0.00		R -	
		Wood float	m2	0.87	3,590	155.84	R 10.09	R 36,221.04	
		Formwork bases	m2	8.94	302	7.26	R 216.51	R 65,368.82	
		Formwork to columns	m2	0.16	607	6.13	R 221.03	R 134,104.48	
		Formwork to sides beams	m2	0.20	343	4.88	R 256.67	R 88,051.13	
		Formwork to soffits beams	m2	0.56	121	7.11	R 322.23	R 38,930.81	
		Formwork to soffts of slabs	m2	0.14	59	3.30	R 300.55	R 17,685.64	
		Formwork to pockets	m2	465.89	6	5.23	R 477.03	R 2,764.55	
		Formwork wall	m2	0.11	2,109	7.11	R 221.12	R 466,386.59	
		High tensile reinforcement	t	4.39	707.554	0.00	R 12,325.00	R 8,720,597.65	
		Cast in steel	kg	0.16	19,082	223.49	R 55.15	R 1,052,350.90	
		HD bolts	kg	0.25	12,684	189.23	R 65.13	R 826,183.41	
		Galvanised grating	m2	19.89	156	0.17	R 1,896.36	R 296,251.06	
		Grout	m3	831.33	3.248	6.50	R 9,489.22	R 30,819.07	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.57	193	0.05	R 78.63	R 15,176.37	R 2,370,202.42
	Working space	m2	0.37	520	1.72	R 45.60	R 23,696.45	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.00	97	0.79	R 99.98	R 9,648.92	
	Blinding	m2	4.49	27	21.09	R 74.55	R 2,042.53	
	Concrete bases	m3	0.00	123	0.00	R 1,572.50	R 193,417.50	
	Concrete column	m3	6.23	20	0.00	R 1,572.50	R 31,067.52	
	Concrete beam	m3	1.73	11	0.00	R 1,572.50	R 18,002.70	
	Concrete wall	m3	33.53	4	0.00	R 1,572.50	R 5,768.74	
	Concrete elevated slabs	m3	24.29	1	0.00	R 1,572.50	R 1,279.25	
	Total concrete	m3	0.00	159	0.00		R -	
	Wood float	m2	4.51	27	155.77	R 10.10	R 275.55	
	Formwork bases	m2	1.45	85	7.57	R 207.69	R 17,617.73	
	Formwork to columns	m2	0.13	156	7.02	R 245.73	R 38,399.88	
	Formwork to sides beams	m2	0.23	49	6.10	R 224.14	R 11,019.86	
	Formwork to soffits beams	m2	0.72	16	6.40	R 257.79	R 4,094.91	
	Formwork to soffts of slabs	m2	0.20	4	3.68	R 274.16	R 1,091.77	
	Formwork to pockets	m2	2.95	42	5.74	R 427.48	R 17,832.20	
	Formwork wall	m2	0.29	13	7.22	R 217.95	R 2,730.16	
	High tensile reinforcement	t	6.93	22.896	0.00	R 12,325.00	R 282,196.08	
	Cast in steel	kg	0.02	7,934	192.42	R 64.05	R 508,218.40	
	HD bolts	kg	0.01	13,068	195.43	R 63.07	R 824,185.17	
	Galvanised grating	m2	3.77	42	0.19	R 8,467.31	R 356,406.85	
	Grout	m3	41.02	2.999	6.13	R 2,012.24	R 6,033.90	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.81	1,447	0.05	R 81.99	R 118,665.11	R 10,335,103.93
	Working space	m2	2.35	616	1.82	R 45.07	R 27,781.17	
	Backfill	m3	1.26	1,153	0.78	R 104.74	R 120,711.79	
	Blinding	m2	3.94	202	20.19	R 77.90	R 15,768.35	
	Concrete	m3	0.00	798	0.00	R 1,572.50	R 1,254,855.00	
	Mesh reinforcement	m2	0.44	1,825	61.71	R 199.72	R 364,590.93	
	Rough formwork	m2	2.76	290	8.16	R 192.66	R 55,789.85	
	Smooth formwork	m2	0.55	1,458	6.69	R 234.98	R 342,710.66	
	Finish to concrete	m2	0.22	3,604	103.86	R 15.14	R 54,564.67	
	Construction joints	m	4.85	165	20.13	R 78.11	R 12,862.12	
	Movement joints	m	14.77	54	16.46	R 95.53	R 5,159.89	
	Cast in steel	kg	2.24	356	223.67	R 55.10	R 19,630.43	
	Grout	m3	818.96	0.974	0.16	R 9,698.24	R 9,450.04	
	Brick walls	m2	0.48	1,663	0.00	R 382.50	R 635,906.25	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.43	3,532	0.00		R -	
	Waterproofing membrane	m2	1.99	1,778	11.34	R 138.73	R 246,690.56	
	Roof construction	m2	1.99	1,778	34.92	R 352.94	R 627,380.58	
	Ceiling	m2	0.97	3,636	0.00	R 301.75	R 1,097,217.58	
	Doors and windows	No	441.06	8	0.15	R 2,502.34	R 20,040.44	
	Floor finish	m2	0.98	3,623	0.76	R 505.19	R 1,830,228.64	
	Wall finsih	m2	1.01	3,483	1.38	R 278.18	R 968,779.15	
	Rod reinforcement	t	8.79	91	0.00	R 12,325.00	R 1,118,561.33	
	Metalwork	Item	0.00	1	4.61	R 56,844.66	R 56,844.66	
	Structural steel	Item	0.00	1	11.94	R 147,186.91	R 147,186.91	
	Plumbing and drainage	Item	0.00	1	7.60	R 93,705.21	R 93,705.21	
	Small power and lighting	Item	0.00	1	64.78	R 798,457.52	R 798,457.52	
	External works	Item	0.00	1	185.42	R 291,565.09	R 291,565.09	
BUILDINGS - STEEL	Concrete	m3	0.00	88	0.16	R 1,572.50	R 138,380.00	R 3,280,131.98
	Earthworks	m3	2.38	209	8.69	R 180.90	R 37,852.67	
	Reinforcement	t	8.42	10	0.00	R 12,325.00	R 128,867.01	
	Mesh	m2	0.11	780	9.23	R 170.29	R 132,782.54	
	Formwork	m2	0.40	221	7.66	R 205.25	R 45,316.61	
	Brickwork	m2	5.85	149	5.73	R 274.23	R 40,958.22	
	Roof covering	m2	0.89	979	200.21	R 233.50	R 228,494.47	
	Structural steel	t	19.35	45	0.00	R 46,750.00	R 2,108,952.50	
	Side cladding	m2	1.48	591	0.97	R 225.67	R 133,369.76	
	Doors	No	373.46	2	0.52	R 24,109.64	R 56,358.91	
	Ridge ventilator	m	22.06	40	11.21	R 2,617.59	R 103,588.18	
	Aluminium insulation	m2	0.94	932	1.74	R 134.31	R 125,211.12	
	Total building area	m2	0.00	873	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.72	177	0.12	R 186.45	R 32,913.05	R 2,608,280.79
	Concrete	m3	0.00	65	0.00	R 1,572.50	R 102,212.50	
	Reinforcement	t	11.91	5	0.17	R 12,325.00	R 67,268.94	
	Mesh	m2	0.12	538	10.16	R 154.82	R 83,363.09	
	Formwork	m2	0.46	141	8.11	R 193.88	R 27,395.99	
	Brickwork	m2	5.45	100	5.79	R 271.62	R 27,187.19	
	Screed	m2	1.09	501	41.02	R 38.34	R 19,207.24	
	Structural steel	t	14.48	38	0.00	R 46,750.00	R 1,759,235.06	
	Cat ladders	m	2.49	15	9.31	R 5,020.33	R 75,958.00	
	Hand rail	m	0.71	53	27.19	R 1,719.20	R 91,395.20	
	Kick plates	m	0.75	50	2.54	R 677.99	R 34,115.37	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.84	652	194.37	R 240.52	R 156,851.21	
		Side cladding	m2	4.39	124	0.87	R 208.22	R 25,866.55	
		Floor grating	m2	1.06	36	15.79	R 2,960.47	R 105,311.41	
		Total buiding area	m2	0.00	545	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.26	245	7.70	R 204.35	R 49,997.27	R 794,854.92
		Blinding	m2	0.51	148	20.16	R 78.00	R 11,535.77	
		Concrete	m3	0.00	75	0.00	R 1,572.50	R 117,937.50	
		Reinforcement	t	7.71	10	0.00	R 12,325.00	R 119,970.80	
		Mesh	m2	0.52	144	49.55	R 248.72	R 35,725.96	
		Formwork	m2	0.33	225	7.78	R 202.05	R 45,525.53	
		Finish to concrete	m2	0.46	163	108.71	R 14.47	R 2,362.20	
		Movement joints	m	2.55	29	14.92	R 105.43	R 3,106.85	
		Cast in steel	kg	0.09	833	192.30	R 64.09	R 53,410.67	
		Grout	m3	73.00	1.027	2.59	R 10,145.16	R 10,423.11	
		Brickwork	m2	0.24	58	0.16	R 382.50	R 22,312.50	
		Doors and windows	No	2.83	5	0.25	R 5,004.67	R 24,720.66	
		Pipework	m	2.94	53	0.22	R 606.14	R 31,971.89	
		Bolts	kg	0.11	695	0.08	R 64.09	R 44,567.84	
		Structural steel	t	4.35	3	0.00	R 50,306.12	R 161,825.05	
		Miscellaneous steel	t	145.09	1	0.00	R 55,661.29	R 59,461.34	
		Total bridge area	m2	0.00	155	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.63	114	5.13	R 306.27	R 35,046.54	R 372,531.47
		Blinding	m2	0.67	22	12.40	R 126.82	R 2,842.32	
		Concrete	m3	0.00	15	0.00	R 1,572.50	R 23,587.50	
		Reinforcement	t	5.11	3	0.00	R 12,325.00	R 36,174.00	
		Formwork	m2	0.06	253	4.78	R 329.17	R 83,284.39	
		Finish to concrete	m2	0.31	49	65.40	R 24.04	R 1,174.26	
		Movement joints	m	0.38	39	11.30	R 139.17	R 5,493.48	
		Cast in steel	kg	22.90	0.655	158.26	R 77.88	R 51.01	
		Grout	m3	19.98	0.751	0.58	R 13,342.42	R 10,019.34	
		Bolts	kg	107.12	0.140	0.12	R 44.89	R 6.29	
		Structural steel	t	36.08	0.804	0.22	R 56,759.87	R 45,619.14	
		Miscellaneous steel	t	21.25	1.365	0.17	R 71,895.83	R 98,139.76	
		Brickwork	m2	0.49	59	3.84	R 409.20	R 24,182.75	
		Roof covering	m2	1.48	20	1.16	R 353.19	R 6,910.69	
		Total pump house area	m2	0.00	29	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	429	6.85	R 229.54	R 98,378.72	R 3,460,701.80
	Blinding	m2	1.36	401	18.37	R 85.61	R 34,299.98	
	Concrete	m3	0.00	544	0.00	R 1,572.50	R 855,440.00	
	Reinforcement	t	6.07	89.632	0.00	R 12,325.00	R 1,104,709.90	
	Formwork	m2	0.22	2,530	6.62	R 237.72	R 601,480.08	
	Movement joint	m	1.85	293	0.12	R 113.57	R 33,332.27	
	Cast in steel	kg	0.15	3,752	13.85	R 59.61	R 223,652.53	
	Bolts	kg	0.39	1,390	206.75	R 71.77	R 99,748.65	
	Chemical anchors	No	7.36	74	0.24	R 302.27	R 22,335.09	
	Miscellaneous steelwork	t	92.81	5.861	171.72	R 51,507.46	R 301,907.77	
	Pre-cast concrete	m3	36.46	15	40.78	R 4,694.03	R 70,045.32	
	Brickwork	m2	8.49	47	0.34	R 323.75	R 15,371.52	
	Total area	m2	0.00	403	4.86		R -	
EMERGENCY DAM	Earthworks	m3	0.53	8,790	1.56	R 97.94	R 860,924.95	R 2,872,882.06
	Lining	m2	0.72	6,444	1.17	R 62.90	R 405,304.04	
	Paving	m2	0.71	6,515	0.48	R 132.22	R 861,428.44	
	Pipework	m	26.18	177	0.24	R 413.02	R 72,915.24	
	Manholes	No	14.36	12	0.09	R 4,413.93	R 54,284.00	
	Concrete	m3	2.41	73	0.04	R 1,572.50	R 115,158.02	
	Formwork	m2	0.08	958	5.25	R 299.73	R 287,193.55	
	Mesh	m2	0.63	117	6.48	R 242.70	R 28,275.64	
	Reinforcement	t	4.82	15.205	0.11	R 12,325.00	R 187,398.17	
	Dam area (to top of berm)	m2	0.00	4,621	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.11	837	6.12	R 257.15	R 215,231.18	R 1,842,056.55
	Blinding	m2	0.90	152	15.27	R 102.99	R 15,664.83	
	Concrete	m3	0.00	137	0.00	R 1,572.50	R 215,432.50	
	Reinforcement	t	4.53	30.233	0.00	R 12,325.00	R 372,625.32	
	Mesh	m2	1.01	135	38.29	R 321.88	R 43,476.41	
	Formwork	m2	0.16	849	6.28	R 250.28	R 212,409.35	
	Cast in steel	kg	0.03	4,795	150.40	R 81.95	R 392,946.92	
	Miscellaneous steelwork	t	12.23	5.314	0.18	R 70,428.57	R 374,270.03	
	Total tunnel length	m	0.00	65	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	48	0.00		R -	R 406,914.04
	Steel	t	8.87	5.410	0.00	R 46,750.00	R 252,926.50	
	Handrail	m	1.48	32	26.01	R 1,797.24	R 58,401.53	
	Grating	m2	1.90	25	16.18	R 2,889.88	R 72,870.52	
	Kick flats	m	1.65	29	74.14	R 630.60	R 18,376.56	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stair treads	No	6.07	8	85.19	R 548.76	R 4,338.94	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,697	0.00		R -	R 3,820,065.67
		Steel	t	25.52	66.502	0.00	R 46,750.00	R 3,108,989.50	
		Handrail	m	13.13	129	31.29	R 1,493.92	R 193,019.80	
		Grating	m2	12.23	139	17.89	R 2,613.09	R 362,542.22	
		Kick flats	m	12.98	131	85.51	R 546.70	R 71,459.79	
		Cat ladder	m	99.69	17	9.47	R 4,937.76	R 84,054.34	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	12,149	0.00		R -	R 18,526,206.19
		Steel	t	75.73	160.430	0.00	R 46,750.00	R 7,500,090.08	
		Handrail	m	32.51	374	28.18	R 1,658.77	R 619,814.09	
		Grating	m2	3.78	3,217	15.24	R 3,067.59	R 9,868,608.16	
		Kick flats	m	33.52	362	75.59	R 618.48	R 224,138.12	
		Stair treads	No	237.68	51	96.97	R 482.13	R 24,644.04	
		Cat ladder	m	243.11	50	8.09	R 5,781.29	R 288,911.69	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	405	0.00		R -	R 928,990.81
		Steel	t	24.14	16.778	0.00	R 46,750.00	R 784,354.19	
		Handrail	m	46.97	9	26.89	R 1,738.38	R 14,989.00	
		Grating	m2	58.67	7	17.20	R 2,718.47	R 18,764.31	
		Kick flats	m	47.65	8	76.40	R 611.89	R 5,200.54	
		Cat ladder	m	20.66	20	8.67	R 5,390.38	R 105,682.77	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	45	0.00		R -	R 309,161.68
		Steel	t	14.05	3.204	0.00	R 46,750.00	R 149,778.78	
		Handrail	m	1.09	41	29.93	R 1,561.90	R 64,355.73	
		Grating	m2	1.90	24	16.03	R 2,916.02	R 68,933.98	
		Kick flats	m	1.14	40	82.53	R 566.46	R 22,402.21	
		Stair treads	No	5.70	8	99.97	R 467.64	R 3,690.97	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	506	0.00		R -	R 2,412,229.66
		Steel	t	11.80	42.897	0.00	R 46,750.00	R 2,005,431.75	
		Handrail	m	22.40	23	27.52	R 1,698.68	R 38,378.00	
		Grating	m2	6.93	73	16.88	R 2,769.55	R 202,137.76	
		Kick flats	m	22.62	22	77.42	R 603.83	R 13,506.93	
		Cat ladder	m	18.35	28	8.44	R 5,541.44	R 152,775.22	
	PIPING INSTALLATION	Pipe length	m	0.00	39,216	0.00		R -	R 47,762,510.42
		Total work units	WU	0.30	128,879	0.00	R 370.60	R 47,762,510.42	
		Pipe supports	kg	2.48	15,845	0.00		R -	
		WU for pipe supports	WU	0.17	21,449	0.00		R -	
		Number of welds	No	0.59	22,997	0.00		R -	
		Total fittings	No	0.38	14,706	0.00		R -	
		Stud bolts	No	0.35	5,158	0.00		R -	
		Support number	No	0.19	3,056	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	128,879	0.00	R 370.60		R 154,445.97

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	EXAMINATION (RT)	Number of examinations	No	55.54	2,321	5.57	R 66.55	R 154,445.97	
	DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	128,879	0.00	R 370.60		R 93,815.70
		Number of examinations	No	163.06	790	3.12	R 118.70	R 93,815.70	
	MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	128,879	0.00	R 370.60		R 89,360.12
		Number of examinations	No	285.61	451	1.87	R 198.03	R 89,360.12	
	POST WELD HEAT TREATMENT	Total work units	WU	0.00	128,879	0.00	R 370.60		R 150,218.13
		Number of examinations	No	48.21	2,673	6.60	R 56.19	R 150,218.13	
	MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	128,879	0.00	R 370.60		R 171,424.40
		Number of examinations	No	111.45	1,156	2.50	R 148.24	R 171,424.40	
	MECHANICAL INSTALLATION	Total work units	WU	0.00	128,879	0.00	R 370.60		R 274,980.45
		Mechanical equipment	t	235.40	547	0.74	R 502.27	R 274,980.45	
		Structural steel	t	205.59	627	54.61			
	PAINTING & INSULATION	Total work units	WU	0.00	128,879	0.00	R 370.60		R 3,504,903.28
		Painting to piping	m2	16.79	7,677	0.32	R 155.34	R 1,192,490.62	
		Insulation to piping	m2	47.32	2,724	2.39	R 492.03	R 1,340,157.89	
		Mechanical equipment received	t	0.00	547	0.83	R 502.27	R 274,980.45	
		Painting to mechanical equipment	m2	0.24	2,295	3.33	R 150.70	R 345,833.20	
		Insulation to mechanical equipment	m2	0.67	814	1.16	R 431.92	R 351,441.12	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	23.72	38,480	0.00	R 66.30	R 2,551,224.00	R 6,677,463.07
		Electrical cable terminations	No	298.98	1,622	0.41	R 160.03	R 259,578.41	
		Electrical equipment	No	8.12	129	0.11	R 614.70	R 79,115.52	
		DB's	No	6.05	16	0.27	R 2,264.69	R 35,877.40	
		Rack	m	0.66	6,360	1.62	R 191.78	R 1,219,620.23	
		Support steel	kg	1.34	9,657	2.13	R 31.20	R 301,286.81	
		Instrumentation cable	m	23.90	29,023	0.35	R 28.50	R 827,155.50	
		Instruments	No	0.52	1,215	0.17	R 169.79	R 206,218.36	
		Hook-ups	No	3.84	2,355	0.16	R 181.36	R 427,133.21	
		Light fittings	No	10.34	494	0.02	R 394.98	R 195,064.73	
		Conduit	m	4.09	3,720	0.11	R 40.93	R 152,241.51	
		Instrument stands	No	0.00	297		R 1,425.00	R 422,947.40	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project B				
Location:	South Africa				
Client:				Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,422	R	3.96
2	Concrete demolitions	m3	19	R	1,401.52
3	Bulk excavation	m3	6,845	R	32.34
4	Vertical piles	No	195		
5	Raking piles	No	4		
6	Concrete in piles	m3		R	1,329.64
7	Auger pile	m		R	287.49
8	Total paving and asphalt to road works	m2	5,212		
9	Grey paving to road works	m2	385	R	125.78
10	Asphalt to road surface	m2	4,827		
11	Rip bed of road works	m2	5,212	R	10.78
12	Total concrete in paving and bunding	m3	448	R	1,329.64
13	Concrete in paving	m3	238		
14	Rod reinforcement	t		R	10,421.53
15	Concrete in plinths and bases on area finishing	m3	212		
16	Stormwater pipe to drain surface run-off	m	80		
17	Machine excavation	m3		R	61.09
18	Concrete in pump and pipe support bases	m3	199	R	1,329.64
19	Concrete in tank bases	m3	120	R	1,329.64
20	Concrete in pipe and cable rack foundations	m3	130	R	1,329.64
21	Concrete to simple structural foundations	m3	122	R	1,329.64
22	Complex structural foundations - bases	m3	198	R	1,329.64
23	Concrete pipe racks - bases	m3	245	R	1,329.64
24	Concrete structure including concrete columns and beams - bases	m3	302	R	1,329.64
25	Major equipment bases with blast proof walls - bases	m3	1,550	R	1,329.64
26	Major equipment bases and elevated concrete structure - bases	m3	80	R	1,329.64
27	Concrete frame buildings with brick in-fill - all concrete	m3	455	R	1,329.64
28	One brick wall	m2		R	323.43
29	Concrete in structual steel buildings - all concrete	m3	90	R	1,329.64
30	Total building area - Structural steel buildings	m2	955		
31	Ceiling	m2		R	255.15
32	Structural steel	t		R	39,529.93
33	Steel canopy - concrete	m3	71	R	1,329.64
34	Steel canopy - area	m2	685		
35	Concrete in weighbridge - all concrete	m3	70	R	1,329.64
36	Total weighbridge area	m2	148		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	11	R	1,329.64
39	Total pump house area	m2	22		
40	Concrete in cooling tower	m3	0	R	1,329.64
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	3,885		
43	Concrete in cable tunnel	m3	0	R	1,329.64
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	65		
46	Total volume of steel pipe rack	m3	1,455		
47	Total volume of steel complex steel structure	m3	11,452		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	66		
50	Total volume of steel in cable gantry	m3	398		
51	Piping work unit cost	WU		R	313.36
52	Total process pipe length	m	48,552		
53	Total electrical cable - installation only	m	34,522	R	56.06
54	Total instrumentation cable - installation only	m	27,855	R	37.37

Ratio: Project Ratio Mean

Variables

Material	Simple	Mean
Labour	Simple	Mean
Engineering design	Normal	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Few	Mean
Weather	Normal	Mean
Access	Poor	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Simple	Mean
Repitition	None	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project B			
Location:	South Africa			
Client:	0	Date of estimate:	2007	

	CIVIL CONSTRUCTION COST				R 63,666,281.20
A	SITE CLEARANCE AND DEMOLITIONS		R	95,620.00	
B	BULK EARTHWORKS		R	467,984.72	
C	PILING		R	5,817,091.02	
D	ROAD WORKS		R	2,436,962.75	
E	GENERAL PAVING AND BUNDED AREAS		R	1,188,861.21	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	904,294.40	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,118,715.62	
H	TANK BASES AND BUNDING		R	1,668,896.92	
I	RACK FOUNDATIONS		R	896,282.65	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,059,785.66	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,105,934.25	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,730,107.24	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,539,438.95	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	9,140,034.39	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,277,554.45	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	5,187,308.73	
Q	BUILDINGS - STEEL		R	3,008,218.86	
R	CANOPIES - STEEL		R	2,653,904.76	
S	WEIGHBRIDGE		R	664,210.30	
T	PUMP HOUSE		R	212,293.70	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	1,986,707.73	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	16,506,072.90	
	STRUCTURAL STEEL				R 26,509,201.67
A	STRUCTURAL STEEL - BASIC PLATFORM		R	432,674.56	
B	STRUCTURAL STEEL - PIPERACK		R	2,568,886.52	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	14,120,805.84	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	342,947.72	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,469,829.42	
	Preliminaries and General	40.00%	R	7,574,057.62	
	MECHANICAL AND PIPING				R 65,533,542.53
A	PIPING INSTALLATION		R	46,103,802.18	
B	RADIOGRAPHIC EXAMINATION (RT)		R	129,621.07	
C	DYE PENETRATION TESTING (DP)		R	46,577.06	
D	MAGNETIC PARTICLE TESTING (MPI)		R	72,273.43	
E	POST WELD HEAT TREATMENT		R	125,642.78	
F	MATERIAL HARDNESS TEST (HT)		R	96,746.06	
H	MECHANICAL INSTALLATION		R	235,010.65	
	Preliminaries and General	40.00%	R	18,723,869.30	
	PAINTING AND INSULATION				R 3,750,041.36
A	PAINTING AND INSULATION		R	2,777,808.42	
	Preliminaries and General	35.00%	R	972,232.95	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 6,925,861.90
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	5,130,268.08	
	Preliminaries and General	35.00%	R	1,795,593.83	

TOTAL COST	R	166,384,928.67

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,422		R 3.96	R 68,991.12	R 95,620.00
	Concrete demolitions	m3		19		R 1,401.52	R 26,628.88	
BULK EARTHWORKS	Bulk excavation	m3		6,845		R 32.34	R 221,367.30	R 467,984.72
	Trimming of sides	m2	2.18	3,140	4.30	R 7.52	R 23,615.03	
	Back fill and compact	m3	1.15	5,952	0.98	R 33.00	R 196,421.74	
	Overhaul	m3/km	1.73	3,957	11.34	R 2.85	R 11,283.77	
	Rip bed	m2	1.78	3,846	8.13	R 3.98	R 15,296.88	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 255,689.77	R 255,689.77	R 5,817,091.02
	EO for raking equipment	Item	0.00	1	23.89	R 31,765.10	R 31,765.10	
	Number of piles	No	0.00	195	0.00		R -	
	Move rig to new position	No	1.50	130	0.18	R 239.34	R 31,113.58	
	Number of raking piles	No	18.41	11	0.00		R -	
	EO for setting up raking piles	No	0.93	11	0.28	R 372.30	R 4,240.24	
	EO for raking drilling	m	0.15	71	0.89	R 255.87	R 18,067.68	
	Auger quantity	m	0.05	3,900	0.00	R 287.49	R 1,121,211.00	
	EO for drilling in coarse gravel	m	0.53	368	0.22	R 292.52	R 107,625.58	
	EO for drilling in boulders	m	1.84	106	0.50	R 664.82	R 70,456.47	
	EO for drilling in soft rock	m	1.63	120	0.24	R 319.11	R 38,176.17	
	Temporary casings	m	0.36	542	0.36	R 478.67	R 259,279.80	
	EO casing to raking pile	m	0.18	59	0.51	R 1,236.57	R 72,765.47	
	Mild steel rod reinforcement	t	14.29	13.646	0.93	R 8,940.37	R 121,999.40	
	High tensile rod reinforcement	t	1.32	147.727	7.23	R 9,613.30	R 1,420,146.18	
	Concrete to piles and bases	m3	0.15	1,300	0.00	R 1,329.64	R 1,728,532.00	
	Concrete to raking piles	m3	0.07	151	1.06	R 1,409.42	R 213,266.54	
	Site establishment of test equipment	Item	0.00	1	110.73	R 147,231.04	R 147,231.04	
	Load test to pile	No	99.34	2	27.07	R 35,993.35	R 70,653.35	
	Site establishment of intergity testing	No	258.87	1	48.79	R 64,873.14	R 48,867.24	
	Integrity testing of piles	No	1.25	156	0.27	R 359.00	R 56,004.44	
ROAD WORKS	Red paving	m2	0.15	58	0.97	R 122.01	R 7,045.88	R 2,436,962.75
	Grey paving	m2	0.00	385	0.00	R 125.78	R 48,425.30	
	Kerbing	m	0.13	678	0.00	R 210.80	R 142,827.43	
	Total paving and asphalt	m2	0.00	5,212	0.00		R -	
	Remove top soil	m3	0.55	745	5.83	R 62.85	R 46,841.17	
	Asphalt	m2	0.26	1,355	0.00	R 149.20	R 202,180.16	
	Rip bed	m2	0.00	5,212	0.00	R 10.78	R 56,185.36	
	Reduce levels	m3	0.42	2,189	4.99	R 53.79	R 117,753.28	
	Selected fill	m3	1.65	1,327	0.53	R 101.49	R 134,652.12	
	Imported fill	m3	2.23	595	0.39	R 260.24	R 154,825.94	
	Wearing course	m3	3.86	567	0.29	R 185.49	R 105,193.21	
	Prime	m2	4.74	6,289	1.47	R 52.05	R 327,308.23	
	Three line road marking	m	0.83	5,219	0.20	R 42.16	R 220,049.32	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.02	691	4.19	R 10.54	R 7,284.20	
		1m Wide concrete V-drain	m	0.97	657	0.81	R 944.37	R 620,670.86	
		200mm Diameter PVC pipe	m	0.96	650	0.11	R 299.33	R 194,702.35	
		Road marking - STOP	No	0.15	102	0.05	R 320.41	R 32,564.65	
		Standard signage	No	0.01	7	4.48	R 408.95	R 2,770.85	
		100mm Painted line	m	1.83	1,240	1.42	R 12.65	R 15,682.45	
				0.00		1.52			
				0.00		1.94			
				0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	238	0.74	R 1,329.64	R 316,454.32	R 1,188,861.21
		Concrete in plinths	m3	0.00	47	0.00	R 1,329.64	R 63,038.71	
		Total concrete	m3	0.00	448	0.00		R -	
		Rip and compact	m2	0.13	1,831	187.19	R 7.10	R 13,004.24	
		Formwork to plinth	m2	7.26	344	0.12	R 159.56	R 54,919.32	
		Formwork to slab	m2	0.83	198	0.15	R 199.45	R 39,398.56	
		High tensile steel	t	0.01	4.480	0.00	R 10,421.53	R 46,688.45	
		Mesh	m2	585.35	2,622	51.00	R 204.34	R 535,864.45	
		Construction joint	m	4.00	952	0.05	R 66.48	R 63,290.86	
		Expansion joint	m	2.22	528	0.08	R 106.37	R 56,202.29	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	7,043	0.00		R -	R 904,294.40
		Base excavation	m3	1.50	471	0.00	R 61.09	R 28,780.18	
		Backfill	m3	0.59	314	0.64	R 95.45	R 29,979.35	
		Working space	m2	0.45	798	1.43	R 66.75	R 53,299.78	
		Concrete in bases	m3	0.04	212	25.24	R 1,329.64	R 281,883.68	
		Blinding	m2	0.83	286	20.88	R 63.68	R 18,217.11	
		Concrete in sump walls	m3	0.10	21	29.51	R 1,329.64	R 28,188.37	
		Concrete in slabs	m3	0.02	4	0.91	R 1,329.64	R 5,637.67	
		Total concrete	m3	0.00	237	0.04		R -	
		Wood float	m2	0.70	339	158.37	R 8.40	R 2,847.85	
		Formwork to bases	m2	1.69	358	0.12	R 159.56	R 57,166.01	
		Formwork to sump walls	m2	12.63	268	0.12	R 159.56	R 42,722.29	
		Formwork to sides of slab	m2	5.81	25	0.18	R 239.34	R 5,895.88	
		Mild steel reinforcement	t	0.12	2.668	0.00	R 10,421.53	R 27,803.24	
		High tensile reinforcement	t	10.68	22.232	1.19	R 10,421.53	R 231,693.64	
		Cast in steel	kg	0.46	461	34.10	R 38.99	R 17,970.40	
		Waterstop	m	0.43	49	8.10	R 164.15	R 8,093.13	
		Manhole	No	0.08	6	2.68	R 3,816.42	R 24,425.07	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	80	0.13	R 496.13	R 39,690.75	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	336	0.05	R 61.09	R 20,545.18	R 1,118,715.62
	Working space	m2	0.38	885	0.67	R 40.93	R 36,224.39	
	Backfill	m3	4.42	76	1.32	R 80.64	R 6,135.66	
	Concrete bases	m3	1.01	199	0.00	R 1,329.64	R 264,598.36	
	Concrete plinth	m3	2.29	87	0.00	R 1,329.64	R 115,545.14	
	Total concrete	m3	0.00	286	0.00		R -	
	Wood float	m2	0.47	185	0.05	R 13.30	R 2,458.41	
	Blinding	m2	1.01	197	0.01	R 66.48	R 13,098.93	
	Formwork bases	m2	0.49	406	0.13	R 172.85	R 70,199.56	
	Formwork plinth	m2	0.58	150	0.12	R 159.56	R 23,905.89	
	High tensile reinforcement	t	10.00	28.590	7.15	R 10,421.53	R 297,951.09	
	Cast in steel	kg	0.11	2,599	0.03	R 39.89	R 103,675.50	
	HD Bolts	kg	0.08	3,574	0.03	R 39.89	R 142,553.81	
	Grout	m3	34.52	2.517	6.52	R 8,669.25	R 21,823.70	
TANK BASES AND BUNDING	Restricted excavation	m3	5.84	701	0.05	R 66.48	R 46,590.59	R 1,668,896.92
	Working space	m2	4.36	161	1.63	R 40.79	R 6,555.78	
	Backfill	m3	1.38	508	0.72	R 92.34	R 46,890.69	
	Concrete bases	m3	0.75	120	0.00	R 1,329.64	R 159,556.80	
	Concrete sump wall	m3	2.86	42	0.00	R 1,329.64	R 55,789.09	
	Concrete slab	m3	0.57	211	0.00	R 1,329.64	R 279,924.21	
	Concrete plinth	m3	4.11	29	21.05	R 1,329.64	R 38,821.61	
	Concrete column	m3	19.22	6	164.76	R 1,329.64	R 8,301.60	
	Total concrete	m3	0.00	408	1.11		R -	
	Blinding	m2	2.67	153	1.05	R 63.17	R 9,650.53	
	Wood float	m2	0.25	1,632	1.12	R 8.07	R 13,168.08	
	Formwork to bases	m2	0.42	286	1.14	R 163.75	R 46,785.36	
	Formwork to plinths	m2	0.35	83	8.12	R 174.26	R 14,537.20	
	Formwork to columns	m2	0.12	52	7.63	R 187.27	R 9,743.66	
	Formwork to sumps	m2	0.11	381	7.10	R 181.64	R 69,286.00	
	Formwork to slabs	m2	4.07	52	7.32	R 161.95	R 8,377.28	
	Formwork to slabs n/e 300mm	m	2.17	97	8.21	R 56.44	R 5,475.27	
	Mild steel reinforcement	t	0.23	4.063	23.56	R 10,421.53	R 42,346.32	
	High tensile reinforcement	t	23.09	17.667	1.02	R 10,421.53	R 184,114.42	
	Mesh	m2	0.16	1,316	61.15	R 170.43	R 224,244.31	
	Cast in items	kg	0.19	2,147	214.69	R 48.54	R 104,218.86	
	HD Bolts	kg	0.10	4,079	207.02	R 50.34	R 205,352.23	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	1.998	0.17	R 7,821.41	R 15,628.45	
	Construction joint	m	0.30	702	24.89	R 53.42	R 37,488.18	
	Expansion joint	m	0.46	458	16.88	R 78.77	R 36,050.41	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	482	0.05	R 66.48	R 32,064.27	R 896,282.65
	Working space	m2	0.41	1,176	1.98	R 131.63	R 154,846.96	
	Backfill	m3	2.45	197	0.87	R 76.42	R 15,043.05	
	Blinding	m2	0.37	351	22.19	R 59.92	R 21,053.21	
	Concrete bases	m3	5.81	130	0.00	R 1,329.64	R 172,853.20	
	Concrete plinth	m3	0.00	22	0.00	R 1,329.64	R 29,750.98	
	Total concrete	m3	0.00	152	1.34		R -	
	Wood float	m2	0.35	371	173.00	R 7.69	R 2,854.72	
	Formwork bases	m2	0.47	277	9.63	R 138.07	R 38,190.32	
	Formwork plinths	m2	0.09	249	6.99	R 190.22	R 47,291.34	
	High tensile reinforcement	t	9.33	16.332	0.00	R 10,421.53	R 170,201.81	
	HD Bolts	kg	0.03	4,333	225.70	R 46.17	R 200,088.45	
	Grout	m3	79.73	1.631	0.18	R 7,386.89	R 12,044.34	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	523	0.06	R 79.78	R 41,754.42	R 1,059,785.66
	Working space	m2	0.50	1,047	1.90	R 41.99	R 43,952.02	
	Backfill	m3	2.66	197	0.80	R 99.72	R 19,621.44	
	Blinding	m2	0.33	370	21.39	R 62.16	R 22,981.01	
	Concrete bases	m3	0.00	122	0.00	R 1,329.64	R 162,216.08	
	Concrete plinth	m3	2.58	34	0.00	R 1,329.64	R 44,687.63	
	Concrete slab	m3	3.63	47	0.00	R 1,329.64	R 62,874.45	
	Total concrete	m3	0.00	203	0.00		R -	
	Wood float	m2	0.55	369	161.77	R 8.22	R 3,032.12	
	Formwork bases	m2	0.49	249	8.32	R 159.81	R 39,790.05	
	Formwork plinths	m2	0.11	306	8.34	R 159.43	R 48,711.17	
	High tensile reinforcement	t	13.32	15.232	0.00	R 10,421.53	R 158,744.97	
	HD Bolts	kg	0.02	6,100	217.74	R 47.86	R 291,959.83	
	Cast in items	kg	0.05	2,440	241.09	R 43.23	R 105,473.20	
	Grout	m3	68.22	1.788	0.17	R 7,821.41	R 13,987.28	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	412	0.05	R 66.48	R 27,379.95	R 1,105,934.25
	Working space	m2	0.56	735	1.66	R 40.05	R 29,453.47	
	Backfill	m3	2.15	192	0.79	R 84.15	R 16,120.07	
	Blinding	m2	0.65	305	20.36	R 65.31	R 19,893.36	
	Concrete bases	m3	0.00	198	0.00	R 1,329.64	R 263,268.72	
	Concrete column	m3	28.05	7	0.00	R 1,329.64	R 9,385.69	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	38	0.00	R 1,329.64	R 50,338.19	
	Total concrete	m3	0.00	243	0.00		R -	
	Wood float	m2	0.60	405	158.85	R 8.37	R 3,388.86	
	Formwork bases	m2	0.52	381	8.23	R 161.56	R 61,517.13	
	Formwork plinths	m2	0.33	115	7.44	R 178.72	R 20,502.68	
	Formwork to columns	m2	0.28	25	8.09	R 164.36	R 4,143.43	
	High tensile reinforcement	t	9.06	26.812	0.00	R 10,421.53	R 279,422.77	
	HD bolts	kg	0.04	6,073	209.18	R 49.82	R 302,558.83	
	Grout	m3	108.76	2.234	0.16	R 8,310.25	R 18,561.09	
	Restricted excavation	m3	2.80	686	0.06	R 79.78	R 54,727.98	R 2,730,107.24
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.30	2,287	2.12	R 37.63	R 86,050.29	
	Backfill	m3	2.06	333	0.82	R 97.29	R 32,398.76	
	Blinding	m2	0.67	366	19.99	R 66.52	R 24,322.74	
	Concrete bases	m3	0.00	245	0.00	R 1,329.64	R 325,761.80	
	Concrete column	m3	1.19	221	151.33	R 1,329.64	R 293,953.41	
	Concrete beam	m3	2.68	82	0.95	R 1,329.64	R 109,684.11	
	Total concrete	m3	2.97	549	0.95		R -	
	Wood float	m2	0.47	521	7.50	R 8.79	R 4,580.12	
	Formwork bases	m2	0.48	510	6.55	R 177.29	R 90,489.39	
	Formwork to columns	m2	0.15	1,474	7.98	R 166.62	R 245,575.11	
	Formwork to sides beams	m2	0.33	250	6.11	R 203.00	R 50,744.44	
	Formwork to soffits beams	m2	0.69	120	6.55	R 217.62	R 26,016.77	
	Formwork corbels	m2	10.88	20	5.37	R 247.61	R 5,031.24	
	High tensile reinforcement	t	9.10	60.282	0.00	R 10,421.53	R 628,233.91	
	Cast in steel	kg	0.03	18,286	262.64	R 39.68	R 725,572.21	
	HD bolts	kg	1.48	371	215.28	R 48.41	R 17,943.10	
	Grout	m3	505.30	1.086	0.16	R 8,310.25	R 9,021.86	
	Restricted excavation	m3	3.84	1,160	0.05	R 66.48	R 77,097.85	R 3,539,438.95
	Working space	m2	0.61	1,901	1.79	R 37.14	R 70,608.89	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	1,008	0.79	R 84.15	R 84,862.79	
	Blinding	m2	0.61	495	20.06	R 66.28	R 32,815.59	
	Concrete bases	m3	0.00	302	0.97	R 1,329.64	R 401,551.28	
	Concrete column	m3	2.44	124	1.07	R 1,329.64	R 164,570.20	
	Concrete beam	m3	0.84	147	1.02	R 1,329.64	R 195,916.90	
	Concrete surface slab	m3	1.68	180	0.97	R 1,329.64	R 239,018.62	
	Concrete wall	m3	2.50	50	1.05	R 1,329.64	R 65,828.08	
	Concrete elevated slab	m3	1.10	113	0.00	R 1,329.64	R 149,609.27	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	915	0.00		R -	
		Wood float	m2	0.64	1,430	169.32	R 7.85	R 11,225.92	
		Formwork bases	m2	0.41	737	7.65	R 173.81	R 128,025.28	
		Formwork to columns	m2	0.17	728	6.34	R 209.72	R 152,690.85	
		Formwork to sides beams	m2	0.30	491	5.15	R 258.18	R 126,807.06	
		Formwork to soffits beams	m2	0.84	175	7.57	R 175.65	R 30,810.36	
		Formwork to soffts of slabs	m2	0.31	580	3.23	R 231.24	R 134,091.79	
		Formwork to pockets	m2	26.55	5	5.75	R 411.65	R 1,919.04	
		Formwork wall	m2	0.13	381	8.09	R 164.36	R 62,592.07	
		High tensile reinforcement	t	8.87	103.146	0.00	R 10,421.53	R 1,074,939.16	
		Cast in steel	kg	0.22	4,159	255.59	R 40.77	R 169,566.86	
		HD bolts	kg	0.41	2,231	201.38	R 51.75	R 115,480.14	
		Steel handrailing	m	2.58	40	9.71	R 1,073.28	R 42,908.66	
		Grout	m3	1,039.37	0.880	0.18	R 7,386.89	R 6,502.31	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	1,260	0.04	R 53.19	R 67,022.50	R 9,140,034.39
		Working space	m2	7.92	159	1.42	R 37.45	R 5,959.46	
		Backfill	m3	4.13	305	0.63	R 33.51	R 10,223.77	
		Blinding	m2	1.05	1,476	17.95	R 74.07	R 109,348.30	
		Concrete bases	m3	0.00	1,550	0.00	R 1,329.64	R 2,060,942.00	
		Concrete column	m3	26.31	59	0.00	R 1,329.64	R 78,333.03	
		Concrete beam	m3	1.43	41	0.00	R 1,329.64	R 54,778.34	
		Concrete wall	m3	10.41	149	0.00	R 1,329.64	R 197,977.14	
		Concrete elevated slabs	m3	10.92	5	0.00	R 1,329.64	R 7,173.35	
		Total concrete	m3	0.00	1,804	0.00		R -	
		Wood float	m2	0.82	2,200	138.41	R 9.61	R 21,139.07	
		Formwork bases	m2	8.50	182	6.94	R 191.59	R 34,937.14	
		Formwork to columns	m2	0.14	421	5.63	R 211.05	R 88,812.96	
		Formwork to sides beams	m2	0.17	242	4.72	R 236.17	R 57,233.67	
		Formwork to soffits beams	m2	0.50	82	6.30	R 281.70	R 23,211.16	
		Formwork to soffts of slabs	m2	0.13	41	2.98	R 274.15	R 11,377.25	
		Formwork to pockets	m2	418.49	4	4.85	R 446.19	R 1,652.59	
		Formwork wall	m2	0.10	1,489	6.38	R 208.41	R 310,308.99	
		High tensile reinforcement	t	4.05	445.531	0.00	R 10,421.53	R 4,643,116.07	
		Cast in steel	kg	0.15	12,029	200.08	R 52.09	R 626,570.04	
		HD bolts	kg	0.22	8,202	167.91	R 62.07	R 509,055.72	
		Galvanised grating	m2	17.15	105	0.15	R 1,929.91	R 203,051.72	
		Grout	m3	771.45	2.009	5.40	R 8,864.27	R 17,810.12	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.58	126	0.05	R 66.48	R 8,403.32	R 1,277,554.45
	Working space	m2	0.42	301	1.76	R 37.77	R 11,368.13	
	Backfill	m3	2.04	62	0.80	R 83.10	R 5,149.10	
	Blinding	m2	4.82	17	20.78	R 63.99	R 1,062.02	
	Concrete bases	m3	0.00	80	0.00	R 1,329.64	R 106,371.20	
	Concrete column	m3	6.67	12	0.00	R 1,329.64	R 15,947.71	
	Concrete beam	m3	1.99	6	0.00	R 1,329.64	R 8,013.92	
	Concrete wall	m3	35.85	2	0.00	R 1,329.64	R 2,967.12	
	Concrete elevated slabs	m3	24.74	0	0.00	R 1,329.64	R 644.61	
	Total concrete	m3	0.00	101	0.00		R -	
	Wood float	m2	4.82	17	162.71	R 8.17	R 135.63	
	Formwork bases	m2	1.44	56	8.18	R 162.55	R 9,030.43	
	Formwork to columns	m2	0.14	86	6.98	R 194.11	R 16,629.52	
	Formwork to sides beams	m2	0.23	26	6.34	R 190.49	R 4,991.85	
	Formwork to soffits beams	m2	0.75	8	6.85	R 209.72	R 1,685.37	
	Formwork to soffts of slabs	m2	0.22	2	3.87	R 215.50	R 474.89	
	Formwork to pockets	m2	3.09	26	6.17	R 343.58	R 8,895.18	
	Formwork wall	m2	0.29	8	7.54	R 176.34	R 1,356.96	
	High tensile reinforcement	t	7.31	13.781	0.00	R 10,421.53	R 143,616.76	
	Cast in steel	kg	0.02	5,037	212.67	R 49.00	R 246,823.36	
	HD bolts	kg	0.01	10,074	208.59	R 49.96	R 503,302.41	
	Galvanised grating	m2	3.97	25	0.19	R 6,998.11	R 177,574.65	
	Grout	m3	42.08	1.901	6.37	R 1,636.03	R 3,110.33	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	828	0.05	R 66.48	R 55,053.74	R 5,187,308.73
	Working space	m2	2.50	331	1.84	R 36.13	R 11,968.21	
	Backfill	m3	1.25	662	0.79	R 84.15	R 55,750.63	
	Blinding	m2	3.86	118	20.30	R 65.50	R 7,720.80	
	Concrete	m3	0.00	455	0.00	R 1,329.64	R 604,986.20	
	Mesh reinforcement	m2	0.51	892	65.77	R 158.45	R 141,365.96	
	Rough formwork	m2	3.09	147	8.61	R 154.43	R 22,739.65	
	Smooth formwork	m2	0.57	798	6.80	R 195.54	R 156,085.19	
	Finish to concrete	m2	0.23	1,978	105.40	R 12.62	R 24,956.12	
	Construction joints	m	4.97	92	21.29	R 62.45	R 5,717.60	
	Movement joints	m	15.36	30	17.11	R 77.71	R 2,301.99	
	Cast in steel	kg	2.35	194	232.74	R 44.78	R 8,669.70	
	Grout	m3	882.88	0.515	0.18	R 7,386.89	R 3,806.90	
	Brick walls	m2	0.50	910	0.00	R 323.43	R 294,321.30	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	2,034	0.00		R -	
	Waterproofing membrane	m2	2.22	916	12.03	R 110.53	R 101,259.18	
	Roof construction	m2	2.04	997	38.22	R 272.67	R 271,850.13	
	Ceiling	m2	0.98	2,075	0.00	R 255.15	R 529,527.38	
	Doors and windows	No	474.69	4	0.17	R 1,902.53	R 8,151.55	
	Floor finish	m2	1.03	1,975	0.79	R 409.41	R 808,416.01	
	Wall finsih	m2	1.04	1,956	1.47	R 220.02	R 430,277.41	
	Rod reinforcement	t	9.25	49	0.00	R 10,421.53	R 512,626.61	
	Metalwork	Item	0.00	1	4.44	R 46,271.59	R 46,271.59	
	Structural steel	Item	0.00	1	11.50	R 119,847.60	R 119,847.60	
	Plumbing and drainage	Item	0.00	1	7.32	R 76,285.60	R 76,285.60	
	Small power and lighting	Item	0.00	1	62.40	R 650,303.47	R 650,303.47	
	External works	Item	0.00	1	178.28	R 237,048.22	R 237,048.22	
BUILDINGS - STEEL	Concrete	m3	0.00	90	0.17	R 1,329.64	R 119,667.60	R 3,008,218.86
	Earthworks	m3	2.37	213	9.13	R 145.63	R 31,063.77	
	Reinforcement	t	8.82	10	0.00	R 10,421.53	R 106,342.14	
	Mesh	m2	0.12	750	10.27	R 129.47	R 97,101.27	
	Formwork	m2	0.40	225	8.06	R 164.97	R 37,117.74	
	Brickwork	m2	6.11	156	6.08	R 218.69	R 34,181.62	
	Roof covering	m2	0.87	1,098	208.48	R 189.61	R 208,135.31	
	Structural steel	t	18.83	51	0.00	R 39,529.93	R 2,004,837.13	
	Side cladding	m2	1.54	620	0.98	R 185.82	R 115,231.28	
	Doors	No	405.94	2	0.51	R 20,160.26	R 47,428.32	
	Ridge ventilator	m	21.95	44	11.48	R 2,176.72	R 94,704.89	
	Aluminium insulation	m2	0.89	1,073	1.81	R 104.76	R 112,407.80	
	Total building area	m2	0.00	955	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	222	0.13	R 172.85	R 38,290.44	R 2,653,904.76
	Concrete	m3	0.00	71	0.00	R 1,329.64	R 94,404.44	
	Reinforcement	t	11.42	6	0.18	R 10,421.53	R 64,792.35	
	Mesh	m2	0.12	592	10.21	R 130.23	R 77,052.27	
	Formwork	m2	0.45	158	8.51	R 156.24	R 24,651.90	
	Brickwork	m2	5.94	115	5.91	R 224.98	R 25,944.82	
	Screed	m2	1.12	612	43.13	R 30.83	R 18,855.03	
	Structural steel	t	14.72	47	0.00	R 39,529.93	R 1,839,538.18	
	Cat ladders	m	2.74	17	9.66	R 4,092.13	R 69,499.41	
	Hand rail	m	0.73	64	27.40	R 1,442.70	R 91,967.71	
	Kick plates	m	0.76	61	2.76	R 522.72	R 32,006.31	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	753	195.47	R 202.23	R 152,228.20	
		Side cladding	m2	4.76	144	0.93	R 188.07	R 27,065.28	
		Floor grating	m2	1.09	43	17.29	R 2,286.29	R 97,608.43	
		Total buiding area	m2	0.00	685	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	231	8.02	R 165.79	R 38,297.61	R 664,210.30
		Blinding	m2	0.47	149	18.72	R 71.03	R 10,578.61	
		Concrete	m3	0.00	70	0.00	R 1,329.64	R 93,074.80	
		Reinforcement	t	7.97	9	0.00	R 10,421.53	R 91,531.63	
		Mesh	m2	0.49	143	50.23	R 207.48	R 29,639.46	
		Formwork	m2	0.31	226	7.58	R 175.41	R 39,609.67	
		Finish to concrete	m2	0.44	159	103.65	R 12.83	R 2,040.85	
		Movement joints	m	2.46	28	15.35	R 86.62	R 2,464.84	
		Cast in steel	kg	0.09	778	179.47	R 58.07	R 45,164.29	
		Grout	m3	71.08	0.985	2.53	R 8,864.27	R 8,729.58	
		Brickwork	m2	0.24	58	0.15	R 323.43	R 18,866.75	
		Doors and windows	No	2.74	5	0.26	R 4,042.88	R 20,657.03	
		Pipework	m	2.59	57	0.21	R 525.55	R 30,031.39	
		Bolts	kg	0.11	636	0.08	R 58.07	R 36,952.60	
		Structural steel	t	3.99	4	0.00	R 40,082.81	R 140,641.43	
		Miscellaneous steel	t	131.32	1	0.00	R 49,626.33	R 55,929.77	
		Total bridge area	m2	0.00	148	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	94	6.07	R 219.05	R 20,698.14	R 212,293.70
		Blinding	m2	0.71	15	14.50	R 91.70	R 1,420.69	
		Concrete	m3	0.00	11	0.00	R 1,329.64	R 14,626.04	
		Reinforcement	t	5.75	2	0.00	R 10,421.53	R 19,936.84	
		Formwork	m2	0.07	157	5.72	R 232.45	R 36,528.57	
		Finish to concrete	m2	0.31	35	77.96	R 17.06	R 605.19	
		Movement joints	m	0.42	26	12.46	R 106.71	R 2,794.86	
		Cast in steel	kg	23.71	0.464	163.17	R 63.87	R 29.63	
		Grout	m3	22.24	0.495	0.62	R 10,228.00	R 5,058.81	
		Bolts	kg	109.85	0.100	0.13	R 39.60	R 3.97	
		Structural steel	t	35.84	0.614	0.22	R 47,370.59	R 29,077.93	
		Miscellaneous steel	t	20.04	1.098	0.18	R 57,897.39	R 63,560.01	
		Brickwork	m2	0.49	45	4.24	R 313.59	R 14,079.75	
		Roof covering	m2	1.46	15	1.22	R 257.04	R 3,873.27	
		Total pump house area	m2	0.00	22	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	6.10	R 217.97	R -	R -
	Blinding	m2	1.17	0	16.23	R 81.92	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	5.89	0.000	0.00	R 10,421.53	R -	
	Formwork	m2	0.21	0	6.04	R 220.14	R -	
	Movement joint	m	1.61	0	0.12	R 103.23	R -	
	Cast in steel	kg	0.13	0	12.88	R 53.13	R -	
	Bolts	kg	0.37	0	196.16	R 64.16	R -	
	Chemical anchors	No	6.13	0	0.22	R 289.65	R -	
	Miscellaneous steelwork	t	88.98	0.000	162.42	R 47,370.59	R -	
	Pre-cast concrete	m3	30.27	0	35.98	R 4,432.13	R -	
	Brickwork	m2	7.79	0	0.30	R 304.27	R -	
	Total area	m2	0.00	0	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	7,064	1.68	R 89.35	R 631,148.68	R 1,986,707.73
	Lining	m2	0.70	5,550	1.16	R 53.19	R 295,180.08	
	Paving	m2	0.65	5,977	0.53	R 100.35	R 599,785.36	
	Pipework	m	28.23	138	0.24	R 372.30	R 51,235.65	
	Manholes	No	16.47	8	0.10	R 3,722.99	R 31,108.47	
	Concrete	m3	2.43	57	0.04	R 1,329.64	R 75,302.25	
	Formwork	m2	0.08	708	5.85	R 227.29	R 160,902.24	
	Mesh	m2	0.70	81	6.64	R 200.25	R 16,201.00	
	Reinforcement	t	4.69	12.075	0.12	R 10,421.53	R 125,844.00	
	Dam area (to top of berm)	m2	0.00	3,885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	0	5.56	R 239.14	R -	R -
	Blinding	m2	0.85	0	13.49	R 98.56	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	4.52	0.000	0.00	R 10,421.53	R -	
	Mesh	m2	0.90	0	38.60	R 269.99	R -	
	Formwork	m2	0.15	0	5.36	R 248.07	R -	
	Cast in steel	kg	0.02	0	140.16	R 74.35	R -	
	Miscellaneous steelwork	t	11.14	0.000	0.16	R 65,134.56	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	65	0.00		R -	R 432,674.56
	Steel	t	9.58	6.785	0.00	R 39,529.93	R 268,209.34	
	Handrail	m	1.45	45	28.73	R 1,375.91	R 61,678.78	
	Grating	m2	1.91	34	16.97	R 2,329.40	R 79,272.80	
	Kick flats	m	1.71	38	76.94	R 513.78	R 19,529.50	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stair treads	No	6.72	10	95.97	R 411.90	R 3,984.14	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,455	0.00		R -	R 2,568,886.52
		Steel	t	27.86	52.225	0.00	R 39,529.93	R 2,064,466.91	
		Handrail	m	13.37	109	30.43	R 1,299.04	R 141,369.49	
		Grating	m2	12.47	117	18.55	R 2,130.99	R 248,644.39	
		Kick flats	m	13.35	109	84.90	R 465.61	R 50,745.80	
		Cat ladder	m	98.85	15	9.14	R 4,324.94	R 63,659.93	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	11,452	0.00		R -	R 14,120,805.84
		Steel	t	76.43	149.836	0.00	R 39,529.93	R 5,923,024.45	
		Handrail	m	31.26	366	30.84	R 1,281.77	R 469,574.00	
		Grating	m2	3.84	2,982	16.10	R 2,455.28	R 7,322,346.63	
		Kick flats	m	34.08	336	83.17	R 475.29	R 159,713.31	
		Stair treads	No	230.28	50	101.90	R 387.93	R 19,291.99	
		Cat ladder	m	238.13	48	8.38	R 4,717.18	R 226,855.47	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	25.51	0.000	0.00	R 39,529.93	R -	
		Handrail	m	45.84	0	30.11	R 1,312.85	R -	
		Grating	m2	60.74	0	17.06	R 2,317.11	R -	
		Kick flats	m	46.49	0	79.97	R 494.31	R -	
		Cat ladder	m	20.35	0	8.64	R 4,575.22	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	66	0.00		R -	R 342,947.72
		Steel	t	16.54	3.990	0.00	R 39,529.93	R 157,737.33	
		Handrail	m	1.10	60	31.41	R 1,258.51	R 75,510.85	
		Grating	m2	1.98	33	16.95	R 2,332.15	R 77,738.31	
		Kick flats	m	1.16	57	80.43	R 491.48	R 27,963.65	
		Stair treads	No	6.10	11	106.99	R 369.47	R 3,997.58	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	398	0.00		R -	R 1,469,829.42
		Steel	t	12.73	31.265	0.00	R 39,529.93	R 1,235,892.55	
		Handrail	m	25.10	16	32.05	R 1,233.38	R 19,557.23	
		Grating	m2	7.46	53	17.66	R 2,238.39	R 119,420.69	
		Kick flats	m	22.84	17	84.46	R 468.03	R 8,155.71	
		Cat ladder	m	20.48	19	8.85	R 4,466.66	R 86,803.23	
	PIPING INSTALLATION	Pipe length	m	0.00	48,552	0.00		R -	R 46,103,802.18
		Total work units	WU	0.33	147,127	0.00	R 313.36	R 46,103,802.18	
		Pipe supports	kg	2.61	18,602	0.00		R -	
		WU for pipe supports	WU	0.16	23,540	0.00		R -	
		Number of welds	No	0.61	29,617	0.00		R -	
		Total fittings	No	0.38	18,450	0.00		R -	
		Stud bolts	No	0.34	6,273	0.00		R -	
		Support number	No	0.19	3,534	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	147,127	0.00	R 313.36		R 129,621.07

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	2,453	5.93	R 52.84	R 129,621.07	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	147,127	0.00	R 313.36		R 46,577.06
	Number of examinations	No	168.34	874	5.88	R 53.29	R 46,577.06	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	147,127	0.00	R 313.36		R 72,273.43
	Number of examinations	No	300.90	489	2.12	R 147.81	R 72,273.43	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	147,127	0.00	R 313.36		R 125,642.78
	Number of examinations	No	52.95	2,779	6.93	R 45.22	R 125,642.78	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	147,127	0.00	R 313.36		R 96,746.06
	Number of examinations	No	114.83	1,281	4.15	R 75.51	R 96,746.06	
MECHANICAL INSTALLATION	Total work units	WU	0.00	147,127	0.00	R 313.36		R 235,010.65
	Mechanical equipment	t	261.57	562	0.75	R 417.81	R 235,010.65	
	Structural steel	t	218.09	675	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	147,127	0.00	R 313.36		R 2,777,808.42
	Painting to piping	m2	17.88	8,229	0.34	R 120.52	R 991,735.55	
	Insulation to piping	m2	51.67	2,847	2.60	R 354.48	R 1,009,359.83	
	Mechanical equipment received	t	0.00	562	0.82	R 417.81	R 235,010.65	
	Painting to mechanical equipment	m2	0.25	2,250	3.69	R 113.23	R 254,754.09	
	Insulation to mechanical equipment	m2	0.70	804	1.17	R 357.11	R 286,948.29	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	34,522	0.00	R 56.06	R 1,935,303.32	R 5,130,268.08
	Electrical cable terminations	No	311.25	1,372	0.43	R 130.37	R 178,812.29	
	Electrical equipment	No	9.05	111	0.11	R 509.64	R 56,525.84	
	DB's	No	6.39	12	0.32	R 1,592.61	R 19,518.59	
	Rack	m	0.69	5,403	1.65	R 160.17	R 865,326.77	
	Support steel	kg	1.42	7,830	2.13	R 26.32	R 206,072.24	
	Instrumentation cable	m	27.43	27,855	0.35	R 28.50	R 793,867.50	
	Instruments	No	0.58	1,015	0.18	R 158.33	R 160,786.55	
	Hook-ups	No	3.98	1,751	0.16	R 178.13	R 311,870.46	
	Light fittings	No	10.26	441	0.02	R 311.44	R 137,483.40	
	Conduit	m	4.13	3,365	0.13	R 33.98	R 114,318.82	
	Instrument stands	No	0.00	246		R 1,425.00	R 350,382.31	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project B				
Location:	South Africa				
Client:				Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,422	R	3.96
2	Concrete demolitions	m3	19	R	1,401.52
3	Bulk excavation	m3	6,845	R	32.34
4	Vertical piles	No	195		
5	Raking piles	No	4		
6	Concrete in piles	m3		R	1,329.64
7	Auger pile	m		R	287.49
8	Total paving and asphalt to road works	m2	5,212		
9	Grey paving to road works	m2	385	R	125.78
10	Asphalt to road surface	m2	4,827		
11	Rip bed of road works	m2	5,212	R	10.78
12	Total concrete in paving and bunding	m3	448	R	1,329.64
13	Concrete in paving	m3	238		
14	Rod reinforcement	t		R	10,421.53
15	Concrete in plinths and bases on area finishing	m3	212		
16	Stormwater pipe to drain surface run-off	m	80		
17	Machine excavation	m3		R	61.09
18	Concrete in pump and pipe support bases	m3	199	R	1,329.64
19	Concrete in tank bases	m3	120	R	1,329.64
20	Concrete in pipe and cable rack foundations	m3	130	R	1,329.64
21	Concrete to simple structural foundations	m3	122	R	1,329.64
22	Complex structural foundations - bases	m3	198	R	1,329.64
23	Concrete pipe racks - bases	m3	245	R	1,329.64
24	Concrete structure including concrete columns and beams - bases	m3	302	R	1,329.64
25	Major equipment bases with blast proof walls - bases	m3	1,550	R	1,329.64
26	Major equipment bases and elevated concrete structure - bases	m3	80	R	1,329.64
27	Concrete frame buildings with brick in-fill - all concrete	m3	455	R	1,329.64
28	One brick wall	m2		R	323.43
29	Concrete in structual steel buildings - all concrete	m3	90	R	1,329.64
30	Total building area - Structural steel buildings	m2	955		
31	Ceiling	m2		R	255.15
32	Structural steel	t		R	39,529.93
33	Steel canopy - concrete	m3	71	R	1,329.64
34	Steel canopy - area	m2	685		
35	Concrete in weighbridge - all concrete	m3	70	R	1,329.64
36	Total weighbridge area	m2	148		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	11	R	1,329.64
39	Total pump house area	m2	22		
40	Concrete in cooling tower	m3	0	R	1,329.64
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	3,885		
43	Concrete in cable tunnel	m3	0	R	1,329.64
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	65		
46	Total volume of steel pipe rack	m3	1,455		
47	Total volume of steel complex steel structure	m3	11,452		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	66		
50	Total volume of steel in cable gantry	m3	398		
51	Piping work unit cost	WU		R	313.36
52	Total process pipe length	m	48,552		
53	Total electrical cable - installation only	m	34,522	R	56.06
54	Total instrumentation cable - installation only	m	27,855	R	37.37

Ratio: Project Ratio Median

Variables

Material	Simple	Median
Labour	Simple	Median
Engineering design	Normal	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Few	Median
Weather	Normal	Median
Access	Poor	Median
Project size	Medium	Median
Project conditions	Normal	Median
Complexity	Simple	Median
Repitition	None	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project B			
Location:	South Africa			
Client:	0	Date of estimate:	2007	

	CIVIL CONSTRUCTION COST				R 64,451,642.97
A	SITE CLEARANCE AND DEMOLITIONS		R	95,620.00	
B	BULK EARTHWORKS		R	480,742.79	
C	PILING		R	5,782,981.29	
D	ROAD WORKS		R	1,844,541.78	
E	GENERAL PAVING AND BUNDED AREAS		R	1,285,364.55	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	958,750.50	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,173,590.60	
H	TANK BASES AND BUNDING		R	1,824,671.23	
I	RACK FOUNDATIONS		R	912,238.97	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,145,578.50	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,157,069.99	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,827,330.20	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,151,478.60	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	8,684,682.50	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,432,362.50	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	5,471,783.40	
Q	BUILDINGS - STEEL		R	3,180,458.73	
R	CANOPIES - STEEL		R	2,685,392.41	
S	WEIGHBRIDGE		R	606,698.97	
T	PUMP HOUSE		R	181,203.08	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	1,859,417.16	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	16,709,685.21	
	STRUCTURAL STEEL				R 29,681,756.50
A	STRUCTURAL STEEL - BASIC PLATFORM		R	478,892.41	
B	STRUCTURAL STEEL - PIPERACK		R	3,016,872.57	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	15,712,216.34	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	407,670.84	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,585,602.49	
	Preliminaries and General	40.00%	R	8,480,501.86	
	MECHANICAL AND PIPING				R 72,436,137.84
A	PIPING INSTALLATION		R	50,714,182.40	
B	RADIOGRAPHIC EXAMINATION (RT)		R	165,240.14	
C	DYE PENETRATION TESTING (DP)		R	101,951.35	
D	MAGNETIC PARTICLE TESTING (MPI)		R	97,983.94	
E	POST WELD HEAT TREATMENT		R	167,824.95	
F	MATERIAL HARDNESS TEST (HT)		R	198,943.59	
H	MECHANICAL INSTALLATION		R	293,972.08	
	Preliminaries and General	40.00%	R	20,696,039.38	
	PAINTING AND INSULATION				R 5,042,116.98
A	PAINTING AND INSULATION		R	3,734,901.47	
	Preliminaries and General	35.00%	R	1,307,215.51	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 7,771,380.50
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	5,756,578.15	
	Preliminaries and General	35.00%	R	2,014,802.35	

TOTAL COST	R	179,383,034.79

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,422		R 3.96	R 68,991.12	R 95,620.00
	Concrete demolitions	m3		19		R 1,401.52	R 26,628.88	
BULK EARTHWORKS	Bulk excavation	m3		6,845		R 32.34	R 221,367.30	R 480,742.79
	Trimming of sides	m2	2.20	3,111	4.18	R 7.74	R 24,072.13	
	Back fill and compact	m3	1.12	6,112	0.95	R 34.04	R 208,051.97	
	Overhaul	m3/km	1.62	4,225	11.35	R 2.85	R 12,039.34	
	Rip bed	m2	1.71	4,003	8.51	R 3.80	R 15,212.05	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 255,809.44	R 255,809.44	R 5,782,981.29
	EO for raking equipment	Item	0.00	1	24.25	R 32,243.77	R 32,243.77	
	Number of piles	No	0.00	195	0.00		R -	
	Move rig to new position	No	1.48	132	0.19	R 252.63	R 33,285.92	
	Number of raking piles	No	19.43	10	0.00		R -	
	EO for setting up raking piles	No	0.93	11	0.24	R 319.11	R 3,443.69	
	EO for raking drilling	m	0.14	72	0.61	R 175.37	R 12,571.48	
	Auger quantity	m	0.05	3,900	0.00	R 287.49	R 1,121,211.00	
	EO for drilling in coarse gravel	m	0.55	355	0.22	R 292.52	R 103,711.92	
	EO for drilling in boulders	m	1.65	118	0.51	R 678.12	R 80,141.03	
	EO for drilling in soft rock	m	1.57	124	0.23	R 305.82	R 37,983.66	
	Temporary casings	m	0.38	513	0.31	R 412.19	R 211,517.73	
	EO casing to raking pile	m	0.17	59	0.57	R 930.75	R 54,947.13	
	Mild steel rod reinforcement	t	14.65	13.311	0.70	R 6,757.23	R 89,942.66	
	High tensile rod reinforcement	t	1.16	168.103	7.26	R 9,653.19	R 1,622,733.92	
	Concrete to piles and bases	m3	0.16	1,219	0.00	R 1,329.64	R 1,620,498.75	
	Concrete to raking piles	m3	0.08	125	1.08	R 1,436.01	R 180,148.09	
	Site establishment of test equipment	Item	0.00	1	115.74	R 153,892.53	R 153,892.53	
	Load test to pile	No	93.50	2	22.16	R 29,464.82	R 61,450.70	
	Site establishment of intergity testing	No	255.00	1	49.96	R 66,428.81	R 50,798.51	
	Integrity testing of piles	No	1.19	164	0.26	R 345.71	R 56,649.37	
ROAD WORKS	Red paving	m2	0.14	54	0.93	R 116.98	R 6,304.97	R 1,844,541.78
	Grey paving	m2	0.00	385	0.00	R 125.78	R 48,425.30	
	Kerbing	m	0.09	469	0.00	R 238.18	R 111,726.70	
	Total paving and asphalt	m2	0.00	5,212	0.00		R -	
	Remove top soil	m3	0.49	511	4.45	R 47.97	R 24,502.44	
	Asphalt	m2	0.20	1,042	0.00	R 148.13	R 154,412.03	
	Rip bed	m2	0.00	5,212	0.00	R 10.78	R 56,185.36	
	Reduce levels	m3	0.36	1,876	4.30	R 46.35	R 86,974.94	
	Selected fill	m3	1.50	1,251	0.46	R 100.77	R 126,050.63	
	Imported fill	m3	1.94	645	0.33	R 305.36	R 196,892.59	
	Wearing course	m3	3.89	482	0.20	R 231.77	R 111,792.98	
	Prime	m2	4.34	5,429	1.47	R 30.54	R 165,775.68	
	Three line road marking	m	0.78	4,234	0.10	R 23.82	R 100,857.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.99	464	4.06	R 7.15	R 3,318.28	
	1m Wide concrete V-drain	m	1.00	469	0.78	R 1,019.42	R 478,190.27	
	200mm Diameter PVC pipe	m	0.93	436	0.09	R 316.78	R 138,194.75	
	Road marking - STOP	No	0.15	70	0.03	R 390.62	R 27,484.77	
	Standard signage	No	0.01	5	4.28	R 438.26	R 2,055.77	
	100mm Painted line	m	1.61	755	1.33	R 7.15	R 5,396.40	
			0.00		1.64			
			0.00		1.84			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	238	0.75	R 1,329.64	R 316,454.32	R 1,285,364.55
		Concrete in plinths	m3	0.00	49	0.00	R 1,329.64	R 64,847.20	
		Total concrete	m3	0.00	448	0.00		R -	
		Rip and compact	m2	0.13	1,831	193.57	R 6.87	R 12,575.63	
		Formwork to plinth	m2	6.92	337	0.12	R 159.56	R 53,849.11	
		Formwork to slab	m2	0.80	190	0.15	R 199.45	R 37,974.52	
		High tensile steel	t	0.01	4.480	0.00	R 10,421.53	R 46,688.45	
		Mesh	m2	607.27	2,721	43.37	R 240.29	R 653,735.25	
		Construction joint	m	3.64	866	0.04	R 53.19	R 46,075.75	
		Expansion joint	m	2.10	500	0.08	R 106.37	R 53,164.33	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	7,043	0.00		R -	R 958,750.50
		Base excavation	m3	1.42	493	0.00	R 61.09	R 30,118.79	
		Backfill	m3	0.56	347	0.63	R 96.97	R 33,667.33	
		Working space	m2	0.43	880	1.35	R 71.83	R 63,237.57	
		Concrete in bases	m3	0.04	212	23.71	R 1,329.64	R 281,883.68	
		Blinding	m2	0.71	337	19.17	R 69.36	R 23,402.81	
		Concrete in sump walls	m3	0.11	23	31.87	R 1,329.64	R 31,007.20	
		Concrete in slabs	m3	0.02	4	0.81	R 1,329.64	R 5,637.67	
		Total concrete	m3	0.00	240	0.03		R -	
		Wood float	m2	0.61	393	123.90	R 10.73	R 4,214.51	
		Formwork to bases	m2	1.73	367	0.12	R 159.56	R 58,519.05	
		Formwork to sump walls	m2	11.18	261	0.12	R 159.56	R 41,599.27	
		Formwork to sides of slab	m2	5.67	24	0.17	R 226.04	R 5,434.15	
		Mild steel reinforcement	t	0.08	2.045	0.00	R 10,421.53	R 21,315.53	
		High tensile reinforcement	t	9.37	25.567	0.92	R 10,421.53	R 266,444.15	
		Cast in steel	kg	0.45	471	33.55	R 39.63	R 18,670.88	
		Waterstop	m	0.44	53	8.37	R 158.86	R 8,419.46	
		Manhole	No	0.08	6	2.72	R 4,073.65	R 26,071.37	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	80	0.12	R 488.84	R 39,107.06	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	320	0.05	R 61.09	R 19,572.63	R 1,173,590.60
	Working space	m2	0.33	971	0.68	R 41.54	R 40,331.47	
	Backfill	m3	3.97	81	1.27	R 77.58	R 6,261.27	
	Concrete bases	m3	0.93	199	0.00	R 1,329.64	R 264,598.36	
	Concrete plinth	m3	2.01	99	0.00	R 1,329.64	R 131,640.98	
	Total concrete	m3	0.00	298	0.00		R -	
	Wood float	m2	0.46	215	0.05	R 13.30	R 2,861.76	
	Blinding	m2	0.93	214	0.01	R 66.48	R 14,225.72	
	Formwork bases	m2	0.47	423	0.12	R 159.56	R 67,557.03	
	Formwork plinth	m2	0.53	187	0.12	R 159.56	R 29,805.50	
	High tensile reinforcement	t	10.15	29.360	6.60	R 10,421.53	R 305,977.12	
	Cast in steel	kg	0.10	2,980	0.03	R 39.89	R 118,871.80	
	HD Bolts	kg	0.08	3,725	0.03	R 39.89	R 148,589.75	
	Grout	m3	33.79	2.930	5.98	R 7,951.25	R 23,297.22	
TANK BASES AND BUNDING	Restricted excavation	m3	5.54	665	0.05	R 66.48	R 44,197.23	R 1,824,671.23
	Working space	m2	3.95	168	1.56	R 42.62	R 7,172.55	
	Backfill	m3	1.34	496	0.75	R 88.64	R 43,977.35	
	Concrete bases	m3	0.70	120	0.00	R 1,329.64	R 159,556.80	
	Concrete sump wall	m3	2.55	47	0.00	R 1,329.64	R 62,571.29	
	Concrete slab	m3	0.56	214	0.00	R 1,329.64	R 284,922.86	
	Concrete plinth	m3	3.73	32	19.74	R 1,329.64	R 42,776.62	
	Concrete column	m3	19.00	6	160.09	R 1,329.64	R 8,397.73	
	Total concrete	m3	0.00	420	0.99		R -	
	Blinding	m2	2.44	172	1.05	R 67.36	R 11,589.71	
	Wood float	m2	0.25	1,679	1.05	R 8.31	R 13,947.79	
	Formwork to bases	m2	0.39	308	1.05	R 175.88	R 54,116.40	
	Formwork to plinths	m2	0.34	95	7.56	R 184.16	R 17,425.71	
	Formwork to columns	m2	0.11	57	7.22	R 194.11	R 11,144.96	
	Formwork to sumps	m2	0.10	471	6.85	R 181.64	R 85,479.91	
	Formwork to slabs	m2	3.83	56	7.32	R 165.17	R 9,241.29	
	Formwork to slabs n/e 300mm	m	2.05	105	8.05	R 60.44	R 6,317.58	
	Mild steel reinforcement	t	0.22	4.176	22.00	R 10,421.53	R 43,515.55	
	High tensile reinforcement	t	22.12	18.980	0.90	R 10,421.53	R 197,797.96	
	Mesh	m2	0.15	1,429	54.97	R 189.59	R 270,836.82	
	Cast in items	kg	0.19	2,210	218.75	R 47.64	R 105,270.16	
	HD Bolts	kg	0.09	4,665	198.48	R 52.51	R 244,933.21	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	200.00	2.099	0.16	R 8,310.25	R 17,444.54	
		Construction joint	m	0.29	739	24.07	R 55.24	R 40,818.14	
		Expansion joint	m	0.44	487	15.71	R 84.64	R 41,219.09	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	426	0.05	R 66.48	R 28,347.92	R 912,238.97
		Working space	m2	0.30	1,421	1.58	R 105.04	R 149,299.07	
		Backfill	m3	2.36	181	0.78	R 85.23	R 15,399.79	
		Blinding	m2	0.40	325	24.38	R 54.54	R 17,724.90	
		Concrete bases	m3	5.73	130	0.00	R 1,329.64	R 172,853.20	
		Concrete plinth	m3	0.00	23	0.00	R 1,329.64	R 30,166.35	
		Total concrete	m3	0.00	153	1.35		R -	
		Wood float	m2	0.35	371	182.61	R 7.28	R 2,704.49	
		Formwork bases	m2	0.49	265	11.01	R 120.77	R 32,040.11	
		Formwork plinths	m2	0.09	252	6.94	R 191.59	R 48,297.07	
		High tensile reinforcement	t	9.11	16.760	0.00	R 10,421.53	R 174,669.43	
		HD Bolts	kg	0.03	4,333	198.55	R 52.49	R 227,448.82	
		Grout	m3	76.52	1.699	0.17	R 7,821.41	R 13,287.81	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	475	0.05	R 66.48	R 31,551.03	R 1,145,578.50
		Working space	m2	0.45	1,055	1.88	R 35.36	R 37,294.36	
		Backfill	m3	2.48	191	0.78	R 85.23	R 16,310.50	
		Blinding	m2	0.35	349	21.52	R 61.79	R 21,536.92	
		Concrete bases	m3	0.00	122	0.00	R 1,329.64	R 162,216.08	
		Concrete plinth	m3	2.36	41	0.00	R 1,329.64	R 54,802.73	
		Concrete slab	m3	2.96	52	0.00	R 1,329.64	R 68,735.63	
		Total concrete	m3	0.00	215	0.00		R -	
		Wood float	m2	0.51	421	155.50	R 8.55	R 3,603.23	
		Formwork bases	m2	0.45	271	8.00	R 166.21	R 45,060.02	
		Formwork plinths	m2	0.10	412	7.78	R 170.90	R 70,440.53	
		High tensile reinforcement	t	12.87	16.699	0.00	R 10,421.53	R 174,025.08	
		HD Bolts	kg	0.02	6,100	190.91	R 54.59	R 332,991.11	
		Cast in items	kg	0.05	2,440	225.21	R 46.27	R 112,910.32	
		Grout	m3	67.67	1.803	0.17	R 7,821.41	R 14,100.96	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	402	0.05	R 66.48	R 26,721.78	R 1,157,069.99
		Working space	m2	0.50	804	1.64	R 40.54	R 32,587.53	
		Backfill	m3	2.15	187	0.76	R 87.48	R 16,353.60	
		Blinding	m2	0.66	300	20.25	R 65.66	R 19,698.37	
		Concrete bases	m3	0.00	198	0.00	R 1,329.64	R 263,268.72	
		Concrete column	m3	27.56	7	0.00	R 1,329.64	R 9,552.57	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	42	0.00	R 1,329.64	R 56,374.46	
	Total concrete	m3	0.00	248	0.00		R -	
	Wood float	m2	0.59	420	157.14	R 8.46	R 3,550.71	
	Formwork bases	m2	0.49	404	7.78	R 170.90	R 69,059.52	
	Formwork plinths	m2	0.31	137	7.42	R 179.20	R 24,508.50	
	Formwork to columns	m2	0.29	25	7.75	R 171.57	R 4,250.31	
	High tensile reinforcement	t	8.97	27.601	0.00	R 10,421.53	R 287,646.56	
	HD bolts	kg	0.04	6,190	200.18	R 52.06	R 322,233.69	
	Grout	m3	96.76	2.559	0.16	R 8,310.25	R 21,263.68	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	642	0.05	R 66.48	R 42,674.80	R 2,827,330.20
	Working space	m2	0.25	2,568	2.02	R 32.91	R 84,504.55	
	Backfill	m3	1.91	336	0.79	R 84.15	R 28,282.06	
	Blinding	m2	0.68	360	20.00	R 66.48	R 23,953.07	
	Concrete bases	m3	0.00	245	0.00	R 1,329.64	R 325,761.80	
	Concrete column	m3	1.08	222	145.46	R 1,329.64	R 295,074.09	
	Concrete beam	m3	2.50	89	0.88	R 1,329.64	R 118,029.64	
	Total concrete	m3	2.76	556	0.88		R -	
	Wood float	m2	0.44	557	7.44	R 9.14	R 5,089.84	
	Formwork bases	m2	0.45	544	6.41	R 178.72	R 97,300.42	
	Formwork to columns	m2	0.14	1,585	7.35	R 180.90	R 286,758.11	
	Formwork to sides beams	m2	0.32	277	5.90	R 207.43	R 57,541.75	
	Formwork to soffits beams	m2	0.68	131	6.41	R 225.36	R 29,419.15	
	Formwork corbels	m2	10.42	21	4.87	R 273.03	R 5,814.79	
	High tensile reinforcement	t	8.81	63.075	0.00	R 10,421.53	R 657,335.23	
	Cast in steel	kg	0.03	18,523	260.94	R 39.94	R 739,777.14	
	HD bolts	kg	1.43	389	199.28	R 52.30	R 20,321.84	
	Grout	m3	476.47	1.166	0.16	R 8,310.25	R 9,691.92	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	1,120	0.05	R 66.48	R 74,487.76	R 4,151,478.60
	Working space	m2	0.58	1,932	1.69	R 39.34	R 75,992.41	
	Backfill	m3	1.15	974	0.78	R 85.23	R 83,040.98	
	Blinding	m2	0.62	487	19.41	R 68.50	R 33,367.51	
	Concrete bases	m3	0.00	302	0.88	R 1,329.64	R 401,551.28	
	Concrete column	m3	2.01	150	1.07	R 1,329.64	R 199,776.76	
	Concrete beam	m3	0.83	181	1.00	R 1,329.64	R 240,694.89	
	Concrete surface slab	m3	1.64	184	0.92	R 1,329.64	R 244,848.34	
	Concrete wall	m3	2.14	70	1.00	R 1,329.64	R 93,353.62	
	Concrete elevated slab	m3	0.97	155	0.00	R 1,329.64	R 205,955.42	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,043	0.00		R -	
		Wood float	m2	0.60	1,738	152.05	R 8.74	R 15,194.35	
		Formwork bases	m2	0.39	774	7.60	R 174.95	R 135,476.14	
		Formwork to columns	m2	0.15	1,002	6.20	R 214.46	R 214,813.72	
		Formwork to sides beams	m2	0.29	624	4.91	R 270.80	R 169,039.18	
		Formwork to soffits beams	m2	0.79	229	7.19	R 184.93	R 42,375.11	
		Formwork to soffts of slabs	m2	0.30	614	3.11	R 235.33	R 144,453.30	
		Formwork to pockets	m2	25.00	6	5.65	R 427.54	R 2,569.48	
		Formwork wall	m2	0.12	585	7.88	R 168.74	R 98,724.22	
		High tensile reinforcement	t	8.60	121.224	0.00	R 10,421.53	R 1,263,335.46	
		Cast in steel	kg	0.21	4,964	251.20	R 41.49	R 205,957.78	
		HD bolts	kg	0.39	2,673	193.52	R 53.85	R 143,954.97	
		Steel handrailing	m	2.48	49	9.30	R 1,120.59	R 54,775.21	
		Grout	m3	994.87	1.048	0.18	R 7,386.89	R 7,740.71	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	1,183	0.04	R 53.19	R 62,929.53	R 8,684,682.50
		Working space	m2	7.47	158	1.41	R 37.72	R 5,974.68	
		Backfill	m3	4.63	256	0.74	R 39.36	R 10,057.85	
		Blinding	m2	1.22	1,270	19.45	R 68.36	R 86,853.30	
		Concrete bases	m3	0.00	1,550	0.00	R 1,329.64	R 2,060,942.00	
		Concrete column	m3	28.46	54	0.00	R 1,329.64	R 72,415.39	
		Concrete beam	m3	1.44	38	0.00	R 1,329.64	R 50,288.47	
		Concrete wall	m3	11.19	139	0.00	R 1,329.64	R 184,177.12	
		Concrete elevated slabs	m3	11.80	5	0.00	R 1,329.64	R 6,136.90	
		Total concrete	m3	0.00	1,785	0.00		R -	
		Wood float	m2	0.88	2,029	160.92	R 8.26	R 16,764.12	
		Formwork bases	m2	8.70	178	6.92	R 192.14	R 34,232.64	
		Formwork to columns	m2	0.15	363	5.95	R 209.06	R 75,907.12	
		Formwork to sides beams	m2	0.17	222	5.05	R 223.47	R 49,716.72	
		Formwork to soffits beams	m2	0.51	74	6.36	R 263.30	R 19,525.71	
		Formwork to soffts of slabs	m2	0.14	33	3.22	R 248.53	R 8,193.45	
		Formwork to pockets	m2	450.00	3	5.35	R 412.93	R 1,422.32	
		Formwork wall	m2	0.11	1,259	6.97	R 190.77	R 240,220.58	
		High tensile reinforcement	t	4.12	433.353	0.00	R 10,421.53	R 4,516,204.19	
		Cast in steel	kg	0.16	11,159	209.64	R 49.71	R 554,723.61	
		HD bolts	kg	0.24	7,439	171.78	R 60.67	R 451,322.46	
		Galvanised grating	m2	18.82	95	0.16	R 1,697.32	R 161,021.10	
		Grout	m3	822.89	1.884	6.14	R 8,310.25	R 15,653.23	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.48	118	0.05	R 66.48	R 7,871.47	R 1,432,362.50
	Working space	m2	0.38	312	1.56	R 42.62	R 13,278.46	
	Backfill	m3	1.98	60	0.78	R 85.23	R 5,096.78	
	Blinding	m2	4.71	17	21.03	R 63.23	R 1,073.90	
	Concrete bases	m3	0.00	80	0.00	R 1,329.64	R 106,371.20	
	Concrete column	m3	6.03	13	0.00	R 1,329.64	R 17,640.33	
	Concrete beam	m3	1.73	8	0.00	R 1,329.64	R 10,196.72	
	Concrete wall	m3	33.33	2	0.00	R 1,329.64	R 3,191.46	
	Concrete elevated slabs	m3	24.00	1	0.00	R 1,329.64	R 735.01	
	Total concrete	m3	0.00	104	0.00		R -	
	Wood float	m2	4.62	17	151.91	R 8.75	R 151.56	
	Formwork bases	m2	1.43	56	7.62	R 174.49	R 9,761.87	
	Formwork to columns	m2	0.13	102	6.99	R 212.40	R 21,676.50	
	Formwork to sides beams	m2	0.23	33	5.94	R 190.22	R 6,342.43	
	Formwork to soffits beams	m2	0.69	11	6.26	R 223.85	R 2,487.86	
	Formwork to soffts of slabs	m2	0.20	3	3.67	R 232.45	R 642.49	
	Formwork to pockets	m2	2.86	28	5.72	R 362.30	R 10,134.26	
	Formwork wall	m2	0.29	8	7.33	R 181.40	R 1,501.37	
	High tensile reinforcement	t	7.10	14.632	0.00	R 10,421.53	R 152,490.20	
	Cast in steel	kg	0.02	5,194	188.96	R 55.15	R 286,484.02	
	HD bolts	kg	0.01	10,389	197.35	R 52.81	R 548,609.27	
	Galvanised grating	m2	3.64	29	0.17	R 7,821.41	R 223,230.00	
	Grout	m3	40.32	1.984	6.09	R 1,711.25	R 3,395.34	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	787	0.05	R 66.48	R 52,331.31	R 5,471,783.40
	Working space	m2	2.26	348	1.69	R 39.34	R 13,701.45	
	Backfill	m3	1.23	640	0.76	R 87.48	R 55,981.29	
	Blinding	m2	3.82	119	19.66	R 67.63	R 8,055.61	
	Concrete	m3	0.00	455	0.00	R 1,329.64	R 604,986.20	
	Mesh reinforcement	m2	0.40	1,138	61.78	R 168.69	R 191,882.33	
	Rough formwork	m2	2.73	167	7.94	R 167.46	R 27,910.16	
	Smooth formwork	m2	0.56	813	6.78	R 196.11	R 159,341.08	
	Finish to concrete	m2	0.22	2,068	108.86	R 12.21	R 25,261.23	
	Construction joints	m	4.61	99	19.60	R 67.84	R 6,695.58	
	Movement joints	m	14.81	31	15.71	R 84.64	R 2,600.24	
	Cast in steel	kg	2.30	198	221.43	R 47.06	R 9,310.62	
	Grout	m3	803.00	0.567	0.16	R 8,310.25	R 4,708.80	
	Brick walls	m2	0.46	989	0.00	R 323.43	R 319,914.46	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	2,002	0.00		R -	
	Waterproofing membrane	m2	2.00	1,001	11.21	R 118.61	R 118,730.57	
	Roof construction	m2	1.99	1,006	34.10	R 305.62	R 307,459.63	
	Ceiling	m2	0.97	2,064	0.00	R 255.15	R 526,608.56	
	Doors and windows	No	434.63	5	0.15	R 2,156.20	R 9,931.92	
	Floor finish	m2	1.00	2,002	0.77	R 420.04	R 840,918.00	
	Wall finsih	m2	1.01	1,982	1.37	R 236.08	R 467,953.21	
	Rod reinforcement	t	8.63	53	0.00	R 10,421.53	R 549,454.94	
	Metalwork	Item	0.00	1	4.56	R 47,522.18	R 47,522.18	
	Structural steel	Item	0.00	1	11.81	R 123,078.27	R 123,078.27	
	Plumbing and drainage	Item	0.00	1	7.52	R 78,369.91	R 78,369.91	
	Small power and lighting	Item	0.00	1	64.07	R 667,707.43	R 667,707.43	
	External works	Item	0.00	1	189.05	R 251,368.44	R 251,368.44	
BUILDINGS - STEEL	Concrete	m3	0.00	90	0.16	R 1,329.64	R 119,667.60	R 3,180,458.73
	Earthworks	m3	2.30	207	8.34	R 159.43	R 33,001.86	
	Reinforcement	t	8.29	11	0.00	R 10,421.53	R 113,140.86	
	Mesh	m2	0.11	818	9.20	R 144.53	R 118,248.62	
	Formwork	m2	0.40	225	7.44	R 178.72	R 40,210.89	
	Brickwork	m2	5.73	167	5.65	R 235.33	R 39,222.42	
	Roof covering	m2	0.83	1,151	202.02	R 195.67	R 225,142.23	
	Structural steel	t	17.93	53	0.00	R 39,529.93	R 2,105,470.34	
	Side cladding	m2	1.49	641	0.95	R 185.89	R 119,144.06	
	Doors	No	371.00	3	0.49	R 19,369.67	R 49,859.92	
	Ridge ventilator	m	20.62	46	10.67	R 2,087.83	R 96,696.51	
	Aluminium insulation	m2	0.88	1,085	1.76	R 111.18	R 120,653.44	
	Total building area	m2	0.00	955	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	196	0.12	R 159.56	R 31,266.75	R 2,685,392.41
	Concrete	m3	0.00	71	0.00	R 1,329.64	R 94,404.44	
	Reinforcement	t	10.55	7	0.16	R 10,421.53	R 70,135.42	
	Mesh	m2	0.11	645	9.84	R 135.13	R 87,217.70	
	Formwork	m2	0.41	173	8.08	R 164.56	R 28,496.87	
	Brickwork	m2	5.78	119	5.59	R 237.86	R 28,189.35	
	Screed	m2	1.10	623	39.96	R 33.27	R 20,720.80	
	Structural steel	t	14.85	46	0.00	R 39,529.93	R 1,823,434.48	
	Cat ladders	m	2.52	18	9.58	R 4,126.30	R 75,530.80	
	Hand rail	m	0.72	64	26.40	R 1,497.35	R 95,929.84	
	Kick plates	m	0.73	63	2.64	R 567.18	R 35,839.29	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	787	193.17	R 204.64	R 161,123.05	
		Side cladding	m2	4.70	146	0.92	R 188.27	R 27,438.91	
		Floor grating	m2	1.06	44	16.28	R 2,428.13	R 105,664.69	
		Total buiding area	m2	0.00	685	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	237	7.88	R 168.74	R 40,041.06	R 606,698.97
		Blinding	m2	0.48	146	20.45	R 65.02	R 9,481.95	
		Concrete	m3	0.00	70	0.00	R 1,329.64	R 93,074.80	
		Reinforcement	t	8.00	9	0.00	R 10,421.53	R 91,188.39	
		Mesh	m2	0.50	140	48.38	R 215.41	R 30,157.38	
		Formwork	m2	0.35	200	7.78	R 170.90	R 34,180.98	
		Finish to concrete	m2	0.46	152	108.02	R 12.31	R 1,873.14	
		Movement joints	m	2.57	27	15.71	R 84.64	R 2,305.28	
		Cast in steel	kg	0.09	778	204.99	R 50.84	R 39,541.61	
		Grout	m3	72.28	0.968	2.62	R 7,821.41	R 7,574.69	
		Brickwork	m2	0.25	56	0.17	R 323.43	R 18,112.08	
		Doors and windows	No	3.00	5	0.28	R 3,593.67	R 16,770.44	
		Pipework	m	2.93	51	0.22	R 507.50	R 25,634.62	
		Bolts	kg	0.11	636	0.09	R 50.84	R 32,352.23	
		Structural steel	t	4.50	3	0.00	R 37,219.75	R 115,794.78	
		Miscellaneous steel	t	144.21	1	0.00	R 47,370.59	R 48,615.54	
		Total bridge area	m2	0.00	148	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.76	85	6.28	R 211.73	R 18,072.94	R 181,203.08
		Blinding	m2	0.82	13	15.92	R 83.52	R 1,120.39	
		Concrete	m3	0.00	11	0.00	R 1,329.64	R 14,626.04	
		Reinforcement	t	5.77	2	0.00	R 10,421.53	R 19,867.73	
		Formwork	m2	0.07	157	5.92	R 224.60	R 35,294.50	
		Finish to concrete	m2	0.34	32	81.15	R 16.38	R 530.10	
		Movement joints	m	0.46	24	15.43	R 86.17	R 2,060.64	
		Cast in steel	kg	28.85	0.381	181.80	R 57.32	R 21.86	
		Grout	m3	24.19	0.455	0.79	R 8,310.25	R 3,778.95	
		Bolts	kg	121.43	0.091	0.16	R 45.29	R 4.10	
		Structural steel	t	43.33	0.508	0.26	R 40,082.81	R 20,351.30	
		Miscellaneous steel	t	24.14	0.911	0.18	R 57,897.39	R 52,764.81	
		Brickwork	m2	0.60	37	4.81	R 276.43	R 10,135.86	
		Roof covering	m2	1.79	12	1.32	R 209.42	R 2,573.86	
		Total pump house area	m2	0.00	22	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	0	7.10	R 187.27	R -	R -
	Blinding	m2	1.40	0	19.02	R 69.91	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	5.77	0.000	0.00	R 10,421.53	R -	
	Formwork	m2	0.20	0	7.01	R 189.68	R -	
	Movement joint	m	1.86	0	0.13	R 90.64	R -	
	Cast in steel	kg	0.15	0	14.67	R 48.66	R -	
	Bolts	kg	0.39	0	214.19	R 60.53	R -	
	Chemical anchors	No	7.24	0	0.25	R 253.87	R -	
	Miscellaneous steelwork	t	91.86	0.000	172.18	R 41,686.12	R -	
	Pre-cast concrete	m3	36.75	0	41.05	R 3,693.44	R -	
	Brickwork	m2	8.86	0	0.36	R 278.75	R -	
	Total area	m2	0.00	0	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	5,977	1.69	R 112.35	R 671,534.68	R 1,859,417.16
	Lining	m2	0.82	4,738	1.50	R 66.48	R 314,978.74	
	Paving	m2	0.84	4,625	0.59	R 112.68	R 521,151.27	
	Pipework	m	28.97	134	0.26	R 432.13	R 57,950.87	
	Manholes	No	17.25	8	0.11	R 3,928.48	R 30,540.64	
	Concrete	m3	2.90	46	0.05	R 1,329.64	R 61,486.33	
	Formwork	m2	0.10	462	5.83	R 228.07	R 105,465.41	
	Mesh	m2	0.78	59	7.36	R 180.66	R 10,710.41	
	Reinforcement	t	5.63	8.214	0.14	R 10,421.53	R 85,598.79	
	Dam area (to top of berm)	m2	0.00	3,885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	0	5.85	R 227.29	R -	R -
	Blinding	m2	0.92	0	13.72	R 96.91	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	4.44	0.000	0.00	R 10,421.53	R -	
	Mesh	m2	1.14	0	41.22	R 252.83	R -	
	Formwork	m2	0.15	0	5.63	R 236.17	R -	
	Cast in steel	kg	0.03	0	157.23	R 66.28	R -	
	Miscellaneous steelwork	t	13.35	0.000	0.18	R 57,897.39	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	65	0.00		R -	R 478,892.41
	Steel	t	8.75	7.429	0.00	R 39,529.93	R 293,650.91	
	Handrail	m	1.45	45	25.58	R 1,545.35	R 69,274.09	
	Grating	m2	1.79	36	15.88	R 2,489.29	R 90,393.22	
	Kick flats	m	1.64	40	75.83	R 521.30	R 20,661.15	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	11	90.17	R 438.39	R 4,913.03	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,455	0.00		R -	R 3,016,872.57
		Steel	t	23.48	61.968	0.00	R 39,529.93	R 2,449,576.16	
		Handrail	m	12.68	115	29.85	R 1,324.29	R 151,958.66	
		Grating	m2	12.33	118	16.37	R 2,414.78	R 284,955.66	
		Kick flats	m	12.52	116	77.41	R 510.66	R 59,345.48	
		Cat ladder	m	94.92	15	8.53	R 4,634.22	R 71,036.62	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	11,452	0.00		R -	R 15,712,216.34
		Steel	t	64.24	178.269	0.00	R 39,529.93	R 7,046,960.75	
		Handrail	m	29.15	393	28.17	R 1,403.26	R 551,292.37	
		Grating	m2	3.70	3,095	15.96	R 2,476.81	R 7,666,069.88	
		Kick flats	m	32.29	355	77.41	R 510.66	R 181,109.93	
		Stair treads	No	217.41	53	91.87	R 430.28	R 22,664.92	
		Cat ladder	m	228.94	50	8.10	R 4,880.24	R 244,118.50	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	22.16	0.000	0.00	R 39,529.93	R -	
		Handrail	m	45.11	0	26.08	R 1,515.72	R -	
		Grating	m2	58.13	0	15.86	R 2,492.43	R -	
		Kick flats	m	42.58	0	77.41	R 510.66	R -	
		Cat ladder	m	19.44	0	8.11	R 4,874.22	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	66	0.00		R -	R 407,670.84
		Steel	t	13.69	4.821	0.00	R 39,529.93	R 190,575.27	
		Handrail	m	1.04	63	26.86	R 1,471.70	R 93,396.51	
		Grating	m2	1.91	35	15.68	R 2,521.04	R 87,114.52	
		Kick flats	m	1.08	61	76.30	R 518.09	R 31,660.79	
		Stair treads	No	5.57	12	95.13	R 415.54	R 4,923.76	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	398	0.00		R -	R 1,585,602.49
		Steel	t	11.98	33.222	0.00	R 39,529.93	R 1,313,264.79	
		Handrail	m	22.00	18	26.10	R 1,514.56	R 27,399.71	
		Grating	m2	7.32	54	15.97	R 2,475.26	R 134,583.90	
		Kick flats	m	22.59	18	78.04	R 506.53	R 8,924.33	
		Cat ladder	m	18.87	21	8.22	R 4,808.99	R 101,429.76	
	PIPING INSTALLATION	Pipe length	m	0.00	48,552	0.00		R -	R 50,714,182.40
		Total work units	WU	0.30	161,840	0.00	R 313.36	R 50,714,182.40	
		Pipe supports	kg	2.49	19,499	0.00		R -	
		WU for pipe supports	WU	0.16	25,894	0.00		R -	
		Number of welds	No	0.56	27,189	0.00		R -	
		Total fittings	No	0.39	18,935	0.00		R -	
		Stud bolts	No	0.35	6,627	0.00		R -	
		Support number	No	0.19	3,705	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	161,840	0.00	R 313.36		R 165,240.14

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	2,911	5.52	R 56.77	R 165,240.14	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	161,840	0.00	R 313.36		R 101,951.35
	Number of examinations	No	164.17	986	3.03	R 103.42	R 101,951.35	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	161,840	0.00	R 313.36		R 97,983.94
	Number of examinations	No	273.85	591	1.89	R 165.80	R 97,983.94	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	161,840	0.00	R 313.36		R 167,824.95
	Number of examinations	No	46.49	3,481	6.50	R 48.21	R 167,824.95	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	161,840	0.00	R 313.36		R 198,943.59
	Number of examinations	No	106.66	1,517	2.39	R 131.11	R 198,943.59	
MECHANICAL INSTALLATION	Total work units	WU	0.00	161,840	0.00	R 313.36		R 293,972.08
	Mechanical equipment	t	236.32	685	0.73	R 429.26	R 293,972.08	
	Structural steel	t	192.98	839	54.54			
PAINTING & INSULATION	Total work units	WU	0.00	161,840	0.00	R 313.36		R 3,734,901.47
	Painting to piping	m2	16.80	9,633	0.32	R 133.34	R 1,284,553.76	
	Insulation to piping	m2	48.21	3,357	2.35	R 416.70	R 1,398,860.66	
	Mechanical equipment received	t	0.00	685	0.81	R 429.26	R 293,972.08	
	Painting to mechanical equipment	m2	0.23	2,978	3.37	R 127.38	R 379,269.88	
	Insulation to mechanical equipment	m2	0.67	1,022	1.16	R 370.05	R 378,245.09	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.74	34,522	0.00	R 56.06	R 1,935,303.32	R 5,756,578.15
	Electrical cable terminations	No	276.76	1,518	0.38	R 147.53	R 223,962.33	
	Electrical equipment	No	8.25	125	0.10	R 560.60	R 69,927.13	
	DB's	No	5.97	15	0.28	R 2,002.14	R 30,271.49	
	Rack	m	0.59	5,783	1.65	R 175.19	R 1,013,035.66	
	Support steel	kg	1.34	9,801	1.99	R 28.17	R 276,102.04	
	Instrumentation cable	m	23.73	27,855	0.32	R 28.50	R 793,867.50	
	Instruments	No	0.44	1,174	0.16	R 178.13	R 209,088.57	
	Hook-ups	No	3.69	2,668	0.15	R 190.00	R 506,881.39	
	Light fittings	No	9.97	460	0.02	R 350.38	R 161,269.45	
	Conduit	m	3.99	3,463	0.11	R 33.98	R 117,644.04	
	Instrument stands	No	0.00	294		R 1,425.00	R 419,225.21	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project B				
Location:	South Africa				
Client:				Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,422	R	3.96
2	Concrete demolitions	m3	19	R	1,401.52
3	Bulk excavation	m3	6,845	R	32.34
4	Vertical piles	No	195		
5	Raking piles	No	4		
6	Concrete in piles	m3		R	1,329.64
7	Auger pile	m		R	287.49
8	Total paving and asphalt to road works	m2	5,212		
9	Grey paving to road works	m2	385	R	125.78
10	Asphalt to road surface	m2	4,827		
11	Rip bed of road works	m2	5,212	R	10.78
12	Total concrete in paving and bunding	m3	448	R	1,329.64
13	Concrete in paving	m3	238		
14	Rod reinforcement	t		R	10,421.53
15	Concrete in plinths and bases on area finishing	m3	212		
16	Stormwater pipe to drain surface run-off	m	80		
17	Machine excavation	m3		R	61.09
18	Concrete in pump and pipe support bases	m3	199	R	1,329.64
19	Concrete in tank bases	m3	120	R	1,329.64
20	Concrete in pipe and cable rack foundations	m3	130	R	1,329.64
21	Concrete to simple structural foundations	m3	122	R	1,329.64
22	Complex structural foundations - bases	m3	198	R	1,329.64
23	Concrete pipe racks - bases	m3	245	R	1,329.64
24	Concrete structure including concrete columns and beams - bases	m3	302	R	1,329.64
25	Major equipment bases with blast proof walls - bases	m3	1,550	R	1,329.64
26	Major equipment bases and elevated concrete structure - bases	m3	80	R	1,329.64
27	Concrete frame buildings with brick in-fill - all concrete	m3	455	R	1,329.64
28	One brick wall	m2		R	323.43
29	Concrete in structual steel buildings - all concrete	m3	90	R	1,329.64
30	Total building area - Structural steel buildings	m2	955		
31	Ceiling	m2		R	255.15
32	Structural steel	t		R	39,529.93
33	Steel canopy - concrete	m3	71	R	1,329.64
34	Steel canopy - area	m2	685		
35	Concrete in weighbridge - all concrete	m3	70	R	1,329.64
36	Total weighbridge area	m2	148		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	11	R	1,329.64
39	Total pump house area	m2	22		
40	Concrete in cooling tower	m3	0	R	1,329.64
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	3,885		
43	Concrete in cable tunnel	m3	0	R	1,329.64
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	65		
46	Total volume of steel pipe rack	m3	1,455		
47	Total volume of steel complex steel structure	m3	11,452		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	66		
50	Total volume of steel in cable gantry	m3	398		
51	Piping work unit cost	WU		R	313.36
52	Total process pipe length	m	48,552		
53	Total electrical cable - installation only	m	34,522	R	56.06
54	Total instrumentation cable - installation only	m	27,855	R	37.37

Ratio: Variable ratio

Variables

Material	Simple	Mean
Labour	Simple	Mean
Engineering design	Normal	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Few	Mean
Weather	Normal	Mean
Access	Poor	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Simple	Mean
Repitition	None	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project B				
Location:	South Africa				
Client:		0	Date of estimate:	2007	

	CIVIL CONSTRUCTION COST				R 63,864,236.18
A	SITE CLEARANCE AND DEMOLITIONS		R	95,620.00	
B	BULK EARTHWORKS		R	465,147.36	
C	PILING		R	5,763,230.86	
D	ROAD WORKS		R	2,425,680.31	
E	GENERAL PAVING AND BUNDED AREAS		R	1,184,327.87	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	911,104.56	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,136,186.28	
H	TANK BASES AND BUNDING		R	1,678,813.34	
I	RACK FOUNDATIONS		R	913,907.74	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,021,274.02	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,088,529.20	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,733,017.82	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,530,375.79	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	9,197,995.97	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,174,051.97	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	5,184,346.40	
Q	BUILDINGS - STEEL		R	3,001,242.93	
R	CANOPIES - STEEL		R	2,683,586.41	
S	WEIGHBRIDGE		R	688,485.13	
T	PUMP HOUSE		R	215,127.98	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	2,214,789.67	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	16,557,394.57	
	STRUCTURAL STEEL				R 26,563,958.93
A	STRUCTURAL STEEL - BASIC PLATFORM		R	433,106.45	
B	STRUCTURAL STEEL - PIPERACK		R	2,621,881.43	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	14,087,740.54	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	337,640.08	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,493,887.88	
	Preliminaries and General	40.00%	R	7,589,702.55	
	MECHANICAL AND PIPING				R 65,304,502.35
A	PIPING INSTALLATION		R	45,905,078.90	
B	RADIOGRAPHIC EXAMINATION (RT)		R	130,861.16	
C	DYE PENETRATION TESTING (DP)		R	55,242.41	
D	MAGNETIC PARTICLE TESTING (MPI)		R	75,603.30	
E	POST WELD HEAT TREATMENT		R	127,342.10	
F	MATERIAL HARDNESS TEST (HT)		R	116,090.30	
H	MECHANICAL INSTALLATION		R	235,854.93	
	Preliminaries and General	40.00%	R	18,658,429.24	
	PAINTING AND INSULATION				R 3,883,191.01
A	PAINTING AND INSULATION		R	2,876,437.79	
	Preliminaries and General	35.00%	R	1,006,753.23	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 6,904,392.07
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	5,114,364.50	
	Preliminaries and General	35.00%	R	1,790,027.57	

TOTAL COST	R	166,520,280.54

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,422		R 3.96	R 68,991.12	R 95,620.00
	Concrete demolitions	m3		19		R 1,401.52	R 26,628.88	
BULK EARTHWORKS	Bulk excavation	m3		6,845		R 32.34	R 221,367.30	R 465,147.36
	Trimming of sides	m2	2.18	3,143	4.27	R 7.58	R 23,820.28	
	Back fill and compact	m3	1.14	5,989	1.00	R 32.41	R 194,112.34	
	Overhaul	m3/km	1.76	3,889	11.43	R 2.83	R 11,002.73	
	Rip bed	m2	1.82	3,770	8.21	R 3.94	R 14,844.71	
PILING	Site establishment of rig	Item	0.00	1	191.91	R 255,168.36	R 255,168.36	R 5,763,230.86
	EO for raking equipment	Item	0.00	1	23.85	R 31,710.96	R 31,710.96	
	Number of piles	No	0.00	195	0.00		R -	
	Move rig to new position	No	1.50	130	0.18	R 240.28	R 31,326.55	
	Number of raking piles	No	18.44	11	0.00		R -	
	EO for setting up raking piles	No	0.93	11	0.28	R 371.35	R 4,209.12	
	EO for raking drilling	m	0.15	70	0.87	R 251.35	R 17,633.76	
	Auger quantity	m	0.05	3,900	0.00	R 287.49	R 1,121,211.00	
	EO for drilling in coarse gravel	m	0.53	368	0.22	R 289.67	R 106,721.11	
	EO for drilling in boulders	m	1.83	107	0.50	R 667.67	R 71,312.09	
	EO for drilling in soft rock	m	1.65	118	0.23	R 307.72	R 36,429.60	
	Temporary casings	m	0.36	535	0.35	R 464.42	R 248,603.57	
	EO casing to raking pile	m	0.18	59	0.51	R 1,228.02	R 72,713.63	
	Mild steel rod reinforcement	t	14.35	13.586	0.92	R 8,889.97	R 120,780.42	
	High tensile rod reinforcement	t	1.31	148.612	7.24	R 9,625.64	R 1,430,484.91	
	Concrete to piles and bases	m3	0.15	1,264	0.00	R 1,329.64	R 1,680,517.22	
	Concrete to raking piles	m3	0.07	150	1.06	R 1,408.47	R 210,602.37	
	Site establishment of test equipment	Item	0.00	1	109.88	R 146,097.99	R 146,097.99	
	Load test to pile	No	97.82	2	27.16	R 36,117.77	R 72,001.34	
	Site establishment of intergity testing	No	256.58	1	49.02	R 65,177.05	R 49,534.50	
	Integrity testing of piles	No	1.25	156	0.27	R 360.90	R 56,172.36	
ROAD WORKS	Red paving	m2	0.15	58	0.96	R 120.93	R 7,050.13	R 2,425,680.31
	Grey paving	m2	0.00	385	0.00	R 125.78	R 48,425.30	
	Kerbing	m	0.13	681	0.00	R 218.49	R 148,854.00	
	Total paving and asphalt	m2	0.00	5,212	0.00		R -	
	Remove top soil	m3	0.56	748	5.83	R 62.80	R 46,963.55	
	Asphalt	m2	0.26	1,344	0.00	R 147.26	R 197,907.88	
	Rip bed	m2	0.00	5,212	0.00	R 10.78	R 56,185.36	
	Reduce levels	m3	0.42	2,170	4.89	R 52.74	R 114,462.39	
	Selected fill	m3	1.67	1,300	0.52	R 101.56	R 132,046.16	
	Imported fill	m3	2.22	586	0.38	R 265.76	R 155,699.35	
	Wearing course	m3	3.86	563	0.27	R 197.41	R 111,125.67	
	Prime	m2	4.82	6,266	1.45	R 48.98	R 306,884.08	
	Three line road marking	m	0.82	5,156	0.18	R 40.26	R 207,608.96	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.02	697	4.26	R 10.77	R 7,509.30	
		1m Wide concrete V-drain	m	0.96	653	0.82	R 975.41	R 636,996.40	
		200mm Diameter PVC pipe	m	0.96	655	0.11	R 300.27	R 196,677.45	
		Road marking - STOP	No	0.15	104	0.05	R 333.82	R 34,601.49	
		Standard signage	No	0.01	7	4.46	R 415.13	R 2,828.23	
		100mm Painted line	m	1.79	1,216	1.37	R 11.39	R 13,854.59	
				0.00		1.53			
				0.00		1.90			
				0.00		0.05			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.04	238	0.74	R 1,329.64	R 316,454.32	R 1,184,327.87
		Concrete in plinths	m3	0.00	47	0.00	R 1,329.64	R 62,833.08	
		Total concrete	m3	0.00	448	0.00		R -	
		Rip and compact	m2	0.13	1,831	184.85	R 7.19	R 13,168.86	
		Formwork to plinth	m2	7.44	351	0.13	R 168.10	R 59,068.55	
		Formwork to slab	m2	0.84	200	0.15	R 200.40	R 40,131.25	
		High tensile steel	t	0.01	4.480	0.00	R 10,421.53	R 46,688.45	
		Mesh	m2	573.17	2,568	51.07	R 204.07	R 524,009.59	
		Construction joint	m	4.11	979	0.05	R 68.38	R 66,924.28	
		Expansion joint	m	2.26	537	0.08	R 102.57	R 55,049.49	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.49	7,043	0.00		R -	R 911,104.56
		Base excavation	m3	1.50	473	0.00	R 61.09	R 28,871.83	
		Backfill	m3	0.59	315	0.63	R 96.97	R 30,508.62	
		Working space	m2	0.45	802	1.40	R 69.23	R 55,521.14	
		Concrete in bases	m3	0.04	212	25.22	R 1,329.64	R 281,883.68	
		Blinding	m2	0.84	283	20.35	R 65.34	R 18,511.76	
		Concrete in sump walls	m3	0.10	21	29.18	R 1,329.64	R 27,785.68	
		Concrete in slabs	m3	0.02	4	0.91	R 1,329.64	R 5,436.33	
		Total concrete	m3	0.00	237	0.04		R -	
		Wood float	m2	0.70	336	157.13	R 8.46	R 2,847.36	
		Formwork to bases	m2	1.70	360	0.12	R 157.66	R 56,700.33	
		Formwork to sump walls	m2	12.94	270	0.13	R 167.15	R 45,202.65	
		Formwork to sides of slab	m2	5.94	24	0.19	R 248.83	R 6,044.63	
		Mild steel reinforcement	t	0.12	2.560	0.00	R 10,421.53	R 26,676.90	
		High tensile reinforcement	t	10.71	22.122	1.13	R 10,421.53	R 230,541.09	
		Cast in steel	kg	0.45	473	33.44	R 39.76	R 18,819.92	
		Waterstop	m	0.42	50	7.87	R 168.98	R 8,422.00	
		Manhole	No	0.09	7	2.67	R 4,049.09	R 27,533.84	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	80	0.12	R 497.46	R 39,796.81	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.73	344	0.05	R 61.09	R 21,040.14	R 1,136,186.28
	Working space	m2	0.39	883	0.65	R 39.97	R 35,298.11	
	Backfill	m3	4.56	76	1.26	R 77.10	R 5,830.00	
	Concrete bases	m3	1.01	199	0.00	R 1,329.64	R 264,598.36	
	Concrete plinth	m3	2.24	89	0.00	R 1,329.64	R 117,936.23	
	Total concrete	m3	0.00	288	0.00		R -	
	Wood float	m2	0.48	183	0.06	R 13.30	R 2,438.86	
	Blinding	m2	1.01	198	0.01	R 75.03	R 14,825.01	
	Formwork bases	m2	0.48	412	0.13	R 176.65	R 72,803.69	
	Formwork plinth	m2	0.60	149	0.12	R 158.61	R 23,643.88	
	High tensile reinforcement	t	9.98	28.815	7.33	R 10,421.53	R 300,297.09	
	Cast in steel	kg	0.11	2,685	0.03	R 39.89	R 107,109.69	
	HD Bolts	kg	0.08	3,629	0.03	R 40.84	R 148,189.08	
	Grout	m3	35.38	2.507	6.65	R 8,844.96	R 22,176.15	
TANK BASES AND BUNDING	Restricted excavation	m3	6.07	729	0.05	R 66.48	R 48,459.68	R 1,678,813.34
	Working space	m2	4.51	162	1.63	R 40.84	R 6,603.80	
	Backfill	m3	1.36	534	0.70	R 94.49	R 50,485.54	
	Concrete bases	m3	0.73	120	0.00	R 1,329.64	R 159,556.80	
	Concrete sump wall	m3	2.80	43	0.00	R 1,329.64	R 56,970.04	
	Concrete slab	m3	0.56	216	0.00	R 1,329.64	R 287,489.73	
	Concrete plinth	m3	3.98	30	20.81	R 1,329.64	R 40,132.86	
	Concrete column	m3	19.34	6	164.39	R 1,329.64	R 8,252.23	
	Total concrete	m3	0.00	415	1.10		R -	
	Blinding	m2	2.70	154	1.03	R 63.90	R 9,822.10	
	Wood float	m2	0.26	1,602	1.12	R 8.09	R 12,959.99	
	Formwork to bases	m2	0.40	299	1.15	R 164.81	R 49,266.17	
	Formwork to plinths	m2	0.35	87	8.07	R 172.86	R 14,998.64	
	Formwork to columns	m2	0.12	51	7.69	R 187.67	R 9,648.78	
	Formwork to sumps	m2	0.12	366	7.09	R 182.93	R 66,908.55	
	Formwork to slabs	m2	4.01	54	7.27	R 160.65	R 8,654.63	
	Formwork to slabs n/e 300mm	m	2.19	99	8.28	R 54.17	R 5,358.31	
	Mild steel reinforcement	t	0.23	4.053	24.55	R 10,421.53	R 42,235.33	
	High tensile reinforcement	t	23.58	17.620	0.99	R 10,421.53	R 183,631.87	
	Mesh	m2	0.16	1,339	62.07	R 167.90	R 224,878.33	
	Cast in items	kg	0.20	2,107	216.82	R 48.07	R 101,290.93	
	HD Bolts	kg	0.10	4,125	213.35	R 48.85	R 201,497.04	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	207.96	1.998	0.17	R 7,887.69	R 15,757.97	
		Construction joint	m	0.30	719	25.25	R 52.65	R 37,859.08	
		Expansion joint	m	0.46	466	17.16	R 77.51	R 36,094.94	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.65	475	0.05	R 64.58	R 30,662.39	R 913,907.74
		Working space	m2	0.39	1,222	1.85	R 119.48	R 145,984.56	
		Backfill	m3	2.42	196	0.86	R 74.79	R 14,667.78	
		Blinding	m2	0.37	354	22.19	R 59.91	R 21,212.95	
		Concrete bases	m3	5.77	130	0.00	R 1,329.64	R 172,853.20	
		Concrete plinth	m3	0.00	23	0.00	R 1,329.64	R 29,972.07	
		Total concrete	m3	0.00	153	1.33		R -	
		Wood float	m2	0.36	366	177.44	R 7.49	R 2,744.15	
		Formwork bases	m2	0.48	274	9.72	R 136.86	R 37,457.69	
		Formwork plinths	m2	0.09	250	7.00	R 189.91	R 47,565.00	
		High tensile reinforcement	t	9.46	16.129	0.00	R 10,421.53	R 168,084.13	
		HD Bolts	kg	0.03	4,919	222.49	R 46.84	R 230,404.34	
		Grout	m3	77.46	1.678	0.18	R 7,328.72	R 12,299.47	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.24	518	0.06	R 75.03	R 38,850.59	R 1,021,274.02
		Working space	m2	0.49	1,048	1.93	R 38.83	R 40,679.94	
		Backfill	m3	2.59	200	0.80	R 94.29	R 18,882.52	
		Blinding	m2	0.33	371	21.41	R 62.11	R 23,063.22	
		Concrete bases	m3	0.00	122	0.00	R 1,329.64	R 162,216.08	
		Concrete plinth	m3	2.64	33	0.00	R 1,329.64	R 44,166.18	
		Concrete slab	m3	3.67	46	0.00	R 1,329.64	R 61,495.40	
		Total concrete	m3	0.00	201	0.00		R -	
		Wood float	m2	0.55	369	161.66	R 8.22	R 3,036.47	
		Formwork bases	m2	0.49	249	8.24	R 161.32	R 40,224.55	
		Formwork plinths	m2	0.11	314	8.09	R 164.36	R 51,642.55	
		High tensile reinforcement	t	13.34	15.098	0.00	R 10,421.53	R 157,339.80	
		HD Bolts	kg	0.02	5,510	217.53	R 47.91	R 263,964.56	
		Cast in items	kg	0.05	2,340	241.75	R 43.11	R 100,861.07	
		Grout	m3	67.66	1.803	0.16	R 8,236.71	R 14,851.10	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.12	419	0.05	R 70.28	R 29,471.32	R 1,088,529.20
		Working space	m2	0.57	739	1.71	R 41.19	R 30,452.22	
		Backfill	m3	2.17	194	0.80	R 87.38	R 16,925.10	
		Blinding	m2	0.64	309	20.27	R 65.59	R 20,270.56	
		Concrete bases	m3	0.00	198	0.00	R 1,329.64	R 263,268.72	
		Concrete column	m3	27.03	7	0.00	R 1,329.64	R 9,739.36	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.17	38	0.00	R 1,329.64	R 50,901.29	
	Total concrete	m3	0.00	244	0.00		R -	
	Wood float	m2	0.59	414	157.03	R 8.47	R 3,508.79	
	Formwork bases	m2	0.52	384	8.21	R 161.90	R 62,157.83	
	Formwork plinths	m2	0.33	116	7.47	R 177.93	R 20,640.88	
	Formwork to columns	m2	0.28	26	7.98	R 166.53	R 4,312.48	
	High tensile reinforcement	t	9.26	26.314	0.00	R 10,421.53	R 274,227.14	
	HD bolts	kg	0.04	5,684	208.00	R 50.10	R 284,797.29	
	Grout	m3	109.94	2.216	0.17	R 8,058.42	R 17,856.22	
	Restricted excavation	m3	2.82	691	0.06	R 76.93	R 53,150.36	R 2,733,017.82
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.30	2,336	2.09	R 36.77	R 85,909.78	
	Backfill	m3	2.04	339	0.82	R 93.73	R 31,779.02	
	Blinding	m2	0.67	366	20.13	R 66.05	R 24,152.73	
	Concrete bases	m3	0.00	245	0.00	R 1,329.64	R 325,761.80	
	Concrete column	m3	1.18	223	151.29	R 1,329.64	R 296,453.43	
	Concrete beam	m3	2.70	83	0.94	R 1,329.64	R 109,710.49	
	Total concrete	m3	2.97	550	0.94		R -	
	Wood float	m2	0.47	519	7.30	R 8.79	R 4,560.59	
	Formwork bases	m2	0.48	508	6.71	R 182.18	R 92,573.47	
	Formwork to columns	m2	0.16	1,375	8.11	R 163.95	R 225,443.54	
	Formwork to sides beams	m2	0.33	252	6.19	R 198.20	R 49,989.72	
	Formwork to soffits beams	m2	0.68	122	6.71	R 214.83	R 26,260.55	
	Formwork corbels	m2	10.78	21	5.43	R 244.80	R 5,064.86	
	High tensile reinforcement	t	9.19	59.917	0.00	R 10,421.53	R 624,430.27	
	Cast in steel	kg	0.03	18,797	260.65	R 39.98	R 751,550.23	
	HD bolts	kg	1.51	366	218.44	R 47.71	R 17,449.78	
	Grout	m3	505.39	1.089	0.17	R 8,058.42	R 8,777.20	
	Restricted excavation	m3	3.88	1,172	0.05	R 68.38	R 80,111.94	R 3,530,375.79
	Working space	m2	0.63	1,860	1.77	R 38.66	R 71,900.86	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.16	1,010	0.77	R 88.56	R 89,442.02	
	Blinding	m2	0.62	485	20.78	R 64.00	R 31,028.93	
	Concrete bases	m3	0.00	302	1.00	R 1,329.64	R 401,551.28	
	Concrete column	m3	2.45	123	1.11	R 1,329.64	R 163,850.71	
	Concrete beam	m3	0.86	143	1.02	R 1,329.64	R 190,682.46	
	Concrete surface slab	m3	1.66	182	1.00	R 1,329.64	R 242,315.43	
	Concrete wall	m3	2.51	49	1.07	R 1,329.64	R 65,167.90	
	Concrete elevated slab	m3	1.12	110	0.00	R 1,329.64	R 146,669.44	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	910	0.00		R -	
		Wood float	m2	0.63	1,443	171.04	R 7.77	R 11,218.83	
		Formwork bases	m2	0.41	735	7.82	R 169.94	R 124,955.82	
		Formwork to columns	m2	0.17	722	6.34	R 209.58	R 151,284.95	
		Formwork to sides beams	m2	0.29	493	5.17	R 257.33	R 126,938.66	
		Formwork to soffits beams	m2	0.83	172	7.61	R 174.64	R 30,019.78	
		Formwork to soffts of slabs	m2	0.31	595	3.18	R 230.95	R 137,355.10	
		Formwork to pockets	m2	26.26	5	5.76	R 417.56	R 1,959.80	
		Formwork wall	m2	0.13	381	8.04	R 165.47	R 63,076.09	
		High tensile reinforcement	t	8.93	101.942	0.00	R 10,421.53	R 1,062,394.80	
		Cast in steel	kg	0.22	4,071	248.75	R 41.90	R 170,563.96	
		HD bolts	kg	0.41	2,228	198.42	R 52.52	R 117,005.18	
		Steel handrailing	m	2.52	40	9.43	R 1,105.73	R 44,667.23	
		Grout	m3	1,052.65	0.865	0.19	R 7,187.24	R 6,214.64	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	1,261	0.04	R 50.34	R 63,468.87	R 9,197,995.97
		Working space	m2	7.96	158	1.40	R 36.06	R 5,714.88	
		Backfill	m3	4.15	304	0.61	R 30.88	R 9,387.01	
		Blinding	m2	1.03	1,503	17.60	R 75.56	R 113,553.91	
		Concrete bases	m3	0.00	1,550	0.00	R 1,329.64	R 2,060,942.00	
		Concrete column	m3	25.85	60	0.00	R 1,329.64	R 79,713.75	
		Concrete beam	m3	1.43	42	0.00	R 1,329.64	R 55,716.05	
		Concrete wall	m3	10.47	148	0.00	R 1,329.64	R 196,842.60	
		Concrete elevated slabs	m3	10.93	5	0.00	R 1,329.64	R 7,296.45	
		Total concrete	m3	0.00	1,805	0.00		R -	
		Wood float	m2	0.82	2,207	140.82	R 9.44	R 20,842.87	
		Formwork bases	m2	8.61	180	7.08	R 187.84	R 33,809.98	
		Formwork to columns	m2	0.13	459	5.67	R 218.97	R 100,431.09	
		Formwork to sides beams	m2	0.17	250	4.81	R 234.45	R 58,525.89	
		Formwork to soffits beams	m2	0.48	87	6.07	R 276.43	R 23,918.48	
		Formwork to soffts of slabs	m2	0.13	43	2.91	R 283.29	R 12,091.05	
		Formwork to pockets	m2	409.58	4	4.69	R 456.70	R 1,728.30	
		Formwork wall	m2	0.10	1,524	6.18	R 215.30	R 328,111.17	
		High tensile reinforcement	t	4.07	443.505	0.00	R 10,421.53	R 4,622,005.55	
		Cast in steel	kg	0.15	12,451	198.48	R 52.51	R 653,754.62	
		HD bolts	kg	0.21	8,510	169.14	R 61.61	R 524,349.48	
		Galvanised grating	m2	16.73	108	0.15	R 1,930.68	R 208,318.64	
		Grout	m3	778.90	1.990	5.40	R 8,780.64	R 17,473.34	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.55	124	0.05	R 69.33	R 8,569.34	R 1,174,051.97
	Working space	m2	0.41	305	1.76	R 39.49	R 12,051.43	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.06	60	0.79	R 87.52	R 5,262.37	
	Blinding	m2	4.94	16	20.22	R 65.77	R 1,065.72	
	Concrete bases	m3	0.00	80	0.00	R 1,329.64	R 106,371.20	
	Concrete column	m3	6.54	12	0.00	R 1,329.64	R 16,254.06	
	Concrete beam	m3	2.05	6	0.00	R 1,329.64	R 7,937.11	
	Concrete wall	m3	36.36	2	0.00	R 1,329.64	R 2,925.39	
	Concrete elevated slabs	m3	25.10	0	0.00	R 1,329.64	R 647.61	
	Total concrete	m3	0.00	101	0.00		R -	
	Wood float	m2	4.86	16	158.06	R 8.41	R 138.57	
	Formwork bases	m2	1.47	54	8.07	R 164.71	R 8,946.15	
	Formwork to columns	m2	0.15	83	7.06	R 194.84	R 16,265.93	
	Formwork to sides beams	m2	0.23	26	6.36	R 188.47	R 4,816.65	
	Formwork to soffits beams	m2	0.75	8	6.82	R 209.16	R 1,659.97	
	Formwork to soffts of slabs	m2	0.22	2	3.77	R 211.89	R 466.09	
	Formwork to pockets	m2	3.07	26	6.28	R 352.96	R 9,208.29	
	Formwork wall	m2	0.29	7	7.78	R 170.87	R 1,277.48	
	High tensile reinforcement	t	7.34	13.747	0.00	R 10,421.53	R 143,261.39	
	Cast in steel	kg	0.02	5,044	211.44	R 49.29	R 248,618.71	
	HD bolts	kg	0.01	7,846	209.16	R 49.83	R 390,946.73	
	Galvanised grating	m2	4.00	25	0.18	R 7,299.98	R 184,206.04	
	Grout	m3	41.35	1.935	6.39	R 1,631.28	R 3,155.77	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.81	825	0.05	R 66.48	R 54,816.07	R 5,184,346.40
	Working space	m2	2.56	322	1.86	R 35.77	R 11,530.61	
	Backfill	m3	1.24	667	0.78	R 84.92	R 56,631.28	
	Blinding	m2	3.87	118	20.60	R 64.56	R 7,587.74	
	Concrete	m3	0.00	455	0.00	R 1,329.64	R 604,986.20	
	Mesh reinforcement	m2	0.50	902	67.88	R 153.53	R 138,522.34	
	Rough formwork	m2	3.13	145	8.69	R 152.95	R 22,223.10	
	Smooth formwork	m2	0.56	806	6.77	R 196.48	R 158,431.33	
	Finish to concrete	m2	0.23	1,966	106.48	R 12.49	R 24,551.49	
	Construction joints	m	4.98	91	21.15	R 62.85	R 5,744.37	
	Movement joints	m	15.53	29	17.04	R 78.01	R 2,284.94	
	Cast in steel	kg	2.35	194	236.45	R 44.07	R 8,536.11	
	Grout	m3	884.57	0.514	0.18	R 7,536.42	R 3,876.56	
	Brick walls	m2	0.49	931	0.00	R 323.43	R 301,206.01	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.49	2,042	0.00		R -	
	Waterproofing membrane	m2	2.23	918	11.95	R 111.29	R 102,148.87	
	Roof construction	m2	2.05	996	39.33	R 265.01	R 264,010.10	
	Ceiling	m2	0.98	2,092	0.00	R 255.15	R 533,672.26	
	Doors and windows	No	475.84	4	0.17	R 1,918.65	R 8,234.86	
	Floor finish	m2	1.03	1,992	0.80	R 406.10	R 809,150.19	
	Wall finsih	m2	1.04	1,972	1.45	R 223.61	R 440,923.13	
	Rod reinforcement	t	9.23	49	0.00	R 10,421.53	R 513,777.15	
	Metalwork	Item	0.00	1	4.35	R 45,370.88	R 45,370.88	
	Structural steel	Item	0.00	1	11.27	R 117,480.42	R 117,480.42	
	Plumbing and drainage	Item	0.00	1	7.18	R 74,811.70	R 74,811.70	
	Small power and lighting	Item	0.00	1	61.15	R 637,313.78	R 637,313.78	
	External works	Item	0.00	1	177.89	R 236,524.91	R 236,524.91	
BUILDINGS - STEEL	Concrete	m3	0.00	90	0.17	R 1,329.64	R 119,667.60	R 3,001,242.93
	Earthworks	m3	2.30	207	9.17	R 145.06	R 30,035.79	
	Reinforcement	t	8.90	10	0.00	R 10,421.53	R 105,420.10	
	Mesh	m2	0.12	773	10.28	R 129.37	R 100,003.32	
	Formwork	m2	0.40	224	7.94	R 167.49	R 37,551.38	
	Brickwork	m2	6.19	154	6.20	R 214.46	R 33,086.83	
	Roof covering	m2	0.87	1,099	209.14	R 189.01	R 207,650.38	
	Structural steel	t	18.87	51	0.00	R 39,529.93	R 2,000,511.62	
	Side cladding	m2	1.54	622	0.97	R 182.94	R 113,814.65	
	Doors	No	406.83	2	0.50	R 19,821.44	R 46,529.36	
	Ridge ventilator	m	21.43	45	11.69	R 2,209.43	R 98,450.44	
	Aluminium insulation	m2	0.91	1,051	1.83	R 103.25	R 108,521.46	
	Total building area	m2	0.00	955	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.25	231	0.12	R 164.31	R 37,896.83	R 2,683,586.41
	Concrete	m3	0.00	71	0.00	R 1,329.64	R 94,404.44	
	Reinforcement	t	10.84	7	0.18	R 10,421.53	R 68,241.11	
	Mesh	m2	0.12	599	10.30	R 129.10	R 77,304.59	
	Formwork	m2	0.43	167	8.31	R 160.05	R 26,692.25	
	Brickwork	m2	5.88	117	5.81	R 228.74	R 26,663.77	
	Screed	m2	1.10	621	42.73	R 31.12	R 19,315.49	
	Structural steel	t	14.63	47	0.00	R 39,529.93	R 1,850,944.92	
	Cat ladders	m	2.76	17	9.81	R 4,028.09	R 68,425.77	
	Hand rail	m	0.72	65	26.74	R 1,478.50	R 96,727.60	
	Kick plates	m	0.75	63	2.87	R 516.06	R 32,403.58	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.90	762	194.97	R 202.75	R 154,556.85	
		Side cladding	m2	4.68	146	0.92	R 187.25	R 27,390.53	
		Floor grating	m2	1.07	44	16.91	R 2,337.17	R 102,618.67	
		Total buiding area	m2	0.00	685	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.31	231	7.96	R 167.15	R 38,669.04	R 688,485.13
		Blinding	m2	0.46	151	18.38	R 72.36	R 10,926.68	
		Concrete	m3	0.00	70	0.00	R 1,329.64	R 93,074.80	
		Reinforcement	t	7.98	9	0.00	R 10,421.53	R 91,457.86	
		Mesh	m2	0.48	146	49.61	R 210.05	R 30,586.92	
		Formwork	m2	0.31	229	7.40	R 179.68	R 41,141.93	
		Finish to concrete	m2	0.44	160	102.53	R 12.97	R 2,076.58	
		Movement joints	m	2.41	29	14.78	R 89.98	R 2,615.84	
		Cast in steel	kg	0.08	860	173.11	R 60.20	R 51,751.77	
		Grout	m3	69.87	1.002	2.52	R 8,538.97	R 8,555.03	
		Brickwork	m2	0.23	62	0.16	R 323.43	R 20,124.53	
		Doors and windows	No	2.64	5	0.26	R 3,937.41	R 20,919.82	
		Pipework	m	2.49	60	0.21	R 528.38	R 31,460.09	
		Bolts	kg	0.11	662	0.08	R 60.20	R 39,862.85	
		Structural steel	t	3.86	4	0.00	R 40,641.06	R 147,430.10	
		Miscellaneous steel	t	127.00	1	0.00	R 49,626.33	R 57,831.29	
		Total bridge area	m2	0.00	148	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	9.09	100	6.38	R 208.43	R 20,841.00	R 215,127.98
		Blinding	m2	0.70	16	15.33	R 86.74	R 1,357.49	
		Concrete	m3	0.00	11	0.00	R 1,329.64	R 14,626.04	
		Reinforcement	t	5.48	2	0.00	R 10,421.53	R 20,913.68	
		Formwork	m2	0.06	175	5.89	R 225.85	R 39,524.61	
		Finish to concrete	m2	0.30	36	81.09	R 16.40	R 595.57	
		Movement joints	m	0.40	27	13.01	R 102.21	R 2,785.82	
		Cast in steel	kg	23.47	0.469	165.50	R 62.97	R 29.51	
		Grout	m3	21.94	0.501	0.63	R 10,228.00	R 5,129.15	
		Bolts	kg	103.71	0.106	0.13	R 39.45	R 4.18	
		Structural steel	t	36.08	0.610	0.22	R 46,763.28	R 28,515.89	
		Miscellaneous steel	t	20.14	1.092	0.18	R 57,668.55	R 62,989.97	
		Brickwork	m2	0.48	46	4.35	R 305.71	R 14,138.15	
		Roof covering	m2	1.46	15	1.25	R 244.01	R 3,676.92	
		Total pump house area	m2	0.00	22	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	5.74	R 231.47	R -	R -
	Blinding	m2	1.09	0	15.73	R 84.54	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	5.30	0.000	0.00	R 10,421.53	R -	
	Formwork	m2	0.20	0	5.96	R 223.04	R -	
	Movement joint	m	1.48	0	0.12	R 109.88	R -	
	Cast in steel	kg	0.13	0	12.10	R 54.51	R -	
	Bolts	kg	0.34	0	191.19	R 65.05	R -	
	Chemical anchors	No	5.72	0	0.21	R 295.58	R -	
	Miscellaneous steelwork	t	84.57	0.000	160.20	R 48,633.81	R -	
	Pre-cast concrete	m3	28.22	0	35.26	R 4,584.97	R -	
	Brickwork	m2	7.40	0	0.29	R 310.30	R -	
	Total area	m2	0.00	0	4.29		R -	
EMERGENCY DAM	Earthworks	m3	0.56	6,885	1.74	R 105.81	R 728,459.60	R 2,214,789.67
	Lining	m2	0.70	5,556	1.19	R 60.78	R 337,693.25	
	Paving	m2	0.65	6,017	0.53	R 114.22	R 687,239.96	
	Pipework	m	28.10	138	0.24	R 434.40	R 60,065.77	
	Manholes	No	17.29	8	0.10	R 4,165.45	R 33,320.76	
	Concrete	m3	2.47	56	0.05	R 1,329.64	R 74,348.97	
	Formwork	m2	0.08	663	5.75	R 231.18	R 153,371.71	
	Mesh	m2	0.70	80	6.49	R 204.85	R 16,397.27	
	Reinforcement	t	4.70	11.888	0.12	R 10,421.53	R 123,892.39	
	Dam area (to top of berm)	m2	0.00	3,885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	5.80	0	5.35	R 248.53	R -	R -
	Blinding	m2	0.85	0	12.78	R 104.06	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	4.65	0.000	0.00	R 10,421.53	R -	
	Mesh	m2	0.86	0	37.65	R 276.83	R -	
	Formwork	m2	0.15	0	5.16	R 257.61	R -	
	Cast in steel	kg	0.02	0	138.01	R 75.51	R -	
	Miscellaneous steelwork	t	11.06	0.000	0.16	R 64,845.08	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	65	0.00		R -	R 433,106.45
	Steel	t	9.50	6.844	0.00	R 39,529.93	R 270,528.96	
	Handrail	m	1.42	46	29.24	R 1,352.08	R 61,735.62	
	Grating	m2	1.88	34	17.54	R 2,253.15	R 77,724.32	
	Kick flats	m	1.69	38	79.82	R 495.22	R 19,062.89	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.61	10	95.84	R 412.46	R 4,054.65	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,455	0.00		R -	R 2,621,881.43
		Steel	t	27.27	53.361	0.00	R 39,529.93	R 2,109,353.68	
		Handrail	m	13.12	111	30.97	R 1,276.45	R 141,588.71	
		Grating	m2	12.21	119	18.41	R 2,147.78	R 255,954.61	
		Kick flats	m	13.29	109	85.19	R 464.02	R 50,795.49	
		Cat ladder	m	97.31	15	9.21	R 4,293.07	R 64,188.95	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	11,452	0.00		R -	R 14,087,740.54
		Steel	t	74.91	152.877	0.00	R 39,529.93	R 6,043,208.63	
		Handrail	m	31.16	368	32.01	R 1,234.79	R 453,843.04	
		Grating	m2	3.83	2,994	16.47	R 2,400.74	R 7,187,789.83	
		Kick flats	m	34.77	329	84.13	R 469.86	R 154,772.67	
		Stair treads	No	225.13	51	99.06	R 399.04	R 20,298.22	
		Cat ladder	m	233.98	49	8.49	R 4,654.88	R 227,828.15	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	25.61	0.000	0.00	R 39,529.93	R -	
		Handrail	m	45.03	0	29.00	R 1,363.24	R -	
		Grating	m2	60.49	0	17.10	R 2,311.88	R -	
		Kick flats	m	45.58	0	78.44	R 503.97	R -	
		Cat ladder	m	20.33	0	8.64	R 4,574.85	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	66	0.00		R -	R 337,640.08
		Steel	t	17.07	3.867	0.00	R 39,529.93	R 152,858.99	
		Handrail	m	1.12	59	31.53	R 1,253.67	R 73,688.86	
		Grating	m2	1.97	34	16.58	R 2,383.68	R 79,888.30	
		Kick flats	m	1.19	56	80.69	R 489.89	R 27,268.58	
		Stair treads	No	6.24	11	106.30	R 371.86	R 3,935.35	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	398	0.00		R -	R 1,493,887.88
		Steel	t	12.56	31.701	0.00	R 39,529.93	R 1,253,119.25	
		Handrail	m	24.61	16	32.57	R 1,213.88	R 19,631.75	
		Grating	m2	7.33	54	17.00	R 2,325.39	R 126,188.74	
		Kick flats	m	23.02	17	83.78	R 471.81	R 8,158.79	
		Cat ladder	m	19.98	20	9.07	R 4,356.60	R 86,789.35	
	PIPING INSTALLATION	Pipe length	m	0.00	48,552	0.00		R -	R 45,905,078.90
		Total work units	WU	0.33	146,493	0.00	R 313.36	R 45,905,078.90	
		Pipe supports	kg	2.54	19,147	0.00		R -	
		WU for pipe supports	WU	0.16	23,544	0.00		R -	
		Number of welds	No	0.61	29,686	0.00		R -	
		Total fittings	No	0.38	18,346	0.00		R -	
		Stud bolts	No	0.35	6,473	0.00		R -	
		Support number	No	0.19	3,542	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	146,493	0.00	R 313.36		R 130,861.16

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	60.66	2,415	5.78	R 54.19	R 130,861.16	
DYE PENETRATION	Total work units	WU	0.00	146,493	0.00	R 313.36		R 55,242.41
TESTING (DP)	Number of examinations	No	167.73	873	4.95	R 63.25	R 55,242.41	
MAGNETIC PARTICLE	Total work units	WU	0.00	146,493	0.00	R 313.36		R 75,603.30
TESTING (MPI)	Number of examinations	No	294.75	497	2.06	R 152.12	R 75,603.30	
POST WELD HEAT	Total work units	WU	0.00	146,493	0.00	R 313.36		R 127,342.10
TREATMENT	Number of examinations	No	52.23	2,805	6.90	R 45.41	R 127,342.10	
MATERIAL HARDNESS	Total work units	WU	0.00	146,493	0.00	R 313.36		R 116,090.30
TEST (HT)	Number of examinations	No	112.25	1,305	3.52	R 88.95	R 116,090.30	
MECHANICAL	Total work units	WU	0.00	146,493	0.00	R 313.36		R 235,854.93
INSTALLATION	Mechanical equipment	t	263.02	557	0.74	R 423.46	R 235,854.93	
	Structural steel	t	217.02	675	54.52			
	Total work units	WU	0.00	146,493	0.00	R 313.36		R 2,876,437.79
PAINTING & INSULATION	Painting to piping	m2	17.76	8,246	0.33	R 122.78	R 1,012,530.25	
	Insulation to piping	m2	51.48	2,846	2.55	R 377.79	R 1,075,033.03	
	Mechanical equipment received	t	0.00	557	0.79	R 423.46	R 235,854.93	
	Painting to mechanical equipment	m2	0.25	2,215	3.62	R 116.98	R 259,132.43	
	Insulation to mechanical equipment	m2	0.70	798	1.15	R 368.23	R 293,887.15	
ELECTRICAL &	Electrical cable	m	24.21	34,522	0.00	R 56.06	R 1,935,303.32	R 5,114,364.50
INSTRUMENTATION -	Electrical cable terminations	No	308.79	1,426	0.42	R 134.39	R 191,655.24	
INSTALLATION ONLY	Electrical equipment	No	9.16	112	0.11	R 519.76	R 58,107.86	
	DB's	No	6.47	12	0.33	R 1,595.76	R 19,470.05	
	Rack	m	0.67	5,335	1.63	R 160.50	R 856,185.87	
	Support steel	kg	1.40	7,911	2.06	R 27.20	R 215,222.24	
	Instrumentation cable	m	27.52	27,855	0.35	R 28.50	R 793,867.50	
	Instruments	No	0.58	1,012	0.18	R 160.24	R 162,204.20	
	Hook-ups	No	4.03	1,756	0.16	R 176.55	R 310,032.70	
	Light fittings	No	10.25	451	0.02	R 315.20	R 142,009.55	
	Conduit	m	4.15	3,368	0.12	R 34.45	R 116,037.80	
	Instrument stands	No	0.00	244		R 1,287.10	R 314,268.16	

Induvidual marked cells indicate information collected from "Project information".

REFINERY 1A PROJECT - REQUEST TO WORK OVERTIME AUGUST 2011

				Normal	Normal	Normal	Normal	TOTAL
DATE		12-Sep-11		10-Aug	11-Aug	23-Aug	24-Aug	
CERTIFICATE NO.		NCE-011		041007	041008	041016	041017	
	INITIALS & SURNAME	DESIGNATION	TIME 1.5	Wednesday	Thursday	Tuesday	Wednesday	
1	S, MWALE	GENERAL WORKER	R 69.25	1.50	0.50	0.00	0.00	138.50
2	R, NXUMALO	GENERAL WORKER	R 69.25	1.50	0.50	0.00	0.00	138.50
3	SA, ZIQUBA	GENERAL WORKER	R 69.25	1.50	0.00	0.00	0.00	103.88
9	PP, DLAMINI	S/S BOILERMAKER	R 136.18	1.50	0.50	1.25	0.00	272.36
4	M, NGXEBA	GENERAL WORKER	R 69.25	1.50	0.00	1.25	0.00	103.88
5	MA, MOSIA	GENERAL WORKER	R 69.25	1.50	0.50	1.25	0.00	138.50
6	DSS, MAHLANGU	GENERAL WORKER	R 69.25	1.50	0.00	0.00	0.00	103.88
7	S, MABASO	S/S ELECTRICIAN	R 136.18	1.00	2.50	4.50	0.00	476.63
8	IB, MOTAUNG	S/S BOILERMAKER	R 136.18	1.50	0.50	0.00	0.00	272.36
10	HN, MANGANE	S/S ELECTRICIAN	R 136.18	1.50	0.50	4.50	0.00	272.36
11								
12								
28								2020.84
				14.50	5.50	12.75	0.00	

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project B				
Location:	South Africa				
Client:				Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,422	R	3.96
2	Concrete demolitions	m3	19	R	1,401.52
3	Bulk excavation	m3	6,845	R	32.34
4	Vertical piles	No	195		
5	Raking piles	No	4		
6	Concrete in piles	m3		R	1,329.64
7	Auger pile	m		R	287.49
8	Total paving and asphalt to road works	m2	5,212		
9	Grey paving to road works	m2	385	R	125.78
10	Asphalt to road surface	m2	4,827		
11	Rip bed of road works	m2	5,212	R	10.78
12	Total concrete in paving and bunding	m3	448	R	1,329.64
13	Concrete in paving	m3	238		
14	Rod reinforcement	t		R	10,421.53
15	Concrete in plinths and bases on area finishing	m3	212		
16	Stormwater pipe to drain surface run-off	m	80		
17	Machine excavation	m3		R	61.09
18	Concrete in pump and pipe support bases	m3	199	R	1,329.64
19	Concrete in tank bases	m3	120	R	1,329.64
20	Concrete in pipe and cable rack foundations	m3	130	R	1,329.64
21	Concrete to simple structural foundations	m3	122	R	1,329.64
22	Complex structural foundations - bases	m3	198	R	1,329.64
23	Concrete pipe racks - bases	m3	245	R	1,329.64
24	Concrete structure including concrete columns and beams - bases	m3	302	R	1,329.64
25	Major equipment bases with blast proof walls - bases	m3	1,550	R	1,329.64
26	Major equipment bases and elevated concrete structure - bases	m3	80	R	1,329.64
27	Concrete frame buildings with brick in-fill - all concrete	m3	455	R	1,329.64
28	One brick wall	m2		R	323.43
29	Concrete in structual steel buildings - all concrete	m3	90	R	1,329.64
30	Total building area - Structural steel buildings	m2	955		
31	Ceiling	m2		R	255.15
32	Structural steel	t		R	39,529.93
33	Steel canopy - concrete	m3	71	R	1,329.64
34	Steel canopy - area	m2	685		
35	Concrete in weighbridge - all concrete	m3	70	R	1,329.64
36	Total weighbridge area	m2	148		
37	Total control room area - weighbridge	m2	14		
38	Concrete in pump house - all concrete	m3	11	R	1,329.64
39	Total pump house area	m2	22		
40	Concrete in cooling tower	m3	0	R	1,329.64
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	3,885		
43	Concrete in cable tunnel	m3	0	R	1,329.64
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	65		
46	Total volume of steel pipe rack	m3	1,455		
47	Total volume of steel complex steel structure	m3	11,452		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	66		
50	Total volume of steel in cable gantry	m3	398		
51	Piping work unit cost	WU		R	313.36
52	Total process pipe length	m	48,552		
53	Total electrical cable - installation only	m	34,522	R	56.06
54	Total instrumentation cable - installation only	m	27,855	R	37.37

Ratio: Variable ratio

Variables

Material	Simple	Median
Labour	Simple	Median
Engineering design	Normal	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Few	Median
Weather	Normal	Median
Access	Poor	Median
Project size	Medium	Median
Project conditions	Normal	Median
Complexity	Simple	Median
Repitition	None	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project B			
Location:	South Africa			
Client:	0	Date of estimate:	2007	

	CIVIL CONSTRUCTION COST				R 64,275,475.70
A	SITE CLEARANCE AND DEMOLITIONS		R	95,620.00	
B	BULK EARTHWORKS		R	474,825.03	
C	PILING		R	6,029,068.62	
D	ROAD WORKS		R	2,064,775.35	
E	GENERAL PAVING AND BUNDED AREAS		R	1,213,038.56	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	951,951.95	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,205,015.50	
H	TANK BASES AND BUNDING		R	1,823,290.71	
I	RACK FOUNDATIONS		R	915,207.53	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,121,608.58	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	1,155,075.83	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	2,841,450.57	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,925,662.54	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	8,517,484.17	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,369,140.89	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	5,378,774.15	
Q	BUILDINGS - STEEL		R	3,162,767.60	
R	CANOPIES - STEEL		R	2,666,493.10	
S	WEIGHBRIDGE		R	621,530.59	
T	PUMP HOUSE		R	183,204.52	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	1,895,477.67	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	16,664,012.22	
	STRUCTURAL STEEL				R 29,344,138.77
A	STRUCTURAL STEEL - BASIC PLATFORM		R	480,457.66	
B	STRUCTURAL STEEL - PIPERACK		R	2,989,166.63	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	15,517,537.86	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	395,497.39	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,577,439.57	
	Preliminaries and General	40.00%	R	8,384,039.65	
	MECHANICAL AND PIPING				R 71,912,225.13
A	PIPING INSTALLATION		R	50,354,507.35	
B	RADIOGRAPHIC EXAMINATION (RT)		R	162,118.10	
C	DYE PENETRATION TESTING (DP)		R	104,858.71	
D	MAGNETIC PARTICLE TESTING (MPI)		R	94,684.02	
E	POST WELD HEAT TREATMENT		R	161,342.78	
F	MATERIAL HARDNESS TEST (HT)		R	196,130.78	
H	MECHANICAL INSTALLATION		R	292,233.36	
	Preliminaries and General	40.00%	R	20,546,350.04	
	PAINTING AND INSULATION				R 5,152,781.16
A	PAINTING AND INSULATION		R	3,816,874.94	
	Preliminaries and General	35.00%	R	1,335,906.23	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 7,511,050.53
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	5,563,741.13	
	Preliminaries and General	35.00%	R	1,947,309.40	

TOTAL COST	R	178,195,671.30

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,422		R 3.96	R 68,991.12	R 95,620.00
	Concrete demolitions	m3		19		R 1,401.52	R 26,628.88	
BULK EARTHWORKS	Bulk excavation	m3		6,845		R 32.34	R 221,367.30	R 474,825.03
	Trimming of sides	m2	2.19	3,128	4.19	R 7.71	R 24,115.41	
	Back fill and compact	m3	1.13	6,046	0.96	R 33.61	R 203,222.92	
	Overhaul	m3/km	1.68	4,066	11.26	R 2.87	R 11,682.52	
	Rip bed	m2	1.79	3,815	8.55	R 3.78	R 14,436.89	
PILING	Site establishment of rig	Item	0.00	1	192.93	R 256,529.34	R 256,529.34	R 6,029,068.62
	EO for raking equipment	Item	0.00	1	23.98	R 31,885.72	R 31,885.72	
	Number of piles	No	0.00	195	0.00		R -	
	Move rig to new position	No	1.48	132	0.19	R 252.63	R 33,237.80	
	Number of raking piles	No	19.06	10	0.00		R -	
	EO for setting up raking piles	No	0.93	11	0.26	R 348.56	R 3,821.97	
	EO for raking drilling	m	0.14	74	0.75	R 214.39	R 15,907.29	
	Auger quantity	m	0.05	4,266	0.00	R 287.49	R 1,226,324.53	
	EO for drilling in coarse gravel	m	0.54	359	0.22	R 291.57	R 104,597.76	
	EO for drilling in boulders	m	1.67	116	0.52	R 688.56	R 80,195.33	
	EO for drilling in soft rock	m	1.63	119	0.23	R 302.02	R 36,052.02	
	Temporary casings	m	0.37	524	0.31	R 411.24	R 215,485.90	
	EO casing to raking pile	m	0.17	61	0.56	R 926.95	R 56,728.12	
	Mild steel rod reinforcement	t	14.69	13.273	0.70	R 6,972.64	R 92,548.21	
	High tensile rod reinforcement	t	1.17	167.382	7.52	R 10,001.74	R 1,674,111.33	
	Concrete to piles and bases	m3	0.15	1,270	0.00	R 1,329.64	R 1,688,333.58	
	Concrete to raking piles	m3	0.07	138	1.06	R 1,413.22	R 194,596.04	
	Site establishment of test equipment	Item	0.00	1	108.37	R 144,088.34	R 144,088.34	
	Load test to pile	No	90.29	2	23.92	R 31,800.24	R 68,678.68	
	Site establishment of intergity testing	No	251.82	1	50.09	R 66,602.62	R 51,574.29	
	Integrity testing of piles	No	1.24	158	0.26	R 344.76	R 54,372.37	
ROAD WORKS	Red paving	m2	0.14	55	0.93	R 116.80	R 6,423.76	R 2,064,775.35
	Grey paving	m2	0.00	385	0.00	R 125.78	R 48,425.30	
	Kerbing	m	0.10	525	0.00	R 248.91	R 130,657.02	
	Total paving and asphalt	m2	0.00	5,212	0.00		R -	
	Remove top soil	m3	0.50	555	4.84	R 52.21	R 28,970.07	
	Asphalt	m2	0.21	1,102	0.00	R 151.61	R 167,064.12	
	Rip bed	m2	0.00	5,212	0.00	R 10.78	R 56,185.36	
	Reduce levels	m3	0.37	1,943	4.34	R 46.82	R 90,993.97	
	Selected fill	m3	1.48	1,312	0.45	R 103.23	R 135,421.06	
	Imported fill	m3	1.84	714	0.32	R 321.17	R 229,328.90	
	Wearing course	m3	3.92	496	0.19	R 242.79	R 120,318.54	
	Prime	m2	4.40	5,776	1.47	R 33.26	R 192,121.64	
	Three line road marking	m	0.78	4,493	0.10	R 25.78	R 115,818.47	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.99	520	4.08	R 8.18	R 4,256.22	
	1m Wide concrete V-drain	m	0.95	499	0.78	R 1,065.32	R 532,050.32	
	200mm Diameter PVC pipe	m	0.93	488	0.09	R 337.80	R 164,907.82	
	Road marking - STOP	No	0.16	85	0.03	R 383.85	R 32,526.53	
	Standard signage	No	0.01	5	4.28	R 459.77	R 2,413.42	
	100mm Painted line	m	1.68	881	1.36	R 7.82	R 6,892.82	
			0.00		1.54			
			0.00		1.85			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.93	238	0.75	R 1,329.64	R 316,454.32	R 1,213,038.56
		Concrete in plinths	m3	0.00	48	0.00	R 1,329.64	R 64,208.12	
		Total concrete	m3	0.00	448	0.00		R -	
		Rip and compact	m2	0.13	1,831	190.95	R 6.96	R 12,748.27	
		Formwork to plinth	m2	7.20	347	0.12	R 158.61	R 55,112.78	
		Formwork to slab	m2	0.81	194	0.15	R 201.35	R 39,020.76	
		High tensile steel	t	0.01	4.480	0.00	R 10,421.53	R 46,688.45	
		Mesh	m2	567.57	2,543	46.78	R 222.78	R 566,462.96	
		Construction joint	m	3.96	944	0.05	R 61.73	R 58,245.36	
		Expansion joint	m	2.18	518	0.08	R 104.47	R 54,097.54	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	11.99	7,043	0.00		R -	R 951,951.95
		Base excavation	m3	1.44	507	0.00	R 61.09	R 30,994.04	
		Backfill	m3	0.56	352	0.63	R 96.64	R 33,998.10	
		Working space	m2	0.42	914	1.33	R 72.82	R 66,565.97	
		Concrete in bases	m3	0.05	212	24.10	R 1,329.64	R 281,883.68	
		Blinding	m2	0.74	323	18.60	R 71.49	R 23,110.05	
		Concrete in sump walls	m3	0.11	23	30.42	R 1,329.64	R 30,403.17	
		Concrete in slabs	m3	0.02	3	0.88	R 1,329.64	R 4,228.26	
		Total concrete	m3	0.00	238	0.03		R -	
		Wood float	m2	0.61	393	126.76	R 10.49	R 4,127.24	
		Formwork to bases	m2	1.73	367	0.12	R 160.51	R 58,843.07	
		Formwork to sump walls	m2	11.44	262	0.12	R 155.76	R 40,736.09	
		Formwork to sides of slab	m2	5.82	19	0.18	R 236.49	R 4,377.86	
		Mild steel reinforcement	t	0.09	2.110	0.00	R 10,421.53	R 21,989.96	
		High tensile reinforcement	t	9.59	24.824	0.88	R 10,421.53	R 258,705.46	
		Cast in steel	kg	0.45	476	32.82	R 40.51	R 19,300.20	
		Waterstop	m	0.43	53	8.25	R 161.22	R 8,559.06	
		Manhole	No	0.08	6	2.71	R 4,141.22	R 24,847.32	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	80	0.12	R 491.03	R 39,282.43	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.64	327	0.05	R 61.09	R 19,972.07	R 1,205,015.50
		Working space	m2	0.33	989	0.67	R 40.84	R 40,375.49	
		Backfill	m3	4.28	76	1.22	R 74.44	R 5,681.57	
		Concrete bases	m3	0.94	199	0.00	R 1,329.64	R 264,598.36	
		Concrete plinth	m3	1.97	101	0.00	R 1,329.64	R 134,508.97	
		Total concrete	m3	0.00	300	0.00		R -	
		Wood float	m2	0.48	210	0.05	R 13.30	R 2,785.69	
		Blinding	m2	0.94	211	0.01	R 70.28	R 14,844.79	
		Formwork bases	m2	0.47	421	0.13	R 169.05	R 71,145.78	
		Formwork plinth	m2	0.55	184	0.12	R 157.66	R 29,035.75	
		High tensile reinforcement	t	9.58	31.330	6.77	R 10,421.53	R 326,504.54	
		Cast in steel	kg	0.10	2,939	0.03	R 37.99	R 111,638.41	
		HD Bolts	kg	0.08	4,002	0.03	R 39.89	R 159,642.93	
		Grout	m3	33.93	2.981	6.13	R 8,144.99	R 24,281.15	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.70	683	0.05	R 60.78	R 41,544.68	R 1,823,290.71
		Working space	m2	3.95	173	1.52	R 39.95	R 6,919.26	
		Backfill	m3	1.31	523	0.71	R 85.52	R 44,719.54	
		Concrete bases	m3	0.68	120	0.00	R 1,329.64	R 159,556.80	
		Concrete sump wall	m3	2.59	46	0.00	R 1,329.64	R 61,724.10	
		Concrete slab	m3	0.54	222	0.00	R 1,329.64	R 295,085.23	
		Concrete plinth	m3	3.63	33	20.05	R 1,329.64	R 43,981.00	
		Concrete column	m3	19.05	6	161.89	R 1,329.64	R 8,377.57	
		Total concrete	m3	0.00	428	1.01		R -	
		Blinding	m2	2.51	170	0.98	R 66.33	R 11,299.32	
		Wood float	m2	0.26	1,641	1.07	R 8.21	R 13,474.76	
		Formwork to bases	m2	0.38	318	1.09	R 176.16	R 55,945.35	
		Formwork to plinths	m2	0.34	98	7.55	R 182.21	R 17,801.72	
		Formwork to columns	m2	0.11	55	7.30	R 197.09	R 10,933.90	
		Formwork to sumps	m2	0.11	430	6.75	R 184.42	R 79,372.60	
		Formwork to slabs	m2	3.84	58	7.21	R 169.10	R 9,785.92	
		Formwork to slabs n/e 300mm	m	2.02	110	7.86	R 57.80	R 6,347.56	
		Mild steel reinforcement	t	0.22	4.090	23.01	R 10,421.53	R 42,625.81	
		High tensile reinforcement	t	22.48	19.024	0.88	R 10,421.53	R 198,259.59	
		Mesh	m2	0.15	1,487	54.52	R 191.16	R 284,172.58	
		Cast in items	kg	0.19	2,286	218.22	R 47.76	R 109,154.14	
		HD Bolts	kg	0.10	4,436	207.82	R 50.15	R 222,438.22	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	203.32	2.104	0.16	R 8,347.52	R 17,560.96	
	Construction joint	m	0.29	765	24.23	R 54.88	R 41,994.85	
	Expansion joint	m	0.45	492	16.25	R 81.80	R 40,215.23	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.31	430	0.05	R 59.83	R 25,740.93	R 915,207.53
	Working space	m2	0.31	1,404	1.48	R 88.77	R 124,624.49	
	Backfill	m3	2.40	179	0.82	R 73.42	R 13,159.98	
	Blinding	m2	0.40	327	24.10	R 55.17	R 18,058.76	
	Concrete bases	m3	5.57	130	0.00	R 1,329.64	R 172,853.20	
	Concrete plinth	m3	0.00	23	0.00	R 1,329.64	R 31,040.85	
	Total concrete	m3	0.00	153	1.31		R -	
	Wood float	m2	0.36	363	179.45	R 7.41	R 2,686.26	
	Formwork bases	m2	0.48	269	10.11	R 131.58	R 35,426.03	
	Formwork plinths	m2	0.09	259	7.04	R 188.91	R 49,001.19	
	High tensile reinforcement	t	9.22	16.634	0.00	R 10,421.53	R 173,355.79	
	HD Bolts	kg	0.03	5,056	205.87	R 50.62	R 255,921.81	
	Grout	m3	74.66	1.741	0.17	R 7,660.48	R 13,338.25	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.84	469	0.05	R 71.23	R 33,401.20	R 1,121,608.58
	Working space	m2	0.45	1,042	1.89	R 37.62	R 39,198.36	
	Backfill	m3	2.49	188	0.77	R 93.03	R 17,508.42	
	Blinding	m2	0.34	357	22.40	R 59.36	R 21,167.33	
	Concrete bases	m3	0.00	122	0.00	R 1,329.64	R 162,216.08	
	Concrete plinth	m3	2.42	38	0.00	R 1,329.64	R 50,144.07	
	Concrete slab	m3	3.24	50	0.00	R 1,329.64	R 67,090.85	
	Total concrete	m3	0.00	210	0.00		R -	
	Wood float	m2	0.52	406	152.56	R 8.72	R 3,537.28	
	Formwork bases	m2	0.48	254	8.02	R 165.81	R 42,142.18	
	Formwork plinths	m2	0.10	394	7.57	R 175.65	R 69,206.51	
	High tensile reinforcement	t	12.82	16.399	0.00	R 10,421.53	R 170,907.16	
	HD Bolts	kg	0.02	5,693	185.11	R 56.30	R 320,529.65	
	Cast in items	kg	0.05	2,440	231.41	R 45.03	R 109,883.16	
	Grout	m3	67.28	1.813	0.16	R 8,093.46	R 14,676.33	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.06	408	0.05	R 70.28	R 28,705.96	R 1,155,075.83
	Working space	m2	0.51	808	1.64	R 42.89	R 34,641.88	
	Backfill	m3	2.13	191	0.78	R 90.27	R 17,280.90	
	Blinding	m2	0.66	302	21.26	R 62.53	R 18,903.24	
	Concrete bases	m3	0.00	198	0.00	R 1,329.64	R 263,268.72	
	Concrete column	m3	25.91	8	0.00	R 1,329.64	R 10,160.05	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.76	42	0.00	R 1,329.64	R 55,350.08	
	Total concrete	m3	0.00	247	0.00		R -	
	Wood float	m2	0.58	425	153.94	R 8.64	R 3,668.76	
	Formwork bases	m2	0.49	408	7.62	R 174.51	R 71,138.41	
	Formwork plinths	m2	0.32	131	7.48	R 177.66	R 23,319.16	
	Formwork to columns	m2	0.28	27	7.68	R 173.21	R 4,679.18	
	High tensile reinforcement	t	8.99	27.496	0.00	R 10,421.53	R 286,552.10	
	HD bolts	kg	0.04	6,073	199.55	R 52.23	R 317,184.58	
	Grout	m3	100.27	2.466	0.16	R 8,200.42	R 20,222.80	
	Restricted excavation	m3	2.66	652	0.05	R 67.43	R 43,992.47	R 2,841,450.57
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.28	2,306	2.03	R 33.24	R 76,669.19	
	Backfill	m3	1.92	341	0.81	R 83.62	R 28,486.80	
	Blinding	m2	0.68	363	20.53	R 64.77	R 23,510.83	
	Concrete bases	m3	0.00	245	0.00	R 1,329.64	R 325,761.80	
	Concrete column	m3	1.07	222	150.53	R 1,329.64	R 295,634.51	
	Concrete beam	m3	2.51	89	0.90	R 1,329.64	R 117,816.20	
	Total concrete	m3	2.77	556	0.90		R -	
	Wood float	m2	0.45	544	7.28	R 8.83	R 4,801.58	
	Formwork bases	m2	0.46	529	6.45	R 182.75	R 96,733.64	
	Formwork to columns	m2	0.15	1,461	7.54	R 176.28	R 257,612.95	
	Formwork to sides beams	m2	0.32	279	6.04	R 206.12	R 57,589.36	
	Formwork to soffits beams	m2	0.66	134	6.45	R 220.14	R 29,458.89	
	Formwork corbels	m2	10.36	21	5.02	R 264.87	R 5,684.88	
	High tensile reinforcement	t	8.76	63.459	0.00	R 10,421.53	R 661,343.68	
	Cast in steel	kg	0.03	18,532	245.23	R 42.50	R 787,538.64	
	HD bolts	kg	1.46	382	207.42	R 50.24	R 19,188.65	
	Grout	m3	473.59	1.174	0.16	R 8,200.42	R 9,626.50	
	Restricted excavation	m3	3.69	1,115	0.05	R 65.53	R 73,098.52	R 3,925,662.54
	Working space	m2	0.61	1,826	1.68	R 38.92	R 71,094.98	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.14	980	0.77	R 85.34	R 83,664.34	
	Blinding	m2	0.62	486	20.48	R 64.93	R 31,554.79	
	Concrete bases	m3	0.00	302	0.94	R 1,329.64	R 401,551.28	
	Concrete column	m3	2.11	143	1.10	R 1,329.64	R 190,308.66	
	Concrete beam	m3	0.85	169	0.99	R 1,329.64	R 224,080.85	
	Concrete surface slab	m3	1.64	185	0.95	R 1,329.64	R 245,382.71	
	Concrete wall	m3	2.29	63	1.03	R 1,329.64	R 83,104.22	
	Concrete elevated slab	m3	1.08	133	0.00	R 1,329.64	R 176,913.76	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	994	0.00		R -	
		Wood float	m2	0.61	1,618	159.02	R 8.36	R 13,526.43	
		Formwork bases	m2	0.40	751	7.54	R 176.45	R 132,506.21	
		Formwork to columns	m2	0.16	899	6.14	R 216.43	R 194,473.67	
		Formwork to sides beams	m2	0.28	613	4.78	R 278.33	R 170,570.46	
		Formwork to soffits beams	m2	0.78	215	7.34	R 181.11	R 38,953.42	
		Formwork to soffts of slabs	m2	0.29	627	3.00	R 235.39	R 147,616.93	
		Formwork to pockets	m2	25.85	6	5.65	R 442.58	R 2,450.31	
		Formwork wall	m2	0.12	512	7.95	R 167.28	R 85,598.45	
		High tensile reinforcement	t	8.97	110.734	0.00	R 10,421.53	R 1,154,018.02	
		Cast in steel	kg	0.21	4,638	234.66	R 44.41	R 205,957.47	
		HD bolts	kg	0.38	2,635	196.24	R 53.11	R 139,934.18	
		Steel handrailing	m	2.46	45	8.99	R 1,159.14	R 52,116.97	
		Grout	m3	1,001.68	0.992	0.18	R 7,243.18	R 7,185.90	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.33	1,169	0.04	R 55.09	R 64,369.76	R 8,517,484.17
		Working space	m2	7.72	151	1.44	R 38.39	R 5,812.10	
		Backfill	m3	4.65	251	0.70	R 38.76	R 9,745.50	
		Blinding	m2	1.14	1,362	18.96	R 70.14	R 95,544.38	
		Concrete bases	m3	0.00	1,550	0.00	R 1,329.64	R 2,060,942.00	
		Concrete column	m3	26.97	57	0.00	R 1,329.64	R 76,418.12	
		Concrete beam	m3	1.38	42	0.00	R 1,329.64	R 55,432.83	
		Concrete wall	m3	11.35	137	0.00	R 1,329.64	R 181,649.38	
		Concrete elevated slabs	m3	11.45	5	0.00	R 1,329.64	R 6,673.24	
		Total concrete	m3	0.00	1,791	0.00		R -	
		Wood float	m2	0.87	2,069	163.23	R 8.15	R 16,850.75	
		Formwork bases	m2	8.50	182	7.27	R 183.00	R 33,368.14	
		Formwork to columns	m2	0.15	396	5.92	R 217.95	R 86,386.85	
		Formwork to sides beams	m2	0.18	235	5.09	R 224.66	R 52,872.09	
		Formwork to soffits beams	m2	0.52	80	6.10	R 261.19	R 20,998.09	
		Formwork to soffts of slabs	m2	0.14	36	3.14	R 267.76	R 9,648.25	
		Formwork to pockets	m2	428.83	4	4.97	R 423.64	R 1,531.25	
		Formwork wall	m2	0.11	1,258	6.83	R 194.82	R 245,140.87	
		High tensile reinforcement	t	4.32	414.331	0.00	R 10,421.53	R 4,317,961.53	
		Cast in steel	kg	0.16	10,996	206.13	R 50.56	R 555,940.57	
		HD bolts	kg	0.24	7,620	178.50	R 58.38	R 444,907.85	
		Galvanised grating	m2	18.99	94	0.16	R 1,693.57	R 159,737.68	
		Grout	m3	806.59	1.922	6.15	R 8,093.46	R 15,552.96	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.46	117	0.05	R 65.53	R 7,635.44	R 1,369,140.89
	Working space	m2	0.37	314	1.56	R 42.07	R 13,221.09	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.01	58	0.77	R 85.11	R 4,926.41	
	Blinding	m2	4.86	16	19.67	R 67.61	R 1,113.73	
	Concrete bases	m3	0.00	80	0.00	R 1,329.64	R 106,371.20	
	Concrete column	m3	5.92	14	0.00	R 1,329.64	R 17,983.30	
	Concrete beam	m3	1.77	8	0.00	R 1,329.64	R 10,135.51	
	Concrete wall	m3	34.57	2	0.00	R 1,329.64	R 3,077.36	
	Concrete elevated slabs	m3	24.54	1	0.00	R 1,329.64	R 732.94	
	Total concrete	m3	0.00	104	0.00		R -	
	Wood float	m2	4.61	17	152.25	R 8.73	R 151.51	
	Formwork bases	m2	1.41	57	7.34	R 181.27	R 10,305.90	
	Formwork to columns	m2	0.14	100	7.35	R 209.27	R 20,855.75	
	Formwork to sides beams	m2	0.23	33	6.10	R 180.94	R 5,996.74	
	Formwork to soffits beams	m2	0.72	11	6.35	R 217.82	R 2,296.99	
	Formwork to soffts of slabs	m2	0.23	2	3.49	R 226.27	R 538.94	
	Formwork to pockets	m2	2.90	28	5.88	R 381.53	R 10,527.62	
	Formwork wall	m2	0.29	8	7.43	R 179.08	R 1,436.25	
	High tensile reinforcement	t	7.13	14.581	0.00	R 10,421.53	R 151,954.50	
	Cast in steel	kg	0.02	5,393	188.37	R 55.33	R 298,389.13	
	HD bolts	kg	0.01	9,101	200.04	R 52.10	R 474,157.52	
	Galvanised grating	m2	3.73	28	0.17	R 8,023.69	R 223,917.06	
	Grout	m3	39.05	2.049	6.25	R 1,667.25	R 3,416.00	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.71	776	0.05	R 65.53	R 50,859.58	R 5,378,774.15
	Working space	m2	2.29	339	1.68	R 39.11	R 13,253.71	
	Backfill	m3	1.20	649	0.74	R 88.13	R 57,237.70	
	Blinding	m2	3.87	117	21.06	R 63.14	R 7,417.72	
	Concrete	m3	0.00	455	0.00	R 1,329.64	R 604,986.20	
	Mesh reinforcement	m2	0.42	1,074	65.17	R 159.92	R 171,787.79	
	Rough formwork	m2	2.85	160	7.96	R 167.10	R 26,690.78	
	Smooth formwork	m2	0.57	802	6.56	R 202.69	R 162,610.72	
	Finish to concrete	m2	0.23	2,009	105.57	R 12.59	R 25,309.10	
	Construction joints	m	4.69	97	20.18	R 65.88	R 6,395.73	
	Movement joints	m	15.30	30	15.97	R 83.25	R 2,476.58	
	Cast in steel	kg	2.33	195	227.18	R 45.87	R 8,952.60	
	Grout	m3	809.27	0.562	0.16	R 8,200.42	R 4,610.58	
	Brick walls	m2	0.46	980	0.00	R 323.43	R 316,961.40	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.38	1,992	0.00		R -	
	Waterproofing membrane	m2	2.01	989	11.39	R 116.76	R 115,482.14	
	Roof construction	m2	2.02	985	36.90	R 282.43	R 278,060.19	
	Ceiling	m2	0.97	2,063	0.00	R 255.15	R 526,369.54	
	Doors and windows	No	450.57	4	0.16	R 2,067.59	R 9,142.10	
	Floor finish	m2	1.01	1,977	0.76	R 423.58	R 837,289.20	
	Wall finsih	m2	1.01	1,982	1.35	R 239.45	R 474,673.06	
	Rod reinforcement	t	8.67	53	0.00	R 10,421.53	R 547,235.56	
	Metalwork	Item	0.00	1	4.38	R 45,683.52	R 45,683.52	
	Structural steel	Item	0.00	1	11.35	R 118,284.37	R 118,284.37	
	Plumbing and drainage	Item	0.00	1	7.23	R 75,317.89	R 75,317.89	
	Small power and lighting	Item	0.00	1	61.57	R 641,668.49	R 641,668.49	
	External works	Item	0.00	1	188.03	R 250,017.91	R 250,017.91	
BUILDINGS - STEEL	Concrete	m3	0.00	90	0.16	R 1,329.64	R 119,667.60	R 3,162,767.60
	Earthworks	m3	2.25	203	8.63	R 154.14	R 31,212.47	
	Reinforcement	t	8.20	11	0.00	R 10,421.53	R 114,342.81	
	Mesh	m2	0.11	813	9.39	R 141.62	R 115,126.00	
	Formwork	m2	0.38	235	7.23	R 183.91	R 43,151.12	
	Brickwork	m2	5.78	165	5.85	R 227.43	R 37,604.61	
	Roof covering	m2	0.86	1,110	202.03	R 195.67	R 217,101.20	
	Structural steel	t	17.97	53	0.00	R 39,529.93	R 2,100,867.21	
	Side cladding	m2	1.50	638	0.94	R 184.63	R 117,825.70	
	Doors	No	368.13	3	0.49	R 19,426.14	R 50,395.04	
	Ridge ventilator	m	20.59	46	11.10	R 2,171.21	R 100,718.30	
	Aluminium insulation	m2	0.92	1,037	1.77	R 110.64	R 114,755.56	
	Total building area	m2	0.00	955	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.91	207	0.12	R 158.61	R 32,801.98	R 2,666,493.10
	Concrete	m3	0.00	71	0.00	R 1,329.64	R 94,404.44	
	Reinforcement	t	10.44	7	0.16	R 10,421.53	R 70,869.54	
	Mesh	m2	0.11	650	10.09	R 131.72	R 85,576.29	
	Formwork	m2	0.40	180	7.97	R 166.80	R 29,981.90	
	Brickwork	m2	5.72	120	5.34	R 249.00	R 29,811.16	
	Screed	m2	1.06	644	40.73	R 32.64	R 21,023.15	
	Structural steel	t	15.04	46	0.00	R 39,529.93	R 1,800,826.70	
	Cat ladders	m	2.53	18	10.09	R 3,918.01	R 70,588.88	
	Hand rail	m	0.71	64	26.29	R 1,503.45	R 96,176.07	
	Kick plates	m	0.72	63	2.77	R 543.18	R 34,164.93	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.85	810	194.89	R 202.83	R 164,284.67	
		Side cladding	m2	4.48	153	0.88	R 178.78	R 27,331.32	
		Floor grating	m2	1.03	44	16.17	R 2,444.65	R 108,652.08	
		Total buiding area	m2	0.00	685	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.37	236	8.44	R 157.47	R 37,195.28	R 621,530.59
		Blinding	m2	0.51	138	20.74	R 64.11	R 8,849.59	
		Concrete	m3	0.00	70	0.00	R 1,329.64	R 93,074.80	
		Reinforcement	t	8.01	9	0.00	R 10,421.53	R 91,082.67	
		Mesh	m2	0.52	135	48.46	R 215.06	R 29,110.84	
		Formwork	m2	0.34	207	7.95	R 167.31	R 34,591.61	
		Finish to concrete	m2	0.46	151	109.20	R 12.18	R 1,841.45	
		Movement joints	m	2.57	27	15.72	R 84.59	R 2,307.76	
		Cast in steel	kg	0.09	817	200.05	R 52.09	R 42,543.49	
		Grout	m3	71.67	0.977	2.72	R 7,854.41	R 7,671.17	
		Brickwork	m2	0.24	57	0.17	R 323.43	R 18,535.75	
		Doors and windows	No	2.85	5	0.27	R 4,116.38	R 20,210.69	
		Pipework	m	2.86	52	0.22	R 488.84	R 25,315.49	
		Bolts	kg	0.11	632	0.08	R 52.09	R 32,936.89	
		Structural steel	t	4.38	3	0.00	R 39,011.07	R 124,591.34	
		Miscellaneous steel	t	137.02	1	0.00	R 47,836.53	R 51,671.76	
		Total bridge area	m2	0.00	148	0.00		R -	
		Total control room area	m2	0.00	14	0.00		R -	
	PUMP HOUSE	Earthworks	m3	9.31	102	7.03	R 189.12	R 19,357.25	R 183,204.52
		Blinding	m2	0.78	14	17.23	R 77.19	R 1,091.52	
		Concrete	m3	0.00	11	0.00	R 1,329.64	R 14,626.04	
		Reinforcement	t	5.70	2	0.00	R 10,421.53	R 20,126.86	
		Formwork	m2	0.07	164	5.89	R 225.80	R 36,992.78	
		Finish to concrete	m2	0.34	32	88.60	R 15.01	R 487.59	
		Movement joints	m	0.44	25	15.30	R 86.90	R 2,158.60	
		Cast in steel	kg	25.95	0.424	177.71	R 58.64	R 24.86	
		Grout	m3	25.60	0.430	0.76	R 8,310.25	R 3,571.21	
		Bolts	kg	109.99	0.100	0.16	R 44.28	R 4.43	
		Structural steel	t	42.54	0.517	0.25	R 41,449.27	R 21,435.92	
		Miscellaneous steel	t	24.08	0.914	0.19	R 55,687.56	R 50,872.82	
		Brickwork	m2	0.56	39	5.14	R 258.94	R 10,108.05	
		Roof covering	m2	1.83	12	1.33	R 195.42	R 2,346.61	
		Total pump house area	m2	0.00	22	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.90	0	6.46	R 205.69	R -	R -
	Blinding	m2	1.18	0	18.70	R 71.11	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	5.39	0.000	0.00	R 10,421.53	R -	
	Formwork	m2	0.21	0	6.71	R 198.28	R -	
	Movement joint	m	1.73	0	0.12	R 94.26	R -	
	Cast in steel	kg	0.15	0	14.11	R 49.91	R -	
	Bolts	kg	0.39	0	208.80	R 57.48	R -	
	Chemical anchors	No	7.06	0	0.25	R 253.09	R -	
	Miscellaneous steelwork	t	86.99	0.000	181.30	R 42,290.27	R -	
	Pre-cast concrete	m3	33.37	0	41.18	R 3,730.45	R -	
	Brickwork	m2	8.38	0	0.36	R 272.95	R -	
	Total area	m2	0.00	0	4.87		R -	
EMERGENCY DAM	Earthworks	m3	0.64	6,030	1.80	R 112.61	R 679,004.18	R 1,895,477.67
	Lining	m2	0.81	4,788	1.51	R 62.68	R 300,117.07	
	Paving	m2	0.76	5,083	0.58	R 107.68	R 547,338.10	
	Pipework	m	29.11	133	0.28	R 399.11	R 53,271.26	
	Manholes	No	17.39	8	0.11	R 3,514.16	R 26,970.48	
	Concrete	m3	2.82	47	0.05	R 1,329.64	R 62,838.75	
	Formwork	m2	0.09	547	5.76	R 230.70	R 126,147.47	
	Mesh	m2	0.77	61	7.13	R 186.45	R 11,411.78	
	Reinforcement	t	5.57	8.480	0.13	R 10,421.53	R 88,378.59	
	Dam area (to top of berm)	m2	0.00	3,885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.35	0	5.48	R 242.73	R -	R -
	Blinding	m2	0.87	0	13.09	R 101.58	R -	
	Concrete	m3	0.00	0	0.00	R 1,329.64	R -	
	Reinforcement	t	4.72	0.000	0.00	R 10,421.53	R -	
	Mesh	m2	0.98	0	39.24	R 265.57	R -	
	Formwork	m2	0.15	0	5.28	R 251.89	R -	
	Cast in steel	kg	0.03	0	157.81	R 66.04	R -	
	Miscellaneous steelwork	t	12.99	0.000	0.18	R 59,309.52	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	65	0.00		R -	R 480,457.66
	Steel	t	8.57	7.584	0.00	R 39,529.93	R 299,793.62	
	Handrail	m	1.40	46	26.01	R 1,520.05	R 70,573.65	
	Grating	m2	1.82	36	16.62	R 2,378.76	R 84,756.21	
	Kick flats	m	1.64	40	76.65	R 515.71	R 20,386.46	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.77	11	89.94	R 439.53	R 4,947.72	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,455	0.00		R -	R 2,989,166.63
		Steel	t	23.70	61.396	0.00	R 39,529.93	R 2,426,983.77	
		Handrail	m	12.61	115	28.68	R 1,378.55	R 159,009.45	
		Grating	m2	12.06	121	17.01	R 2,324.51	R 280,427.84	
		Kick flats	m	12.40	117	81.29	R 486.29	R 57,060.80	
		Cat ladder	m	98.06	15	8.93	R 4,426.64	R 65,684.77	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	11,452	0.00		R -	R 15,517,537.86
		Steel	t	64.13	178.587	0.00	R 39,529.93	R 7,059,519.94	
		Handrail	m	30.26	378	29.07	R 1,359.69	R 514,626.04	
		Grating	m2	3.71	3,087	16.27	R 2,429.83	R 7,500,393.63	
		Kick flats	m	32.79	349	79.59	R 496.70	R 173,453.69	
		Stair treads	No	217.77	53	92.34	R 428.07	R 22,511.56	
		Cat ladder	m	227.50	50	8.06	R 4,907.50	R 247,033.01	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	22.38	0.000	0.00	R 39,529.93	R -	
		Handrail	m	44.36	0	24.27	R 1,628.57	R -	
		Grating	m2	57.63	0	16.40	R 2,410.89	R -	
		Kick flats	m	43.07	0	75.30	R 524.95	R -	
		Cat ladder	m	19.49	0	8.64	R 4,576.36	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	66	0.00		R -	R 395,497.39
		Steel	t	13.76	4.796	0.00	R 39,529.93	R 189,595.93	
		Handrail	m	1.12	59	27.33	R 1,446.17	R 84,895.67	
		Grating	m2	1.93	34	15.80	R 2,501.22	R 85,533.81	
		Kick flats	m	1.08	61	79.21	R 499.04	R 30,557.72	
		Stair treads	No	5.54	12	95.83	R 412.50	R 4,914.27	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	398	0.00		R -	R 1,577,439.57
		Steel	t	12.00	33.161	0.00	R 39,529.93	R 1,310,841.93	
		Handrail	m	22.56	18	26.98	R 1,465.16	R 25,843.98	
		Grating	m2	7.01	57	16.21	R 2,438.51	R 138,420.51	
		Kick flats	m	22.47	18	80.79	R 489.29	R 8,667.70	
		Cat ladder	m	19.57	20	8.58	R 4,606.45	R 93,665.46	
	PIPING INSTALLATION	Pipe length	m	0.00	48,552	0.00		R -	R 50,354,507.35
		Total work units	WU	0.30	160,692	0.00	R 313.36	R 50,354,507.35	
		Pipe supports	kg	2.35	20,673	0.00		R -	
		WU for pipe supports	WU	0.16	25,022	0.00		R -	
		Number of welds	No	0.57	27,501	0.00		R -	
		Total fittings	No	0.38	18,415	0.00		R -	
		Stud bolts	No	0.36	6,551	0.00		R -	
		Support number	No	0.18	3,647	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	160,692	0.00	R 313.36		R 162,118.10

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	57.02	2,818	5.45	R 57.53	R 162,118.10	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	160,692	0.00	R 313.36		R 104,858.71
	Number of examinations	No	161.69	994	2.97	R 105.51	R 104,858.71	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	160,692	0.00	R 313.36		R 94,684.02
	Number of examinations	No	277.30	579	1.92	R 163.39	R 94,684.02	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	160,692	0.00	R 313.36		R 161,342.78
	Number of examinations	No	47.34	3,395	6.59	R 47.53	R 161,342.78	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	160,692	0.00	R 313.36		R 196,130.78
	Number of examinations	No	105.31	1,526	2.44	R 128.54	R 196,130.78	
MECHANICAL INSTALLATION	Total work units	WU	0.00	160,692	0.00	R 313.36		R 292,233.36
	Mechanical equipment	t	240.75	667	0.72	R 437.83	R 292,233.36	
	Structural steel	t	199.68	805	54.91			
PAINTING & INSULATION	Total work units	WU	0.00	160,692	0.00	R 313.36		R 3,816,874.94
	Painting to piping	m2	16.72	9,608	0.31	R 134.24	R 1,289,842.73	
	Insulation to piping	m2	47.32	3,396	2.33	R 432.04	R 1,467,163.05	
	Mechanical equipment received	t	0.00	667	0.79	R 437.83	R 292,233.36	
	Painting to mechanical equipment	m2	0.24	2,823	3.22	R 135.94	R 383,775.84	
	Insulation to mechanical equipment	m2	0.68	986	1.12	R 389.43	R 383,859.95	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.58	34,522	0.00	R 56.06	R 1,935,303.32	R 5,563,741.13
	Electrical cable terminations	No	279.48	1,529	0.38	R 147.53	R 225,520.78	
	Electrical equipment	No	8.46	124	0.09	R 599.11	R 74,004.54	
	DB's	No	6.11	15	0.30	R 2,011.42	R 29,365.90	
	Rack	m	0.60	5,650	1.60	R 171.36	R 968,211.84	
	Support steel	kg	1.35	9,361	1.97	R 28.42	R 266,001.15	
	Instrumentation cable	m	25.29	27,855	0.33	R 28.50	R 793,867.50	
	Instruments	No	0.48	1,101	0.16	R 178.13	R 196,174.44	
	Hook-ups	No	3.68	2,291	0.16	R 181.36	R 415,509.28	
	Light fittings	No	10.22	455	0.02	R 350.38	R 159,422.92	
	Conduit	m	4.11	3,378	0.12	R 35.08	R 118,511.42	
	Instrument stands	No	0.00	268		R 1,425.00	R 381,848.05	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project C				
Location:	South Africa				
Client:				Date of estimate:	2010

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	15,442	R	6.10
2	Concrete demolitions	m3	102	R	1,945.00
3	Bulk excavation	m3	6,552	R	48.22
4	Vertical piles	No	0		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,745.00
7	Auger pile	m		R	395.00
8	Total paving and asphalt to road works	m2	3,855		
9	Grey paving to road works	m2	202	R	166.00
10	Asphalt to road surface	m2	3,653		
11	Rip bed of road works	m2	3,855	R	14.50
12	Total concrete in paving and bunding	m3	399	R	1,745.00
13	Concrete in paving	m3	221		
14	Rod reinforcement	t		R	14,221.00
15	Concrete in plinths and bases on area finishing	m3	245		
16	Stormwater pipe to drain surface run-off	m	122		
17	Machine excavation	m3		R	88.00
18	Concrete in pump and pipe support bases	m3	184	R	1,745.00
19	Concrete in tank bases	m3	60	R	1,745.00
20	Concrete in pipe and cable rack foundations	m3	145	R	1,745.00
21	Concrete to simple structural foundations	m3	255	R	1,745.00
22	Complex structural foundations - bases	m3	65	R	1,745.00
23	Concrete pipe racks - bases	m3	42	R	1,745.00
24	Concrete structure including concrete columns and beams - bases	m3	265	R	1,745.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,745.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,745.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	685	R	1,745.00
28	One brick wall	m2		R	456.00
29	Concrete in structual steel buildings - all concrete	m3	119	R	1,745.00
30	Total building area - Structural steel buildings	m2	1,442		
31	Ceiling	m2		R	355.00
32	Structural steel	t		R	47,552.00
33	Steel canopy - concrete	m3	85	R	1,745.00
34	Steel canopy - area	m2	985		
35	Concrete in weighbridge - all concrete	m3	62	R	1,745.00
36	Total weighbridge area	m2	120		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,745.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	0	R	1,745.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	42	R	1,745.00
44	Total lengh of cable tunnel	m	28		
45	Total volume of basic steel platform	m3	78		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	9,445		
48	Total volume of steel in stack	m3	988		
49	Total volume of steel in walkway	m3	124		
50	Total volume of steel in cable gantry	m3	425		
51	Piping work unit cost	WU		R	435.00
52	Total process pipe length	m	55,422		
53	Total electrical cable - installation only	m	39,442	R	75.00
54	Total instrumentation cable - installation only	m	31,220	R	52.00

Ratio: Project Ratio Mean

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Complex	Mean
Current economic conditions	Normal	Mean
Current economic factors	Good	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasiona	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project C			
Location:	South Africa			
Client:	0	Date of estimate:	2010	

	CIVIL CONSTRUCTION COST				R 53,759,084.82
A	SITE CLEARANCE AND DEMOLITIONS		R	292,586.20	
B	BULK EARTHWORKS		R	667,912.09	
C	PILING		R	-	
D	ROAD WORKS		R	2,407,701.14	
E	GENERAL PAVING AND BUNDED AREAS		R	1,446,866.58	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,434,838.89	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,379,349.08	
H	TANK BASES AND BUNDING		R	1,114,958.67	
I	RACK FOUNDATIONS		R	1,333,548.23	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,967,773.72	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	486,445.41	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	626,494.14	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,140,256.28	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	9,908,735.75	
Q	BUILDINGS - STEEL		R	5,445,293.87	
R	CANOPIES - STEEL		R	4,554,291.41	
S	WEIGHBRIDGE		R	778,230.91	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	836,261.93	
	Preliminaries and General	35.00%	R	13,937,540.51	
	STRUCTURAL STEEL				R 33,259,041.72
A	STRUCTURAL STEEL - BASIC PLATFORM		R	624,576.08	
B	STRUCTURAL STEEL - PIPERACK		R	4,258,327.37	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	14,009,506.82	
D	STRUCTURAL STEEL - STACK		R	2,200,905.87	
E	STRUCTURAL STEEL - WALKWAY		R	775,083.35	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,888,058.89	
	Preliminaries and General	40.00%	R	9,502,583.35	
	MECHANICAL AND PIPING				R 103,844,718.43
A	PIPING INSTALLATION		R	73,056,272.73	
B	RADIOGRAPHIC EXAMINATION (RT)		R	205,398.07	
C	DYE PENETRATION TESTING (DP)		R	73,806.20	
D	MAGNETIC PARTICLE TESTING (MPI)		R	114,524.78	
E	POST WELD HEAT TREATMENT		R	199,094.06	
F	MATERIAL HARDNESS TEST (HT)		R	153,304.20	
H	MECHANICAL INSTALLATION		R	372,398.84	
	Preliminaries and General	40.00%	R	29,669,919.55	
	PAINTING AND INSULATION				R 5,942,330.82
A	PAINTING AND INSULATION		R	4,401,726.53	
	Preliminaries and General	35.00%	R	1,540,604.29	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 9,696,346.86
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	7,182,479.15	
	Preliminaries and General	35.00%	R	2,513,867.70	

TOTAL COST	R	206,501,522.65

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		15,442		R 6.10	R 94,196.20	R 292,586.20
	Concrete demolitions	m3		102		R 1,945.00	R 198,390.00	
BULK EARTHWORKS	Bulk excavation	m3		6,552		R 48.22	R 315,937.44	R 667,912.09
	Trimming of sides	m2	2.18	3,006	4.30	R 11.21	R 33,703.59	
	Back fill and compact	m3	1.15	5,697	0.98	R 49.20	R 280,334.91	
	Overhaul	m3/km	1.73	3,787	11.34	R 4.25	R 16,104.30	
	Rip bed	m2	1.78	3,681	8.13	R 5.93	R 21,831.85	
PILING	Site establishment of rig	Item	0.00	0	192.30	R 335,563.50	R -	R -
	EO for raking equipment	Item	0.00	0	23.89	R 41,688.05	R -	
	Number of piles	No	0.00	0	0.00		R -	
	Move rig to new position	No	1.50	0	0.18	R 314.10	R -	
	Number of raking piles	No	18.41	0	0.00		R -	
	EO for setting up raking piles	No	0.93	0	0.28	R 488.60	R -	
	EO for raking drilling	m	0.15	0	0.89	R 351.55	R -	
	Auger quantity	m	0.05	0	0.00	R 395.00	R -	
	EO for drilling in coarse gravel	m	0.53	0	0.22	R 383.90	R -	
	EO for drilling in boulders	m	1.84	0	0.50	R 872.50	R -	
	EO for drilling in soft rock	m	1.63	0	0.24	R 418.80	R -	
	Temporary casings	m	0.36	0	0.36	R 628.20	R -	
	EO casing to raking pile	m	0.18	0	0.51	R 1,622.85	R -	
	Mild steel rod reinforcement	t	14.29	0.000	0.93	R 11,733.21	R -	
	High tensile rod reinforcement	t	1.32	0.000	7.23	R 12,616.35	R -	
	Concrete to piles and bases	m3	0.15	0	0.00	R 1,745.00	R -	
	Concrete to raking piles	m3	0.07	0	1.06	R 1,849.70	R -	
	Site establishment of test equipment	Item	0.00	0	110.73	R 193,223.85	R -	
	Load test to pile	No	99.34	0	27.07	R 47,237.15	R -	
	Site establishment of intergity testing	No	258.87	0	48.79	R 85,138.55	R -	
	Integrity testing of piles	No	1.25	0	0.27	R 471.15	R -	
ROAD WORKS	Red paving	m2	0.15	30	0.97	R 161.02	R 4,878.91	R 2,407,701.14
	Grey paving	m2	0.00	202	0.00	R 166.00	R 33,532.00	
	Kerbing	m	0.13	501	0.00	R 283.54	R 142,095.66	
	Total paving and asphalt	m2	0.00	3,855	0.00		R -	
	Remove top soil	m3	0.55	551	5.83	R 84.54	R 46,601.19	
	Asphalt	m2	0.26	1,002	0.00	R 200.68	R 201,144.31	
	Rip bed	m2	0.00	3,855	0.00	R 14.50	R 55,897.50	
	Reduce levels	m3	0.42	1,619	4.99	R 72.36	R 117,149.98	
	Selected fill	m3	1.65	981	0.53	R 136.52	R 133,962.24	
	Imported fill	m3	2.23	440	0.39	R 350.05	R 154,032.70	
	Wearing course	m3	3.86	419	0.29	R 249.50	R 104,654.26	
	Prime	m2	4.74	4,651	1.47	R 70.01	R 325,631.30	
	Three line road marking	m	0.83	3,861	0.20	R 56.71	R 218,921.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	511	4.19	R 14.18	R 7,246.88	
	1m Wide concrete V-drain	m	0.97	486	0.81	R 1,270.26	R 617,490.92	
	200mm Diameter PVC pipe	m	0.96	481	0.11	R 402.63	R 193,704.81	
	Road marking - STOP	No	0.15	75	0.05	R 430.98	R 32,397.81	
	Standard signage	No	0.01	5	4.48	R 550.07	R 2,756.66	
	100mm Painted line	m	1.83	917	1.42	R 17.01	R 15,602.10	
			0.00		1.52			
			0.00		1.94			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	221	0.74	R 1,745.00	R 385,645.00	R 1,446,866.58
		Concrete in plinths	m3	0.00	44	0.00	R 1,745.00	R 76,821.71	
		Total concrete	m3	0.00	399	0.00		R -	
		Rip and compact	m2	0.13	1,700	187.19	R 9.32	R 15,847.53	
		Formwork to plinth	m2	7.26	320	0.12	R 209.40	R 66,927.08	
		Formwork to slab	m2	0.83	183	0.15	R 261.75	R 48,012.80	
		High tensile steel	t	0.01	3.990	0.00	R 14,221.00	R 56,741.79	
		Mesh	m2	585.35	2,336	51.00	R 278.84	R 651,251.11	
		Construction joint	m	4.00	884	0.05	R 87.25	R 77,129.00	
		Expansion joint	m	2.22	491	0.08	R 139.60	R 68,490.55	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	5,555	0.00		R -	R 1,434,838.89
		Base excavation	m3	1.50	544	0.00	R 88.00	R 47,911.11	
		Backfill	m3	0.59	363	0.64	R 137.50	R 49,907.41	
		Working space	m2	0.45	923	1.43	R 96.15	R 88,729.54	
		Concrete in bases	m3	0.04	245	25.24	R 1,745.00	R 427,525.00	
		Blinding	m2	0.83	331	20.88	R 83.57	R 27,629.37	
		Concrete in sump walls	m3	0.10	25	29.51	R 1,745.00	R 42,752.50	
		Concrete in slabs	m3	0.02	5	0.91	R 1,745.00	R 8,550.50	
		Total concrete	m3	0.00	274	0.04		R -	
		Wood float	m2	0.70	392	158.37	R 11.02	R 4,319.25	
		Formwork to bases	m2	1.69	414	0.12	R 209.40	R 86,702.07	
		Formwork to sump walls	m2	12.63	309	0.12	R 209.40	R 64,795.69	
		Formwork to sides of slab	m2	5.81	28	0.18	R 314.10	R 8,942.11	
		Mild steel reinforcement	t	0.12	3.083	0.00	R 14,221.00	R 43,845.42	
		High tensile reinforcement	t	10.68	25.693	1.19	R 14,221.00	R 365,378.50	
		Cast in steel	kg	0.46	533	34.10	R 51.17	R 27,255.20	
		Waterstop	m	0.43	57	8.10	R 215.43	R 12,274.62	
		Manhole	No	0.08	10	2.68	R 5,008.61	R 48,884.04	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	122	0.13	R 651.12	R 79,436.57	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	311	0.05	R 88.00	R 27,364.48	R 1,379,349.08
	Working space	m2	0.38	818	0.67	R 58.96	R 48,247.90	
	Backfill	m3	4.42	70	1.32	R 116.16	R 8,172.20	
	Concrete bases	m3	1.01	184	0.00	R 1,745.00	R 321,080.00	
	Concrete plinth	m3	2.29	80	0.00	R 1,745.00	R 140,209.61	
	Total concrete	m3	0.00	264	0.00		R -	
	Wood float	m2	0.47	171	0.05	R 17.45	R 2,983.18	
	Blinding	m2	1.01	182	0.01	R 87.25	R 15,895.05	
	Formwork bases	m2	0.49	376	0.13	R 226.85	R 85,184.49	
	Formwork plinth	m2	0.58	139	0.12	R 209.40	R 29,008.88	
	High tensile reinforcement	t	10.00	26.435	7.15	R 14,221.00	R 375,931.20	
	Cast in steel	kg	0.11	2,403	0.03	R 52.35	R 125,806.26	
	HD Bolts	kg	0.08	3,304	0.03	R 52.35	R 172,983.60	
	Grout	m3	34.52	2.328	6.52	R 11,377.40	R 26,482.23	
TANK BASES AND BUNDING	Restricted excavation	m3	5.84	350	0.05	R 87.25	R 30,572.40	R 1,114,958.67
	Working space	m2	4.36	80	1.63	R 53.53	R 4,301.85	
	Backfill	m3	1.38	254	0.72	R 121.18	R 30,769.32	
	Concrete bases	m3	0.75	60	0.00	R 1,745.00	R 104,700.00	
	Concrete sump wall	m3	2.86	21	0.00	R 1,745.00	R 36,608.39	
	Concrete slab	m3	0.57	105	0.00	R 1,745.00	R 183,684.21	
	Concrete plinth	m3	4.11	15	21.05	R 1,745.00	R 25,474.45	
	Concrete column	m3	19.22	3	164.76	R 1,745.00	R 5,447.45	
	Total concrete	m3	0.00	204	1.11		R -	
	Blinding	m2	2.67	76	1.05	R 82.90	R 6,332.60	
	Wood float	m2	0.25	816	1.12	R 10.59	R 8,640.80	
	Formwork to bases	m2	0.42	143	1.14	R 214.90	R 30,700.21	
	Formwork to plinths	m2	0.35	42	8.12	R 228.70	R 9,539.21	
	Formwork to columns	m2	0.12	26	7.63	R 245.77	R 6,393.72	
	Formwork to sumps	m2	0.11	191	7.10	R 238.39	R 45,464.97	
	Formwork to slabs	m2	4.07	26	7.32	R 212.55	R 5,497.11	
	Formwork to slabs n/e 300mm	m	2.17	49	8.21	R 74.07	R 3,592.83	
	Mild steel reinforcement	t	0.23	2.032	23.56	R 14,221.00	R 28,892.45	
	High tensile reinforcement	t	23.09	8.833	1.02	R 14,221.00	R 125,619.33	
	Mesh	m2	0.16	658	61.15	R 232.56	R 152,999.53	
	Cast in items	kg	0.19	1,073	214.69	R 66.24	R 71,107.43	
	HD Bolts	kg	0.10	2,040	207.02	R 68.69	R 140,109.66	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	0.999	0.17	R 10,264.71	R 10,255.28	
	Construction joint	m	0.30	351	24.89	R 70.11	R 24,599.47	
	Expansion joint	m	0.46	229	16.88	R 103.38	R 23,656.01	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	538	0.05	R 87.25	R 46,936.14	R 1,333,548.23
	Working space	m2	0.41	1,312	1.98	R 172.76	R 226,667.20	
	Backfill	m3	2.45	220	0.87	R 100.29	R 22,020.24	
	Blinding	m2	0.37	392	22.19	R 78.64	R 30,818.00	
	Concrete bases	m3	5.81	145	0.00	R 1,745.00	R 253,025.00	
	Concrete plinth	m3	0.00	25	0.00	R 1,745.00	R 43,549.91	
	Total concrete	m3	0.00	170	1.34		R -	
	Wood float	m2	0.35	414	173.00	R 10.09	R 4,178.78	
	Formwork bases	m2	0.47	309	9.63	R 181.20	R 55,903.54	
	Formwork plinths	m2	0.09	277	6.99	R 249.64	R 69,225.74	
	High tensile reinforcement	t	9.33	18.216	0.00	R 14,221.00	R 259,052.31	
	HD Bolts	kg	0.03	4,833	225.70	R 63.01	R 304,540.69	
	Grout	m3	79.73	1.819	0.18	R 9,694.44	R 17,630.68	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	1,094	0.06	R 104.70	R 114,536.57	R 2,967,773.72
	Working space	m2	0.50	2,188	1.90	R 55.11	R 120,564.81	
	Backfill	m3	2.66	411	0.80	R 130.88	R 53,823.57	
	Blinding	m2	0.33	773	21.39	R 81.58	R 63,039.23	
	Concrete bases	m3	0.00	255	0.00	R 1,745.00	R 444,975.00	
	Concrete plinth	m3	2.58	70	0.00	R 1,745.00	R 122,582.64	
	Concrete slab	m3	3.63	99	0.00	R 1,745.00	R 172,470.93	
	Total concrete	m3	0.00	424	0.00		R -	
	Wood float	m2	0.55	771	161.77	R 10.79	R 8,317.40	
	Formwork bases	m2	0.49	520	8.32	R 209.74	R 109,148.11	
	Formwork plinths	m2	0.11	639	8.34	R 209.23	R 133,619.63	
	High tensile reinforcement	t	13.32	31.838	0.00	R 14,221.00	R 452,771.38	
	HD Bolts	kg	0.02	12,750	217.74	R 65.31	R 832,725.96	
	Cast in items	kg	0.05	5,100	241.09	R 58.99	R 300,829.98	
	Grout	m3	68.22	3.738	0.17	R 10,264.71	R 38,368.51	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	135	0.05	R 87.25	R 11,796.20	R 486,445.41
	Working space	m2	0.56	241	1.66	R 52.56	R 12,689.54	
	Backfill	m3	2.15	63	0.79	R 110.44	R 6,945.07	
	Blinding	m2	0.65	100	20.36	R 85.71	R 8,570.73	
	Concrete bases	m3	0.00	65	0.00	R 1,745.00	R 113,425.00	
	Concrete column	m3	28.05	2	0.00	R 1,745.00	R 4,043.67	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	12	0.00	R 1,745.00	R 21,687.38	
	Total concrete	m3	0.00	80	0.00		R -	
	Wood float	m2	0.60	133	158.85	R 10.99	R 1,460.04	
	Formwork bases	m2	0.52	125	8.23	R 212.03	R 26,503.65	
	Formwork plinths	m2	0.33	38	7.44	R 234.54	R 8,833.24	
	Formwork to columns	m2	0.28	8	8.09	R 215.70	R 1,785.13	
	High tensile reinforcement	t	9.06	8.802	0.00	R 14,221.00	R 125,172.41	
	HD bolts	kg	0.04	1,994	209.18	R 67.98	R 135,536.62	
	Grout	m3	108.76	0.733	0.16	R 10,906.25	R 7,996.74	
	CONCRETE PIPE RACKS AND FOUNDATIONS							
	Restricted excavation	m3	2.80	118	0.06	R 104.70	R 12,312.72	R 626,494.14
	Working space	m2	0.30	392	2.12	R 49.39	R 19,359.62	
	Backfill	m3	2.06	57	0.82	R 127.68	R 7,289.08	
	Blinding	m2	0.67	63	19.99	R 87.29	R 5,472.14	
	Concrete bases	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Concrete column	m3	1.19	38	151.33	R 1,745.00	R 66,133.74	
	Concrete beam	m3	2.68	14	0.95	R 1,745.00	R 24,676.77	
	Total concrete	m3	2.97	94	0.95		R -	
	Wood float	m2	0.47	89	7.50	R 11.53	R 1,030.44	
	Formwork bases	m2	0.48	88	6.55	R 232.67	R 20,358.33	
	Formwork to columns	m2	0.15	253	7.98	R 218.67	R 55,249.57	
	Formwork to sides beams	m2	0.33	43	6.11	R 266.41	R 11,416.50	
	Formwork to soffits beams	m2	0.69	20	6.55	R 285.60	R 5,853.26	
	Formwork corbels	m2	10.88	3	5.37	R 324.95	R 1,131.93	
	High tensile reinforcement	t	9.10	10.334	0.00	R 14,221.00	R 146,961.38	
	Cast in steel	kg	0.03	3,135	262.64	R 54.15	R 169,731.52	
	HD bolts	kg	1.48	64	215.28	R 66.06	R 4,197.39	
	Grout	m3	505.30	0.186	0.16	R 10,906.25	R 2,029.74	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS							
	Restricted excavation	m3	3.84	1,018	0.05	R 87.25	R 88,785.60	R 4,140,256.28
	Working space	m2	0.61	1,668	1.79	R 48.74	R 81,312.94	
	Backfill	m3	1.15	885	0.79	R 110.44	R 97,727.68	
	Blinding	m2	0.61	434	20.06	R 86.99	R 37,790.32	
	Concrete bases	m3	0.00	265	0.97	R 1,745.00	R 462,425.00	
	Concrete column	m3	2.44	109	1.07	R 1,745.00	R 189,518.44	
	Concrete beam	m3	0.84	129	1.02	R 1,745.00	R 225,617.19	
	Concrete surface slab	m3	1.68	158	0.97	R 1,745.00	R 275,252.98	
	Concrete wall	m3	2.50	43	1.05	R 1,745.00	R 75,807.38	
	Concrete elevated slab	m3	1.10	99	0.00	R 1,745.00	R 172,289.49	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	803	0.00		R -	
		Wood float	m2	0.64	1,254	169.32	R 10.31	R 12,927.73	
		Formwork bases	m2	0.41	646	7.65	R 228.10	R 147,433.44	
		Formwork to columns	m2	0.17	639	6.34	R 275.24	R 175,838.23	
		Formwork to sides beams	m2	0.30	431	5.15	R 338.83	R 146,030.55	
		Formwork to soffits beams	m2	0.84	154	7.57	R 230.52	R 35,481.10	
		Formwork to soffts of slabs	m2	0.31	509	3.23	R 303.48	R 154,419.62	
		Formwork to pockets	m2	26.55	4	5.75	R 540.25	R 2,209.96	
		Formwork wall	m2	0.13	334	8.09	R 215.70	R 72,080.80	
		High tensile reinforcement	t	8.87	90.509	0.00	R 14,221.00	R 1,287,127.21	
		Cast in steel	kg	0.22	3,649	255.59	R 55.64	R 203,038.57	
		HD bolts	kg	0.41	1,958	201.38	R 70.62	R 138,275.39	
		Steel handrailing	m	2.58	35	9.71	R 1,464.57	R 51,378.63	
		Grout	m3	1,039.37	0.772	0.18	R 9,694.44	R 7,488.03	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	0	0.04	R 69.80	R -	R -
		Working space	m2	7.92	0	1.42	R 49.15	R -	
		Backfill	m3	4.13	0	0.63	R 43.97	R -	
		Blinding	m2	1.05	0	17.95	R 97.21	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
		Concrete column	m3	26.31	0	0.00	R 1,745.00	R -	
		Concrete beam	m3	1.43	0	0.00	R 1,745.00	R -	
		Concrete wall	m3	10.41	0	0.00	R 1,745.00	R -	
		Concrete elevated slabs	m3	10.92	0	0.00	R 1,745.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	138.41	R 12.61	R -	
		Formwork bases	m2	8.50	0	6.94	R 251.44	R -	
		Formwork to columns	m2	0.14	0	5.63	R 276.98	R -	
		Formwork to sides beams	m2	0.17	0	4.72	R 309.95	R -	
		Formwork to soffits beams	m2	0.50	0	6.30	R 369.70	R -	
		Formwork to soffts of slabs	m2	0.13	0	2.98	R 359.79	R -	
		Formwork to pockets	m2	418.49	0	4.85	R 585.57	R -	
		Formwork wall	m2	0.10	0	6.38	R 273.51	R -	
		High tensile reinforcement	t	4.05	0.000	0.00	R 14,221.00	R -	
		Cast in steel	kg	0.15	0	200.08	R 71.08	R -	
		HD bolts	kg	0.22	0	167.91	R 84.69	R -	
		Galvanised grating	m2	17.15	0	0.15	R 2,633.52	R -	
		Grout	m3	771.45	0.000	5.40	R 11,633.33	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	0	0.05	R 87.25	R -	R -
	Working space	m2	0.42	0	1.76	R 49.57	R -	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	0	0.80	R 109.06	R -	
	Blinding	m2	4.82	0	20.78	R 83.97	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
	Concrete column	m3	6.67	0	0.00	R 1,745.00	R -	
	Concrete beam	m3	1.99	0	0.00	R 1,745.00	R -	
	Concrete wall	m3	35.85	0	0.00	R 1,745.00	R -	
	Concrete elevated slabs	m3	24.74	0	0.00	R 1,745.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.82	0	162.71	R 10.72	R -	
	Formwork bases	m2	1.44	0	8.18	R 213.33	R -	
	Formwork to columns	m2	0.14	0	6.98	R 254.74	R -	
	Formwork to sides beams	m2	0.23	0	6.34	R 250.00	R -	
	Formwork to soffits beams	m2	0.75	0	6.85	R 275.24	R -	
	Formwork to soffts of slabs	m2	0.22	0	3.87	R 282.82	R -	
	Formwork to pockets	m2	3.09	0	6.17	R 450.90	R -	
	Formwork wall	m2	0.29	0	7.54	R 231.43	R -	
	High tensile reinforcement	t	7.31	0.000	0.00	R 14,221.00	R -	
	Cast in steel	kg	0.02	0	212.67	R 66.87	R -	
	HD bolts	kg	0.01	0	208.59	R 68.18	R -	
	Galvanised grating	m2	3.97	0	0.19	R 9,184.21	R -	
	Grout	m3	42.08	0.000	6.37	R 2,232.50	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	1,247	0.05	R 87.25	R 108,774.58	R 9,908,735.75
	Working space	m2	2.50	499	1.84	R 47.42	R 23,646.65	
	Backfill	m3	1.25	997	0.79	R 110.44	R 110,151.47	
	Blinding	m2	3.86	177	20.30	R 85.96	R 15,254.66	
	Concrete	m3	0.00	685	0.00	R 1,745.00	R 1,195,325.00	
	Mesh reinforcement	m2	0.51	1,343	65.77	R 216.22	R 290,417.44	
	Rough formwork	m2	3.09	222	8.61	R 202.67	R 44,928.75	
	Smooth formwork	m2	0.57	1,202	6.80	R 256.62	R 308,391.38	
	Finish to concrete	m2	0.23	2,978	105.40	R 16.56	R 49,308.02	
	Construction joints	m	4.97	138	21.29	R 81.96	R 11,296.76	
	Movement joints	m	15.36	45	17.11	R 101.99	R 4,548.25	
	Cast in steel	kg	2.35	291	232.74	R 61.10	R 17,810.73	
	Grout	m3	882.88	0.776	0.18	R 9,694.44	R 7,521.63	
	Brick walls	m2	0.50	1,370	0.00	R 456.00	R 624,720.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	3,062	0.00		R -	
	Waterproofing membrane	m2	2.22	1,379	12.03	R 145.05	R 200,066.75	
	Roof construction	m2	2.04	1,501	38.22	R 372.08	R 558,479.69	
	Ceiling	m2	0.98	3,124	0.00	R 355.00	R 1,109,175.77	
	Doors and windows	No	474.69	6	0.17	R 2,682.35	R 17,302.30	
	Floor finish	m2	1.03	2,973	0.79	R 577.22	R 1,715,926.26	
	Wall finsih	m2	1.04	2,944	1.47	R 310.20	R 913,297.49	
	Rod reinforcement	t	9.25	74	0.00	R 14,221.00	R 1,053,122.70	
	Metalwork	Item	0.00	1	4.44	R 63,141.24	R 63,141.24	
	Structural steel	Item	0.00	1	11.50	R 163,541.50	R 163,541.50	
	Plumbing and drainage	Item	0.00	1	7.32	R 104,097.72	R 104,097.72	
	Small power and lighting	Item	0.00	1	62.40	R 887,390.40	R 887,390.40	
	External works	Item	0.00	1	178.28	R 311,098.60	R 311,098.60	
BUILDINGS - STEEL	Concrete	m3	0.00	119	0.17	R 1,745.00	R 207,655.00	R 5,445,293.87
	Earthworks	m3	2.37	282	9.13	R 191.13	R 53,903.87	
	Reinforcement	t	8.82	13	0.00	R 14,221.00	R 191,870.63	
	Mesh	m2	0.12	992	10.27	R 169.91	R 168,496.43	
	Formwork	m2	0.40	298	8.06	R 216.50	R 64,409.12	
	Brickwork	m2	6.11	236	6.08	R 287.01	R 67,735.43	
	Roof covering	m2	0.87	1,657	208.48	R 228.09	R 378,051.01	
	Structural steel	t	18.83	77	0.00	R 47,552.00	R 3,641,528.62	
	Side cladding	m2	1.54	936	0.98	R 223.53	R 209,302.78	
	Doors	No	405.94	4	0.51	R 24,251.52	R 86,147.44	
	Ridge ventilator	m	21.95	66	11.48	R 2,618.46	R 172,019.24	
	Aluminium insulation	m2	0.89	1,620	1.81	R 126.02	R 204,174.30	
	Total building area	m2	0.00	1,442	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	265	0.13	R 226.85	R 60,160.62	R 4,554,291.41
	Concrete	m3	0.00	85	0.00	R 1,745.00	R 148,325.00	
	Reinforcement	t	11.42	7	0.18	R 14,221.00	R 105,848.07	
	Mesh	m2	0.12	708	10.21	R 170.91	R 121,061.87	
	Formwork	m2	0.45	189	8.51	R 205.05	R 38,732.21	
	Brickwork	m2	5.94	166	5.91	R 295.26	R 48,961.84	
	Screed	m2	1.12	879	43.13	R 40.46	R 35,582.31	
	Structural steel	t	14.72	67	0.00	R 47,552.00	R 3,181,978.26	
	Cat ladders	m	2.74	24	9.66	R 4,922.57	R 120,218.01	
	Hand rail	m	0.73	92	27.40	R 1,735.47	R 159,083.00	
	Kick plates	m	0.76	88	2.76	R 628.80	R 55,363.56	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.91	1,082	195.47	R 243.27	R 263,319.80	
	Side cladding	m2	4.76	207	0.93	R 226.24	R 46,816.71	
	Floor grating	m2	1.09	61	17.29	R 2,750.26	R 168,840.15	
	Total buiding area	m2	0.00	985	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.30	205	8.02	R 217.58	R 44,517.08	R 778,230.91
	Blinding	m2	0.47	132	18.72	R 93.22	R 12,296.55	
	Concrete	m3	0.00	62	0.00	R 1,745.00	R 108,190.00	
	Reinforcement	t	7.97	8	0.00	R 14,221.00	R 110,627.60	
	Mesh	m2	0.49	127	50.23	R 283.12	R 35,823.05	
	Formwork	m2	0.31	200	7.58	R 230.21	R 46,042.22	
	Finish to concrete	m2	0.44	141	103.65	R 16.84	R 2,372.28	
	Movement joints	m	2.46	25	15.35	R 113.68	R 2,865.13	
	Cast in steel	kg	0.09	689	179.47	R 79.24	R 54,586.78	
	Grout	m3	71.08	0.872	2.53	R 11,633.33	R 10,147.25	
	Brickwork	m2	0.24	50	0.15	R 456.00	R 22,800.00	
	Doors and windows	No	2.74	4	0.26	R 5,700.00	R 24,963.50	
	Pipework	m	2.59	46	0.21	R 689.72	R 31,956.29	
	Bolts	kg	0.11	564	0.08	R 79.24	R 44,661.91	
	Structural steel	t	3.99	3	0.00	R 54,696.15	R 164,499.71	
	Miscellaneous steel	t	131.32	1	0.00	R 67,719.05	R 61,881.55	
	Total bridge area	m2	0.00	120	0.00		R -	
	Total control room area	m2	0.00	12	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.59	0	6.07	R 287.48	R -	R -
	Blinding	m2	0.71	0	14.50	R 120.34	R -	
	Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
	Reinforcement	t	5.75	0	0.00	R 14,221.00	R -	
	Formwork	m2	0.07	0	5.72	R 305.07	R -	
	Finish to concrete	m2	0.31	0	77.96	R 22.38	R -	
	Movement joints	m	0.42	0	12.46	R 140.05	R -	
	Cast in steel	kg	23.71	0.000	163.17	R 87.15	R -	
	Grout	m3	22.24	0.000	0.62	R 13,423.08	R -	
	Bolts	kg	109.85	0.000	0.13	R 54.04	R -	
	Structural steel	t	35.84	0.000	0.22	R 64,640.91	R -	
	Miscellaneous steel	t	20.04	0.000	0.18	R 79,005.56	R -	
	Brickwork	m2	0.49	0	4.24	R 411.56	R -	
	Roof covering	m2	1.46	0	1.22	R 337.34	R -	
	Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	6.10	R 286.07	R -	R -
	Blinding	m2	1.17	0	16.23	R 107.52	R -	
	Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
	Reinforcement	t	5.89	0.000	0.00	R 14,221.00	R -	
	Formwork	m2	0.21	0	6.04	R 288.91	R -	
	Movement joint	m	1.61	0	0.12	R 135.48	R -	
	Cast in steel	kg	0.13	0	12.88	R 72.50	R -	
	Bolts	kg	0.37	0	196.16	R 87.56	R -	
	Chemical anchors	No	6.13	0	0.22	R 395.25	R -	
	Miscellaneous steelwork	t	88.98	0.000	162.42	R 64,640.91	R -	
	Pre-cast concrete	m3	30.27	0	35.98	R 5,816.67	R -	
	Brickwork	m2	7.79	0	0.30	R 399.31	R -	
	Total area	m2	0.00	0	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.68	R 117.26	R -	R -
	Lining	m2	0.70	0	1.16	R 69.80	R -	
	Paving	m2	0.65	0	0.53	R 131.70	R -	
	Pipework	m	28.23	0	0.24	R 488.60	R -	
	Manholes	No	16.47	0	0.10	R 4,886.00	R -	
	Concrete	m3	2.43	0	0.04	R 1,745.00	R -	
	Formwork	m2	0.08	0	5.85	R 298.29	R -	
	Mesh	m2	0.70	0	6.64	R 262.80	R -	
	Reinforcement	t	4.69	0.000	0.12	R 14,221.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	254	5.56	R 313.85	R 79,617.19	R 836,261.93
	Blinding	m2	0.85	49	13.49	R 129.36	R 6,391.66	
	Concrete	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Reinforcement	t	4.52	9.292	0.00	R 14,221.00	R 132,142.04	
	Mesh	m2	0.90	47	38.60	R 368.42	R 17,192.92	
	Formwork	m2	0.15	280	5.36	R 325.56	R 91,156.72	
	Cast in steel	kg	0.02	2,100	140.16	R 101.46	R 213,071.49	
	Miscellaneous steelwork	t	11.14	2.513	0.16	R 88,881.25	R 223,399.91	
	Total tunnel length	m	0.00	28	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	78	0.00		R -	R 624,576.08
	Steel	t	9.58	8.142	0.00	R 47,552.00	R 387,166.60	
	Handrail	m	1.45	54	28.73	R 1,655.13	R 89,034.79	
	Grating	m2	1.91	41	16.97	R 2,802.12	R 114,432.18	
	Kick flats	m	1.71	46	76.94	R 618.04	R 28,191.30	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stair treads	No	6.72	12	95.97	R 495.49	R 5,751.20	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 4,258,327.37
		Steel	t	27.86	71.967	0.00	R 47,552.00	R 3,422,173.73	
		Handrail	m	13.37	150	30.43	R 1,562.67	R 234,341.82	
		Grating	m2	12.47	161	18.55	R 2,563.45	R 412,166.60	
		Kick flats	m	13.35	150	84.90	R 560.09	R 84,119.02	
		Cat ladder	m	98.85	20	9.14	R 5,202.63	R 105,526.20	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	9,445	0.00		R -	R 14,009,506.82
		Steel	t	76.43	123.577	0.00	R 47,552.00	R 5,876,339.66	
		Handrail	m	31.26	302	30.84	R 1,541.89	R 465,872.86	
		Grating	m2	3.84	2,460	16.10	R 2,953.54	R 7,264,632.51	
		Kick flats	m	34.08	277	83.17	R 571.74	R 158,454.46	
		Stair treads	No	230.28	41	101.90	R 466.65	R 19,139.93	
		Cat ladder	m	238.13	40	8.38	R 5,674.46	R 225,067.41	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	988	0.00		R -	R 2,200,905.87
		Steel	t	25.51	38.730	0.00	R 47,552.00	R 1,841,684.67	
		Handrail	m	45.84	22	30.11	R 1,579.28	R 34,038.50	
		Grating	m2	60.74	16	17.06	R 2,787.34	R 45,339.00	
		Kick flats	m	46.49	21	79.97	R 594.62	R 12,636.86	
		Cat ladder	m	20.35	49	8.64	R 5,503.70	R 267,206.84	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	124	0.00		R -	R 775,083.35
		Steel	t	16.54	7.497	0.00	R 47,552.00	R 356,496.25	
		Handrail	m	1.10	113	31.41	R 1,513.91	R 170,659.26	
		Grating	m2	1.98	63	16.95	R 2,805.43	R 175,693.45	
		Kick flats	m	1.16	107	80.43	R 591.22	R 63,199.61	
		Stair treads	No	6.10	20	106.99	R 444.45	R 9,034.78	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	425	0.00		R -	R 1,888,058.89
		Steel	t	12.73	33.386	0.00	R 47,552.00	R 1,587,556.95	
		Handrail	m	25.10	17	32.05	R 1,483.68	R 25,122.10	
		Grating	m2	7.46	57	17.66	R 2,692.64	R 153,401.00	
		Kick flats	m	22.84	19	84.46	R 563.01	R 10,476.36	
		Cat ladder	m	20.48	21	8.85	R 5,373.11	R 111,502.47	
	PIPING INSTALLATION	Pipe length	m	0.00	55,422	0.00		R -	R 73,056,272.73
		Total work units	WU	0.33	167,945	0.00	R 435.00	R 73,056,272.73	
		Pipe supports	kg	2.61	21,234	0.00		R -	
		WU for pipe supports	WU	0.16	26,871	0.00		R -	
		Number of welds	No	0.61	33,807	0.00		R -	
		Total fittings	No	0.38	21,060	0.00		R -	
		Stud bolts	No	0.34	7,161	0.00		R -	
		Support number	No	0.19	4,035	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	167,945	0.00	R 435.00		R 205,398.07

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	2,800	5.93	R 73.36	R 205,398.07	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	167,945	0.00	R 435.00		R 73,806.20
	Number of examinations	No	168.34	998	5.88	R 73.98	R 73,806.20	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	167,945	0.00	R 435.00		R 114,524.78
	Number of examinations	No	300.90	558	2.12	R 205.19	R 114,524.78	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	167,945	0.00	R 435.00		R 199,094.06
	Number of examinations	No	52.95	3,172	6.93	R 62.77	R 199,094.06	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	167,945	0.00	R 435.00		R 153,304.20
	Number of examinations	No	114.83	1,463	4.15	R 104.82	R 153,304.20	
MECHANICAL INSTALLATION	Total work units	WU	0.00	167,945	0.00	R 435.00		R 372,398.84
	Mechanical equipment	t	261.57	642	0.75	R 580.00	R 372,398.84	
	Structural steel	t	218.09	770	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	167,945	0.00	R 435.00		R 4,401,726.53
	Painting to piping	m2	17.88	9,393	0.34	R 167.31	R 1,571,508.19	
	Insulation to piping	m2	51.67	3,250	2.60	R 492.08	R 1,599,435.70	
	Mechanical equipment received	t	0.00	642	0.82	R 580.00	R 372,398.84	
	Painting to mechanical equipment	m2	0.25	2,568	3.69	R 157.18	R 403,684.38	
	Insulation to mechanical equipment	m2	0.70	917	1.17	R 495.73	R 454,699.43	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	39,442	0.00	R 75.00	R 2,958,150.00	R 7,182,479.15
	Electrical cable terminations	No	311.25	1,567	0.43	R 174.42	R 273,318.18	
	Electrical equipment	No	9.05	127	0.11	R 681.82	R 86,400.88	
	DB's	No	6.39	14	0.32	R 2,130.68	R 29,834.56	
	Rack	m	0.69	6,172	1.65	R 214.29	R 1,322,669.35	
	Support steel	kg	1.42	8,946	2.13	R 35.21	R 314,985.56	
	Instrumentation cable	m	27.43	31,220	0.35	R 28.50	R 889,770.00	
	Instruments	No	0.58	1,138	0.18	R 158.33	R 180,210.23	
	Hook-ups	No	3.98	1,962	0.16	R 178.13	R 349,545.71	
	Light fittings	No	10.26	504	0.02	R 416.67	R 210,146.13	
	Conduit	m	4.13	3,844	0.13	R 45.45	R 174,738.61	
	Instrument stands	No	0.00	276		R 1,425.00	R 392,709.95	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project C				
Location:	South Africa				
Client:				Date of estimate:	2010

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	15,442	R	6.10
2	Concrete demolitions	m3	102	R	1,945.00
3	Bulk excavation	m3	6,552	R	48.22
4	Vertical piles	No	0		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,745.00
7	Auger pile	m		R	395.00
8	Total paving and asphalt to road works	m2	3,855		
9	Grey paving to road works	m2	202	R	166.00
10	Asphalt to road surface	m2	3,653		
11	Rip bed of road works	m2	3,855	R	14.50
12	Total concrete in paving and bunding	m3	399	R	1,745.00
13	Concrete in paving	m3	221		
14	Rod reinforcement	t		R	14,221.00
15	Concrete in plinths and bases on area finishing	m3	245		
16	Stormwater pipe to drain surface run-off	m	122		
17	Machine excavation	m3		R	88.00
18	Concrete in pump and pipe support bases	m3	184	R	1,745.00
19	Concrete in tank bases	m3	60	R	1,745.00
20	Concrete in pipe and cable rack foundations	m3	145	R	1,745.00
21	Concrete to simple structural foundations	m3	255	R	1,745.00
22	Complex structural foundations - bases	m3	65	R	1,745.00
23	Concrete pipe racks - bases	m3	42	R	1,745.00
24	Concrete structure including concrete columns and beams - bases	m3	265	R	1,745.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,745.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,745.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	685	R	1,745.00
28	One brick wall	m2		R	456.00
29	Concrete in structual steel buildings - all concrete	m3	119	R	1,745.00
30	Total building area - Structural steel buildings	m2	1,442		
31	Ceiling	m2		R	355.00
32	Structural steel	t		R	47,552.00
33	Steel canopy - concrete	m3	85	R	1,745.00
34	Steel canopy - area	m2	985		
35	Concrete in weighbridge - all concrete	m3	62	R	1,745.00
36	Total weighbridge area	m2	120		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,745.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	0	R	1,745.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	42	R	1,745.00
44	Total lengh of cable tunnel	m	28		
45	Total volume of basic steel platform	m3	78		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	9,445		
48	Total volume of steel in stack	m3	988		
49	Total volume of steel in walkway	m3	124		
50	Total volume of steel in cable gantry	m3	425		
51	Piping work unit cost	WU		R	435.00
52	Total process pipe length	m	55,422		
53	Total electrical cable - installation only	m	39,442	R	75.00
54	Total instrumentation cable - installation only	m	31,220	R	52.00

Ratio: Project Ratio Median

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Complex	Median
Current economic conditions	Normal	Median
Current economic factors	Good	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Normal	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Medium	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project C			
Location:	South Africa			
Client:	0	Date of estimate:	2010	

	CIVIL CONSTRUCTION COST				R 55,851,065.89
A	SITE CLEARANCE AND DEMOLITIONS		R	292,586.20	
B	BULK EARTHWORKS		R	686,120.52	
C	PILING		R	-	
D	ROAD WORKS		R	1,818,539.45	
E	GENERAL PAVING AND BUNDED AREAS		R	1,564,078.96	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,521,866.29	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,446,711.29	
H	TANK BASES AND BUNDING		R	1,219,840.53	
I	RACK FOUNDATIONS		R	1,358,758.21	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	3,210,066.64	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	508,954.43	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	648,776.16	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,857,221.56	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	10,470,331.46	
Q	BUILDINGS - STEEL		R	5,756,773.01	
R	CANOPIES - STEEL		R	4,607,782.98	
S	WEIGHBRIDGE		R	711,363.23	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	691,389.00	
	Preliminaries and General	35.00%	R	14,479,905.97	
	STRUCTURAL STEEL				R 37,466,766.63
A	STRUCTURAL STEEL - BASIC PLATFORM		R	691,292.65	
B	STRUCTURAL STEEL - PIPERACK		R	5,000,933.65	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	15,588,373.95	
D	STRUCTURAL STEEL - STACK		R	2,523,239.88	
E	STRUCTURAL STEEL - WALKWAY		R	921,361.68	
F	STRUCTURAL STEEL - CABLE GANTRY		R	2,036,774.36	
	Preliminaries and General	40.00%	R	10,704,790.47	
	MECHANICAL AND PIPING				R 114,782,599.06
A	PIPING INSTALLATION		R	80,361,900.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	261,840.20	
C	DYE PENETRATION TESTING (DP)		R	161,552.53	
D	MAGNETIC PARTICLE TESTING (MPI)		R	155,265.74	
E	POST WELD HEAT TREATMENT		R	265,936.10	
F	MATERIAL HARDNESS TEST (HT)		R	315,246.82	
H	MECHANICAL INSTALLATION		R	465,829.36	
	Preliminaries and General	40.00%	R	32,795,028.30	
	PAINTING AND INSULATION				R 7,989,759.11
A	PAINTING AND INSULATION		R	5,918,340.08	
	Preliminaries and General	35.00%	R	2,071,419.03	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 10,816,923.28
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	8,012,535.76	
	Preliminaries and General	35.00%	R	2,804,387.52	

TOTAL COST	R	226,907,113.97

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		15,442		R 6.10	R 94,196.20	R 292,586.20
	Concrete demolitions	m3		102		R 1,945.00	R 198,390.00	
BULK EARTHWORKS	Bulk excavation	m3		6,552		R 48.22	R 315,937.44	R 686,120.52
	Trimming of sides	m2	2.20	2,978	4.18	R 11.54	R 34,355.96	
	Back fill and compact	m3	1.12	5,850	0.95	R 50.76	R 296,933.68	
	Overhaul	m3/km	1.62	4,044	11.35	R 4.25	R 17,182.65	
	Rip bed	m2	1.71	3,832	8.51	R 5.67	R 21,710.78	
PILING	Site establishment of rig	Item	0.00	0	192.39	R 335,720.55	R -	R -
	EO for raking equipment	Item	0.00	0	24.25	R 42,316.25	R -	
	Number of piles	No	0.00	0	0.00		R -	
	Move rig to new position	No	1.48	0	0.19	R 331.55	R -	
	Number of raking piles	No	19.43	0	0.00		R -	
	EO for setting up raking piles	No	0.93	0	0.24	R 418.80	R -	
	EO for raking drilling	m	0.14	0	0.61	R 240.95	R -	
	Auger quantity	m	0.05	0	0.00	R 395.00	R -	
	EO for drilling in coarse gravel	m	0.55	0	0.22	R 383.90	R -	
	EO for drilling in boulders	m	1.65	0	0.51	R 889.95	R -	
	EO for drilling in soft rock	m	1.57	0	0.23	R 401.35	R -	
	Temporary casings	m	0.38	0	0.31	R 540.95	R -	
	EO casing to raking pile	m	0.17	0	0.57	R 1,221.50	R -	
	Mild steel rod reinforcement	t	14.65	0.000	0.70	R 8,868.09	R -	
	High tensile rod reinforcement	t	1.16	0.000	7.26	R 12,668.70	R -	
	Concrete to piles and bases	m3	0.16	0	0.00	R 1,745.00	R -	
	Concrete to raking piles	m3	0.08	0	1.08	R 1,884.60	R -	
	Site establishment of test equipment	Item	0.00	0	115.74	R 201,966.30	R -	
	Load test to pile	No	93.50	0	22.16	R 38,669.20	R -	
	Site establishment of intergity testing	No	255.00	0	49.96	R 87,180.20	R -	
	Integrity testing of piles	No	1.19	0	0.26	R 453.70	R -	
ROAD WORKS	Red paving	m2	0.14	28	0.93	R 154.38	R 4,365.87	R 1,818,539.45
	Grey paving	m2	0.00	202	0.00	R 166.00	R 33,532.00	
	Kerbing	m	0.09	347	0.00	R 320.38	R 111,154.28	
	Total paving and asphalt	m2	0.00	3,855	0.00		R -	
	Remove top soil	m3	0.49	378	4.45	R 64.53	R 24,376.90	
	Asphalt	m2	0.20	771	0.00	R 199.25	R 153,620.91	
	Rip bed	m2	0.00	3,855	0.00	R 14.50	R 55,897.50	
	Reduce levels	m3	0.36	1,388	4.30	R 62.35	R 86,529.33	
	Selected fill	m3	1.50	925	0.46	R 135.54	R 125,404.83	
	Imported fill	m3	1.94	477	0.33	R 410.74	R 195,883.83	
	Wearing course	m3	3.89	357	0.20	R 311.75	R 111,220.22	
	Prime	m2	4.34	4,015	1.47	R 41.07	R 164,926.35	
	Three line road marking	m	0.78	3,132	0.10	R 32.04	R 100,341.19	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.99	343	4.06	R 9.61	R 3,301.28	
	1m Wide concrete V-drain	m	1.00	347	0.78	R 1,371.21	R 475,740.31	
	200mm Diameter PVC pipe	m	0.93	323	0.09	R 426.10	R 137,486.73	
	Road marking - STOP	No	0.15	52	0.03	R 525.42	R 27,343.95	
	Standard signage	No	0.01	3	4.28	R 589.49	R 2,045.24	
	100mm Painted line	m	1.61	559	1.33	R 9.61	R 5,368.75	
			0.00		1.64			
			0.00		1.84			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	221	0.75	R 1,745.00	R 385,645.00	R 1,564,078.96
		Concrete in plinths	m3	0.00	45	0.00	R 1,745.00	R 79,025.61	
		Total concrete	m3	0.00	399	0.00		R -	
		Rip and compact	m2	0.13	1,700	193.57	R 9.01	R 15,325.21	
		Formwork to plinth	m2	6.92	313	0.12	R 209.40	R 65,622.87	
		Formwork to slab	m2	0.80	177	0.15	R 261.75	R 46,277.40	
		High tensile steel	t	0.01	3.990	0.00	R 14,221.00	R 56,741.79	
		Mesh	m2	607.27	2,423	43.37	R 327.90	R 794,502.81	
		Construction joint	m	3.64	804	0.04	R 69.80	R 56,149.91	
		Expansion joint	m	2.10	464	0.08	R 139.60	R 64,788.36	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	5,555	0.00		R -	R 1,521,866.29
		Base excavation	m3	1.42	570	0.00	R 88.00	R 50,139.53	
		Backfill	m3	0.56	401	0.63	R 139.68	R 56,046.88	
		Working space	m2	0.43	1,017	1.35	R 103.47	R 105,273.23	
		Concrete in bases	m3	0.04	245	23.71	R 1,745.00	R 427,525.00	
		Blinding	m2	0.71	390	19.17	R 91.03	R 35,494.37	
		Concrete in sump walls	m3	0.11	27	31.87	R 1,745.00	R 47,027.75	
		Concrete in slabs	m3	0.02	5	0.81	R 1,745.00	R 8,550.50	
		Total concrete	m3	0.00	277	0.03		R -	
		Wood float	m2	0.61	454	123.90	R 14.08	R 6,392.03	
		Formwork to bases	m2	1.73	424	0.12	R 209.40	R 88,754.19	
		Formwork to sump walls	m2	11.18	301	0.12	R 209.40	R 63,092.43	
		Formwork to sides of slab	m2	5.67	28	0.17	R 296.65	R 8,241.83	
		Mild steel reinforcement	t	0.08	2.364	0.00	R 14,221.00	R 33,614.38	
		High tensile reinforcement	t	9.37	29.546	0.92	R 14,221.00	R 420,179.71	
		Cast in steel	kg	0.45	544	33.55	R 52.01	R 28,317.60	
		Waterstop	m	0.44	61	8.37	R 208.48	R 12,769.56	
		Manhole	No	0.08	10	2.72	R 5,346.20	R 52,178.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	122	0.12	R 641.54	R 78,268.38	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	296	0.05	R 88.00	R 26,069.12	R 1,446,711.29
	Working space	m2	0.33	898	0.68	R 59.84	R 53,718.19	
	Backfill	m3	3.97	75	1.27	R 111.76	R 8,339.49	
	Concrete bases	m3	0.93	184	0.00	R 1,745.00	R 321,080.00	
	Concrete plinth	m3	2.01	92	0.00	R 1,745.00	R 159,741.29	
	Total concrete	m3	0.00	276	0.00		R -	
	Wood float	m2	0.46	199	0.05	R 17.45	R 3,472.64	
	Blinding	m2	0.93	198	0.01	R 87.25	R 17,262.37	
	Formwork bases	m2	0.47	391	0.12	R 209.40	R 81,977.87	
	Formwork plinth	m2	0.53	173	0.12	R 209.40	R 36,167.84	
	High tensile reinforcement	t	10.15	27.147	6.60	R 14,221.00	R 386,057.82	
	Cast in steel	kg	0.10	2,755	0.03	R 52.35	R 144,246.39	
	HD Bolts	kg	0.08	3,444	0.03	R 52.35	R 180,307.99	
	Grout	m3	33.79	2.709	5.98	R 10,435.10	R 28,270.29	
TANK BASES AND BUNDING	Restricted excavation	m3	5.54	332	0.05	R 87.25	R 29,001.90	R 1,219,840.53
	Working space	m2	3.95	84	1.56	R 55.93	R 4,706.57	
	Backfill	m3	1.34	248	0.75	R 116.33	R 28,857.61	
	Concrete bases	m3	0.70	60	0.00	R 1,745.00	R 104,700.00	
	Concrete sump wall	m3	2.55	24	0.00	R 1,745.00	R 41,058.82	
	Concrete slab	m3	0.56	107	0.00	R 1,745.00	R 186,964.29	
	Concrete plinth	m3	3.73	16	19.74	R 1,745.00	R 28,069.71	
	Concrete column	m3	19.00	3	160.09	R 1,745.00	R 5,510.53	
	Total concrete	m3	0.00	210	0.99		R -	
	Blinding	m2	2.44	86	1.05	R 88.40	R 7,605.08	
	Wood float	m2	0.25	840	1.05	R 10.90	R 9,152.44	
	Formwork to bases	m2	0.39	154	1.05	R 230.82	R 35,510.79	
	Formwork to plinths	m2	0.34	47	7.56	R 241.69	R 11,434.62	
	Formwork to columns	m2	0.11	29	7.22	R 254.74	R 7,313.24	
	Formwork to sumps	m2	0.10	235	6.85	R 238.39	R 56,091.29	
	Formwork to slabs	m2	3.83	28	7.32	R 216.77	R 6,064.07	
	Formwork to slabs n/e 300mm	m	2.05	52	8.05	R 79.32	R 4,145.55	
	Mild steel reinforcement	t	0.22	2.088	22.00	R 14,221.00	R 29,690.20	
	High tensile reinforcement	t	22.12	9.490	0.90	R 14,221.00	R 134,955.46	
	Mesh	m2	0.15	714	54.97	R 258.70	R 184,789.11	
	Cast in items	kg	0.19	1,105	218.75	R 65.01	R 71,824.72	
	HD Bolts	kg	0.09	2,332	198.48	R 71.65	R 167,115.34	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	200.00	1.050	0.16	R 10,906.25	R 11,446.98	
	Construction joint	m	0.29	369	24.07	R 72.50	R 26,784.56	
	Expansion joint	m	0.44	244	15.71	R 111.08	R 27,047.67	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	476	0.05	R 87.25	R 41,496.10	R 1,358,758.21
	Working space	m2	0.30	1,585	1.58	R 137.86	R 218,546.13	
	Backfill	m3	2.36	202	0.78	R 111.86	R 22,542.43	
	Blinding	m2	0.40	363	24.38	R 71.58	R 25,945.96	
	Concrete bases	m3	5.73	145	0.00	R 1,745.00	R 253,025.00	
	Concrete plinth	m3	0.00	25	0.00	R 1,745.00	R 44,157.94	
	Total concrete	m3	0.00	170	1.35		R -	
	Wood float	m2	0.35	414	182.61	R 9.56	R 3,958.87	
	Formwork bases	m2	0.49	296	11.01	R 158.49	R 46,900.78	
	Formwork plinths	m2	0.09	281	6.94	R 251.44	R 70,697.95	
	High tensile reinforcement	t	9.11	18.694	0.00	R 14,221.00	R 265,852.17	
	HD Bolts	kg	0.03	4,833	198.55	R 71.62	R 346,184.00	
	Grout	m3	76.52	1.895	0.17	R 10,264.71	R 19,450.89	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	992	0.05	R 87.25	R 86,547.64	R 3,210,066.64
	Working space	m2	0.45	2,204	1.88	R 46.41	R 102,302.17	
	Backfill	m3	2.48	400	0.78	R 111.86	R 44,741.33	
	Blinding	m2	0.35	729	21.52	R 81.09	R 59,077.93	
	Concrete bases	m3	0.00	255	0.00	R 1,745.00	R 444,975.00	
	Concrete plinth	m3	2.36	86	0.00	R 1,745.00	R 150,329.39	
	Concrete slab	m3	2.96	108	0.00	R 1,745.00	R 188,548.73	
	Total concrete	m3	0.00	449	0.00		R -	
	Wood float	m2	0.51	881	155.50	R 11.22	R 9,884.03	
	Formwork bases	m2	0.45	567	8.00	R 218.13	R 123,604.17	
	Formwork plinths	m2	0.10	861	7.78	R 224.29	R 193,225.44	
	High tensile reinforcement	t	12.87	34.903	0.00	R 14,221.00	R 496,353.23	
	HD Bolts	kg	0.02	12,750	190.91	R 74.49	R 949,755.12	
	Cast in items	kg	0.05	5,100	225.21	R 63.15	R 322,042.09	
	Grout	m3	67.67	3.768	0.17	R 10,264.71	R 38,680.36	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	132	0.05	R 87.25	R 11,512.64	R 508,954.43
	Working space	m2	0.50	264	1.64	R 53.20	R 14,039.80	
	Backfill	m3	2.15	61	0.76	R 114.80	R 7,045.68	
	Blinding	m2	0.66	98	20.25	R 86.17	R 8,486.72	
	Concrete bases	m3	0.00	65	0.00	R 1,745.00	R 113,425.00	
	Concrete column	m3	27.56	2	0.00	R 1,745.00	R 4,115.57	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	14	0.00	R 1,745.00	R 24,288.01	
	Total concrete	m3	0.00	81	0.00		R -	
	Wood float	m2	0.59	138	157.14	R 11.10	R 1,529.77	
	Formwork bases	m2	0.49	133	7.78	R 224.29	R 29,753.16	
	Formwork plinths	m2	0.31	45	7.42	R 235.18	R 10,559.09	
	Formwork to columns	m2	0.29	8	7.75	R 225.16	R 1,831.18	
	High tensile reinforcement	t	8.97	9.061	0.00	R 14,221.00	R 128,856.40	
	HD bolts	kg	0.04	2,032	200.18	R 71.04	R 144,350.33	
	Grout	m3	96.76	0.840	0.16	R 10,906.25	R 9,161.11	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	110	0.05	R 87.25	R 9,600.99	R 648,776.16
	Working space	m2	0.25	440	2.02	R 43.19	R 19,011.86	
	Backfill	m3	1.91	58	0.79	R 110.44	R 6,362.91	
	Blinding	m2	0.68	62	20.00	R 87.25	R 5,388.97	
	Concrete bases	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Concrete column	m3	1.08	38	145.46	R 1,745.00	R 66,385.87	
	Concrete beam	m3	2.50	15	0.88	R 1,745.00	R 26,554.35	
	Total concrete	m3	2.76	95	0.88		R -	
	Wood float	m2	0.44	95	7.44	R 12.00	R 1,145.11	
	Formwork bases	m2	0.45	93	6.41	R 234.54	R 21,890.68	
	Formwork to columns	m2	0.14	272	7.35	R 237.41	R 64,514.94	
	Formwork to sides beams	m2	0.32	48	5.90	R 272.23	R 12,945.76	
	Formwork to soffits beams	m2	0.68	22	6.41	R 295.76	R 6,618.73	
	Formwork corbels	m2	10.42	4	4.87	R 358.32	R 1,308.21	
	High tensile reinforcement	t	8.81	10.813	0.00	R 14,221.00	R 153,768.99	
	Cast in steel	kg	0.03	3,175	260.94	R 54.50	R 173,054.45	
	HD bolts	kg	1.43	67	199.28	R 71.36	R 4,753.84	
	Grout	m3	476.47	0.200	0.16	R 10,906.25	R 2,180.49	
	Restricted excavation	m3	3.71	983	0.05	R 87.25	R 85,779.84	R 4,857,221.56
	Working space	m2	0.58	1,695	1.69	R 51.63	R 87,512.59	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	855	0.78	R 111.86	R 95,629.70	
	Blinding	m2	0.62	427	19.41	R 89.90	R 38,425.90	
	Concrete bases	m3	0.00	265	0.88	R 1,745.00	R 462,425.00	
	Concrete column	m3	2.01	132	1.07	R 1,745.00	R 230,062.19	
	Concrete beam	m3	0.83	159	1.00	R 1,745.00	R 277,183.36	
	Concrete surface slab	m3	1.64	162	0.92	R 1,745.00	R 281,966.46	
	Concrete wall	m3	2.14	62	1.00	R 1,745.00	R 107,505.70	
	Concrete elevated slab	m3	0.97	136	0.00	R 1,745.00	R 237,177.51	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	915	0.00		R -	
		Wood float	m2	0.60	1,525	152.05	R 11.48	R 17,497.76	
		Formwork bases	m2	0.39	679	7.60	R 229.61	R 156,013.83	
		Formwork to columns	m2	0.15	879	6.20	R 281.45	R 247,378.70	
		Formwork to sides beams	m2	0.29	548	4.91	R 355.40	R 194,664.91	
		Formwork to soffits beams	m2	0.79	201	7.19	R 242.70	R 48,799.03	
		Formwork to soffts of slabs	m2	0.30	539	3.11	R 308.85	R 166,351.90	
		Formwork to pockets	m2	25.00	5	5.65	R 561.09	R 2,959.00	
		Formwork wall	m2	0.12	513	7.88	R 221.45	R 113,690.46	
		High tensile reinforcement	t	8.60	106.372	0.00	R 14,221.00	R 1,512,712.06	
		Cast in steel	kg	0.21	4,356	251.20	R 56.61	R 246,612.90	
		HD bolts	kg	0.39	2,346	193.52	R 73.49	R 172,371.02	
		Steel handrailing	m	2.48	43	9.30	R 1,529.14	R 65,587.59	
		Grout	m3	994.87	0.920	0.18	R 9,694.44	R 8,914.18	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	0	0.04	R 69.80	R -	R -
		Working space	m2	7.47	0	1.41	R 49.50	R -	
		Backfill	m3	4.63	0	0.74	R 51.65	R -	
		Blinding	m2	1.22	0	19.45	R 89.72	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
		Concrete column	m3	28.46	0	0.00	R 1,745.00	R -	
		Concrete beam	m3	1.44	0	0.00	R 1,745.00	R -	
		Concrete wall	m3	11.19	0	0.00	R 1,745.00	R -	
		Concrete elevated slabs	m3	11.80	0	0.00	R 1,745.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.88	0	160.92	R 10.84	R -	
		Formwork bases	m2	8.70	0	6.92	R 252.17	R -	
		Formwork to columns	m2	0.15	0	5.95	R 274.37	R -	
		Formwork to sides beams	m2	0.17	0	5.05	R 293.28	R -	
		Formwork to soffits beams	m2	0.51	0	6.36	R 345.54	R -	
		Formwork to soffts of slabs	m2	0.14	0	3.22	R 326.17	R -	
		Formwork to pockets	m2	450.00	0	5.35	R 541.93	R -	
		Formwork wall	m2	0.11	0	6.97	R 250.36	R -	
		High tensile reinforcement	t	4.12	0.000	0.00	R 14,221.00	R -	
		Cast in steel	kg	0.16	0	209.64	R 67.84	R -	
		HD bolts	kg	0.24	0	171.78	R 82.79	R -	
		Galvanised grating	m2	18.82	0	0.16	R 2,316.12	R -	
		Grout	m3	822.89	0.000	6.14	R 10,906.25	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.48	0	0.05	R 87.25	R -	R -
	Working space	m2	0.38	0	1.56	R 55.93	R -	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.98	0	0.78	R 111.86	R -	
	Blinding	m2	4.71	0	21.03	R 82.98	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
	Concrete column	m3	6.03	0	0.00	R 1,745.00	R -	
	Concrete beam	m3	1.73	0	0.00	R 1,745.00	R -	
	Concrete wall	m3	33.33	0	0.00	R 1,745.00	R -	
	Concrete elevated slabs	m3	24.00	0	0.00	R 1,745.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.62	0	151.91	R 11.49	R -	
	Formwork bases	m2	1.43	0	7.62	R 229.00	R -	
	Formwork to columns	m2	0.13	0	6.99	R 278.75	R -	
	Formwork to sides beams	m2	0.23	0	5.94	R 249.64	R -	
	Formwork to soffits beams	m2	0.69	0	6.26	R 293.77	R -	
	Formwork to soffts of slabs	m2	0.20	0	3.67	R 305.07	R -	
	Formwork to pockets	m2	2.86	0	5.72	R 475.48	R -	
	Formwork wall	m2	0.29	0	7.33	R 238.06	R -	
	High tensile reinforcement	t	7.10	0.000	0.00	R 14,221.00	R -	
	Cast in steel	kg	0.02	0	188.96	R 75.26	R -	
	HD bolts	kg	0.01	0	197.35	R 72.06	R -	
	Galvanised grating	m2	3.64	0	0.17	R 10,264.71	R -	
	Grout	m3	40.32	0.000	6.09	R 2,335.14	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	1,185	0.05	R 87.25	R 103,395.61	R 10,470,331.46
	Working space	m2	2.26	524	1.69	R 51.63	R 27,071.17	
	Backfill	m3	1.23	963	0.76	R 114.80	R 110,607.20	
	Blinding	m2	3.82	179	19.66	R 88.76	R 15,916.19	
	Concrete	m3	0.00	685	0.00	R 1,745.00	R 1,195,325.00	
	Mesh reinforcement	m2	0.40	1,713	61.78	R 230.19	R 394,196.54	
	Rough formwork	m2	2.73	251	7.94	R 219.77	R 55,144.58	
	Smooth formwork	m2	0.56	1,223	6.78	R 257.37	R 314,824.33	
	Finish to concrete	m2	0.22	3,114	108.86	R 16.03	R 49,910.85	
	Construction joints	m	4.61	149	19.60	R 89.03	R 13,229.06	
	Movement joints	m	14.81	46	15.71	R 111.08	R 5,137.53	
	Cast in steel	kg	2.30	298	221.43	R 64.22	R 19,127.42	
	Grout	m3	803.00	0.853	0.16	R 10,906.25	R 9,303.59	
	Brick walls	m2	0.46	1,489	0.00	R 456.00	R 679,043.48	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	3,014	0.00		R -	
	Waterproofing membrane	m2	2.00	1,507	11.21	R 155.66	R 234,586.53	
	Roof construction	m2	1.99	1,515	34.10	R 417.04	R 631,634.62	
	Ceiling	m2	0.97	3,107	0.00	R 355.00	R 1,103,061.86	
	Doors and windows	No	434.63	7	0.15	R 3,040.00	R 21,081.29	
	Floor finish	m2	1.00	3,014	0.77	R 592.21	R 1,784,914.29	
	Wall finsih	m2	1.01	2,984	1.37	R 332.85	R 993,267.33	
	Rod reinforcement	t	8.63	79	0.00	R 14,221.00	R 1,128,781.58	
	Metalwork	Item	0.00	1	4.56	R 64,847.76	R 64,847.76	
	Structural steel	Item	0.00	1	11.81	R 167,950.01	R 167,950.01	
	Plumbing and drainage	Item	0.00	1	7.52	R 106,941.92	R 106,941.92	
	Small power and lighting	Item	0.00	1	64.07	R 911,139.47	R 911,139.47	
	External works	Item	0.00	1	189.05	R 329,892.25	R 329,892.25	
BUILDINGS - STEEL	Concrete	m3	0.00	119	0.16	R 1,745.00	R 207,655.00	R 5,756,773.01
	Earthworks	m3	2.30	274	8.34	R 209.23	R 57,266.97	
	Reinforcement	t	8.29	14	0.00	R 14,221.00	R 204,137.39	
	Mesh	m2	0.11	1,082	9.20	R 189.67	R 205,192.69	
	Formwork	m2	0.40	298	7.44	R 234.54	R 69,776.55	
	Brickwork	m2	5.73	252	5.65	R 308.85	R 77,724.44	
	Roof covering	m2	0.83	1,737	202.02	R 235.38	R 408,941.88	
	Structural steel	t	17.93	80	0.00	R 47,552.00	R 3,824,315.90	
	Side cladding	m2	1.49	968	0.95	R 223.61	R 216,409.85	
	Doors	No	371.00	4	0.49	R 23,300.48	R 90,564.13	
	Ridge ventilator	m	20.62	70	10.67	R 2,511.53	R 175,636.77	
	Aluminium insulation	m2	0.88	1,639	1.76	R 133.74	R 219,151.45	
	Total building area	m2	0.00	1,442	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	235	0.12	R 209.40	R 49,125.24	R 4,607,782.98
	Concrete	m3	0.00	85	0.00	R 1,745.00	R 148,325.00	
	Reinforcement	t	10.55	8	0.16	R 14,221.00	R 114,576.78	
	Mesh	m2	0.11	773	9.84	R 177.34	R 137,033.44	
	Formwork	m2	0.41	207	8.08	R 215.97	R 44,773.30	
	Brickwork	m2	5.78	170	5.59	R 312.16	R 53,197.60	
	Screed	m2	1.10	895	39.96	R 43.67	R 39,103.31	
	Structural steel	t	14.85	66	0.00	R 47,552.00	R 3,154,122.56	
	Cat ladders	m	2.52	26	9.58	R 4,963.67	R 130,650.93	
	Hand rail	m	0.72	92	26.40	R 1,801.21	R 165,936.58	
	Kick plates	m	0.73	91	2.64	R 682.28	R 61,993.74	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	1,132	193.17	R 246.17	R 278,705.85	
		Side cladding	m2	4.70	210	0.92	R 226.47	R 47,463.01	
		Floor grating	m2	1.06	63	16.28	R 2,920.88	R 182,775.63	
		Total buiding area	m2	0.00	985	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	210	7.88	R 221.45	R 46,543.67	R 711,363.23
		Blinding	m2	0.48	129	20.45	R 85.33	R 11,021.80	
		Concrete	m3	0.00	62	0.00	R 1,745.00	R 108,190.00	
		Reinforcement	t	8.00	8	0.00	R 14,221.00	R 110,212.75	
		Mesh	m2	0.50	124	48.38	R 293.94	R 36,449.03	
		Formwork	m2	0.35	177	7.78	R 224.29	R 39,731.91	
		Finish to concrete	m2	0.46	135	108.02	R 16.15	R 2,177.33	
		Movement joints	m	2.57	24	15.71	R 111.08	R 2,679.65	
		Cast in steel	kg	0.09	689	204.99	R 69.37	R 47,791.06	
		Grout	m3	72.28	0.858	2.62	R 10,264.71	R 8,804.81	
		Brickwork	m2	0.25	48	0.17	R 456.00	R 21,888.00	
		Doors and windows	No	3.00	4	0.28	R 5,066.67	R 20,266.67	
		Pipework	m	2.93	41	0.22	R 666.03	R 27,277.70	
		Bolts	kg	0.11	564	0.09	R 69.37	R 39,101.77	
		Structural steel	t	4.50	3	0.00	R 50,789.29	R 135,438.10	
		Miscellaneous steel	t	144.21	1	0.00	R 64,640.91	R 53,788.98	
		Total bridge area	m2	0.00	120	0.00		R -	
		Total control room area	m2	0.00	12	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.76	0	6.28	R 277.87	R -	R -
		Blinding	m2	0.82	0	15.92	R 109.61	R -	
		Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
		Reinforcement	t	5.77	0	0.00	R 14,221.00	R -	
		Formwork	m2	0.07	0	5.92	R 294.76	R -	
		Finish to concrete	m2	0.34	0	81.15	R 21.50	R -	
		Movement joints	m	0.46	0	15.43	R 113.09	R -	
		Cast in steel	kg	28.85	0.000	181.80	R 78.22	R -	
		Grout	m3	24.19	0.000	0.79	R 10,906.25	R -	
		Bolts	kg	121.43	0.000	0.16	R 61.80	R -	
		Structural steel	t	43.33	0.000	0.26	R 54,696.15	R -	
		Miscellaneous steel	t	24.14	0.000	0.18	R 79,005.56	R -	
		Brickwork	m2	0.60	0	4.81	R 362.79	R -	
		Roof covering	m2	1.79	0	1.32	R 274.84	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	0	7.10	R 245.77	R -	R -
	Blinding	m2	1.40	0	19.02	R 91.75	R -	
	Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
	Reinforcement	t	5.77	0.000	0.00	R 14,221.00	R -	
	Formwork	m2	0.20	0	7.01	R 248.93	R -	
	Movement joint	m	1.86	0	0.13	R 118.95	R -	
	Cast in steel	kg	0.15	0	14.67	R 66.39	R -	
	Bolts	kg	0.39	0	214.19	R 82.59	R -	
	Chemical anchors	No	7.24	0	0.25	R 346.43	R -	
	Miscellaneous steelwork	t	91.86	0.000	172.18	R 56,884.00	R -	
	Pre-cast concrete	m3	36.75	0	41.05	R 4,847.22	R -	
	Brickwork	m2	8.86	0	0.36	R 365.83	R -	
	Total area	m2	0.00	0	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	0	1.69	R 147.45	R -	R -
	Lining	m2	0.82	0	1.50	R 87.25	R -	
	Paving	m2	0.84	0	0.59	R 147.88	R -	
	Pipework	m	28.97	0	0.26	R 567.13	R -	
	Manholes	No	17.25	0	0.11	R 5,155.68	R -	
	Concrete	m3	2.90	0	0.05	R 1,745.00	R -	
	Formwork	m2	0.10	0	5.83	R 299.31	R -	
	Mesh	m2	0.78	0	7.36	R 237.09	R -	
	Reinforcement	t	5.63	0.000	0.14	R 14,221.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	288	5.85	R 298.29	R 85,943.49	R 691,389.00
	Blinding	m2	0.92	46	13.72	R 127.19	R 5,806.34	
	Concrete	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Reinforcement	t	4.44	9.459	0.00	R 14,221.00	R 134,522.97	
	Mesh	m2	1.14	37	41.22	R 345.00	R 12,710.62	
	Formwork	m2	0.15	280	5.63	R 309.95	R 86,785.08	
	Cast in steel	kg	0.03	1,400	157.23	R 90.45	R 126,625.96	
	Miscellaneous steelwork	t	13.35	2.097	0.18	R 79,005.56	R 165,704.54	
	Total tunnel length	m	0.00	28	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	78	0.00		R -	R 691,292.65
	Steel	t	8.75	8.914	0.00	R 47,552.00	R 423,892.11	
	Handrail	m	1.45	54	25.58	R 1,858.95	R 99,998.81	
	Grating	m2	1.79	44	15.88	R 2,994.46	R 130,484.78	
	Kick flats	m	1.64	48	75.83	R 627.09	R 29,824.86	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	13	90.17	R 527.36	R 7,092.08	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 5,000,933.65
		Steel	t	23.48	85.392	0.00	R 47,552.00	R 4,060,551.96	
		Handrail	m	12.68	158	29.85	R 1,593.03	R 251,895.02	
		Grating	m2	12.33	163	16.37	R 2,904.83	R 472,358.15	
		Kick flats	m	12.52	160	77.41	R 614.29	R 98,374.33	
		Cat ladder	m	94.92	21	8.53	R 5,574.68	R 117,754.20	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	9,445	0.00		R -	R 15,588,373.95
		Steel	t	64.24	147.027	0.00	R 47,552.00	R 6,991,417.19	
		Handrail	m	29.15	324	28.17	R 1,688.04	R 546,947.13	
		Grating	m2	3.70	2,553	15.96	R 2,979.45	R 7,605,646.55	
		Kick flats	m	32.29	293	77.41	R 614.29	R 179,682.44	
		Stair treads	No	217.41	43	91.87	R 517.60	R 22,486.27	
		Cat ladder	m	228.94	41	8.10	R 5,870.62	R 242,194.38	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	988	0.00		R -	R 2,523,239.88
		Steel	t	22.16	44.585	0.00	R 47,552.00	R 2,120,098.19	
		Handrail	m	45.11	22	26.08	R 1,823.31	R 39,934.23	
		Grating	m2	58.13	17	15.86	R 2,998.23	R 50,959.16	
		Kick flats	m	42.58	23	77.41	R 614.29	R 14,253.55	
		Cat ladder	m	19.44	51	8.11	R 5,863.38	R 297,994.75	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	124	0.00		R -	R 921,361.68
		Steel	t	13.69	9.058	0.00	R 47,552.00	R 430,712.05	
		Handrail	m	1.04	119	26.86	R 1,770.36	R 211,081.96	
		Grating	m2	1.91	65	15.68	R 3,032.65	R 196,884.28	
		Kick flats	m	1.08	115	76.30	R 623.22	R 71,555.36	
		Stair treads	No	5.57	22	95.13	R 499.86	R 11,128.02	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	425	0.00		R -	R 2,036,774.36
		Steel	t	11.98	35.476	0.00	R 47,552.00	R 1,686,944.91	
		Handrail	m	22.00	19	26.10	R 1,821.92	R 35,196.10	
		Grating	m2	7.32	58	15.97	R 2,977.58	R 172,878.79	
		Kick flats	m	22.59	19	78.04	R 609.33	R 11,463.68	
		Cat ladder	m	18.87	23	8.22	R 5,784.91	R 130,290.87	
	PIPING INSTALLATION	Pipe length	m	0.00	55,422	0.00		R -	R 80,361,900.00
		Total work units	WU	0.30	184,740	0.00	R 435.00	R 80,361,900.00	
		Pipe supports	kg	2.49	22,258	0.00		R -	
		WU for pipe supports	WU	0.16	29,558	0.00		R -	
		Number of welds	No	0.56	31,036	0.00		R -	
		Total fittings	No	0.39	21,615	0.00		R -	
		Stud bolts	No	0.35	7,565	0.00		R -	
		Support number	No	0.19	4,229	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	184,740	0.00	R 435.00		R 261,840.20

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	3,323	5.52	R 78.80	R 261,840.20	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	184,740	0.00	R 435.00		R 161,552.53
	Number of examinations	No	164.17	1,125	3.03	R 143.56	R 161,552.53	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	184,740	0.00	R 435.00		R 155,265.74
	Number of examinations	No	273.85	675	1.89	R 230.16	R 155,265.74	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	184,740	0.00	R 435.00		R 265,936.10
	Number of examinations	No	46.49	3,974	6.50	R 66.92	R 265,936.10	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	184,740	0.00	R 435.00		R 315,246.82
	Number of examinations	No	106.66	1,732	2.39	R 182.01	R 315,246.82	
MECHANICAL INSTALLATION	Total work units	WU	0.00	184,740	0.00	R 435.00		R 465,829.36
	Mechanical equipment	t	236.32	782	0.73	R 595.89	R 465,829.36	
	Structural steel	t	192.98	957	54.54			
PAINTING & INSULATION	Total work units	WU	0.00	184,740	0.00	R 435.00		R 5,918,340.08
	Painting to piping	m2	16.80	10,996	0.32	R 185.11	R 2,035,509.12	
	Insulation to piping	m2	48.21	3,832	2.35	R 578.46	R 2,216,640.30	
	Mechanical equipment received	t	0.00	782	0.81	R 595.89	R 465,829.36	
	Painting to mechanical equipment	m2	0.23	3,399	3.37	R 176.82	R 600,992.60	
	Insulation to mechanical equipment	m2	0.67	1,167	1.16	R 513.70	R 599,368.71	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.74	39,442	0.00	R 75.00	R 2,958,150.00	R 8,012,535.76
	Electrical cable terminations	No	276.76	1,734	0.38	R 197.37	R 342,330.93	
	Electrical equipment	No	8.25	143	0.10	R 750.00	R 106,885.03	
	DB's	No	5.97	17	0.28	R 2,678.57	R 46,270.57	
	Rack	m	0.59	6,607	1.65	R 234.38	R 1,548,445.35	
	Support steel	kg	1.34	11,198	1.99	R 37.69	R 422,027.52	
	Instrumentation cable	m	23.73	31,220	0.32	R 28.50	R 889,770.00	
	Instruments	No	0.44	1,316	0.16	R 178.13	R 234,347.35	
	Hook-ups	No	3.69	2,990	0.15	R 190.00	R 568,114.78	
	Light fittings	No	9.97	526	0.02	R 468.75	R 246,503.59	
	Conduit	m	3.99	3,956	0.11	R 45.45	R 179,821.28	
	Instrument stands	No	0.00	330		R 1,425.00	R 469,869.36	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project C				
Location:	South Africa				
Client:				Date of estimate:	2010

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	15,442	R	6.10
2	Concrete demolitions	m3	102	R	1,945.00
3	Bulk excavation	m3	6,552	R	48.22
4	Vertical piles	No	0		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,745.00
7	Auger pile	m		R	395.00
8	Total paving and asphalt to road works	m2	3,855		
9	Grey paving to road works	m2	202	R	166.00
10	Asphalt to road surface	m2	3,653		
11	Rip bed of road works	m2	3,855	R	14.50
12	Total concrete in paving and bunding	m3	399	R	1,745.00
13	Concrete in paving	m3	221		
14	Rod reinforcement	t		R	14,221.00
15	Concrete in plinths and bases on area finishing	m3	245		
16	Stormwater pipe to drain surface run-off	m	122		
17	Machine excavation	m3		R	88.00
18	Concrete in pump and pipe support bases	m3	184	R	1,745.00
19	Concrete in tank bases	m3	60	R	1,745.00
20	Concrete in pipe and cable rack foundations	m3	145	R	1,745.00
21	Concrete to simple structural foundations	m3	255	R	1,745.00
22	Complex structural foundations - bases	m3	65	R	1,745.00
23	Concrete pipe racks - bases	m3	42	R	1,745.00
24	Concrete structure including concrete columns and beams - bases	m3	265	R	1,745.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,745.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,745.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	685	R	1,745.00
28	One brick wall	m2		R	456.00
29	Concrete in structual steel buildings - all concrete	m3	119	R	1,745.00
30	Total building area - Structural steel buildings	m2	1,442		
31	Ceiling	m2		R	355.00
32	Structural steel	t		R	47,552.00
33	Steel canopy - concrete	m3	85	R	1,745.00
34	Steel canopy - area	m2	985		
35	Concrete in weighbridge - all concrete	m3	62	R	1,745.00
36	Total weighbridge area	m2	120		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,745.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	0	R	1,745.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	42	R	1,745.00
44	Total lengh of cable tunnel	m	28		
45	Total volume of basic steel platform	m3	78		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	9,445		
48	Total volume of steel in stack	m3	988		
49	Total volume of steel in walkway	m3	124		
50	Total volume of steel in cable gantry	m3	425		
51	Piping work unit cost	WU		R	435.00
52	Total process pipe length	m	55,422		
53	Total electrical cable - installation only	m	39,442	R	75.00
54	Total instrumentation cable - installation only	m	31,220	R	52.00

Ratio: Variable ratio

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Complex	Mean
Current economic conditions	Normal	Mean
Current economic factors	Good	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasiona	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project C			
Location:	South Africa			
Client:	0	Date of estimate:	2010	

	CIVIL CONSTRUCTION COST				R 53,767,256.25
A	SITE CLEARANCE AND DEMOLITIONS		R	292,586.20	
B	BULK EARTHWORKS		R	670,630.13	
C	PILING		R	-	
D	ROAD WORKS		R	2,393,568.38	
E	GENERAL PAVING AND BUNDED AREAS		R	1,451,694.08	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,442,602.34	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,378,319.55	
H	TANK BASES AND BUNDING		R	1,128,317.60	
I	RACK FOUNDATIONS		R	1,352,076.77	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,966,464.63	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	485,852.25	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	623,121.15	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,150,901.51	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	9,915,182.51	
Q	BUILDINGS - STEEL		R	5,470,406.32	
R	CANOPIES - STEEL		R	4,548,347.23	
S	WEIGHBRIDGE		R	775,105.95	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	782,420.59	
	Preliminaries and General	35.00%	R	13,939,659.03	
	STRUCTURAL STEEL				R 33,197,935.75
A	STRUCTURAL STEEL - BASIC PLATFORM		R	623,998.63	
B	STRUCTURAL STEEL - PIPERACK		R	4,314,095.54	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	13,962,548.56	
D	STRUCTURAL STEEL - STACK		R	2,174,423.94	
E	STRUCTURAL STEEL - WALKWAY		R	764,215.58	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,873,529.01	
	Preliminaries and General	40.00%	R	9,485,124.50	
	MECHANICAL AND PIPING				R 103,641,466.75
A	PIPING INSTALLATION		R	72,898,483.80	
B	RADIOGRAPHIC EXAMINATION (RT)		R	204,659.07	
C	DYE PENETRATION TESTING (DP)		R	79,362.04	
D	MAGNETIC PARTICLE TESTING (MPI)		R	112,499.63	
E	POST WELD HEAT TREATMENT		R	194,367.72	
F	MATERIAL HARDNESS TEST (HT)		R	172,155.32	
H	MECHANICAL INSTALLATION		R	368,091.53	
	Preliminaries and General	40.00%	R	29,611,847.64	
	PAINTING AND INSULATION				R 5,843,131.62
A	PAINTING AND INSULATION		R	4,328,245.65	
	Preliminaries and General	35.00%	R	1,514,885.98	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 9,611,321.27
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	7,119,497.24	
	Preliminaries and General	35.00%	R	2,491,824.03	

TOTAL COST	R 206,061,111.64

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		15,442		R 6.10	R 94,196.20	R 292,586.20
	Concrete demolitions	m3		102		R 1,945.00	R 198,390.00	
BULK EARTHWORKS	Bulk excavation	m3		6,552		R 48.22	R 315,937.44	R 670,630.13
	Trimming of sides	m2	2.16	3,032	4.29	R 11.25	R 34,117.76	
	Back fill and compact	m3	1.14	5,729	0.98	R 49.17	R 281,705.48	
	Overhaul	m3/km	1.70	3,851	11.21	R 4.30	R 16,567.80	
	Rip bed	m2	1.76	3,726	8.06	R 5.99	R 22,301.65	
PILING	Site establishment of rig	Item	0.00	0	191.99	R 335,021.30	R -	R -
	EO for raking equipment	Item	0.00	0	23.91	R 41,721.70	R -	
	Number of piles	No	0.00	0	0.00		R -	
	Move rig to new position	No	1.50	0	0.18	R 315.35	R -	
	Number of raking piles	No	18.39	0	0.00		R -	
	EO for setting up raking piles	No	0.93	0	0.28	R 486.11	R -	
	EO for raking drilling	m	0.16	0	0.90	R 356.91	R -	
	Auger quantity	m	0.05	0	0.00	R 395.00	R -	
	EO for drilling in coarse gravel	m	0.53	0	0.22	R 380.16	R -	
	EO for drilling in boulders	m	1.83	0	0.50	R 874.99	R -	
	EO for drilling in soft rock	m	1.61	0	0.24	R 415.06	R -	
	Temporary casings	m	0.35	0	0.36	R 626.95	R -	
	EO casing to raking pile	m	0.18	0	0.50	R 1,625.34	R -	
	Mild steel rod reinforcement	t	14.26	0.000	0.93	R 11,784.90	R -	
	High tensile rod reinforcement	t	1.32	0.000	7.25	R 12,652.50	R -	
	Concrete to piles and bases	m3	0.15	0	0.00	R 1,745.00	R -	
	Concrete to raking piles	m3	0.07	0	1.07	R 1,858.43	R -	
	Site establishment of test equipment	Item	0.00	0	111.63	R 194,795.60	R -	
	Load test to pile	No	101.82	0	27.13	R 47,340.60	R -	
	Site establishment of intergity testing	No	262.92	0	48.83	R 85,203.36	R -	
	Integrity testing of piles	No	1.26	0	0.27	R 473.64	R -	
ROAD WORKS	Red paving	m2	0.15	30	0.96	R 158.89	R 4,768.39	R 2,393,568.38
	Grey paving	m2	0.00	202	0.00	R 166.00	R 33,532.00	
	Kerbing	m	0.13	496	0.00	R 268.31	R 132,988.25	
	Total paving and asphalt	m2	0.00	3,855	0.00		R -	
	Remove top soil	m3	0.55	551	5.74	R 83.22	R 45,882.62	
	Asphalt	m2	0.26	1,005	0.00	R 196.40	R 197,394.44	
	Rip bed	m2	0.00	3,855	0.00	R 14.50	R 55,897.50	
	Reduce levels	m3	0.43	1,652	4.98	R 72.20	R 119,284.12	
	Selected fill	m3	1.67	987	0.55	R 132.13	R 130,438.26	
	Imported fill	m3	2.25	439	0.40	R 333.90	R 146,547.58	
	Wearing course	m3	3.90	424	0.31	R 230.78	R 97,780.33	
	Prime	m2	4.76	4,698	1.49	R 75.37	R 354,045.36	
	Three line road marking	m	0.85	3,976	0.23	R 60.56	R 240,809.55	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.03	513	4.19	R 15.14	R 7,761.63	
	1m Wide concrete V-drain	m	1.01	498	0.80	R 1,190.74	R 593,555.31	
	200mm Diameter PVC pipe	m	0.98	484	0.12	R 379.47	R 183,515.64	
	Road marking - STOP	No	0.16	78	0.06	R 404.58	R 31,654.66	
	Standard signage	No	0.01	5	4.44	R 516.89	R 2,561.92	
	100mm Painted line	m	1.88	930	1.41	R 16.29	R 15,150.82	
			0.00		1.51			
			0.00		1.93			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.00	221	0.75	R 1,745.00	R 385,645.00	R 1,451,694.08
		Concrete in plinths	m3	0.00	44	0.00	R 1,745.00	R 77,073.95	
		Total concrete	m3	0.00	399	0.00		R -	
		Rip and compact	m2	0.13	1,682	188.86	R 9.24	R 15,536.49	
		Formwork to plinth	m2	7.15	316	0.12	R 214.39	R 67,676.90	
		Formwork to slab	m2	0.82	182	0.15	R 255.52	R 46,506.62	
		High tensile steel	t	0.01	3.990	0.00	R 14,221.00	R 56,741.79	
		Mesh	m2	592.70	2,365	50.50	R 281.58	R 665,914.52	
		Construction joint	m	3.89	859	0.05	R 86.00	R 73,895.68	
		Expansion joint	m	2.21	488	0.07	R 128.38	R 62,703.12	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.77	5,537	0.00		R -	R 1,442,602.34
		Base excavation	m3	1.51	542	0.00	R 88.00	R 47,684.04	
		Backfill	m3	0.58	359	0.64	R 136.59	R 49,036.91	
		Working space	m2	0.45	927	1.43	R 95.32	R 88,402.88	
		Concrete in bases	m3	0.04	245	25.22	R 1,745.00	R 427,525.00	
		Blinding	m2	0.83	330	21.04	R 82.93	R 27,377.28	
		Concrete in sump walls	m3	0.10	24	29.72	R 1,745.00	R 42,447.13	
		Concrete in slabs	m3	0.02	5	0.92	R 1,745.00	R 8,550.50	
		Total concrete	m3	0.00	274	0.04		R -	
		Wood float	m2	0.69	396	158.48	R 11.01	R 4,357.85	
		Formwork to bases	m2	1.70	417	0.12	R 214.39	R 89,441.72	
		Formwork to sump walls	m2	12.57	306	0.12	R 210.65	R 64,408.36	
		Formwork to sides of slab	m2	5.71	28	0.18	R 319.09	R 8,931.05	
		Mild steel reinforcement	t	0.12	3.090	0.00	R 14,221.00	R 43,945.36	
		High tensile reinforcement	t	10.52	26.062	1.22	R 14,221.00	R 370,623.53	
		Cast in steel	kg	0.46	533	34.11	R 51.15	R 27,245.49	
		Waterstop	m	0.43	57	8.19	R 213.08	R 12,175.42	
		Manhole	No	0.08	10	2.68	R 5,215.91	R 50,907.24	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	122	0.13	R 651.99	R 79,542.57	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.67	307	0.05	R 88.00	R 27,052.21	R 1,378,319.55
		Working space	m2	0.38	809	0.67	R 58.77	R 47,544.76	
		Backfill	m3	4.38	70	1.33	R 116.91	R 8,200.31	
		Concrete bases	m3	1.03	184	0.00	R 1,745.00	R 321,080.00	
		Concrete plinth	m3	2.34	79	0.00	R 1,745.00	R 137,171.80	
		Total concrete	m3	0.00	263	0.00		R -	
		Wood float	m2	0.45	173	0.06	R 17.45	R 3,019.51	
		Blinding	m2	1.03	180	0.01	R 97.22	R 17,452.43	
		Formwork bases	m2	0.50	371	0.13	R 231.84	R 85,929.32	
		Formwork plinth	m2	0.57	137	0.12	R 208.15	R 28,492.15	
		High tensile reinforcement	t	9.99	26.297	7.15	R 14,221.00	R 373,963.05	
		Cast in steel	kg	0.11	2,435	0.03	R 52.35	R 127,460.77	
		HD Bolts	kg	0.08	3,342	0.03	R 52.35	R 174,968.87	
		Grout	m3	34.31	2.291	6.50	R 11,342.50	R 25,984.38	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.83	350	0.05	R 86.00	R 30,084.05	R 1,128,317.60
		Working space	m2	4.30	81	1.61	R 53.32	R 4,339.27	
		Backfill	m3	1.39	252	0.73	R 118.51	R 29,853.99	
		Concrete bases	m3	0.75	60	0.00	R 1,745.00	R 104,700.00	
		Concrete sump wall	m3	2.84	21	0.00	R 1,745.00	R 36,921.91	
		Concrete slab	m3	0.57	106	0.00	R 1,745.00	R 185,309.73	
		Concrete plinth	m3	4.07	15	20.86	R 1,745.00	R 25,751.93	
		Concrete column	m3	18.84	3	162.67	R 1,745.00	R 5,556.90	
		Total concrete	m3	0.00	205	1.10		R -	
		Blinding	m2	2.66	77	1.05	R 83.67	R 6,464.50	
		Wood float	m2	0.25	814	1.10	R 10.73	R 8,733.96	
		Formwork to bases	m2	0.41	145	1.12	R 216.67	R 31,380.38	
		Formwork to plinths	m2	0.35	42	8.05	R 228.15	R 9,580.59	
		Formwork to columns	m2	0.12	26	7.65	R 247.27	R 6,484.60	
		Formwork to sumps	m2	0.11	189	7.06	R 237.58	R 44,825.05	
		Formwork to slabs	m2	4.11	26	7.35	R 213.18	R 5,504.25	
		Formwork to slabs n/e 300mm	m	2.14	50	8.19	R 74.46	R 3,688.89	
		Mild steel reinforcement	t	0.23	2.017	23.44	R 14,221.00	R 28,684.90	
		High tensile reinforcement	t	22.97	8.936	1.04	R 14,221.00	R 127,085.02	
		Mesh	m2	0.16	655	60.70	R 234.27	R 153,431.94	
		Cast in items	kg	0.19	1,085	213.42	R 66.63	R 72,269.00	
		HD Bolts	kg	0.10	2,129	204.14	R 69.66	R 148,312.26	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	203.70	1.008	0.17	R 10,440.17	R 10,521.87	
		Construction joint	m	0.30	352	24.76	R 70.47	R 24,827.08	
		Expansion joint	m	0.46	231	16.78	R 103.98	R 24,005.54	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.70	536	0.05	R 88.50	R 47,450.84	R 1,352,076.77
		Working space	m2	0.42	1,283	2.04	R 180.47	R 231,576.31	
		Backfill	m3	2.45	218	0.88	R 100.65	R 21,988.15	
		Blinding	m2	0.37	393	22.15	R 78.78	R 30,931.37	
		Concrete bases	m3	5.83	145	0.00	R 1,745.00	R 253,025.00	
		Concrete plinth	m3	0.00	25	0.00	R 1,745.00	R 43,400.51	
		Total concrete	m3	0.00	170	1.34		R -	
		Wood float	m2	0.36	407	171.56	R 10.17	R 4,137.90	
		Formwork bases	m2	0.47	308	9.71	R 179.72	R 55,279.01	
		Formwork plinths	m2	0.09	272	6.98	R 249.85	R 67,965.88	
		High tensile reinforcement	t	9.39	18.085	0.00	R 14,221.00	R 257,189.11	
		HD Bolts	kg	0.03	5,205	230.06	R 61.81	R 321,745.41	
		Grout	m3	79.90	1.815	0.18	R 9,580.39	R 17,387.28	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.36	1,111	0.05	R 94.73	R 105,198.45	R 2,966,464.63
		Working space	m2	0.50	2,202	1.88	R 50.29	R 110,751.74	
		Backfill	m3	2.67	416	0.81	R 117.57	R 48,966.42	
		Blinding	m2	0.32	792	21.50	R 81.15	R 64,235.71	
		Concrete bases	m3	0.00	255	0.00	R 1,745.00	R 444,975.00	
		Concrete plinth	m3	2.55	71	0.00	R 1,745.00	R 123,042.66	
		Concrete slab	m3	3.62	100	0.00	R 1,745.00	R 174,744.74	
		Total concrete	m3	0.00	426	0.00		R -	
		Wood float	m2	0.55	778	163.93	R 10.64	R 8,281.30	
		Formwork bases	m2	0.48	532	8.28	R 210.69	R 112,098.14	
		Formwork plinths	m2	0.11	645	8.30	R 210.33	R 135,706.66	
		High tensile reinforcement	t	13.20	32.257	0.00	R 14,221.00	R 458,724.27	
		HD Bolts	kg	0.02	12,750	215.31	R 66.05	R 842,110.18	
		Cast in items	kg	0.05	5,028	239.76	R 59.31	R 298,233.76	
		Grout	m3	67.58	3.773	0.17	R 10,440.17	R 39,395.62	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.07	135	0.05	R 89.74	R 12,070.73	R 485,852.25
		Working space	m2	0.55	244	1.64	R 54.84	R 13,394.00	
		Backfill	m3	2.15	63	0.79	R 114.22	R 7,154.97	
		Blinding	m2	0.65	101	20.03	R 87.13	R 8,781.03	
		Concrete bases	m3	0.00	65	0.00	R 1,745.00	R 113,425.00	
		Concrete column	m3	28.24	2	0.00	R 1,745.00	R 4,016.26	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	12	0.00	R 1,745.00	R 21,708.13	
	Total concrete	m3	0.00	80	0.00		R -	
	Wood float	m2	0.59	135	158.26	R 11.03	R 1,492.04	
	Formwork bases	m2	0.52	124	8.31	R 209.88	R 26,056.01	
	Formwork plinths	m2	0.33	38	7.41	R 235.65	R 8,980.68	
	Formwork to columns	m2	0.28	8	8.19	R 213.18	R 1,747.84	
	High tensile reinforcement	t	8.91	8.947	0.00	R 14,221.00	R 127,232.80	
	HD bolts	kg	0.04	1,959	210.85	R 67.44	R 132,095.12	
	Grout	m3	109.09	0.731	0.17	R 10,530.17	R 7,697.62	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.79	117	0.06	R 100.96	R 11,848.75	R 623,121.15
	Working space	m2	0.30	393	2.12	R 47.62	R 18,719.25	
	Backfill	m3	2.09	56	0.83	R 122.27	R 6,868.23	
	Blinding	m2	0.67	62	20.02	R 87.17	R 5,435.36	
	Concrete bases	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Concrete column	m3	1.19	38	152.63	R 1,745.00	R 65,642.81	
	Concrete beam	m3	2.67	14	0.96	R 1,745.00	R 24,611.66	
	Total concrete	m3	2.98	94	0.96		R -	
	Wood float	m2	0.47	89	7.60	R 11.43	R 1,023.25	
	Formwork bases	m2	0.48	88	6.47	R 229.52	R 20,233.46	
	Formwork to columns	m2	0.15	245	7.94	R 219.69	R 53,814.58	
	Formwork to sides beams	m2	0.33	42	6.07	R 269.74	R 11,380.64	
	Formwork to soffits beams	m2	0.69	20	6.47	R 287.41	R 5,862.77	
	Formwork corbels	m2	10.91	3	5.28	R 330.54	R 1,139.62	
	High tensile reinforcement	t	9.05	10.359	0.00	R 14,221.00	R 147,319.12	
	Cast in steel	kg	0.03	3,124	261.79	R 54.32	R 169,704.24	
	HD bolts	kg	1.48	63	213.19	R 66.71	R 4,222.10	
	Grout	m3	505.20	0.186	0.16	R 10,809.73	R 2,005.34	
	Restricted excavation	m3	3.87	1,024	0.05	R 90.99	R 93,193.50	R 4,150,901.51
	Working space	m2	0.60	1,695	1.79	R 50.75	R 86,019.64	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.16	885	0.79	R 115.49	R 102,223.60	
	Blinding	m2	0.62	430	20.18	R 86.49	R 37,183.05	
	Concrete bases	m3	0.00	265	0.97	R 1,745.00	R 462,425.00	
	Concrete column	m3	2.41	110	1.08	R 1,745.00	R 192,219.42	
	Concrete beam	m3	0.85	130	1.02	R 1,745.00	R 226,712.03	
	Concrete surface slab	m3	1.67	158	0.98	R 1,745.00	R 276,546.35	
	Concrete wall	m3	2.54	43	1.05	R 1,745.00	R 75,613.15	
	Concrete elevated slab	m3	1.12	99	0.00	R 1,745.00	R 172,173.50	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	806	0.00		R -	
		Wood float	m2	0.64	1,260	170.28	R 10.25	R 12,912.84	
		Formwork bases	m2	0.42	633	7.74	R 225.39	R 142,695.59	
		Formwork to columns	m2	0.17	648	6.24	R 279.74	R 181,264.56	
		Formwork to sides beams	m2	0.30	435	5.11	R 341.49	R 148,595.42	
		Formwork to soffits beams	m2	0.84	155	7.52	R 232.14	R 36,026.51	
		Formwork to soffts of slabs	m2	0.31	511	3.24	R 304.12	R 155,473.55	
		Formwork to pockets	m2	26.96	4	5.74	R 539.29	R 2,203.24	
		Formwork wall	m2	0.13	331	8.00	R 218.11	R 72,301.20	
		High tensile reinforcement	t	8.93	90.229	0.00	R 14,221.00	R 1,283,148.31	
		Cast in steel	kg	0.22	3,603	259.39	R 54.83	R 197,541.95	
		HD bolts	kg	0.42	1,941	202.74	R 70.15	R 136,158.33	
		Steel handrailing	m	2.57	35	9.84	R 1,445.64	R 50,698.16	
		Grout	m3	1,039.52	0.775	0.18	R 9,772.00	R 7,572.62	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.24	0	0.04	R 69.80	R -	R -
		Working space	m2	7.96	0	1.42	R 49.11	R -	
		Backfill	m3	4.20	0	0.64	R 44.32	R -	
		Blinding	m2	1.09	0	18.54	R 94.12	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
		Concrete column	m3	26.85	0	0.00	R 1,745.00	R -	
		Concrete beam	m3	1.46	0	0.00	R 1,745.00	R -	
		Concrete wall	m3	10.52	0	0.00	R 1,745.00	R -	
		Concrete elevated slabs	m3	11.21	0	0.00	R 1,745.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.84	0	139.70	R 12.49	R -	
		Formwork bases	m2	8.52	0	6.93	R 251.65	R -	
		Formwork to columns	m2	0.14	0	5.72	R 266.09	R -	
		Formwork to sides beams	m2	0.17	0	4.76	R 304.84	R -	
		Formwork to soffits beams	m2	0.52	0	6.56	R 366.60	R -	
		Formwork to soffts of slabs	m2	0.13	0	3.04	R 343.75	R -	
		Formwork to pockets	m2	437.11	0	5.08	R 574.55	R -	
		Formwork wall	m2	0.10	0	6.47	R 269.62	R -	
		High tensile reinforcement	t	4.15	0.000	0.00	R 14,221.00	R -	
		Cast in steel	kg	0.15	0	198.44	R 71.66	R -	
		HD bolts	kg	0.22	0	168.18	R 84.56	R -	
		Galvanised grating	m2	17.43	0	0.15	R 2,623.80	R -	
		Grout	m3	779.52	0.000	5.42	R 11,578.20	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.61	0	0.05	R 90.99	R -	R -
	Working space	m2	0.42	0	1.79	R 50.95	R -	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	0	0.81	R 112.83	R -	
	Blinding	m2	4.70	0	20.54	R 84.96	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
	Concrete column	m3	6.57	0	0.00	R 1,745.00	R -	
	Concrete beam	m3	2.00	0	0.00	R 1,745.00	R -	
	Concrete wall	m3	35.36	0	0.00	R 1,745.00	R -	
	Concrete elevated slabs	m3	25.15	0	0.00	R 1,745.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.65	0	161.28	R 10.82	R -	
	Formwork bases	m2	1.42	0	8.11	R 215.22	R -	
	Formwork to columns	m2	0.14	0	7.01	R 257.10	R -	
	Formwork to sides beams	m2	0.23	0	6.33	R 248.93	R -	
	Formwork to soffits beams	m2	0.75	0	6.79	R 275.55	R -	
	Formwork to soffts of slabs	m2	0.21	0	3.88	R 281.45	R -	
	Formwork to pockets	m2	3.03	0	6.20	R 450.24	R -	
	Formwork wall	m2	0.29	0	7.39	R 236.02	R -	
	High tensile reinforcement	t	7.31	0.000	0.00	R 14,221.00	R -	
	Cast in steel	kg	0.02	0	209.67	R 67.83	R -	
	HD bolts	kg	0.01	0	206.83	R 68.76	R -	
	Galvanised grating	m2	3.94	0	0.19	R 9,324.43	R -	
	Grout	m3	42.10	0.000	6.31	R 2,254.49	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.81	1,241	0.05	R 88.50	R 109,852.20	R 9,915,182.51
	Working space	m2	2.49	499	1.83	R 48.40	R 24,168.27	
	Backfill	m3	1.24	998	0.79	R 111.82	R 111,551.88	
	Blinding	m2	3.90	176	20.30	R 85.97	R 15,103.10	
	Concrete	m3	0.00	685	0.00	R 1,745.00	R 1,195,325.00	
	Mesh reinforcement	m2	0.51	1,332	64.64	R 220.01	R 293,038.38	
	Rough formwork	m2	3.05	224	8.56	R 203.96	R 45,753.22	
	Smooth formwork	m2	0.58	1,190	6.81	R 256.19	R 304,818.13	
	Finish to concrete	m2	0.23	2,997	105.26	R 16.58	R 49,680.16	
	Construction joints	m	5.00	137	21.39	R 81.60	R 11,185.12	
	Movement joints	m	15.33	45	17.08	R 102.14	R 4,564.65	
	Cast in steel	kg	2.37	290	228.82	R 62.15	R 17,995.47	
	Grout	m3	886.39	0.773	0.17	R 10,012.30	R 7,737.46	
	Brick walls	m2	0.50	1,372	0.00	R 456.00	R 625,613.73	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.46	3,052	0.00		R -	
	Waterproofing membrane	m2	2.19	1,394	11.98	R 145.71	R 203,109.32	
	Roof construction	m2	2.04	1,496	37.42	R 380.05	R 568,726.07	
	Ceiling	m2	0.98	3,109	0.00	R 355.00	R 1,103,844.60	
	Doors and windows	No	469.54	6	0.17	R 2,728.21	R 17,731.31	
	Floor finish	m2	1.03	2,959	0.80	R 569.49	R 1,684,947.56	
	Wall finsih	m2	1.03	2,969	1.45	R 313.71	R 931,395.18	
	Rod reinforcement	t	9.39	73	0.00	R 14,221.00	R 1,036,947.92	
	Metalwork	Item	0.00	1	4.53	R 64,350.03	R 64,350.03	
	Structural steel	Item	0.00	1	11.71	R 166,568.54	R 166,568.54	
	Plumbing and drainage	Item	0.00	1	7.46	R 106,048.03	R 106,048.03	
	Small power and lighting	Item	0.00	1	63.54	R 903,602.34	R 903,602.34	
	External works	Item	0.00	1	178.52	R 311,524.88	R 311,524.88	
BUILDINGS - STEEL	Concrete	m3	0.00	119	0.17	R 1,745.00	R 207,655.00	R 5,470,406.32
	Earthworks	m3	2.40	285	9.18	R 190.16	R 54,196.87	
	Reinforcement	t	8.79	14	0.00	R 14,221.00	R 192,603.74	
	Mesh	m2	0.11	1,041	10.15	R 171.99	R 179,088.55	
	Formwork	m2	0.40	300	8.14	R 214.37	R 64,350.67	
	Brickwork	m2	6.14	235	6.02	R 289.70	R 68,091.37	
	Roof covering	m2	0.86	1,675	205.85	R 231.00	R 387,014.45	
	Structural steel	t	18.84	77	0.00	R 47,552.00	R 3,640,285.83	
	Side cladding	m2	1.55	931	0.99	R 228.53	R 212,704.37	
	Doors	No	407.92	4	0.51	R 24,285.49	R 85,849.66	
	Ridge ventilator	m	21.99	66	11.28	R 2,605.57	R 170,866.40	
	Aluminium insulation	m2	0.89	1,627	1.81	R 127.68	R 207,699.42	
	Total building area	m2	0.00	1,442	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.07	261	0.12	R 215.63	R 56,282.30	R 4,548,347.23
	Concrete	m3	0.00	85	0.00	R 1,745.00	R 148,325.00	
	Reinforcement	t	11.59	7	0.19	R 14,221.00	R 104,269.81	
	Mesh	m2	0.12	688	10.36	R 168.51	R 115,908.75	
	Formwork	m2	0.46	186	8.62	R 202.50	R 37,711.89	
	Brickwork	m2	5.91	167	6.04	R 289.01	R 48,133.40	
	Screed	m2	1.11	889	43.40	R 40.21	R 35,751.47	
	Structural steel	t	14.68	67	0.00	R 47,552.00	R 3,191,114.31	
	Cat ladders	m	2.73	25	9.66	R 4,924.02	R 121,008.94	
	Hand rail	m	0.74	91	27.63	R 1,721.03	R 156,526.97	
	Kick plates	m	0.75	89	2.77	R 620.83	R 55,286.80	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.90	1,094	197.39	R 240.90	R 263,446.73	
	Side cladding	m2	4.69	210	0.93	R 224.21	R 47,089.43	
	Floor grating	m2	1.09	61	17.43	R 2,727.61	R 167,491.43	
	Total buiding area	m2	0.00	985	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.35	207	8.12	R 214.83	R 44,562.25	R 775,105.95
	Blinding	m2	0.48	129	19.02	R 91.76	R 11,870.35	
	Concrete	m3	0.00	62	0.00	R 1,745.00	R 108,190.00	
	Reinforcement	t	8.00	8	0.00	R 14,221.00	R 110,242.28	
	Mesh	m2	0.50	124	50.55	R 281.32	R 34,833.60	
	Formwork	m2	0.32	195	7.63	R 228.72	R 44,714.49	
	Finish to concrete	m2	0.44	140	105.18	R 16.59	R 2,326.45	
	Movement joints	m	2.54	24	15.73	R 110.95	R 2,712.03	
	Cast in steel	kg	0.09	711	179.84	R 79.07	R 56,259.85	
	Grout	m3	71.98	0.861	2.59	R 11,104.55	R 9,565.28	
	Brickwork	m2	0.24	50	0.16	R 456.00	R 22,868.06	
	Doors and windows	No	2.77	4	0.26	R 5,148.39	R 22,320.75	
	Pipework	m	2.59	46	0.21	R 674.68	R 31,293.62	
	Bolts	kg	0.11	586	0.09	R 79.07	R 46,376.36	
	Structural steel	t	4.00	3	0.00	R 55,303.89	R 165,763.66	
	Miscellaneous steel	t	130.11	1	0.00	R 66,364.67	R 61,206.89	
	Total bridge area	m2	0.00	120	0.00		R -	
	Total control room area	m2	0.00	12	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.37	0	6.00	R 290.80	R -	R -
	Blinding	m2	0.71	0	14.40	R 121.19	R -	
	Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
	Reinforcement	t	5.75	0	0.00	R 14,221.00	R -	
	Formwork	m2	0.07	0	5.70	R 306.22	R -	
	Finish to concrete	m2	0.31	0	76.59	R 22.78	R -	
	Movement joints	m	0.42	0	12.31	R 141.71	R -	
	Cast in steel	kg	23.52	0.000	159.60	R 89.10	R -	
	Grout	m3	22.24	0.000	0.60	R 13,802.26	R -	
	Bolts	kg	110.06	0.000	0.13	R 53.84	R -	
	Structural steel	t	36.36	0.000	0.22	R 64,851.47	R -	
	Miscellaneous steel	t	20.05	0.000	0.18	R 80,279.84	R -	
	Brickwork	m2	0.50	0	4.20	R 415.55	R -	
	Roof covering	m2	1.45	0	1.21	R 344.24	R -	
	Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	6.30	R 277.17	R -	R -
	Blinding	m2	1.21	0	16.50	R 105.79	R -	
	Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
	Reinforcement	t	6.15	0.000	0.00	R 14,221.00	R -	
	Formwork	m2	0.21	0	6.15	R 283.90	R -	
	Movement joint	m	1.65	0	0.12	R 131.85	R -	
	Cast in steel	kg	0.14	0	13.23	R 71.90	R -	
	Bolts	kg	0.37	0	197.79	R 88.13	R -	
	Chemical anchors	No	6.36	0	0.23	R 398.61	R -	
	Miscellaneous steelwork	t	91.12	0.000	161.37	R 62,608.18	R -	
	Pre-cast concrete	m3	31.14	0	35.68	R 5,761.79	R -	
	Brickwork	m2	7.77	0	0.30	R 391.76	R -	
	Total area	m2	0.00	0	4.45		R -	
EMERGENCY DAM	Earthworks	m3	0.53	0	1.64	R 129.06	R -	R -
	Lining	m2	0.70	0	1.14	R 78.53	R -	
	Paving	m2	0.65	0	0.53	R 149.37	R -	
	Pipework	m	27.90	0	0.23	R 552.56	R -	
	Manholes	No	16.15	0	0.10	R 5,335.03	R -	
	Concrete	m3	2.44	0	0.05	R 1,745.00	R -	
	Formwork	m2	0.08	0	5.81	R 300.12	R -	
	Mesh	m2	0.68	0	6.55	R 266.33	R -	
	Reinforcement	t	4.59	0.000	0.12	R 14,221.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.26	263	5.93	R 294.34	R 77,334.20	R 782,420.59
	Blinding	m2	0.88	48	14.37	R 121.43	R 5,804.83	
	Concrete	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Reinforcement	t	4.64	9.060	0.00	R 14,221.00	R 128,843.57	
	Mesh	m2	0.95	44	39.96	R 355.86	R 15,673.63	
	Formwork	m2	0.16	265	5.51	R 316.53	R 83,838.41	
	Cast in steel	kg	0.02	1,897	145.80	R 97.54	R 185,007.04	
	Miscellaneous steelwork	t	11.30	2.478	0.17	R 85,816.38	R 212,628.92	
	Total tunnel length	m	0.00	28	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	78	0.00		R -	R 623,998.63
	Steel	t	9.63	8.104	0.00	R 47,552.00	R 385,356.47	
	Handrail	m	1.46	54	28.64	R 1,660.46	R 88,839.87	
	Grating	m2	1.92	41	16.69	R 2,848.40	R 115,630.21	
	Kick flats	m	1.71	46	76.00	R 625.73	R 28,613.57	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.85	11	97.44	R 488.00	R 5,558.51	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 4,314,095.54
		Steel	t	27.56	72.758	0.00	R 47,552.00	R 3,459,783.93	
		Handrail	m	13.30	151	30.39	R 1,564.73	R 235,885.27	
		Grating	m2	12.23	164	18.38	R 2,587.46	R 424,141.83	
		Kick flats	m	13.16	152	83.67	R 568.31	R 86,599.10	
		Cat ladder	m	98.47	20	8.99	R 5,288.59	R 107,685.40	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	9,445	0.00		R -	R 13,962,548.56
		Steel	t	78.02	121.061	0.00	R 47,552.00	R 5,756,688.85	
		Handrail	m	31.32	302	30.13	R 1,578.49	R 476,092.43	
		Grating	m2	3.92	2,407	15.62	R 3,043.61	R 7,325,374.18	
		Kick flats	m	34.08	277	83.14	R 571.93	R 158,484.90	
		Stair treads	No	234.63	40	101.34	R 469.25	R 18,889.65	
		Cat ladder	m	239.20	39	8.27	R 5,749.44	R 227,018.56	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	988	0.00		R -	R 2,174,423.94
		Steel	t	25.89	38.157	0.00	R 47,552.00	R 1,814,453.14	
		Handrail	m	46.29	21	29.87	R 1,592.00	R 33,978.72	
		Grating	m2	60.47	16	17.15	R 2,772.13	R 45,291.94	
		Kick flats	m	47.39	21	80.55	R 590.36	R 12,308.86	
		Cat ladder	m	20.38	48	8.59	R 5,535.28	R 268,391.27	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	124	0.00		R -	R 764,215.58
		Steel	t	16.76	7.398	0.00	R 47,552.00	R 351,786.72	
		Handrail	m	1.12	111	31.33	R 1,517.81	R 168,365.72	
		Grating	m2	2.01	62	17.05	R 2,788.74	R 172,041.67	
		Kick flats	m	1.17	106	79.61	R 597.35	R 63,270.20	
		Stair treads	No	6.20	20	108.71	R 437.41	R 8,751.27	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	425	0.00		R -	R 1,873,529.01
		Steel	t	12.85	33.070	0.00	R 47,552.00	R 1,572,556.69	
		Handrail	m	25.63	17	31.08	R 1,529.81	R 25,369.65	
		Grating	m2	7.61	56	17.57	R 2,706.10	R 151,185.95	
		Kick flats	m	22.96	19	82.58	R 575.84	R 10,658.48	
		Cat ladder	m	20.53	21	8.65	R 5,494.62	R 113,758.24	
	PIPING INSTALLATION	Pipe length	m	0.00	55,422	0.00		R -	R 72,898,483.80
		Total work units	WU	0.33	167,583	0.00	R 435.00	R 72,898,483.80	
		Pipe supports	kg	2.68	20,674	0.00		R -	
		WU for pipe supports	WU	0.16	26,933	0.00		R -	
		Number of welds	No	0.61	33,570	0.00		R -	
		Total fittings	No	0.38	21,219	0.00		R -	
		Stud bolts	No	0.34	7,154	0.00		R -	
		Support number	No	0.19	3,943	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	167,583	0.00	R 435.00		R 204,659.07

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	60.24	2,782	5.91	R 73.57	R 204,659.07	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	167,583	0.00	R 435.00		R 79,362.04
	Number of examinations	No	169.90	986	5.41	R 80.46	R 79,362.04	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	167,583	0.00	R 435.00		R 112,499.63
	Number of examinations	No	308.99	542	2.10	R 207.43	R 112,499.63	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	167,583	0.00	R 435.00		R 194,367.72
	Number of examinations	No	53.49	3,133	7.01	R 62.04	R 194,367.72	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	167,583	0.00	R 435.00		R 172,155.32
	Number of examinations	No	116.84	1,434	3.62	R 120.02	R 172,155.32	
MECHANICAL INSTALLATION	Total work units	WU	0.00	167,583	0.00	R 435.00		R 368,091.53
	Mechanical equipment	t	263.06	637	0.75	R 577.80	R 368,091.53	
	Structural steel	t	220.21	761	54.53			
PAINTING & INSULATION	Total work units	WU	0.00	167,583	0.00	R 435.00		R 4,328,245.65
	Painting to piping	m2	18.25	9,185	0.34	R 167.77	R 1,540,916.25	
	Insulation to piping	m2	52.59	3,187	2.59	R 494.48	R 1,575,669.99	
	Mechanical equipment received	t	0.00	637	0.83	R 577.80	R 368,091.53	
	Painting to mechanical equipment	m2	0.25	2,593	3.75	R 154.08	R 399,479.18	
	Insulation to mechanical equipment	m2	0.70	906	1.18	R 489.96	R 444,088.70	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.43	39,442	0.00	R 75.00	R 2,958,150.00	R 7,119,497.24
	Electrical cable terminations	No	313.29	1,551	0.43	R 173.27	R 268,768.30	
	Electrical equipment	No	9.10	126	0.11	R 656.25	R 82,618.77	
	DB's	No	6.53	14	0.32	R 2,083.33	R 28,817.65	
	Rack	m	0.68	6,037	1.66	R 215.16	R 1,299,048.14	
	Support steel	kg	1.45	8,823	2.14	R 35.11	R 309,735.64	
	Instrumentation cable	m	27.38	31,220	0.35	R 28.50	R 889,770.00	
	Instruments	No	0.59	1,140	0.18	R 160.24	R 182,704.96	
	Hook-ups	No	3.94	1,935	0.16	R 174.24	R 337,122.93	
	Light fittings	No	10.42	495	0.02	R 421.69	R 208,902.73	
	Conduit	m	4.10	3,786	0.13	R 45.32	R 171,570.97	
	Instrument stands	No	0.00	278		R 1,375.86	R 382,287.15	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project C				
Location:	South Africa				
Client:				Date of estimate:	2010

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	15,442	R	6.10
2	Concrete demolitions	m3	102	R	1,945.00
3	Bulk excavation	m3	6,552	R	48.22
4	Vertical piles	No	0		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,745.00
7	Auger pile	m		R	395.00
8	Total paving and asphalt to road works	m2	3,855		
9	Grey paving to road works	m2	202	R	166.00
10	Asphalt to road surface	m2	3,653		
11	Rip bed of road works	m2	3,855	R	14.50
12	Total concrete in paving and bunding	m3	399	R	1,745.00
13	Concrete in paving	m3	221		
14	Rod reinforcement	t		R	14,221.00
15	Concrete in plinths and bases on area finishing	m3	245		
16	Stormwater pipe to drain surface run-off	m	122		
17	Machine excavation	m3		R	88.00
18	Concrete in pump and pipe support bases	m3	184	R	1,745.00
19	Concrete in tank bases	m3	60	R	1,745.00
20	Concrete in pipe and cable rack foundations	m3	145	R	1,745.00
21	Concrete to simple structural foundations	m3	255	R	1,745.00
22	Complex structural foundations - bases	m3	65	R	1,745.00
23	Concrete pipe racks - bases	m3	42	R	1,745.00
24	Concrete structure including concrete columns and beams - bases	m3	265	R	1,745.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,745.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,745.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	685	R	1,745.00
28	One brick wall	m2		R	456.00
29	Concrete in structual steel buildings - all concrete	m3	119	R	1,745.00
30	Total building area - Structural steel buildings	m2	1,442		
31	Ceiling	m2		R	355.00
32	Structural steel	t		R	47,552.00
33	Steel canopy - concrete	m3	85	R	1,745.00
34	Steel canopy - area	m2	985		
35	Concrete in weighbridge - all concrete	m3	62	R	1,745.00
36	Total weighbridge area	m2	120		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,745.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	0	R	1,745.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	42	R	1,745.00
44	Total lengh of cable tunnel	m	28		
45	Total volume of basic steel platform	m3	78		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	9,445		
48	Total volume of steel in stack	m3	988		
49	Total volume of steel in walkway	m3	124		
50	Total volume of steel in cable gantry	m3	425		
51	Piping work unit cost	WU		R	435.00
52	Total process pipe length	m	55,422		
53	Total electrical cable - installation only	m	39,442	R	75.00
54	Total instrumentation cable - installation only	m	31,220	R	52.00

Ratio: Variable ratio

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Complex	Median
Current economic conditions	Normal	Median
Current economic factors	Good	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Normal	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Medium	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project C			
Location:	South Africa			
Client:	0	Date of estimate:	2010	

	CIVIL CONSTRUCTION COST				R 55,728,920.26
A	SITE CLEARANCE AND DEMOLITIONS		R	292,586.20	
B	BULK EARTHWORKS		R	686,665.13	
C	PILING		R	-	
D	ROAD WORKS		R	1,958,181.68	
E	GENERAL PAVING AND BUNDED AREAS		R	1,536,639.47	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,516,693.70	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,457,377.28	
H	TANK BASES AND BUNDING		R	1,218,244.49	
I	RACK FOUNDATIONS		R	1,373,576.27	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	3,175,510.65	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	510,834.02	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	640,256.35	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	4,694,645.12	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	10,442,727.07	
Q	BUILDINGS - STEEL		R	5,759,781.89	
R	CANOPIES - STEEL		R	4,639,659.16	
S	WEIGHBRIDGE		R	723,348.26	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	653,954.92	
	Preliminaries and General	35.00%	R	14,448,238.59	
	STRUCTURAL STEEL				R 36,281,643.93
A	STRUCTURAL STEEL - BASIC PLATFORM		R	689,044.69	
B	STRUCTURAL STEEL - PIPERACK		R	4,870,991.51	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	14,957,737.08	
D	STRUCTURAL STEEL - STACK		R	2,485,594.89	
E	STRUCTURAL STEEL - WALKWAY		R	893,517.79	
F	STRUCTURAL STEEL - CABLE GANTRY		R	2,018,573.99	
	Preliminaries and General	40.00%	R	10,366,183.98	
	MECHANICAL AND PIPING				R 113,944,973.89
A	PIPING INSTALLATION		R	79,791,957.45	
B	RADIOGRAPHIC EXAMINATION (RT)		R	262,284.48	
C	DYE PENETRATION TESTING (DP)		R	158,413.53	
D	MAGNETIC PARTICLE TESTING (MPI)		R	150,487.90	
E	POST WELD HEAT TREATMENT		R	263,279.74	
F	MATERIAL HARDNESS TEST (HT)		R	298,398.49	
H	MECHANICAL INSTALLATION		R	464,445.47	
	Preliminaries and General	40.00%	R	32,555,706.83	
	PAINTING AND INSULATION				R 7,967,832.81
A	PAINTING AND INSULATION		R	5,902,098.38	
	Preliminaries and General	35.00%	R	2,065,734.43	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 10,616,174.29
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	7,863,832.81	
	Preliminaries and General	35.00%	R	2,752,341.48	

TOTAL COST	R 224,539,545.19

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		15,442		R 6.10	R 94,196.20	R 292,586.20
	Concrete demolitions	m3		102		R 1,945.00	R 198,390.00	
BULK EARTHWORKS	Bulk excavation	m3		6,552		R 48.22	R 315,937.44	R 686,665.13
	Trimming of sides	m2	2.17	3,014	4.24	R 11.38	R 34,293.17	
	Back fill and compact	m3	1.12	5,843	0.95	R 50.76	R 296,555.42	
	Overhaul	m3/km	1.57	4,177	11.21	R 4.30	R 17,968.79	
	Rip bed	m2	1.69	3,867	8.51	R 5.67	R 21,910.31	
PILING	Site establishment of rig	Item	0.00	0	192.39	R 335,720.55	R -	R -
	EO for raking equipment	Item	0.00	0	24.05	R 41,966.00	R -	
	Number of piles	No	0.00	0	0.00		R -	
	Move rig to new position	No	1.50	0	0.19	R 331.55	R -	
	Number of raking piles	No	19.30	0	0.00		R -	
	EO for setting up raking piles	No	0.92	0	0.25	R 439.99	R -	
	EO for raking drilling	m	0.14	0	0.73	R 289.48	R -	
	Auger quantity	m	0.05	0	0.00	R 395.00	R -	
	EO for drilling in coarse gravel	m	0.55	0	0.22	R 383.90	R -	
	EO for drilling in boulders	m	1.71	0	0.52	R 901.17	R -	
	EO for drilling in soft rock	m	1.59	0	0.24	R 412.57	R -	
	Temporary casings	m	0.35	0	0.32	R 552.17	R -	
	EO casing to raking pile	m	0.17	0	0.56	R 1,219.01	R -	
	Mild steel rod reinforcement	t	14.81	0.000	0.70	R 9,205.25	R -	
	High tensile rod reinforcement	t	1.16	0.000	7.55	R 13,177.24	R -	
	Concrete to piles and bases	m3	0.16	0	0.00	R 1,745.00	R -	
	Concrete to raking piles	m3	0.08	0	1.08	R 1,875.88	R -	
	Site establishment of test equipment	Item	0.00	0	113.56	R 198,154.72	R -	
	Load test to pile	No	97.71	0	22.82	R 39,822.15	R -	
	Site establishment of intergity testing	No	259.93	0	49.62	R 86,594.38	R -	
	Integrity testing of piles	No	1.22	0	0.26	R 448.71	R -	
ROAD WORKS	Red paving	m2	0.14	28	0.93	R 154.50	R 4,391.51	R 1,958,181.68
	Grey paving	m2	0.00	202	0.00	R 166.00	R 33,532.00	
	Kerbing	m	0.10	366	0.00	R 326.09	R 119,421.01	
	Total paving and asphalt	m2	0.00	3,855	0.00		R -	
	Remove top soil	m3	0.49	387	4.57	R 66.29	R 25,653.27	
	Asphalt	m2	0.20	788	0.00	R 198.67	R 156,460.22	
	Rip bed	m2	0.00	3,855	0.00	R 14.50	R 55,897.50	
	Reduce levels	m3	0.37	1,432	4.27	R 61.86	R 88,579.29	
	Selected fill	m3	1.49	963	0.46	R 134.69	R 129,749.35	
	Imported fill	m3	1.90	507	0.32	R 419.98	R 213,008.33	
	Wearing course	m3	3.93	364	0.20	R 314.94	R 114,724.46	
	Prime	m2	4.32	4,157	1.48	R 45.00	R 187,069.42	
	Three line road marking	m	0.84	3,480	0.11	R 34.94	R 121,591.69	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.01	371	4.09	R 11.18	R 4,144.15	
		1m Wide concrete V-drain	m	0.99	362	0.78	R 1,395.65	R 505,645.61	
		200mm Diameter PVC pipe	m	0.93	341	0.09	R 466.30	R 158,818.00	
		Road marking - STOP	No	0.17	61	0.03	R 506.60	R 31,142.38	
		Standard signage	No	0.01	4	4.28	R 604.66	R 2,214.41	
		100mm Painted line	m	1.71	628	1.43	R 9.78	R 6,139.09	
				0.00		1.55			
				0.00		1.85			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.89	221	0.73	R 1,745.00	R 385,645.00	R 1,536,639.47
		Concrete in plinths	m3	0.00	45	0.00	R 1,745.00	R 78,921.65	
		Total concrete	m3	0.00	399	0.00		R -	
		Rip and compact	m2	0.14	1,628	199.17	R 8.76	R 14,267.28	
		Formwork to plinth	m2	6.76	306	0.11	R 199.43	R 60,953.28	
		Formwork to slab	m2	0.80	176	0.14	R 251.78	R 44,236.24	
		High tensile steel	t	0.01	3.990	0.00	R 14,221.00	R 56,741.79	
		Mesh	m2	603.63	2,408	44.30	R 321.01	R 773,130.90	
		Construction joint	m	3.65	806	0.04	R 77.28	R 62,275.76	
		Expansion joint	m	2.11	466	0.07	R 129.63	R 60,467.56	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.15	5,483	0.00		R -	R 1,516,693.70
		Base excavation	m3	1.45	568	0.00	R 88.00	R 49,973.51	
		Backfill	m3	0.55	392	0.64	R 138.58	R 54,301.54	
		Working space	m2	0.43	1,030	1.35	R 102.87	R 105,940.79	
		Concrete in bases	m3	0.04	245	23.71	R 1,745.00	R 427,525.00	
		Blinding	m2	0.74	372	19.02	R 91.76	R 34,178.53	
		Concrete in sump walls	m3	0.11	27	31.06	R 1,745.00	R 46,417.00	
		Concrete in slabs	m3	0.02	4	0.85	R 1,745.00	R 7,023.63	
		Total concrete	m3	0.00	276	0.03		R -	
		Wood float	m2	0.61	450	125.09	R 13.95	R 6,273.82	
		Formwork to bases	m2	1.73	423	0.12	R 213.14	R 90,227.19	
		Formwork to sump walls	m2	11.42	304	0.11	R 196.94	R 59,804.85	
		Formwork to sides of slab	m2	5.65	23	0.17	R 300.39	R 6,827.77	
		Mild steel reinforcement	t	0.08	2.489	0.00	R 14,221.00	R 35,394.04	
		High tensile reinforcement	t	9.26	29.781	0.94	R 14,221.00	R 423,518.44	
		Cast in steel	kg	0.45	545	33.19	R 52.58	R 28,672.73	
		Waterstop	m	0.44	61	8.41	R 207.54	R 12,670.39	
		Manhole	No	0.08	9	2.69	R 5,224.97	R 48,719.08	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	122	0.12	R 649.39	R 79,225.41	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.58	290	0.05	R 88.00	R 25,513.97	R 1,457,377.28
	Working space	m2	0.33	875	0.69	R 61.03	R 53,392.37	
	Backfill	m3	3.96	73	1.27	R 111.51	R 8,170.00	
	Concrete bases	m3	0.96	184	0.00	R 1,745.00	R 321,080.00	
	Concrete plinth	m3	2.04	90	0.00	R 1,745.00	R 157,447.29	
	Total concrete	m3	0.00	274	0.00		R -	
	Wood float	m2	0.46	197	0.05	R 17.45	R 3,438.79	
	Blinding	m2	0.96	191	0.01	R 88.50	R 16,886.43	
	Formwork bases	m2	0.48	381	0.13	R 221.86	R 84,544.73	
	Formwork plinth	m2	0.53	171	0.12	R 213.14	R 36,383.09	
	High tensile reinforcement	t	9.93	27.628	6.76	R 14,221.00	R 392,897.84	
	Cast in steel	kg	0.10	2,685	0.03	R 51.10	R 137,200.13	
	HD Bolts	kg	0.08	3,656	0.03	R 52.35	R 191,410.91	
	Grout	m3	33.20	2.718	6.12	R 10,674.41	R 29,011.74	
TANK BASES AND BUNDING	Restricted excavation	m3	5.46	328	0.05	R 83.51	R 27,376.01	R 1,218,244.49
	Working space	m2	3.93	83	1.52	R 54.94	R 4,587.00	
	Backfill	m3	1.34	244	0.75	R 111.45	R 27,193.30	
	Concrete bases	m3	0.72	60	0.00	R 1,745.00	R 104,700.00	
	Concrete sump wall	m3	2.56	23	0.00	R 1,745.00	R 40,887.03	
	Concrete slab	m3	0.56	108	0.00	R 1,745.00	R 188,406.17	
	Concrete plinth	m3	3.73	16	19.84	R 1,745.00	R 28,107.38	
	Concrete column	m3	18.33	3	160.65	R 1,745.00	R 5,712.39	
	Total concrete	m3	0.00	211	1.01		R -	
	Blinding	m2	2.42	87	1.04	R 87.98	R 7,649.11	
	Wood float	m2	0.25	836	1.03	R 10.86	R 9,080.09	
	Formwork to bases	m2	0.39	155	1.06	R 232.71	R 35,999.49	
	Formwork to plinths	m2	0.35	47	7.50	R 240.76	R 11,217.43	
	Formwork to columns	m2	0.11	29	7.25	R 259.81	R 7,632.79	
	Formwork to sumps	m2	0.10	228	6.72	R 239.02	R 54,448.48	
	Formwork to slabs	m2	3.90	28	7.30	R 218.01	R 6,032.11	
	Formwork to slabs n/e 300mm	m	2.02	54	8.00	R 80.84	R 4,327.19	
	Mild steel reinforcement	t	0.22	2.073	21.59	R 14,221.00	R 29,482.83	
	High tensile reinforcement	t	22.22	9.485	0.94	R 14,221.00	R 134,888.78	
	Mesh	m2	0.15	720	55.04	R 258.36	R 185,962.91	
	Cast in items	kg	0.19	1,135	215.59	R 65.96	R 74,867.79	
	HD Bolts	kg	0.09	2,270	197.07	R 72.16	R 163,803.94	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	199.97	1.054	0.16	R 10,857.78	R 11,444.54	
	Construction joint	m	0.29	378	24.09	R 72.44	R 27,373.25	
	Expansion joint	m	0.44	246	15.87	R 109.94	R 27,064.48	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.33	483	0.05	R 84.76	R 40,933.76	R 1,373,576.27
	Working space	m2	0.34	1,417	1.69	R 143.06	R 202,780.89	
	Backfill	m3	2.35	205	0.81	R 104.92	R 21,528.80	
	Blinding	m2	0.40	361	24.00	R 72.70	R 26,213.99	
	Concrete bases	m3	5.72	145	0.00	R 1,745.00	R 253,025.00	
	Concrete plinth	m3	0.00	25	0.00	R 1,745.00	R 44,246.19	
	Total concrete	m3	0.00	170	1.32		R -	
	Wood float	m2	0.36	408	176.26	R 9.90	R 4,035.55	
	Formwork bases	m2	0.48	303	10.12	R 172.37	R 52,303.60	
	Formwork plinths	m2	0.09	282	6.89	R 253.42	R 71,397.73	
	High tensile reinforcement	t	9.16	18.589	0.00	R 14,221.00	R 264,355.84	
	HD Bolts	kg	0.03	5,486	208.96	R 68.06	R 373,390.08	
	Grout	m3	75.28	1.926	0.17	R 10,053.50	R 19,364.84	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.96	1,009	0.05	R 89.74	R 90,524.26	R 3,175,510.65
	Working space	m2	0.47	2,163	1.81	R 49.46	R 106,973.00	
	Backfill	m3	2.46	410	0.78	R 114.84	R 47,036.66	
	Blinding	m2	0.33	778	21.97	R 79.43	R 61,776.16	
	Concrete bases	m3	0.00	255	0.00	R 1,745.00	R 444,975.00	
	Concrete plinth	m3	2.32	82	0.00	R 1,745.00	R 143,573.40	
	Concrete slab	m3	3.10	110	0.00	R 1,745.00	R 191,622.58	
	Total concrete	m3	0.00	447	0.00		R -	
	Wood float	m2	0.52	861	152.92	R 11.41	R 9,824.74	
	Formwork bases	m2	0.45	565	7.96	R 219.28	R 123,865.52	
	Formwork plinths	m2	0.10	811	7.89	R 221.25	R 179,470.88	
	High tensile reinforcement	t	12.95	34.515	0.00	R 14,221.00	R 490,834.38	
	HD Bolts	kg	0.02	12,750	195.78	R 72.64	R 926,116.58	
	Cast in items	kg	0.05	5,100	226.59	R 62.76	R 320,081.77	
	Grout	m3	67.40	3.783	0.17	R 10,264.71	R 38,835.72	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.02	132	0.05	R 90.99	R 11,968.02	R 510,834.02
	Working space	m2	0.50	265	1.61	R 56.37	R 14,955.82	
	Backfill	m3	2.15	61	0.76	R 120.17	R 7,339.81	
	Blinding	m2	0.65	100	20.54	R 84.98	R 8,469.76	
	Concrete bases	m3	0.00	65	0.00	R 1,745.00	R 113,425.00	
	Concrete column	m3	27.08	2	0.00	R 1,745.00	R 4,188.96	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.68	14	0.00	R 1,745.00	R 24,250.92	
	Total concrete	m3	0.00	81	0.00		R -	
	Wood float	m2	0.58	139	152.73	R 11.43	R 1,593.64	
	Formwork bases	m2	0.49	133	7.91	R 220.69	R 29,360.34	
	Formwork plinths	m2	0.31	45	7.15	R 244.03	R 10,889.81	
	Formwork to columns	m2	0.28	9	7.85	R 222.37	R 1,941.16	
	High tensile reinforcement	t	8.86	9.179	0.00	R 14,221.00	R 130,531.68	
	HD bolts	kg	0.04	2,032	202.49	R 70.23	R 142,740.10	
	Grout	m3	97.47	0.834	0.16	R 11,004.50	R 9,178.99	
	Restricted excavation	m3	2.63	111	0.05	R 89.74	R 9,918.38	R 640,256.35
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.28	395	2.05	R 43.85	R 17,309.56	
	Backfill	m3	1.99	56	0.81	R 111.19	R 6,188.33	
	Blinding	m2	0.69	61	20.29	R 86.01	R 5,268.24	
	Concrete bases	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Concrete column	m3	1.08	37	149.43	R 1,745.00	R 64,665.44	
	Concrete beam	m3	2.46	15	0.90	R 1,745.00	R 26,248.66	
	Total concrete	m3	2.79	94	0.90		R -	
	Wood float	m2	0.44	95	7.46	R 11.68	R 1,107.48	
	Formwork bases	m2	0.46	91	6.33	R 233.87	R 21,188.79	
	Formwork to columns	m2	0.14	259	7.29	R 239.30	R 62,074.77	
	Formwork to sides beams	m2	0.32	46	5.87	R 275.89	R 12,797.31	
	Formwork to soffits beams	m2	0.69	22	6.33	R 297.27	R 6,494.12	
	Formwork corbels	m2	10.45	4	4.95	R 352.53	R 1,250.54	
	High tensile reinforcement	t	8.88	10.603	0.00	R 14,221.00	R 150,782.29	
	Cast in steel	kg	0.03	3,137	255.07	R 55.75	R 174,880.63	
	HD bolts	kg	1.43	66	199.25	R 71.37	R 4,687.14	
	Grout	m3	485.45	0.194	0.16	R 10,857.78	R 2,104.67	
	Restricted excavation	m3	3.70	981	0.05	R 86.00	R 84,359.06	R 4,694,645.12
	Working space	m2	0.56	1,743	1.67	R 51.41	R 89,593.13	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	850	0.77	R 111.07	R 94,446.53	
	Blinding	m2	0.62	426	19.61	R 88.99	R 37,907.14	
	Concrete bases	m3	0.00	265	0.91	R 1,745.00	R 462,425.00	
	Concrete column	m3	2.08	127	1.08	R 1,745.00	R 222,243.39	
	Concrete beam	m3	0.82	156	0.98	R 1,745.00	R 272,691.28	
	Concrete surface slab	m3	1.66	160	0.95	R 1,745.00	R 279,410.88	
	Concrete wall	m3	2.28	56	1.01	R 1,745.00	R 97,322.72	
	Concrete elevated slab	m3	1.02	125	0.00	R 1,745.00	R 217,277.06	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	889	0.00		R -	
		Wood float	m2	0.61	1,457	156.67	R 11.14	R 16,232.59	
		Formwork bases	m2	0.40	655	7.57	R 230.60	R 151,154.46	
		Formwork to columns	m2	0.16	814	6.07	R 287.58	R 234,140.98	
		Formwork to sides beams	m2	0.29	547	4.83	R 361.44	R 197,690.08	
		Formwork to soffits beams	m2	0.81	193	7.33	R 237.99	R 45,996.20	
		Formwork to soffts of slabs	m2	0.30	539	3.08	R 308.69	R 166,345.10	
		Formwork to pockets	m2	25.76	5	5.65	R 566.03	R 2,798.76	
		Formwork wall	m2	0.12	465	7.92	R 220.35	R 102,411.09	
		High tensile reinforcement	t	8.69	102.331	0.00	R 14,221.00	R 1,455,249.69	
		Cast in steel	kg	0.21	4,177	253.70	R 56.06	R 234,125.56	
		HD bolts	kg	0.39	2,259	201.89	R 70.44	R 159,118.63	
		Steel handrailing	m	2.48	41	9.34	R 1,523.29	R 62,746.34	
		Grout	m3	989.46	0.899	0.18	R 9,971.43	R 8,959.45	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.35	0	0.04	R 73.54	R -	R -
		Working space	m2	7.69	0	1.41	R 52.18	R -	
		Backfill	m3	4.68	0	0.71	R 52.00	R -	
		Blinding	m2	1.25	0	20.08	R 86.92	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
		Concrete column	m3	27.81	0	0.00	R 1,745.00	R -	
		Concrete beam	m3	1.42	0	0.00	R 1,745.00	R -	
		Concrete wall	m3	11.20	0	0.00	R 1,745.00	R -	
		Concrete elevated slabs	m3	11.77	0	0.00	R 1,745.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.89	0	159.64	R 10.93	R -	
		Formwork bases	m2	8.60	0	7.03	R 248.35	R -	
		Formwork to columns	m2	0.15	0	5.97	R 266.30	R -	
		Formwork to sides beams	m2	0.18	0	4.89	R 292.36	R -	
		Formwork to soffits beams	m2	0.54	0	6.55	R 356.75	R -	
		Formwork to soffts of slabs	m2	0.14	0	3.19	R 326.04	R -	
		Formwork to pockets	m2	466.25	0	5.35	R 546.65	R -	
		Formwork wall	m2	0.11	0	7.01	R 248.78	R -	
		High tensile reinforcement	t	4.32	0.000	0.00	R 14,221.00	R -	
		Cast in steel	kg	0.16	0	202.52	R 70.22	R -	
		HD bolts	kg	0.24	0	176.08	R 80.77	R -	
		Galvanised grating	m2	19.04	0	0.16	R 2,365.38	R -	
		Grout	m3	832.19	0.000	6.01	R 10,955.16	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.52	0	0.05	R 88.50	R -	R -
	Working space	m2	0.39	0	1.64	R 53.98	R -	
	Backfill	m3	2.03	0	0.77	R 114.82	R -	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Blinding	m2	4.54	0	20.72	R 84.21	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,745.00	R -	
	Concrete column	m3	5.89	0	0.00	R 1,745.00	R -	
	Concrete beam	m3	1.75	0	0.00	R 1,745.00	R -	
	Concrete wall	m3	33.56	0	0.00	R 1,745.00	R -	
	Concrete elevated slabs	m3	24.71	0	0.00	R 1,745.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.44	0	154.38	R 11.30	R -	
	Formwork bases	m2	1.40	0	7.34	R 237.78	R -	
	Formwork to columns	m2	0.13	0	7.04	R 277.77	R -	
	Formwork to sides beams	m2	0.23	0	6.02	R 247.74	R -	
	Formwork to soffits beams	m2	0.71	0	6.28	R 289.90	R -	
	Formwork to soffts of slabs	m2	0.21	0	3.68	R 302.43	R -	
	Formwork to pockets	m2	2.85	0	5.77	R 474.55	R -	
	Formwork wall	m2	0.29	0	7.18	R 243.06	R -	
	High tensile reinforcement	t	7.12	0.000	0.00	R 14,221.00	R -	
	Cast in steel	kg	0.02	0	185.16	R 76.80	R -	
	HD bolts	kg	0.01	0	195.96	R 72.57	R -	
	Galvanised grating	m2	3.67	0	0.17	R 10,179.17	R -	
	Grout	m3	40.38	0.000	6.06	R 2,348.36	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.74	1,195	0.05	R 86.00	R 102,760.14	R 10,442,727.07
	Working space	m2	2.26	529	1.71	R 50.34	R 26,629.18	
	Backfill	m3	1.21	986	0.77	R 112.32	R 110,779.68	
	Blinding	m2	3.92	175	19.99	R 87.29	R 15,255.81	
	Concrete	m3	0.00	685	0.00	R 1,745.00	R 1,195,325.00	
	Mesh reinforcement	m2	0.42	1,617	61.79	R 230.15	R 372,195.26	
	Rough formwork	m2	2.77	247	7.95	R 219.44	R 54,307.29	
	Smooth formwork	m2	0.57	1,211	6.79	R 257.10	R 311,316.30	
	Finish to concrete	m2	0.22	3,064	103.43	R 16.87	R 51,692.34	
	Construction joints	m	4.75	144	19.83	R 88.00	R 12,700.24	
	Movement joints	m	14.79	46	15.97	R 109.27	R 5,061.69	
	Cast in steel	kg	2.35	292	222.61	R 63.88	R 18,632.55	
	Grout	m3	816.43	0.839	0.16	R 10,668.12	R 8,950.77	
	Brick walls	m2	0.47	1,469	0.00	R 456.00	R 669,684.53	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.43	3,035	0.00		R -	
	Waterproofing membrane	m2	1.99	1,529	11.07	R 157.70	R 241,128.10	
	Roof construction	m2	2.00	1,519	33.73	R 421.57	R 640,195.26	
	Ceiling	m2	0.97	3,120	0.00	R 355.00	R 1,107,499.65	
	Doors and windows	No	433.09	7	0.16	R 2,941.94	R 20,616.67	
	Floor finish	m2	1.00	3,046	0.77	R 591.66	R 1,802,144.37	
	Wall finsih	m2	1.02	2,969	1.39	R 328.23	R 974,599.07	
	Rod reinforcement	t	8.84	78	0.00	R 14,221.00	R 1,102,501.13	
	Metalwork	Item	0.00	1	4.64	R 65,934.65	R 65,934.65	
	Structural steel	Item	0.00	1	12.01	R 170,743.42	R 170,743.42	
	Plumbing and drainage	Item	0.00	1	7.65	R 108,719.55	R 108,719.55	
	Small power and lighting	Item	0.00	1	65.13	R 926,244.20	R 926,244.20	
	External works	Item	0.00	1	187.46	R 327,110.22	R 327,110.22	
BUILDINGS - STEEL	Concrete	m3	0.00	119	0.16	R 1,745.00	R 207,655.00	R 5,759,781.89
	Earthworks	m3	2.37	282	8.39	R 208.09	R 58,670.50	
	Reinforcement	t	8.34	14	0.00	R 14,221.00	R 202,826.69	
	Mesh	m2	0.11	1,089	9.23	R 189.13	R 205,942.21	
	Formwork	m2	0.38	314	7.43	R 234.84	R 73,818.29	
	Brickwork	m2	5.74	251	5.63	R 309.91	R 77,806.37	
	Roof covering	m2	0.83	1,733	198.81	R 239.18	R 414,477.59	
	Structural steel	t	17.99	80	0.00	R 47,552.00	R 3,812,015.15	
	Side cladding	m2	1.50	963	0.94	R 225.52	R 217,210.89	
	Doors	No	372.86	4	0.49	R 23,130.65	R 89,456.24	
	Ridge ventilator	m	20.96	69	10.53	R 2,519.30	R 173,363.42	
	Aluminium insulation	m2	0.88	1,647	1.74	R 137.58	R 226,539.52	
	Total building area	m2	0.00	1,442	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.68	228	0.12	R 203.17	R 46,355.65	R 4,639,659.16
	Concrete	m3	0.00	85	0.00	R 1,745.00	R 148,325.00	
	Reinforcement	t	10.96	8	0.17	R 14,221.00	R 110,247.49	
	Mesh	m2	0.11	758	9.94	R 175.60	R 133,100.97	
	Formwork	m2	0.43	200	8.00	R 218.18	R 43,636.69	
	Brickwork	m2	5.71	173	5.79	R 301.49	R 52,041.46	
	Screed	m2	1.09	907	40.86	R 42.71	R 38,745.86	
	Structural steel	t	14.66	67	0.00	R 47,552.00	R 3,195,001.36	
	Cat ladders	m	2.53	27	9.66	R 4,920.38	R 130,893.19	
	Hand rail	m	0.73	92	26.34	R 1,805.41	R 166,988.25	
	Kick plates	m	0.73	93	2.66	R 680.00	R 62,957.67	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.86	1,147	196.77	R 241.66	R 277,248.82	
		Side cladding	m2	4.47	221	0.90	R 217.84	R 48,041.56	
		Floor grating	m2	1.06	63	16.20	R 2,935.57	R 186,075.19	
		Total buiding area	m2	0.00	985	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.45	214	8.10	R 215.34	R 46,022.47	R 723,348.26
		Blinding	m2	0.50	124	20.71	R 84.25	R 10,417.61	
		Concrete	m3	0.00	62	0.00	R 1,745.00	R 108,190.00	
		Reinforcement	t	7.86	8	0.00	R 14,221.00	R 112,165.63	
		Mesh	m2	0.51	121	48.95	R 290.50	R 35,069.55	
		Formwork	m2	0.35	179	7.95	R 219.46	R 39,357.24	
		Finish to concrete	m2	0.46	136	108.44	R 16.09	R 2,185.79	
		Movement joints	m	2.63	24	15.69	R 111.23	R 2,617.95	
		Cast in steel	kg	0.09	678	200.69	R 70.86	R 48,052.81	
		Grout	m3	74.11	0.837	2.71	R 10,395.74	R 8,697.36	
		Brickwork	m2	0.25	48	0.17	R 456.00	R 21,888.00	
		Doors and windows	No	2.91	4	0.27	R 5,364.71	R 22,111.64	
		Pipework	m	2.90	41	0.22	R 643.40	R 26,630.12	
		Bolts	kg	0.11	560	0.09	R 70.86	R 39,682.32	
		Structural steel	t	4.40	3	0.00	R 52,950.53	R 144,270.02	
		Miscellaneous steel	t	135.89	1	0.00	R 63,405.73	R 55,989.76	
		Total bridge area	m2	0.00	120	0.00		R -	
		Total control room area	m2	0.00	12	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.11	0	6.20	R 281.45	R -	R -
		Blinding	m2	0.79	0	15.69	R 111.21	R -	
		Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
		Reinforcement	t	5.92	0	0.00	R 14,221.00	R -	
		Formwork	m2	0.07	0	5.68	R 307.37	R -	
		Finish to concrete	m2	0.35	0	76.33	R 22.86	R -	
		Movement joints	m	0.45	0	14.28	R 122.16	R -	
		Cast in steel	kg	26.58	0.000	176.64	R 80.51	R -	
		Grout	m3	23.27	0.000	0.71	R 11,745.19	R -	
		Bolts	kg	122.80	0.000	0.15	R 56.99	R -	
		Structural steel	t	41.62	0.000	0.25	R 57,375.79	R -	
		Miscellaneous steel	t	23.61	0.000	0.18	R 79,005.56	R -	
		Brickwork	m2	0.57	0	4.73	R 369.20	R -	
		Roof covering	m2	1.75	0	1.28	R 289.24	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.88	0	7.47	R 233.69	R -	R -
	Blinding	m2	1.39	0	19.31	R 90.36	R -	
	Concrete	m3	0.00	0	0.00	R 1,745.00	R -	
	Reinforcement	t	6.20	0.000	0.00	R 14,221.00	R -	
	Formwork	m2	0.23	0	6.99	R 249.72	R -	
	Movement joint	m	1.90	0	0.13	R 116.69	R -	
	Cast in steel	kg	0.15	0	14.95	R 66.25	R -	
	Bolts	kg	0.40	0	214.66	R 81.62	R -	
	Chemical anchors	No	7.43	0	0.25	R 347.53	R -	
	Miscellaneous steelwork	t	95.12	0.000	174.24	R 57,210.92	R -	
	Pre-cast concrete	m3	37.11	0	40.92	R 4,925.40	R -	
	Brickwork	m2	8.98	0	0.35	R 343.50	R -	
	Total area	m2	0.00	0	5.08		R -	
EMERGENCY DAM	Earthworks	m3	0.61	0	1.65	R 135.50	R -	R -
	Lining	m2	0.82	0	1.41	R 82.26	R -	
	Paving	m2	0.78	0	0.58	R 141.66	R -	
	Pipework	m	28.79	0	0.26	R 525.49	R -	
	Manholes	No	16.71	0	0.11	R 4,777.17	R -	
	Concrete	m3	2.80	0	0.05	R 1,745.00	R -	
	Formwork	m2	0.09	0	5.70	R 306.22	R -	
	Mesh	m2	0.74	0	7.29	R 239.25	R -	
	Reinforcement	t	5.48	0.000	0.13	R 14,221.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	288	6.29	R 277.30	R 79,870.29	R 653,954.92
	Blinding	m2	0.94	45	15.19	R 114.88	R 5,117.54	
	Concrete	m3	0.00	42	0.00	R 1,745.00	R 73,290.00	
	Reinforcement	t	4.60	9.132	0.00	R 14,221.00	R 129,864.08	
	Mesh	m2	1.13	37	42.16	R 337.28	R 12,512.41	
	Formwork	m2	0.17	255	5.92	R 294.94	R 75,076.00	
	Cast in steel	kg	0.03	1,400	166.02	R 85.66	R 119,922.73	
	Miscellaneous steelwork	t	13.14	2.131	0.19	R 74,288.81	R 158,301.87	
	Total tunnel length	m	0.00	28	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	78	0.00		R -	R 689,044.69
	Steel	t	8.80	8.866	0.00	R 47,552.00	R 421,586.30	
	Handrail	m	1.43	55	25.23	R 1,885.06	R 102,924.31	
	Grating	m2	1.84	42	15.86	R 2,997.42	R 127,114.08	
	Kick flats	m	1.65	47	74.07	R 641.95	R 30,399.37	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.01	13	87.93	R 540.82	R 7,020.63	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 4,870,991.51
		Steel	t	24.20	82.837	0.00	R 47,552.00	R 3,939,044.56	
		Handrail	m	12.62	159	29.50	R 1,612.05	R 256,143.01	
		Grating	m2	12.17	165	16.79	R 2,832.89	R 466,606.53	
		Kick flats	m	12.45	161	79.31	R 599.57	R 96,523.37	
		Cat ladder	m	98.13	20	8.62	R 5,514.65	R 112,674.04	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	9,445	0.00		R -	R 14,957,737.08
		Steel	t	71.08	132.870	0.00	R 47,552.00	R 6,318,254.95	
		Handrail	m	30.46	310	28.10	R 1,692.50	R 524,882.25	
		Grating	m2	3.69	2,561	15.85	R 2,999.32	R 7,680,082.26	
		Kick flats	m	33.14	285	76.81	R 619.05	R 176,450.57	
		Stair treads	No	227.11	42	93.58	R 508.12	R 21,131.32	
		Cat ladder	m	233.08	41	8.13	R 5,846.90	R 236,935.74	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	988	0.00		R -	R 2,485,594.89
		Steel	t	22.40	44.100	0.00	R 47,552.00	R 2,097,048.51	
		Handrail	m	45.23	22	25.89	R 1,837.05	R 40,127.69	
		Grating	m2	57.84	17	16.44	R 2,892.71	R 49,414.55	
		Kick flats	m	44.35	22	77.59	R 612.83	R 13,653.51	
		Cat ladder	m	19.93	50	8.26	R 5,755.91	R 285,350.64	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	124	0.00		R -	R 893,517.79
		Steel	t	13.99	8.862	0.00	R 47,552.00	R 421,389.85	
		Handrail	m	1.10	112	27.12	R 1,753.72	R 197,051.80	
		Grating	m2	1.91	65	15.88	R 2,994.05	R 194,160.57	
		Kick flats	m	1.10	113	76.77	R 619.43	R 70,099.96	
		Stair treads	No	5.65	22	96.52	R 492.68	R 10,815.60	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	425	0.00		R -	R 2,018,573.99
		Steel	t	12.05	35.284	0.00	R 47,552.00	R 1,677,841.43	
		Handrail	m	22.47	19	25.82	R 1,841.57	R 34,839.43	
		Grating	m2	7.39	58	16.29	R 2,918.96	R 167,918.71	
		Kick flats	m	22.65	19	78.07	R 609.13	R 11,430.02	
		Cat ladder	m	19.61	22	8.14	R 5,838.69	R 126,544.40	
	PIPING INSTALLATION	Pipe length	m	0.00	55,422	0.00		R -	R 79,791,957.45
		Total work units	WU	0.30	183,430	0.00	R 435.00	R 79,791,957.45	
		Pipe supports	kg	2.50	22,188	0.00		R -	
		WU for pipe supports	WU	0.15	28,170	0.00		R -	
		Number of welds	No	0.56	31,036	0.00		R -	
		Total fittings	No	0.38	20,783	0.00		R -	
		Stud bolts	No	0.33	6,948	0.00		R -	
		Support number	No	0.19	4,184	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	183,430	0.00	R 435.00		R 262,284.48

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.13	3,327	5.52	R 78.82	R 262,284.48	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	183,430	0.00	R 435.00		R 158,413.53
	Number of examinations	No	165.18	1,110	3.05	R 142.66	R 158,413.53	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	183,430	0.00	R 435.00		R 150,487.90
	Number of examinations	No	280.12	655	1.89	R 229.81	R 150,487.90	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	183,430	0.00	R 435.00		R 263,279.74
	Number of examinations	No	46.72	3,926	6.49	R 67.06	R 263,279.74	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	183,430	0.00	R 435.00		R 298,398.49
	Number of examinations	No	107.89	1,700	2.48	R 175.50	R 298,398.49	
MECHANICAL INSTALLATION	Total work units	WU	0.00	183,430	0.00	R 435.00		R 464,445.47
	Mechanical equipment	t	238.14	770	0.72	R 602.97	R 464,445.47	
	Structural steel	t	203.73	900	54.98			
PAINTING & INSULATION	Total work units	WU	0.00	183,430	0.00	R 435.00		R 5,902,098.38
	Painting to piping	m2	16.84	10,891	0.31	R 183.88	R 2,002,539.36	
	Insulation to piping	m2	48.23	3,803	2.37	R 585.06	R 2,225,160.57	
	Mechanical equipment received	t	0.00	770	0.82	R 602.97	R 464,445.47	
	Painting to mechanical equipment	m2	0.22	3,479	3.41	R 176.60	R 614,329.28	
	Insulation to mechanical equipment	m2	0.67	1,142	1.16	R 521.41	R 595,623.69	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	23.44	39,442	0.00	R 75.00	R 2,958,150.00	R 7,863,832.81
	Electrical cable terminations	No	279.97	1,683	0.39	R 191.96	R 323,059.64	
	Electrical equipment	No	8.31	141	0.10	R 729.17	R 102,724.55	
	DB's	No	6.02	17	0.28	R 2,597.54	R 44,028.52	
	Rack	m	0.61	6,547	1.64	R 234.38	R 1,534,492.09	
	Support steel	kg	1.36	10,796	2.03	R 36.93	R 398,736.65	
	Instrumentation cable	m	23.61	31,220	0.32	R 28.50	R 889,770.00	
	Instruments	No	0.48	1,322	0.16	R 176.55	R 233,418.72	
	Hook-ups	No	3.65	2,771	0.16	R 178.92	R 495,782.08	
	Light fittings	No	10.34	514	0.02	R 464.60	R 238,575.49	
	Conduit	m	4.01	3,813	0.12	R 45.87	R 174,929.04	
	Instrument stands	No	0.00	330		R 1,425.00	R 470,166.04	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project D				
Location:	South Africa				
Client:				Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	24,553	R	6.25
2	Concrete demolitions	m3	45	R	1,788.00
3	Bulk excavation	m3	12,664	R	62.00
4	Vertical piles	No	352		
5	Raking piles	No	45		
6	Concrete in piles	m3		R	1,732.00
7	Auger pile	m		R	325.00
8	Total paving and asphalt to road works	m2	5,547		
9	Grey paving to road works	m2	452	R	142.00
10	Asphalt to road surface	m2	5,095		
11	Rip bed of road works	m2	5,547	R	14.55
12	Total concrete in paving and bunding	m3	558	R	1,732.00
13	Concrete in paving	m3	375		
14	Rod reinforcement	t		R	13,225.00
15	Concrete in plinths and bases on area finishing	m3	423		
16	Stormwater pipe to drain surface run-off	m	455		
17	Machine excavation	m3		R	75.00
18	Concrete in pump and pipe support bases	m3	285	R	1,732.00
19	Concrete in tank bases	m3	242	R	1,732.00
20	Concrete in pipe and cable rack foundations	m3	345	R	1,732.00
21	Concrete to simple structural foundations	m3	365	R	1,732.00
22	Complex structural foundations - bases	m3	125	R	1,732.00
23	Concrete pipe racks - bases	m3	245	R	1,732.00
24	Concrete structure including concrete columns and beams - bases	m3	425	R	1,732.00
25	Major equipment bases with blast proof walls - bases	m3	62	R	1,732.00
26	Major equipment bases and elevated concrete structure - bases	m3	112	R	1,732.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	425	R	1,732.00
28	One brick wall	m2		R	412.00
29	Concrete in structual steel buildings - all concrete	m3	136	R	1,732.00
30	Total building area - Structural steel buildings	m2	1,554		
31	Ceiling	m2		R	285.00
32	Structural steel	t		R	42,551.00
33	Steel canopy - concrete	m3	175	R	1,732.00
34	Steel canopy - area	m2	145		
35	Concrete in weighbridge - all concrete	m3	0	R	1,732.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,732.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	625	R	1,732.00
41	Total cooling tower area	m2	365		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,732.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	2,976		
47	Total volume of steel complex steel structure	m3	12,422		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	157		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	399.00
52	Total process pipe length	m	124,552		
53	Total electrical cable - installation only	m	75,442	R	69.00
54	Total instrumentation cable - installation only	m	65,112	R	46.50

Ratio: Project Ratio Mean

Variables

Material	Complex	Mean
Labour	Simple	Mean
Engineering design	Simple	Mean
Current economic conditions	Good	Mean
Current economic factors	Good	Mean
Level of scope definition	Good	Mean
Rework	Little	Mean
Scope change	Normal	Mean
Weather	Good	Mean
Access	Good	Mean
Project size	Large	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project D			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 91,649,272.60
A	SITE CLEARANCE AND DEMOLITIONS		R	233,916.25	
B	BULK EARTHWORKS		R	1,659,895.70	
C	PILING		R	12,868,276.03	
D	ROAD WORKS		R	3,494,475.23	
E	GENERAL PAVING AND BUNDED AREAS		R	2,165,184.44	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	2,624,545.27	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	2,065,927.03	
H	TANK BASES AND BUNDING		R	4,332,552.32	
I	RACK FOUNDATIONS		R	3,065,359.88	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	4,074,230.35	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	897,123.77	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	3,510,168.41	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	6,421,952.70	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	468,195.66	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,287,625.28	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	6,216,003.49	
Q	BUILDINGS - STEEL		R	5,361,166.28	
R	CANOPIES - STEEL		R	1,493,915.42	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	4,647,836.57	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	23,760,922.53	
	STRUCTURAL STEEL				R 34,256,368.10
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,447,381.76	
B	STRUCTURAL STEEL - PIPERACK		R	5,655,859.07	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	16,487,446.25	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	878,147.28	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	9,787,533.74	
	MECHANICAL AND PIPING				R 214,060,513.77
A	PIPING INSTALLATION		R	150,594,690.91	
B	RADIOGRAPHIC EXAMINATION (RT)		R	423,397.71	
C	DYE PENETRATION TESTING (DP)		R	152,140.56	
D	MAGNETIC PARTICLE TESTING (MPI)		R	236,075.88	
E	POST WELD HEAT TREATMENT		R	410,402.94	
F	MATERIAL HARDNESS TEST (HT)		R	316,013.91	
H	MECHANICAL INSTALLATION		R	767,645.07	
	Preliminaries and General	40.00%	R	61,160,146.79	
	PAINTING AND INSULATION				R 12,249,235.27
A	PAINTING AND INSULATION		R	9,073,507.61	
	Preliminaries and General	35.00%	R	3,175,727.66	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 17,860,049.65
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	13,229,666.41	
	Preliminaries and General	35.00%	R	4,630,383.24	
	TOTAL COST			R	370,075,439.40

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		24,553		R 6.25	R 153,456.25	R 233,916.25
	Concrete demolitions	m3		45		R 1,788.00	R 80,460.00	
BULK EARTHWORKS	Bulk excavation	m3		12,664		R 62.00	R 785,168.00	R 1,659,895.70
	Trimming of sides	m2	2.18	5,809	4.30	R 14.42	R 83,760.19	
	Back fill and compact	m3	1.15	11,012	0.98	R 63.27	R 696,688.55	
	Overhaul	m3/km	1.73	7,320	11.34	R 5.47	R 40,022.43	
	Rip bed	m2	1.78	7,115	8.13	R 7.63	R 54,256.53	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 333,063.60	R 333,063.60	R 12,868,276.03
	EO for raking equipment	Item	0.00	1	23.89	R 41,377.48	R 41,377.48	
	Number of piles	No	0.00	352	0.00		R -	
	Move rig to new position	No	1.50	235	0.18	R 311.76	R 73,159.68	
	Number of raking piles	No	18.41	19	0.00		R -	
	EO for setting up raking piles	No	0.93	21	0.28	R 484.96	R 9,970.38	
	EO for raking drilling	m	0.15	127	0.89	R 289.25	R 36,869.82	
	Auger quantity	m	0.05	7,040	0.00	R 325.00	R 2,288,000.00	
	EO for drilling in coarse gravel	m	0.53	664	0.22	R 381.04	R 253,068.08	
	EO for drilling in boulders	m	1.84	191	0.50	R 866.00	R 165,669.57	
	EO for drilling in soft rock	m	1.63	216	0.24	R 415.68	R 89,766.48	
	Temporary casings	m	0.36	978	0.36	R 623.52	R 609,664.00	
	EO casing to raking pile	m	0.18	106	0.51	R 1,610.76	R 171,098.90	
	Mild steel rod reinforcement	t	14.29	24.633	0.93	R 11,645.79	R 286,866.32	
	High tensile rod reinforcement	t	1.32	266.667	7.23	R 12,522.36	R 3,339,296.00	
	Concrete to piles and bases	m3	0.15	2,347	0.00	R 1,732.00	R 4,064,426.67	
	Concrete to raking piles	m3	0.07	273	1.06	R 1,835.92	R 501,469.57	
	Site establishment of test equipment	Item	0.00	1	110.73	R 191,784.36	R 191,784.36	
	Load test to pile	No	99.34	4	27.07	R 46,885.24	R 166,132.52	
	Site establishment of intergity testing	No	258.87	1	48.79	R 84,504.28	R 114,905.19	
	Integrity testing of piles	No	1.25	282	0.27	R 467.64	R 131,687.42	
ROAD WORKS	Red paving	m2	0.15	68	0.97	R 137.74	R 9,338.77	R 3,494,475.23
	Grey paving	m2	0.00	452	0.00	R 142.00	R 64,184.00	
	Kerbing	m	0.13	721	0.00	R 284.52	R 205,167.99	
	Total paving and asphalt	m2	0.00	5,547	0.00		R -	
	Remove top soil	m3	0.55	793	5.83	R 84.83	R 67,286.16	
	Asphalt	m2	0.26	1,442	0.00	R 201.37	R 290,426.69	
	Rip bed	m2	0.00	5,547	0.00	R 14.55	R 80,708.85	
	Reduce levels	m3	0.42	2,330	4.99	R 72.60	R 169,149.61	
	Selected fill	m3	1.65	1,412	0.53	R 136.99	R 193,424.37	
	Imported fill	m3	2.23	633	0.39	R 351.26	R 222,403.55	
	Wearing course	m3	3.86	604	0.29	R 250.36	R 151,107.39	
	Prime	m2	4.74	6,693	1.47	R 70.25	R 470,170.00	
	Three line road marking	m	0.83	5,555	0.20	R 56.90	R 316,095.29	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.02	736	4.19	R 14.23	R 10,463.57	
		1m Wide concrete V-drain	m	0.97	699	0.81	R 1,274.64	R 891,578.01	
		200mm Diameter PVC pipe	m	0.96	692	0.11	R 404.01	R 279,685.00	
		Road marking - STOP	No	0.15	108	0.05	R 432.47	R 46,778.30	
		Standard signage	No	0.01	7	4.48	R 551.96	R 3,980.26	
		100mm Painted line	m	1.83	1,320	1.42	R 17.07	R 22,527.45	
				0.00		1.52			
				0.00		1.94			
				0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	375	0.74	R 1,732.00	R 649,500.00	R 2,165,184.44
		Concrete in plinths	m3	0.00	75	0.00	R 1,732.00	R 129,382.47	
		Total concrete	m3	0.00	558	0.00		R -	
		Rip and compact	m2	0.13	2,885	187.19	R 9.25	R 26,690.28	
		Formwork to plinth	m2	7.26	542	0.12	R 207.84	R 112,718.01	
		Formwork to slab	m2	0.83	311	0.15	R 259.80	R 80,862.75	
		High tensile steel	t	0.01	5.580	0.00	R 13,225.00	R 73,795.50	
		Mesh	m2	585.35	3,266	51.00	R 259.31	R 846,984.23	
		Construction joint	m	4.00	1,500	0.05	R 86.60	R 129,900.00	
		Expansion joint	m	2.22	833	0.08	R 138.56	R 115,351.20	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	8,432	0.00		R -	R 2,624,545.27
		Base excavation	m3	1.50	940	0.00	R 75.00	R 70,500.00	
		Backfill	m3	0.59	627	0.64	R 117.19	R 73,437.50	
		Working space	m2	0.45	1,593	1.43	R 81.95	R 130,563.29	
		Concrete in bases	m3	0.04	423	25.24	R 1,732.00	R 732,636.00	
		Blinding	m2	0.83	571	20.88	R 82.95	R 47,347.57	
		Concrete in sump walls	m3	0.10	42	29.51	R 1,732.00	R 73,263.60	
		Concrete in slabs	m3	0.02	8	0.91	R 1,732.00	R 14,652.72	
		Total concrete	m3	0.00	474	0.04		R -	
		Wood float	m2	0.70	677	158.37	R 10.94	R 7,401.77	
		Formwork to bases	m2	1.69	715	0.12	R 207.84	R 148,578.58	
		Formwork to sump walls	m2	12.63	534	0.12	R 207.84	R 111,038.31	
		Formwork to sides of slab	m2	5.81	49	0.18	R 311.76	R 15,323.81	
		Mild steel reinforcement	t	0.12	5.323	0.00	R 13,225.00	R 70,398.61	
		High tensile reinforcement	t	10.68	44.360	1.19	R 13,225.00	R 586,655.06	
		Cast in steel	kg	0.46	920	34.10	R 50.79	R 46,706.36	
		Waterstop	m	0.43	98	8.10	R 213.83	R 21,034.63	
		Manhole	No	0.08	36	2.68	R 4,971.30	R 180,955.22	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	455	0.13	R 646.27	R 294,052.24	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	482	0.05	R 75.00	R 36,123.75	R 2,065,927.03
		Working space	m2	0.38	1,268	0.67	R 50.25	R 63,691.88	
		Backfill	m3	4.42	109	1.32	R 99.00	R 10,788.09	
		Concrete bases	m3	1.01	285	0.00	R 1,732.00	R 493,620.00	
		Concrete plinth	m3	2.29	124	0.00	R 1,732.00	R 215,554.59	
		Total concrete	m3	0.00	409	0.00		R -	
		Wood float	m2	0.47	265	0.05	R 17.32	R 4,586.27	
		Blinding	m2	1.01	282	0.01	R 86.60	R 24,436.63	
		Formwork bases	m2	0.49	582	0.13	R 225.16	R 130,960.41	
		Formwork plinth	m2	0.58	215	0.12	R 207.84	R 44,597.50	
		High tensile reinforcement	t	10.00	40.945	7.15	R 13,225.00	R 541,503.11	
		Cast in steel	kg	0.11	3,722	0.03	R 51.96	R 193,411.25	
		HD Bolts	kg	0.08	5,118	0.03	R 51.96	R 265,940.47	
		Grout	m3	34.52	3.605	6.52	R 11,292.64	R 40,713.09	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.84	1,413	0.05	R 86.60	R 122,390.05	R 4,332,552.32
		Working space	m2	4.36	324	1.63	R 53.13	R 17,221.54	
		Backfill	m3	1.38	1,024	0.72	R 120.28	R 123,178.39	
		Concrete bases	m3	0.75	242	0.00	R 1,732.00	R 419,144.00	
		Concrete sump wall	m3	2.86	85	0.00	R 1,732.00	R 146,553.85	
		Concrete slab	m3	0.57	425	0.00	R 1,732.00	R 735,340.35	
		Concrete plinth	m3	4.11	59	21.05	R 1,732.00	R 101,981.51	
		Concrete column	m3	19.22	13	164.76	R 1,732.00	R 21,807.70	
		Total concrete	m3	0.00	823	1.11		R -	
		Blinding	m2	2.67	308	1.05	R 82.28	R 25,351.22	
		Wood float	m2	0.25	3,291	1.12	R 10.51	R 34,591.59	
		Formwork to bases	m2	0.42	576	1.14	R 213.30	R 122,901.71	
		Formwork to plinths	m2	0.35	168	8.12	R 227.00	R 38,188.17	
		Formwork to columns	m2	0.12	105	7.63	R 243.94	R 25,595.89	
		Formwork to sumps	m2	0.11	769	7.10	R 236.61	R 182,009.25	
		Formwork to slabs	m2	4.07	104	7.32	R 210.96	R 22,006.49	
		Formwork to slabs n/e 300mm	m	2.17	196	8.21	R 73.51	R 14,383.13	
		Mild steel reinforcement	t	0.23	8.194	23.56	R 13,225.00	R 108,371.22	
		High tensile reinforcement	t	23.09	35.628	1.02	R 13,225.00	R 471,179.21	
		Mesh	m2	0.16	2,654	61.15	R 216.27	R 573,878.23	
		Cast in items	kg	0.19	4,330	214.69	R 61.60	R 266,713.28	
		HD Bolts	kg	0.10	8,226	207.02	R 63.88	R 525,530.29	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	204.15	4.030	0.17	R 10,188.24	R 41,054.80	
		Construction joint	m	0.30	1,415	24.89	R 69.59	R 98,478.69	
		Expansion joint	m	0.46	923	16.88	R 102.61	R 94,701.78	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	1,280	0.05	R 86.60	R 110,843.67	R 3,065,359.88
		Working space	m2	0.41	3,122	1.98	R 171.47	R 535,293.82	
		Backfill	m3	2.45	522	0.87	R 99.54	R 52,002.66	
		Blinding	m2	0.37	932	22.19	R 78.05	R 72,779.31	
		Concrete bases	m3	5.81	345	0.00	R 1,732.00	R 597,540.00	
		Concrete plinth	m3	0.00	59	0.00	R 1,732.00	R 102,846.82	
		Total concrete	m3	0.00	404	1.34		R -	
		Wood float	m2	0.35	986	173.00	R 10.01	R 9,868.54	
		Formwork bases	m2	0.47	734	9.63	R 179.85	R 132,020.95	
		Formwork plinths	m2	0.09	660	6.99	R 247.78	R 163,482.46	
		High tensile reinforcement	t	9.33	43.342	0.00	R 13,225.00	R 573,197.27	
		HD Bolts	kg	0.03	11,500	225.70	R 58.60	R 673,848.03	
		Grout	m3	79.73	4.327	0.18	R 9,622.22	R 41,636.36	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	1,566	0.06	R 103.92	R 162,723.13	R 4,074,230.35
		Working space	m2	0.50	3,132	1.90	R 54.69	R 171,287.51	
		Backfill	m3	2.66	589	0.80	R 129.90	R 76,467.64	
		Blinding	m2	0.33	1,106	21.39	R 80.97	R 89,560.40	
		Concrete bases	m3	0.00	365	0.00	R 1,732.00	R 632,180.00	
		Concrete plinth	m3	2.58	101	0.00	R 1,732.00	R 174,154.27	
		Concrete slab	m3	3.63	141	0.00	R 1,732.00	R 245,031.01	
		Total concrete	m3	0.00	607	0.00		R -	
		Wood float	m2	0.55	1,104	161.77	R 10.71	R 11,816.61	
		Formwork bases	m2	0.49	745	8.32	R 208.17	R 155,067.70	
		Formwork plinths	m2	0.11	914	8.34	R 207.67	R 189,834.61	
		High tensile reinforcement	t	13.32	45.572	0.00	R 13,225.00	R 602,694.46	
		HD Bolts	kg	0.02	18,250	217.74	R 60.74	R 1,108,460.78	
		Cast in items	kg	0.05	7,300	241.09	R 54.86	R 400,441.74	
		Grout	m3	68.22	5.350	0.17	R 10,188.24	R 54,510.49	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	260	0.05	R 86.60	R 22,516.00	R 897,123.77
		Working space	m2	0.56	464	1.66	R 52.17	R 24,221.17	
		Backfill	m3	2.15	121	0.79	R 109.62	R 13,256.40	
		Blinding	m2	0.65	192	20.36	R 85.07	R 16,359.38	
		Concrete bases	m3	0.00	125	0.00	R 1,732.00	R 216,500.00	
		Concrete column	m3	28.05	4	0.00	R 1,732.00	R 7,718.36	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	5.23	24	0.00	R 1,732.00	R 41,395.79	
		Total concrete	m3	0.00	153	0.00		R -	
		Wood float	m2	0.60	256	158.85	R 10.90	R 2,786.84	
		Formwork bases	m2	0.52	240	8.23	R 210.45	R 50,588.84	
		Formwork plinths	m2	0.33	72	7.44	R 232.80	R 16,860.46	
		Formwork to columns	m2	0.28	16	8.09	R 214.09	R 3,407.36	
		High tensile reinforcement	t	9.06	16.927	0.00	R 13,225.00	R 223,857.07	
		HD bolts	kg	0.04	3,834	209.18	R 63.22	R 242,392.32	
		Grout	m3	108.76	1.410	0.16	R 10,825.00	R 15,263.78	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	686	0.06	R 103.92	R 71,289.12	R 3,510,168.41
		Working space	m2	0.30	2,287	2.12	R 49.02	R 112,089.81	
		Backfill	m3	2.06	333	0.82	R 126.73	R 42,202.89	
		Blinding	m2	0.67	366	19.99	R 86.64	R 31,683.01	
		Concrete bases	m3	0.00	245	0.00	R 1,732.00	R 424,340.00	
		Concrete column	m3	1.19	221	151.33	R 1,732.00	R 382,906.13	
		Concrete beam	m3	2.68	82	0.95	R 1,732.00	R 142,875.42	
		Total concrete	m3	2.97	549	0.95		R -	
		Wood float	m2	0.47	521	7.50	R 11.45	R 5,966.11	
		Formwork bases	m2	0.48	510	6.55	R 230.93	R 117,872.22	
		Formwork to columns	m2	0.15	1,474	7.98	R 217.04	R 319,888.16	
		Formwork to sides beams	m2	0.33	250	6.11	R 264.43	R 66,100.13	
		Formwork to soffits beams	m2	0.69	120	6.55	R 283.47	R 33,889.66	
		Formwork corbels	m2	10.88	20	5.37	R 322.53	R 6,553.74	
		High tensile reinforcement	t	9.10	60.282	0.00	R 13,225.00	R 797,233.55	
		Cast in steel	kg	0.03	18,286	262.64	R 50.35	R 920,756.59	
		HD bolts	kg	1.48	371	215.28	R 61.43	R 22,769.92	
		Grout	m3	505.30	1.086	0.16	R 10,825.00	R 11,751.95	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.84	1,632	0.05	R 86.60	R 141,331.20	R 6,421,952.70
		Working space	m2	0.61	2,675	1.79	R 48.38	R 129,436.03	
		Backfill	m3	1.15	1,419	0.79	R 109.62	R 155,565.44	
		Blinding	m2	0.61	697	20.06	R 86.34	R 60,155.60	
		Concrete bases	m3	0.00	425	0.97	R 1,732.00	R 736,100.00	
		Concrete column	m3	2.44	174	1.07	R 1,732.00	R 301,680.33	
		Concrete beam	m3	0.84	207	1.02	R 1,732.00	R 359,143.25	
		Concrete surface slab	m3	1.68	253	0.97	R 1,732.00	R 438,154.76	
		Concrete wall	m3	2.50	70	1.05	R 1,732.00	R 120,672.13	
		Concrete elevated slab	m3	1.10	158	0.00	R 1,732.00	R 274,254.84	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,288	0.00		R -	
		Wood float	m2	0.64	2,012	169.32	R 10.23	R 20,578.69	
		Formwork bases	m2	0.41	1,037	7.65	R 226.41	R 234,688.35	
		Formwork to columns	m2	0.17	1,025	6.34	R 273.19	R 279,903.81	
		Formwork to sides beams	m2	0.30	691	5.15	R 336.31	R 232,455.18	
		Formwork to soffits beams	m2	0.84	247	7.57	R 228.80	R 56,479.72	
		Formwork to soffts of slabs	m2	0.31	816	3.23	R 301.22	R 245,809.12	
		Formwork to pockets	m2	26.55	7	5.75	R 536.22	R 3,517.87	
		Formwork wall	m2	0.13	536	8.09	R 214.09	R 114,740.07	
		High tensile reinforcement	t	8.87	145.156	0.00	R 13,225.00	R 1,919,685.44	
		Cast in steel	kg	0.22	5,852	255.59	R 51.74	R 302,821.81	
		HD bolts	kg	0.41	3,140	201.38	R 65.67	R 206,230.79	
		Steel handrailing	m	2.58	56	9.71	R 1,362.00	R 76,628.64	
		Grout	m3	1,039.37	1.239	0.18	R 9,622.22	R 11,919.64	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	50	0.04	R 69.28	R 3,492.16	R 468,195.66
		Working space	m2	7.92	6	1.42	R 48.79	R 310.51	
		Backfill	m3	4.13	12	0.63	R 43.65	R 532.70	
		Blinding	m2	1.05	59	17.95	R 96.49	R 5,697.52	
		Concrete bases	m3	0.00	62	0.00	R 1,732.00	R 107,384.00	
		Concrete column	m3	26.31	2	0.00	R 1,732.00	R 4,081.49	
		Concrete beam	m3	1.43	2	0.00	R 1,732.00	R 2,854.19	
		Concrete wall	m3	10.41	6	0.00	R 1,732.00	R 10,315.47	
		Concrete elevated slabs	m3	10.92	0	0.00	R 1,732.00	R 373.76	
		Total concrete	m3	0.00	72	0.00		R -	
		Wood float	m2	0.82	88	138.41	R 12.51	R 1,101.44	
		Formwork bases	m2	8.50	7	6.94	R 249.57	R 1,820.38	
		Formwork to columns	m2	0.14	17	5.63	R 274.92	R 4,627.54	
		Formwork to sides beams	m2	0.17	10	4.72	R 307.64	R 2,982.12	
		Formwork to soffits beams	m2	0.50	3	6.30	R 366.95	R 1,209.40	
		Formwork to soffts of slabs	m2	0.13	2	2.98	R 357.11	R 592.80	
		Formwork to pockets	m2	418.49	0	4.85	R 581.21	R 86.11	
		Formwork wall	m2	0.10	60	6.38	R 271.47	R 16,168.44	
		High tensile reinforcement	t	4.05	17.821	0.00	R 13,225.00	R 235,685.97	
		Cast in steel	kg	0.15	481	200.08	R 66.10	R 31,804.88	
		HD bolts	kg	0.22	328	167.91	R 78.76	R 25,839.82	
		Galvanised grating	m2	17.15	4	0.15	R 2,449.07	R 10,306.97	
		Grout	m3	771.45	0.080	5.40	R 11,546.67	R 927.98	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	177	0.05	R 86.60	R 15,324.74	R 2,287,625.28
	Working space	m2	0.42	421	1.76	R 49.20	R 20,731.52	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	87	0.80	R 108.25	R 9,390.16	
	Blinding	m2	4.82	23	20.78	R 83.35	R 1,936.75	
	Concrete bases	m3	0.00	112	0.00	R 1,732.00	R 193,984.00	
	Concrete column	m3	6.67	17	0.00	R 1,732.00	R 29,083.06	
	Concrete beam	m3	1.99	8	0.00	R 1,732.00	R 14,614.60	
	Concrete wall	m3	35.85	3	0.00	R 1,732.00	R 5,410.99	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,732.00	R 1,175.55	
	Total concrete	m3	0.00	141	0.00		R -	
	Wood float	m2	4.82	23	162.71	R 10.64	R 247.35	
	Formwork bases	m2	1.44	78	8.18	R 211.74	R 16,468.35	
	Formwork to columns	m2	0.14	120	6.98	R 252.85	R 30,326.44	
	Formwork to sides beams	m2	0.23	37	6.34	R 248.14	R 9,103.40	
	Formwork to soffits beams	m2	0.75	11	6.85	R 273.19	R 3,073.52	
	Formwork to soffts of slabs	m2	0.22	3	3.87	R 280.71	R 866.03	
	Formwork to pockets	m2	3.09	36	6.17	R 447.55	R 16,221.70	
	Formwork wall	m2	0.29	11	7.54	R 229.71	R 2,474.61	
	High tensile reinforcement	t	7.31	19.293	0.00	R 13,225.00	R 255,151.04	
	Cast in steel	kg	0.02	7,052	212.67	R 62.19	R 438,508.99	
	HD bolts	kg	0.01	14,103	208.59	R 63.40	R 894,172.36	
	Galvanised grating	m2	3.97	36	0.19	R 9,115.79	R 323,834.28	
	Grout	m3	42.08	2.662	6.37	R 2,076.14	R 5,525.84	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	774	0.05	R 86.60	R 66,985.10	R 6,216,003.49
	Working space	m2	2.50	309	1.84	R 47.07	R 14,561.98	
	Backfill	m3	1.25	619	0.79	R 109.62	R 67,833.01	
	Blinding	m2	3.86	110	20.30	R 85.32	R 9,394.06	
	Concrete	m3	0.00	425	0.00	R 1,732.00	R 736,100.00	
	Mesh reinforcement	m2	0.51	833	65.77	R 201.08	R 167,566.27	
	Rough formwork	m2	3.09	138	8.61	R 201.16	R 27,667.84	
	Smooth formwork	m2	0.57	746	6.80	R 254.71	R 189,912.28	
	Finish to concrete	m2	0.23	1,848	105.40	R 16.43	R 30,364.66	
	Construction joints	m	4.97	86	21.29	R 81.35	R 6,956.72	
	Movement joints	m	15.36	28	17.11	R 101.23	R 2,800.89	
	Cast in steel	kg	2.35	181	232.74	R 56.82	R 10,276.51	
	Grout	m3	882.88	0.481	0.18	R 9,622.22	R 4,631.94	
	Brick walls	m2	0.50	850	0.00	R 412.00	R 350,200.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	1,900	0.00		R -	
	Waterproofing membrane	m2	2.22	856	12.03	R 143.97	R 123,204.26	
	Roof construction	m2	2.04	931	38.22	R 346.02	R 322,233.94	
	Ceiling	m2	0.98	1,939	0.00	R 285.00	R 552,478.32	
	Doors and windows	No	474.69	4	0.17	R 2,423.53	R 9,699.17	
	Floor finish	m2	1.03	1,844	0.79	R 521.52	R 961,898.73	
	Wall finsih	m2	1.04	1,827	1.47	R 280.27	R 511,968.21	
	Rod reinforcement	t	9.25	46	0.00	R 13,225.00	R 607,635.14	
	Metalwork	Item	0.00	1	4.44	R 58,719.00	R 58,719.00	
	Structural steel	Item	0.00	1	11.50	R 152,087.50	R 152,087.50	
	Plumbing and drainage	Item	0.00	1	7.32	R 96,807.00	R 96,807.00	
	Small power and lighting	Item	0.00	1	62.40	R 825,240.00	R 825,240.00	
	External works	Item	0.00	1	178.28	R 308,780.96	R 308,780.96	
BUILDINGS - STEEL	Concrete	m3	0.00	136	0.17	R 1,732.00	R 235,552.00	R 5,361,166.28
	Earthworks	m3	2.37	322	9.13	R 189.70	R 61,145.48	
	Reinforcement	t	8.82	15	0.00	R 13,225.00	R 203,922.90	
	Mesh	m2	0.12	1,133	10.27	R 168.65	R 191,132.75	
	Formwork	m2	0.40	340	8.06	R 214.89	R 73,062.03	
	Brickwork	m2	6.11	254	6.08	R 284.87	R 72,452.62	
	Roof covering	m2	0.87	1,786	208.48	R 204.10	R 364,566.82	
	Structural steel	t	18.83	83	0.00	R 42,551.00	R 3,511,643.87	
	Side cladding	m2	1.54	1,009	0.98	R 200.02	R 201,837.45	
	Doors	No	405.94	4	0.51	R 21,701.01	R 83,074.76	
	Ridge ventilator	m	21.95	71	11.48	R 2,343.08	R 165,883.71	
	Aluminium insulation	m2	0.89	1,746	1.81	R 112.76	R 196,891.88	
	Total building area	m2	0.00	1,554	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	546	0.13	R 225.16	R 122,937.36	R 1,493,915.42
	Concrete	m3	0.00	175	0.00	R 1,732.00	R 303,100.00	
	Reinforcement	t	11.42	15	0.18	R 13,225.00	R 202,659.81	
	Mesh	m2	0.12	1,458	10.21	R 169.64	R 247,388.18	
	Formwork	m2	0.45	389	8.51	R 203.53	R 79,148.71	
	Brickwork	m2	5.94	24	5.91	R 293.06	R 7,153.89	
	Screed	m2	1.12	129	43.13	R 40.16	R 5,198.98	
	Structural steel	t	14.72	10	0.00	R 42,551.00	R 419,150.48	
	Cat ladders	m	2.74	4	9.66	R 4,404.87	R 15,835.88	
	Hand rail	m	0.73	13	27.40	R 1,552.96	R 20,955.43	
	Kick plates	m	0.76	13	2.76	R 562.67	R 7,292.84	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	159	195.47	R 217.69	R 34,686.16	
		Side cladding	m2	4.76	30	0.93	R 202.45	R 6,167.00	
		Floor grating	m2	1.09	9	17.29	R 2,461.02	R 22,240.70	
		Total buiding area	m2	0.00	145	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	0	8.02	R 215.96	R -	R -
		Blinding	m2	0.47	0	18.72	R 92.52	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	7.97	0	0.00	R 13,225.00	R -	
		Mesh	m2	0.49	0	50.23	R 263.29	R -	
		Formwork	m2	0.31	0	7.58	R 228.50	R -	
		Finish to concrete	m2	0.44	0	103.65	R 16.71	R -	
		Movement joints	m	2.46	0	15.35	R 112.83	R -	
		Cast in steel	kg	0.09	0	179.47	R 73.69	R -	
		Grout	m3	71.08	0.000	2.53	R 11,546.67	R -	
		Brickwork	m2	0.24	0	0.15	R 412.00	R -	
		Doors and windows	No	2.74	0	0.26	R 5,150.00	R -	
		Pipework	m	2.59	0	0.21	R 684.58	R -	
		Bolts	kg	0.11	0	0.08	R 73.69	R -	
		Structural steel	t	3.99	0	0.00	R 50,865.38	R -	
		Miscellaneous steel	t	131.32	0	0.00	R 62,976.19	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	0	6.07	R 285.34	R -	R -
		Blinding	m2	0.71	0	14.50	R 119.45	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	5.75	0	0.00	R 13,225.00	R -	
		Formwork	m2	0.07	0	5.72	R 302.80	R -	
		Finish to concrete	m2	0.31	0	77.96	R 22.22	R -	
		Movement joints	m	0.42	0	12.46	R 139.00	R -	
		Cast in steel	kg	23.71	0.000	163.17	R 81.05	R -	
		Grout	m3	22.24	0.000	0.62	R 13,323.08	R -	
		Bolts	kg	109.85	0.000	0.13	R 50.25	R -	
		Structural steel	t	35.84	0.000	0.22	R 60,113.64	R -	
		Miscellaneous steel	t	20.04	0.000	0.18	R 73,472.22	R -	
		Brickwork	m2	0.49	0	4.24	R 408.49	R -	
		Roof covering	m2	1.46	0	1.22	R 334.83	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	494	6.10	R 283.93	R 140,192.62	R 4,647,836.57
	Blinding	m2	1.17	534	16.23	R 106.72	R 57,006.39	
	Concrete	m3	0.00	625	0.00	R 1,732.00	R 1,082,500.00	
	Reinforcement	t	5.89	106.112	0.00	R 13,225.00	R 1,403,331.92	
	Formwork	m2	0.21	2,976	6.04	R 286.75	R 853,437.40	
	Movement joint	m	1.61	388	0.12	R 134.47	R 52,201.88	
	Cast in steel	kg	0.13	4,808	12.88	R 67.42	R 324,131.99	
	Bolts	kg	0.37	1,689	196.16	R 81.42	R 137,541.73	
	Chemical anchors	No	6.13	102	0.22	R 367.57	R 37,476.07	
	Miscellaneous steelwork	t	88.98	7.024	162.42	R 60,113.64	R 422,241.21	
	Pre-cast concrete	m3	30.27	21	35.98	R 5,773.33	R 119,204.93	
	Brickwork	m2	7.79	47	0.30	R 396.34	R 18,570.43	
	Total area	m2	0.00	365	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.68	R 116.39	R -	R -
	Lining	m2	0.70	0	1.16	R 69.28	R -	
	Paving	m2	0.65	0	0.53	R 130.72	R -	
	Pipework	m	28.23	0	0.24	R 484.96	R -	
	Manholes	No	16.47	0	0.10	R 4,849.60	R -	
	Concrete	m3	2.43	0	0.04	R 1,732.00	R -	
	Formwork	m2	0.08	0	5.85	R 296.07	R -	
	Mesh	m2	0.70	0	6.64	R 260.84	R -	
	Reinforcement	t	4.69	0.000	0.12	R 13,225.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	0	5.56	R 311.51	R -	R -
	Blinding	m2	0.85	0	13.49	R 128.39	R -	
	Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
	Reinforcement	t	4.52	0.000	0.00	R 13,225.00	R -	
	Mesh	m2	0.90	0	38.60	R 342.62	R -	
	Formwork	m2	0.15	0	5.36	R 323.13	R -	
	Cast in steel	kg	0.02	0	140.16	R 94.36	R -	
	Miscellaneous steelwork	t	11.14	0.000	0.16	R 82,656.25	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,447,381.76
	Steel	t	9.58	21.086	0.00	R 42,551.00	R 897,213.15	
	Handrail	m	1.45	139	28.73	R 1,481.07	R 206,327.69	
	Grating	m2	1.91	106	16.97	R 2,507.42	R 265,183.15	
	Kick flats	m	1.71	118	76.94	R 553.04	R 65,330.03	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stair treads	No	6.72	30	95.97	R 443.38	R 13,327.74	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,976	0.00		R -	R 5,655,859.07
		Steel	t	27.86	106.820	0.00	R 42,551.00	R 4,545,289.88	
		Handrail	m	13.37	223	30.43	R 1,398.32	R 311,249.98	
		Grating	m2	12.47	239	18.55	R 2,293.85	R 547,434.71	
		Kick flats	m	13.35	223	84.90	R 501.19	R 111,725.87	
		Cat ladder	m	98.85	30	9.14	R 4,655.47	R 140,158.63	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	12,422	0.00		R -	R 16,487,446.25
		Steel	t	76.43	162.528	0.00	R 42,551.00	R 6,915,720.55	
		Handrail	m	31.26	397	30.84	R 1,379.73	R 548,274.38	
		Grating	m2	3.84	3,235	16.10	R 2,642.92	R 8,549,568.48	
		Kick flats	m	34.08	364	83.17	R 511.61	R 186,481.18	
		Stair treads	No	230.28	54	101.90	R 417.58	R 22,525.32	
		Cat ladder	m	238.13	52	8.38	R 5,077.68	R 264,876.34	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	25.51	0.000	0.00	R 42,551.00	R -	
		Handrail	m	45.84	0	30.11	R 1,413.18	R -	
		Grating	m2	60.74	0	17.06	R 2,494.20	R -	
		Kick flats	m	46.49	0	79.97	R 532.09	R -	
		Cat ladder	m	20.35	0	8.64	R 4,924.88	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	157	0.00		R -	R 878,147.28
		Steel	t	16.54	9.492	0.00	R 42,551.00	R 403,900.06	
		Handrail	m	1.10	143	31.41	R 1,354.70	R 193,352.06	
		Grating	m2	1.98	79	16.95	R 2,510.38	R 199,055.66	
		Kick flats	m	1.16	135	80.43	R 529.04	R 71,603.35	
		Stair treads	No	6.10	26	106.99	R 397.71	R 10,236.14	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	12.73	0.000	0.00	R 42,551.00	R -	
		Handrail	m	25.10	0	32.05	R 1,327.64	R -	
		Grating	m2	7.46	0	17.66	R 2,409.46	R -	
		Kick flats	m	22.84	0	84.46	R 503.80	R -	
		Cat ladder	m	20.48	0	8.85	R 4,808.02	R -	
	PIPING INSTALLATION	Pipe length	m	0.00	124,552	0.00		R -	R 150,594,690.91
		Total work units	WU	0.33	377,430	0.00	R 399.00	R 150,594,690.91	
		Pipe supports	kg	2.61	47,721	0.00		R -	
		WU for pipe supports	WU	0.16	60,389	0.00		R -	
		Number of welds	No	0.61	75,977	0.00		R -	
		Total fittings	No	0.38	47,330	0.00		R -	
		Stud bolts	No	0.34	16,092	0.00		R -	
		Support number	No	0.19	9,067	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	377,430	0.00	R 399.00		R 423,397.71

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	6,293	5.93	R 67.28	R 423,397.71	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	377,430	0.00	R 399.00		R 152,140.56
	Number of examinations	No	168.34	2,242	5.88	R 67.86	R 152,140.56	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	377,430	0.00	R 399.00		R 236,075.88
	Number of examinations	No	300.90	1,254	2.12	R 188.21	R 236,075.88	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	377,430	0.00	R 399.00		R 410,402.94
	Number of examinations	No	52.95	7,128	6.93	R 57.58	R 410,402.94	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	377,430	0.00	R 399.00		R 316,013.91
	Number of examinations	No	114.83	3,287	4.15	R 96.14	R 316,013.91	
MECHANICAL INSTALLATION	Total work units	WU	0.00	377,430	0.00	R 399.00		R 767,645.07
	Mechanical equipment	t	261.57	1,443	0.75	R 532.00	R 767,645.07	
	Structural steel	t	218.09	1,731	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	377,430	0.00	R 399.00		R 9,073,507.61
	Painting to piping	m2	17.88	21,109	0.34	R 153.46	R 3,239,431.49	
	Insulation to piping	m2	51.67	7,305	2.60	R 451.36	R 3,296,999.91	
	Mechanical equipment received	t	0.00	1,443	0.82	R 532.00	R 767,645.07	
	Painting to mechanical equipment	m2	0.25	5,772	3.69	R 144.17	R 832,135.58	
	Insulation to mechanical equipment	m2	0.70	2,061	1.17	R 454.70	R 937,295.57	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	75,442	0.00	R 69.00	R 5,205,498.00	R 13,229,666.41
	Electrical cable terminations	No	311.25	2,997	0.43	R 160.47	R 480,961.83	
	Electrical equipment	No	9.05	242	0.11	R 627.27	R 152,040.83	
	DB's	No	6.39	27	0.32	R 1,960.23	R 52,500.29	
	Rack	m	0.69	11,806	1.65	R 197.14	R 2,327,519.79	
	Support steel	kg	1.42	17,111	2.13	R 32.39	R 554,284.50	
	Instrumentation cable	m	27.43	65,112	0.35	R 28.50	R 1,855,692.00	
	Instruments	No	0.58	2,374	0.18	R 158.33	R 375,843.97	
	Hook-ups	No	3.98	4,093	0.16	R 178.13	R 729,007.69	
	Light fittings	No	10.26	965	0.02	R 383.33	R 369,797.09	
	Conduit	m	4.13	7,353	0.13	R 41.82	R 307,489.99	
	Instrument stands	No	0.00	575		R 1,425.00	R 819,030.44	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project D				
Location:	South Africa				
Client:				Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	24,553	R	6.25
2	Concrete demolitions	m3	45	R	1,788.00
3	Bulk excavation	m3	12,664	R	62.00
4	Vertical piles	No	352		
5	Raking piles	No	45		
6	Concrete in piles	m3		R	1,732.00
7	Auger pile	m		R	325.00
8	Total paving and asphalt to road works	m2	5,547		
9	Grey paving to road works	m2	452	R	142.00
10	Asphalt to road surface	m2	5,095		
11	Rip bed of road works	m2	5,547	R	14.55
12	Total concrete in paving and bunding	m3	558	R	1,732.00
13	Concrete in paving	m3	375		
14	Rod reinforcement	t		R	13,225.00
15	Concrete in plinths and bases on area finishing	m3	423		
16	Stormwater pipe to drain surface run-off	m	455		
17	Machine excavation	m3		R	75.00
18	Concrete in pump and pipe support bases	m3	285	R	1,732.00
19	Concrete in tank bases	m3	242	R	1,732.00
20	Concrete in pipe and cable rack foundations	m3	345	R	1,732.00
21	Concrete to simple structural foundations	m3	365	R	1,732.00
22	Complex structural foundations - bases	m3	125	R	1,732.00
23	Concrete pipe racks - bases	m3	245	R	1,732.00
24	Concrete structure including concrete columns and beams - bases	m3	425	R	1,732.00
25	Major equipment bases with blast proof walls - bases	m3	62	R	1,732.00
26	Major equipment bases and elevated concrete structure - bases	m3	112	R	1,732.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	425	R	1,732.00
28	One brick wall	m2		R	412.00
29	Concrete in structual steel buildings - all concrete	m3	136	R	1,732.00
30	Total building area - Structural steel buildings	m2	1,554		
31	Ceiling	m2		R	285.00
32	Structural steel	t		R	42,551.00
33	Steel canopy - concrete	m3	175	R	1,732.00
34	Steel canopy - area	m2	145		
35	Concrete in weighbridge - all concrete	m3	0	R	1,732.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,732.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	625	R	1,732.00
41	Total cooling tower area	m2	365		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,732.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	2,976		
47	Total volume of steel complex steel structure	m3	12,422		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	157		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	399.00
52	Total process pipe length	m	124,552		
53	Total electrical cable - installation only	m	75,442	R	69.00
54	Total instrumentation cable - installation only	m	65,112	R	46.50

Ratio: Project Ratio Median

Variables

Material	Complex	Mean
Labour	Simple	Mean
Engineering design	Simple	Mean
Current economic conditions	Good	Mean
Current economic factors	Good	Mean
Level of scope definition	Good	Mean
Rework	Little	Mean
Scope change	Normal	Mean
Weather	Good	Mean
Access	Good	Mean
Project size	Large	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project D			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 94,656,850.19
A	SITE CLEARANCE AND DEMOLITIONS		R	233,916.25	
B	BULK EARTHWORKS		R	1,705,147.31	
C	PILING		R	12,782,165.20	
D	ROAD WORKS		R	2,643,559.76	
E	GENERAL PAVING AND BUNDED AREAS		R	2,307,635.16	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	2,767,059.72	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	2,167,562.75	
H	TANK BASES AND BUNDING		R	4,734,843.07	
I	RACK FOUNDATIONS		R	3,117,681.48	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	4,402,169.30	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	938,583.64	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	3,635,276.79	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	7,531,370.71	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	444,871.08	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,565,513.43	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	6,558,619.44	
Q	BUILDINGS - STEEL		R	5,671,518.71	
R	CANOPIES - STEEL		R	1,537,621.62	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	4,371,069.92	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	24,540,664.86	
	STRUCTURAL STEEL				R 38,687,071.07
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,601,989.59	
B	STRUCTURAL STEEL - PIPERACK		R	6,642,179.77	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	18,345,576.40	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	1,043,876.44	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	11,053,448.88	
	MECHANICAL AND PIPING				R 236,607,335.44
A	PIPING INSTALLATION		R	165,654,160.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	539,744.81	
C	DYE PENETRATION TESTING (DP)		R	333,016.63	
D	MAGNETIC PARTICLE TESTING (MPI)		R	320,057.34	
E	POST WELD HEAT TREATMENT		R	548,187.90	
F	MATERIAL HARDNESS TEST (HT)		R	649,834.65	
H	MECHANICAL INSTALLATION		R	960,238.27	
	Preliminaries and General	40.00%	R	67,602,095.84	
	PAINTING AND INSULATION				R 16,469,705.59
A	PAINTING AND INSULATION		R	12,199,781.92	
	Preliminaries and General	35.00%	R	4,269,923.67	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 19,985,859.14
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	14,804,340.10	
	Preliminaries and General	35.00%	R	5,181,519.04	

TOTAL COST	R	406,406,821.43

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		24,553		R 6.25	R 153,456.25	R 233,916.25
	Concrete demolitions	m3		45		R 1,788.00	R 80,460.00	
BULK EARTHWORKS	Bulk excavation	m3		12,664		R 62.00	R 785,168.00	R 1,705,147.31
	Trimming of sides	m2	2.20	5,756	4.18	R 14.83	R 85,381.47	
	Back fill and compact	m3	1.12	11,307	0.95	R 65.26	R 737,939.85	
	Overhaul	m3/km	1.62	7,817	11.35	R 5.46	R 42,702.34	
	Rip bed	m2	1.71	7,406	8.51	R 7.29	R 53,955.65	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 333,219.48	R 333,219.48	R 12,782,165.20
	EO for raking equipment	Item	0.00	1	24.25	R 42,001.00	R 42,001.00	
	Number of piles	No	0.00	352	0.00		R -	
	Move rig to new position	No	1.48	238	0.19	R 329.08	R 78,267.68	
	Number of raking piles	No	19.43	18	0.00		R -	
	EO for setting up raking piles	No	0.93	19	0.24	R 415.68	R 8,097.41	
	EO for raking drilling	m	0.14	129	0.61	R 198.25	R 25,654.00	
	Auger quantity	m	0.05	7,040	0.00	R 325.00	R 2,288,000.00	
	EO for drilling in coarse gravel	m	0.55	640	0.22	R 381.04	R 243,865.60	
	EO for drilling in boulders	m	1.65	213	0.51	R 883.32	R 188,441.60	
	EO for drilling in soft rock	m	1.57	224	0.23	R 398.36	R 89,313.83	
	Temporary casings	m	0.38	926	0.31	R 536.92	R 497,357.47	
	EO casing to raking pile	m	0.17	107	0.57	R 1,212.40	R 129,201.30	
	Mild steel rod reinforcement	t	14.65	24.027	0.70	R 8,802.02	R 211,488.90	
	High tensile rod reinforcement	t	1.16	303.448	7.26	R 12,574.32	R 3,815,655.72	
	Concrete to piles and bases	m3	0.16	2,200	0.00	R 1,732.00	R 3,810,400.00	
	Concrete to raking piles	m3	0.08	226	1.08	R 1,870.56	R 423,595.68	
	Site establishment of test equipment	Item	0.00	1	115.74	R 200,461.68	R 200,461.68	
	Load test to pile	No	93.50	4	22.16	R 38,381.12	R 144,493.63	
	Site establishment of intergity testing	No	255.00	1	49.96	R 86,530.72	R 119,446.33	
	Integrity testing of piles	No	1.19	296	0.26	R 450.32	R 133,203.90	
ROAD WORKS	Red paving	m2	0.14	63	0.93	R 132.06	R 8,356.76	R 2,643,559.76
	Grey paving	m2	0.00	452	0.00	R 142.00	R 64,184.00	
	Kerbing	m	0.09	499	0.00	R 321.48	R 160,492.58	
	Total paving and asphalt	m2	0.00	5,547	0.00		R -	
	Remove top soil	m3	0.49	544	4.45	R 64.75	R 35,197.13	
	Asphalt	m2	0.20	1,109	0.00	R 199.94	R 221,808.97	
	Rip bed	m2	0.00	5,547	0.00	R 14.55	R 80,708.85	
	Reduce levels	m3	0.36	1,997	4.30	R 62.57	R 124,937.30	
	Selected fill	m3	1.50	1,331	0.46	R 136.01	R 181,068.55	
	Imported fill	m3	1.94	686	0.33	R 412.15	R 282,831.23	
	Wearing course	m3	3.89	513	0.20	R 312.83	R 160,587.79	
	Prime	m2	4.34	5,778	1.47	R 41.22	R 238,132.58	
	Three line road marking	m	0.78	4,507	0.10	R 32.15	R 144,879.86	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	494	4.06	R 9.64	R 4,766.63	
		1m Wide concrete V-drain	m	1.00	499	0.78	R 1,375.94	R 686,908.24	
		200mm Diameter PVC pipe	m	0.93	464	0.09	R 427.57	R 198,513.27	
		Road marking - STOP	No	0.15	75	0.03	R 527.23	R 39,481.17	
		Standard signage	No	0.01	5	4.28	R 591.52	R 2,953.06	
		100mm Painted line	m	1.61	804	1.33	R 9.64	R 7,751.79	
				0.00		1.64			
				0.00		1.84			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	375	0.75	R 1,732.00	R 649,500.00	R 2,307,635.16
		Concrete in plinths	m3	0.00	77	0.00	R 1,732.00	R 133,094.26	
		Total concrete	m3	0.00	558	0.00		R -	
		Rip and compact	m2	0.13	2,885	193.57	R 8.95	R 25,810.58	
		Formwork to plinth	m2	6.92	532	0.12	R 207.84	R 110,521.48	
		Formwork to slab	m2	0.80	300	0.15	R 259.80	R 77,940.00	
		High tensile steel	t	0.01	5.580	0.00	R 13,225.00	R 73,795.50	
		Mesh	m2	607.27	3,389	43.37	R 304.93	R 1,033,290.14	
		Construction joint	m	3.64	1,365	0.04	R 69.28	R 94,567.20	
		Expansion joint	m	2.10	788	0.08	R 138.56	R 109,116.00	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	8,432	0.00		R -	R 2,767,059.72
		Base excavation	m3	1.42	984	0.00	R 75.00	R 73,779.07	
		Backfill	m3	0.56	693	0.63	R 119.05	R 82,471.57	
		Working space	m2	0.43	1,757	1.35	R 88.18	R 154,906.92	
		Concrete in bases	m3	0.04	423	23.71	R 1,732.00	R 732,636.00	
		Blinding	m2	0.71	673	19.17	R 90.35	R 60,825.58	
		Concrete in sump walls	m3	0.11	47	31.87	R 1,732.00	R 80,589.96	
		Concrete in slabs	m3	0.02	8	0.81	R 1,732.00	R 14,652.72	
		Total concrete	m3	0.00	478	0.03		R -	
		Wood float	m2	0.61	784	123.90	R 13.98	R 10,953.82	
		Formwork to bases	m2	1.73	732	0.12	R 207.84	R 152,095.23	
		Formwork to sump walls	m2	11.18	520	0.12	R 207.84	R 108,119.49	
		Formwork to sides of slab	m2	5.67	48	0.17	R 294.44	R 14,123.76	
		Mild steel reinforcement	t	0.08	4.081	0.00	R 13,225.00	R 53,971.55	
		High tensile reinforcement	t	9.37	51.013	0.92	R 13,225.00	R 674,644.37	
		Cast in steel	kg	0.45	940	33.55	R 51.62	R 48,526.97	
		Waterstop	m	0.44	106	8.37	R 206.93	R 21,882.80	
		Manhole	No	0.08	36	2.72	R 5,306.37	R 193,151.96	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	455	0.12	R 636.76	R 289,727.94	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	459	0.05	R 75.00	R 34,413.75	R 2,167,562.75
	Working space	m2	0.33	1,390	0.68	R 51.00	R 70,913.18	
	Backfill	m3	3.97	116	1.27	R 95.25	R 11,008.93	
	Concrete bases	m3	0.93	285	0.00	R 1,732.00	R 493,620.00	
	Concrete plinth	m3	2.01	142	0.00	R 1,732.00	R 245,582.09	
	Total concrete	m3	0.00	427	0.00		R -	
	Wood float	m2	0.46	308	0.05	R 17.32	R 5,338.74	
	Blinding	m2	0.93	306	0.01	R 86.60	R 26,538.71	
	Formwork bases	m2	0.47	606	0.12	R 207.84	R 126,030.64	
	Formwork plinth	m2	0.53	268	0.12	R 207.84	R 55,603.49	
	High tensile reinforcement	t	10.15	42.048	6.60	R 13,225.00	R 556,089.81	
	Cast in steel	kg	0.10	4,268	0.03	R 51.96	R 221,760.63	
	HD Bolts	kg	0.08	5,335	0.03	R 51.96	R 277,200.78	
	Grout	m3	33.79	4.196	5.98	R 10,357.36	R 43,462.00	
TANK BASES AND BUNDING	Restricted excavation	m3	5.54	1,341	0.05	R 86.60	R 116,102.89	R 4,734,843.07
	Working space	m2	3.95	339	1.56	R 55.51	R 18,841.75	
	Backfill	m3	1.34	1,001	0.75	R 115.47	R 115,525.26	
	Concrete bases	m3	0.70	242	0.00	R 1,732.00	R 419,144.00	
	Concrete sump wall	m3	2.55	95	0.00	R 1,732.00	R 164,370.20	
	Concrete slab	m3	0.56	432	0.00	R 1,732.00	R 748,471.43	
	Concrete plinth	m3	3.73	65	19.74	R 1,732.00	R 112,371.05	
	Concrete column	m3	19.00	13	160.09	R 1,732.00	R 22,060.21	
	Total concrete	m3	0.00	847	0.99		R -	
	Blinding	m2	2.44	347	1.05	R 87.74	R 30,445.32	
	Wood float	m2	0.25	3,387	1.05	R 10.82	R 36,639.81	
	Formwork to bases	m2	0.39	621	1.05	R 229.10	R 142,159.82	
	Formwork to plinths	m2	0.34	191	7.56	R 239.89	R 45,776.05	
	Formwork to columns	m2	0.11	116	7.22	R 252.85	R 29,276.99	
	Formwork to sumps	m2	0.10	949	6.85	R 236.61	R 224,549.45	
	Formwork to slabs	m2	3.83	113	7.32	R 215.16	R 24,276.19	
	Formwork to slabs n/e 300mm	m	2.05	211	8.05	R 78.73	R 16,595.82	
	Mild steel reinforcement	t	0.22	8.421	22.00	R 13,225.00	R 111,363.48	
	High tensile reinforcement	t	22.12	38.276	0.90	R 13,225.00	R 506,197.65	
	Mesh	m2	0.15	2,881	54.97	R 240.59	R 693,116.16	
	Cast in items	kg	0.19	4,456	218.75	R 60.46	R 269,403.72	
	HD Bolts	kg	0.09	9,407	198.48	R 66.63	R 626,824.53	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	200.00	4.233	0.16	R 10,825.00	R 45,825.53	
		Construction joint	m	0.29	1,490	24.07	R 71.96	R 107,226.26	
		Expansion joint	m	0.44	982	15.71	R 110.25	R 108,279.53	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	1,132	0.05	R 86.60	R 97,996.56	R 3,117,681.48
		Working space	m2	0.30	3,772	1.58	R 136.83	R 516,115.22	
		Backfill	m3	2.36	479	0.78	R 111.03	R 53,235.85	
		Blinding	m2	0.40	863	24.38	R 71.04	R 61,273.58	
		Concrete bases	m3	5.73	345	0.00	R 1,732.00	R 597,540.00	
		Concrete plinth	m3	0.00	60	0.00	R 1,732.00	R 104,282.72	
		Total concrete	m3	0.00	405	1.35		R -	
		Wood float	m2	0.35	986	182.61	R 9.48	R 9,349.20	
		Formwork bases	m2	0.49	704	11.01	R 157.31	R 110,760.16	
		Formwork plinths	m2	0.09	669	6.94	R 249.57	R 166,959.21	
		High tensile reinforcement	t	9.11	44.480	0.00	R 13,225.00	R 588,243.10	
		HD Bolts	kg	0.03	11,500	198.55	R 66.61	R 765,990.93	
		Grout	m3	76.52	4.509	0.17	R 10,188.24	R 45,934.93	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	1,420	0.05	R 86.60	R 122,959.01	R 4,402,169.30
		Working space	m2	0.45	3,155	1.88	R 46.06	R 145,341.62	
		Backfill	m3	2.48	573	0.78	R 111.03	R 63,564.42	
		Blinding	m2	0.35	1,043	21.52	R 80.48	R 83,932.55	
		Concrete bases	m3	0.00	365	0.00	R 1,732.00	R 632,180.00	
		Concrete plinth	m3	2.36	123	0.00	R 1,732.00	R 213,574.32	
		Concrete slab	m3	2.96	155	0.00	R 1,732.00	R 267,872.88	
		Total concrete	m3	0.00	643	0.00		R -	
		Wood float	m2	0.51	1,261	155.50	R 11.14	R 14,042.33	
		Formwork bases	m2	0.45	811	8.00	R 216.50	R 175,605.56	
		Formwork plinths	m2	0.10	1,233	7.78	R 222.62	R 274,517.13	
		High tensile reinforcement	t	12.87	49.959	0.00	R 13,225.00	R 660,707.26	
		HD Bolts	kg	0.02	18,250	190.91	R 69.27	R 1,264,241.00	
		Cast in items	kg	0.05	7,300	225.21	R 58.72	R 428,677.68	
		Grout	m3	67.67	5.394	0.17	R 10,188.24	R 54,953.54	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	254	0.05	R 86.60	R 21,974.75	R 938,583.64
		Working space	m2	0.50	508	1.64	R 52.80	R 26,798.48	
		Backfill	m3	2.15	118	0.76	R 113.95	R 13,448.44	
		Blinding	m2	0.66	189	20.25	R 85.53	R 16,199.03	
		Concrete bases	m3	0.00	125	0.00	R 1,732.00	R 216,500.00	
		Concrete column	m3	27.56	5	0.00	R 1,732.00	R 7,855.59	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	27	0.00	R 1,732.00	R 46,359.74	
	Total concrete	m3	0.00	156	0.00		R -	
	Wood float	m2	0.59	265	157.14	R 11.02	R 2,919.94	
	Formwork bases	m2	0.49	255	7.78	R 222.62	R 56,791.35	
	Formwork plinths	m2	0.31	86	7.42	R 233.42	R 20,154.66	
	Formwork to columns	m2	0.29	16	7.75	R 223.48	R 3,495.26	
	High tensile reinforcement	t	8.97	17.425	0.00	R 13,225.00	R 230,445.48	
	HD bolts	kg	0.04	3,908	200.18	R 66.07	R 258,154.66	
	Grout	m3	96.76	1.615	0.16	R 10,825.00	R 17,486.26	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	642	0.05	R 86.60	R 55,588.54	R 3,635,276.79
	Working space	m2	0.25	2,568	2.02	R 42.87	R 110,076.32	
	Backfill	m3	1.91	336	0.79	R 109.62	R 36,840.44	
	Blinding	m2	0.68	360	20.00	R 86.60	R 31,201.47	
	Concrete bases	m3	0.00	245	0.00	R 1,732.00	R 424,340.00	
	Concrete column	m3	1.08	222	145.46	R 1,732.00	R 384,365.94	
	Concrete beam	m3	2.50	89	0.88	R 1,732.00	R 153,746.38	
	Total concrete	m3	2.76	556	0.88		R -	
	Wood float	m2	0.44	557	7.44	R 11.91	R 6,630.06	
	Formwork bases	m2	0.45	544	6.41	R 232.80	R 126,744.32	
	Formwork to columns	m2	0.14	1,585	7.35	R 235.65	R 373,533.47	
	Formwork to sides beams	m2	0.32	277	5.90	R 270.20	R 74,954.36	
	Formwork to soffits beams	m2	0.68	131	6.41	R 293.56	R 38,321.63	
	Formwork corbels	m2	10.42	21	4.87	R 355.65	R 7,574.40	
	High tensile reinforcement	t	8.81	63.075	0.00	R 13,225.00	R 834,163.36	
	Cast in steel	kg	0.03	18,523	260.94	R 50.68	R 938,782.76	
	HD bolts	kg	1.43	389	199.28	R 66.36	R 25,788.57	
	Grout	m3	476.47	1.166	0.16	R 10,825.00	R 12,624.78	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	1,577	0.05	R 86.60	R 136,546.55	R 7,531,370.71
	Working space	m2	0.58	2,719	1.69	R 51.24	R 139,304.78	
	Backfill	m3	1.15	1,371	0.78	R 111.03	R 152,225.81	
	Blinding	m2	0.62	685	19.41	R 89.23	R 61,167.34	
	Concrete bases	m3	0.00	425	0.88	R 1,732.00	R 736,100.00	
	Concrete column	m3	2.01	211	1.07	R 1,732.00	R 366,218.91	
	Concrete beam	m3	0.83	255	1.00	R 1,732.00	R 441,227.60	
	Concrete surface slab	m3	1.64	259	0.92	R 1,732.00	R 448,841.46	
	Concrete wall	m3	2.14	99	1.00	R 1,732.00	R 171,130.33	
	Concrete elevated slab	m3	0.97	218	0.00	R 1,732.00	R 377,545.26	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,467	0.00		R -	
		Wood float	m2	0.60	2,445	152.05	R 11.39	R 27,853.38	
		Formwork bases	m2	0.39	1,090	7.60	R 227.89	R 248,346.83	
		Formwork to columns	m2	0.15	1,410	6.20	R 279.35	R 393,783.77	
		Formwork to sides beams	m2	0.29	878	4.91	R 352.75	R 309,872.60	
		Formwork to soffits beams	m2	0.79	322	7.19	R 240.89	R 77,679.55	
		Formwork to soffts of slabs	m2	0.30	864	3.11	R 306.55	R 264,803.22	
		Formwork to pockets	m2	25.00	8	5.65	R 556.91	R 4,710.21	
		Formwork wall	m2	0.12	823	7.88	R 219.80	R 180,975.39	
		High tensile reinforcement	t	8.60	170.596	0.00	R 13,225.00	R 2,256,133.89	
		Cast in steel	kg	0.21	6,986	251.20	R 52.65	R 367,810.73	
		HD bolts	kg	0.39	3,762	193.52	R 68.34	R 257,082.70	
		Steel handrailing	m	2.48	69	9.30	R 1,422.04	R 97,820.58	
		Grout	m3	994.87	1.475	0.18	R 9,622.22	R 14,189.81	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	47	0.04	R 69.28	R 3,278.90	R 444,871.08
		Working space	m2	7.47	6	1.41	R 49.13	R 311.31	
		Backfill	m3	4.63	10	0.74	R 51.27	R 524.06	
		Blinding	m2	1.22	51	19.45	R 89.05	R 4,525.43	
		Concrete bases	m3	0.00	62	0.00	R 1,732.00	R 107,384.00	
		Concrete column	m3	28.46	2	0.00	R 1,732.00	R 3,773.16	
		Concrete beam	m3	1.44	2	0.00	R 1,732.00	R 2,620.25	
		Concrete wall	m3	11.19	6	0.00	R 1,732.00	R 9,596.43	
		Concrete elevated slabs	m3	11.80	0	0.00	R 1,732.00	R 319.76	
		Total concrete	m3	0.00	71	0.00		R -	
		Wood float	m2	0.88	81	160.92	R 10.76	R 873.48	
		Formwork bases	m2	8.70	7	6.92	R 250.29	R 1,783.67	
		Formwork to columns	m2	0.15	15	5.95	R 272.33	R 3,955.09	
		Formwork to sides beams	m2	0.17	9	5.05	R 291.09	R 2,590.46	
		Formwork to soffits beams	m2	0.51	3	6.36	R 342.97	R 1,017.37	
		Formwork to soffts of slabs	m2	0.14	1	3.22	R 323.74	R 426.91	
		Formwork to pockets	m2	450.00	0	5.35	R 537.89	R 74.11	
		Formwork wall	m2	0.11	50	6.97	R 248.49	R 12,516.53	
		High tensile reinforcement	t	4.12	17.334	0.00	R 13,225.00	R 229,243.88	
		Cast in steel	kg	0.16	446	209.64	R 63.08	R 28,157.94	
		HD bolts	kg	0.24	298	171.78	R 76.99	R 22,909.26	
		Galvanised grating	m2	18.82	4	0.16	R 2,153.91	R 8,173.48	
		Grout	m3	822.89	0.075	6.14	R 10,825.00	R 815.60	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.48	166	0.05	R 86.60	R 14,354.82	R 2,565,513.43
	Working space	m2	0.38	436	1.56	R 55.51	R 24,215.28	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.98	84	0.78	R 111.03	R 9,294.75	
	Blinding	m2	4.71	24	21.03	R 82.36	R 1,958.42	
	Concrete bases	m3	0.00	112	0.00	R 1,732.00	R 193,984.00	
	Concrete column	m3	6.03	19	0.00	R 1,732.00	R 32,169.82	
	Concrete beam	m3	1.73	11	0.00	R 1,732.00	R 18,595.27	
	Concrete wall	m3	33.33	3	0.00	R 1,732.00	R 5,820.10	
	Concrete elevated slabs	m3	24.00	1	0.00	R 1,732.00	R 1,340.41	
	Total concrete	m3	0.00	145	0.00		R -	
	Wood float	m2	4.62	24	151.91	R 11.40	R 276.40	
	Formwork bases	m2	1.43	78	7.62	R 227.30	R 17,802.25	
	Formwork to columns	m2	0.13	143	6.99	R 276.68	R 39,530.37	
	Formwork to sides beams	m2	0.23	47	5.94	R 247.78	R 11,566.38	
	Formwork to soffits beams	m2	0.69	16	6.26	R 291.58	R 4,536.98	
	Formwork to soffts of slabs	m2	0.20	4	3.67	R 302.80	R 1,171.69	
	Formwork to pockets	m2	2.86	39	5.72	R 471.93	R 18,481.36	
	Formwork wall	m2	0.29	12	7.33	R 236.29	R 2,737.97	
	High tensile reinforcement	t	7.10	20.485	0.00	R 13,225.00	R 270,915.69	
	Cast in steel	kg	0.02	7,272	188.96	R 69.99	R 508,970.53	
	HD bolts	kg	0.01	14,544	197.35	R 67.01	R 974,665.02	
	Galvanised grating	m2	3.64	40	0.17	R 10,188.24	R 407,093.73	
	Grout	m3	40.32	2.778	6.09	R 2,171.59	R 6,032.20	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	735	0.05	R 86.60	R 63,672.65	R 6,558,619.44
	Working space	m2	2.26	325	1.69	R 51.24	R 16,670.85	
	Backfill	m3	1.23	598	0.76	R 113.95	R 68,113.66	
	Blinding	m2	3.82	111	19.66	R 88.10	R 9,801.44	
	Concrete	m3	0.00	425	0.00	R 1,732.00	R 736,100.00	
	Mesh reinforcement	m2	0.40	1,063	61.78	R 214.07	R 227,445.17	
	Rough formwork	m2	2.73	156	7.94	R 218.14	R 33,958.90	
	Smooth formwork	m2	0.56	759	6.78	R 255.46	R 193,873.79	
	Finish to concrete	m2	0.22	1,932	108.86	R 15.91	R 30,735.89	
	Construction joints	m	4.61	92	19.60	R 88.37	R 8,146.66	
	Movement joints	m	14.81	29	15.71	R 110.25	R 3,163.77	
	Cast in steel	kg	2.30	185	221.43	R 59.73	R 11,036.22	
	Grout	m3	803.00	0.529	0.16	R 10,825.00	R 5,729.30	
	Brick walls	m2	0.46	924	0.00	R 412.00	R 380,652.17	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	1,870	0.00		R -	
	Waterproofing membrane	m2	2.00	935	11.21	R 154.50	R 144,462.09	
	Roof construction	m2	1.99	940	34.10	R 387.83	R 364,443.18	
	Ceiling	m2	0.97	1,928	0.00	R 285.00	R 549,432.99	
	Doors and windows	No	434.63	4	0.15	R 2,746.67	R 11,817.56	
	Floor finish	m2	1.00	1,870	0.77	R 535.06	R 1,000,571.43	
	Wall finsih	m2	1.01	1,851	1.37	R 300.73	R 556,796.99	
	Rod reinforcement	t	8.63	49	0.00	R 13,225.00	R 651,289.11	
	Metalwork	Item	0.00	1	4.56	R 60,306.00	R 60,306.00	
	Structural steel	Item	0.00	1	11.81	R 156,187.25	R 156,187.25	
	Plumbing and drainage	Item	0.00	1	7.52	R 99,452.00	R 99,452.00	
	Small power and lighting	Item	0.00	1	64.07	R 847,325.75	R 847,325.75	
	External works	Item	0.00	1	189.05	R 327,434.60	R 327,434.60	
BUILDINGS - STEEL	Concrete	m3	0.00	136	0.16	R 1,732.00	R 235,552.00	R 5,671,518.71
	Earthworks	m3	2.30	313	8.34	R 207.67	R 64,960.38	
	Reinforcement	t	8.29	16	0.00	R 13,225.00	R 216,960.19	
	Mesh	m2	0.11	1,236	9.20	R 188.26	R 232,758.89	
	Formwork	m2	0.40	340	7.44	R 232.80	R 79,150.54	
	Brickwork	m2	5.73	271	5.65	R 306.55	R 83,137.28	
	Roof covering	m2	0.83	1,872	202.02	R 210.63	R 394,355.89	
	Structural steel	t	17.93	87	0.00	R 42,551.00	R 3,687,911.54	
	Side cladding	m2	1.49	1,043	0.95	R 200.10	R 208,691.02	
	Doors	No	371.00	4	0.49	R 20,849.99	R 87,333.92	
	Ridge ventilator	m	20.62	75	10.67	R 2,247.40	R 169,372.22	
	Aluminium insulation	m2	0.88	1,766	1.76	R 119.67	R 211,334.83	
	Total building area	m2	0.00	1,554	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	483	0.12	R 207.84	R 100,386.72	R 1,537,621.62
	Concrete	m3	0.00	175	0.00	R 1,732.00	R 303,100.00	
	Reinforcement	t	10.55	17	0.16	R 13,225.00	R 219,372.04	
	Mesh	m2	0.11	1,591	9.84	R 176.02	R 280,025.87	
	Formwork	m2	0.41	427	8.08	R 214.36	R 91,493.60	
	Brickwork	m2	5.78	25	5.59	R 309.84	R 7,772.78	
	Screed	m2	1.10	132	39.96	R 43.34	R 5,713.44	
	Structural steel	t	14.85	10	0.00	R 42,551.00	R 415,481.14	
	Cat ladders	m	2.52	4	9.58	R 4,441.65	R 17,210.17	
	Hand rail	m	0.72	14	26.40	R 1,611.78	R 21,858.23	
	Kick plates	m	0.73	13	2.64	R 610.52	R 8,166.21	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	167	193.17	R 220.28	R 36,712.91	
		Side cladding	m2	4.70	31	0.92	R 202.66	R 6,252.13	
		Floor grating	m2	1.06	9	16.28	R 2,613.70	R 24,076.37	
		Total buiding area	m2	0.00	145	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	0	7.88	R 219.80	R -	R -
		Blinding	m2	0.48	0	20.45	R 84.69	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	8.00	0	0.00	R 13,225.00	R -	
		Mesh	m2	0.50	0	48.38	R 273.36	R -	
		Formwork	m2	0.35	0	7.78	R 222.62	R -	
		Finish to concrete	m2	0.46	0	108.02	R 16.03	R -	
		Movement joints	m	2.57	0	15.71	R 110.25	R -	
		Cast in steel	kg	0.09	0	204.99	R 64.52	R -	
		Grout	m3	72.28	0.000	2.62	R 10,188.24	R -	
		Brickwork	m2	0.25	0	0.17	R 412.00	R -	
		Doors and windows	No	3.00	0	0.28	R 4,577.78	R -	
		Pipework	m	2.93	0	0.22	R 661.07	R -	
		Bolts	kg	0.11	0	0.09	R 64.52	R -	
		Structural steel	t	4.50	0	0.00	R 47,232.14	R -	
		Miscellaneous steel	t	144.21	0	0.00	R 60,113.64	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.76	0	6.28	R 275.80	R -	R -
		Blinding	m2	0.82	0	15.92	R 108.79	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	5.77	0	0.00	R 13,225.00	R -	
		Formwork	m2	0.07	0	5.92	R 292.57	R -	
		Finish to concrete	m2	0.34	0	81.15	R 21.34	R -	
		Movement joints	m	0.46	0	15.43	R 112.25	R -	
		Cast in steel	kg	28.85	0.000	181.80	R 72.74	R -	
		Grout	m3	24.19	0.000	0.79	R 10,825.00	R -	
		Bolts	kg	121.43	0.000	0.16	R 57.47	R -	
		Structural steel	t	43.33	0.000	0.26	R 50,865.38	R -	
		Miscellaneous steel	t	24.14	0.000	0.18	R 73,472.22	R -	
		Brickwork	m2	0.60	0	4.81	R 360.08	R -	
		Roof covering	m2	1.79	0	1.32	R 272.79	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	569	7.10	R 243.94	R 138,742.96	R 4,371,069.92
	Blinding	m2	1.40	446	19.02	R 91.06	R 40,652.70	
	Concrete	m3	0.00	625	0.00	R 1,732.00	R 1,082,500.00	
	Reinforcement	t	5.77	108.319	0.00	R 13,225.00	R 1,432,517.33	
	Formwork	m2	0.20	3,125	7.01	R 247.08	R 772,111.27	
	Movement joint	m	1.86	336	0.13	R 118.06	R 39,672.07	
	Cast in steel	kg	0.15	4,167	14.67	R 61.74	R 257,267.69	
	Bolts	kg	0.39	1,603	214.19	R 76.81	R 123,091.59	
	Chemical anchors	No	7.24	86	0.25	R 322.17	R 27,811.47	
	Miscellaneous steelwork	t	91.86	6.804	172.18	R 52,900.00	R 359,922.71	
	Pre-cast concrete	m3	36.75	17	41.05	R 4,811.11	R 81,821.62	
	Brickwork	m2	8.86	41	0.36	R 363.10	R 14,958.52	
	Total area	m2	0.00	365	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	0	1.69	R 146.35	R -	R -
	Lining	m2	0.82	0	1.50	R 86.60	R -	
	Paving	m2	0.84	0	0.59	R 146.78	R -	
	Pipework	m	28.97	0	0.26	R 562.90	R -	
	Manholes	No	17.25	0	0.11	R 5,117.27	R -	
	Concrete	m3	2.90	0	0.05	R 1,732.00	R -	
	Formwork	m2	0.10	0	5.83	R 297.08	R -	
	Mesh	m2	0.78	0	7.36	R 235.33	R -	
	Reinforcement	t	5.63	0.000	0.14	R 13,225.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	0	5.85	R 296.07	R -	R -
	Blinding	m2	0.92	0	13.72	R 126.24	R -	
	Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
	Reinforcement	t	4.44	0.000	0.00	R 13,225.00	R -	
	Mesh	m2	1.14	0	41.22	R 320.84	R -	
	Formwork	m2	0.15	0	5.63	R 307.64	R -	
	Cast in steel	kg	0.03	0	157.23	R 84.11	R -	
	Miscellaneous steelwork	t	13.35	0.000	0.18	R 73,472.22	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,601,989.59
	Steel	t	8.75	23.086	0.00	R 42,551.00	R 982,320.23	
	Handrail	m	1.45	139	25.58	R 1,663.45	R 231,735.52	
	Grating	m2	1.79	113	15.88	R 2,679.53	R 302,383.17	
	Kick flats	m	1.64	123	75.83	R 561.14	R 69,115.62	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	35	90.17	R 471.90	R 16,435.05	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,976	0.00		R -	R 6,642,179.77
		Steel	t	23.48	126.746	0.00	R 42,551.00	R 5,393,176.15	
		Handrail	m	12.68	235	29.85	R 1,425.49	R 334,563.92	
		Grating	m2	12.33	241	16.37	R 2,599.33	R 627,380.39	
		Kick flats	m	12.52	238	77.41	R 549.68	R 130,659.59	
		Cat ladder	m	94.92	31	8.53	R 4,988.39	R 156,399.71	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	12,422	0.00		R -	R 18,345,576.40
		Steel	t	64.24	193.369	0.00	R 42,551.00	R 8,228,028.05	
		Handrail	m	29.15	426	28.17	R 1,510.51	R 643,688.71	
		Grating	m2	3.70	3,357	15.96	R 2,666.10	R 8,950,899.58	
		Kick flats	m	32.29	385	77.41	R 549.68	R 211,463.87	
		Stair treads	No	217.41	57	91.87	R 463.17	R 26,463.55	
		Cat ladder	m	228.94	54	8.10	R 5,253.21	R 285,032.64	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	22.16	0.000	0.00	R 42,551.00	R -	
		Handrail	m	45.11	0	26.08	R 1,631.56	R -	
		Grating	m2	58.13	0	15.86	R 2,682.91	R -	
		Kick flats	m	42.58	0	77.41	R 549.68	R -	
		Cat ladder	m	19.44	0	8.11	R 5,246.73	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	157	0.00		R -	R 1,043,876.44
		Steel	t	13.69	11.468	0.00	R 42,551.00	R 487,984.44	
		Handrail	m	1.04	151	26.86	R 1,584.18	R 239,149.83	
		Grating	m2	1.91	82	15.68	R 2,713.71	R 223,064.26	
		Kick flats	m	1.08	145	76.30	R 557.68	R 81,070.18	
		Stair treads	No	5.57	28	95.13	R 447.29	R 12,607.73	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	11.98	0.000	0.00	R 42,551.00	R -	
		Handrail	m	22.00	0	26.10	R 1,630.31	R -	
		Grating	m2	7.32	0	15.97	R 2,664.43	R -	
		Kick flats	m	22.59	0	78.04	R 545.25	R -	
		Cat ladder	m	18.87	0	8.22	R 5,176.52	R -	
	PIPING INSTALLATION	Pipe length	m	0.00	124,552	0.00		R -	R 165,654,160.00
		Total work units	WU	0.30	415,173	0.00	R 399.00	R 165,654,160.00	
		Pipe supports	kg	2.49	50,021	0.00		R -	
		WU for pipe supports	WU	0.16	66,428	0.00		R -	
		Number of welds	No	0.56	69,749	0.00		R -	
		Total fittings	No	0.39	48,575	0.00		R -	
		Stud bolts	No	0.35	17,001	0.00		R -	
		Support number	No	0.19	9,504	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	415,173	0.00	R 399.00		R 539,744.81

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	7,467	5.52	R 72.28	R 539,744.81	
DYE PENETRATION	Total work units	WU	0.00	415,173	0.00	R 399.00		R 333,016.63
TESTING (DP)	Number of examinations	No	164.17	2,529	3.03	R 131.68	R 333,016.63	
MAGNETIC PARTICLE	Total work units	WU	0.00	415,173	0.00	R 399.00		R 320,057.34
TESTING (MPI)	Number of examinations	No	273.85	1,516	1.89	R 211.11	R 320,057.34	
POST WELD HEAT	Total work units	WU	0.00	415,173	0.00	R 399.00		R 548,187.90
TREATMENT	Number of examinations	No	46.49	8,930	6.50	R 61.38	R 548,187.90	
MATERIAL HARDNESS	Total work units	WU	0.00	415,173	0.00	R 399.00		R 649,834.65
TEST (HT)	Number of examinations	No	106.66	3,892	2.39	R 166.95	R 649,834.65	
MECHANICAL	Total work units	WU	0.00	415,173	0.00	R 399.00		R 960,238.27
INSTALLATION	Mechanical equipment	t	236.32	1,757	0.73	R 546.58	R 960,238.27	
	Structural steel	t	192.98	2,151	54.54			
	Total work units	WU	0.00	415,173	0.00	R 399.00		R 12,199,781.92
PAINTING & INSULATION	Painting to piping	m2	16.80	24,713	0.32	R 169.79	R 4,195,900.71	
	Insulation to piping	m2	48.21	8,612	2.35	R 530.59	R 4,569,275.82	
	Mechanical equipment received	t	0.00	1,757	0.81	R 546.58	R 960,238.27	
	Painting to mechanical equipment	m2	0.23	7,638	3.37	R 162.19	R 1,238,857.26	
	Insulation to mechanical equipment	m2	0.67	2,622	1.16	R 471.19	R 1,235,509.86	
ELECTRICAL &	Electrical cable	m	22.74	75,442	0.00	R 69.00	R 5,205,498.00	R 14,804,340.10
INSTRUMENTATION -	Electrical cable terminations	No	276.76	3,318	0.38	R 181.58	R 602,404.53	
INSTALLATION ONLY	Electrical equipment	No	8.25	273	0.10	R 690.00	R 188,087.08	
	DB's	No	5.97	33	0.28	R 2,464.29	R 81,422.98	
	Rack	m	0.59	12,637	1.65	R 215.63	R 2,724,820.98	
	Support steel	kg	1.34	21,418	1.99	R 34.67	R 742,647.74	
	Instrumentation cable	m	23.73	65,112	0.32	R 28.50	R 1,855,692.00	
	Instruments	No	0.44	2,744	0.16	R 178.13	R 488,751.58	
	Hook-ups	No	3.69	6,236	0.15	R 190.00	R 1,184,852.32	
	Light fittings	No	9.97	1,006	0.02	R 431.25	R 433,775.83	
	Conduit	m	3.99	7,567	0.11	R 41.82	R 316,434.03	
	Instrument stands	No	0.00	688		R 1,425.00	R 979,953.04	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project D				
Location:	South Africa				
Client:				Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	24,553	R	6.25
2	Concrete demolitions	m3	45	R	1,788.00
3	Bulk excavation	m3	12,664	R	62.00
4	Vertical piles	No	352		
5	Raking piles	No	45		
6	Concrete in piles	m3		R	1,732.00
7	Auger pile	m		R	325.00
8	Total paving and asphalt to road works	m2	5,547		
9	Grey paving to road works	m2	452	R	142.00
10	Asphalt to road surface	m2	5,095		
11	Rip bed of road works	m2	5,547	R	14.55
12	Total concrete in paving and bunding	m3	558	R	1,732.00
13	Concrete in paving	m3	375		
14	Rod reinforcement	t		R	13,225.00
15	Concrete in plinths and bases on area finishing	m3	423		
16	Stormwater pipe to drain surface run-off	m	455		
17	Machine excavation	m3		R	75.00
18	Concrete in pump and pipe support bases	m3	285	R	1,732.00
19	Concrete in tank bases	m3	242	R	1,732.00
20	Concrete in pipe and cable rack foundations	m3	345	R	1,732.00
21	Concrete to simple structural foundations	m3	365	R	1,732.00
22	Complex structural foundations - bases	m3	125	R	1,732.00
23	Concrete pipe racks - bases	m3	245	R	1,732.00
24	Concrete structure including concrete columns and beams - bases	m3	425	R	1,732.00
25	Major equipment bases with blast proof walls - bases	m3	62	R	1,732.00
26	Major equipment bases and elevated concrete structure - bases	m3	112	R	1,732.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	425	R	1,732.00
28	One brick wall	m2		R	412.00
29	Concrete in structual steel buildings - all concrete	m3	136	R	1,732.00
30	Total building area - Structural steel buildings	m2	1,554		
31	Ceiling	m2		R	285.00
32	Structural steel	t		R	42,551.00
33	Steel canopy - concrete	m3	175	R	1,732.00
34	Steel canopy - area	m2	145		
35	Concrete in weighbridge - all concrete	m3	0	R	1,732.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,732.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	625	R	1,732.00
41	Total cooling tower area	m2	365		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,732.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	2,976		
47	Total volume of steel complex steel structure	m3	12,422		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	157		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	399.00
52	Total process pipe length	m	124,552		
53	Total electrical cable - installation only	m	75,442	R	69.00
54	Total instrumentation cable - installation only	m	65,112	R	46.50

Ratio: Variable ratio

Variables

Material	Complex	Mean
Labour	Simple	Mean
Engineering design	Simple	Mean
Current economic conditions	Good	Mean
Current economic factors	Good	Mean
Level of scope definition	Good	Mean
Rework	Little	Mean
Scope change	Normal	Mean
Weather	Good	Mean
Access	Good	Mean
Project size	Large	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project D			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 90,350,585.53
A	SITE CLEARANCE AND DEMOLITIONS		R	233,916.25	
B	BULK EARTHWORKS		R	1,646,727.66	
C	PILING		R	12,894,814.77	
D	ROAD WORKS		R	3,511,341.72	
E	GENERAL PAVING AND BUNDED AREAS		R	2,214,736.25	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	2,638,555.20	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	2,111,698.11	
H	TANK BASES AND BUNDING		R	4,163,477.34	
I	RACK FOUNDATIONS		R	3,078,116.86	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	3,921,274.16	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	894,871.03	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	3,477,164.45	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	6,509,655.80	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	426,202.34	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,974,889.25	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	6,101,508.19	
Q	BUILDINGS - STEEL		R	5,327,817.53	
R	CANOPIES - STEEL		R	1,399,646.58	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	4,399,946.15	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	23,424,225.88	
	STRUCTURAL STEEL				R 33,537,363.55
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,437,873.20	
B	STRUCTURAL STEEL - PIPERACK		R	5,820,059.80	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	15,815,076.75	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	882,249.93	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	9,582,103.87	
	MECHANICAL AND PIPING				R 204,724,144.26
A	PIPING INSTALLATION		R	144,047,095.65	
B	RADIOGRAPHIC EXAMINATION (RT)		R	419,020.22	
C	DYE PENETRATION TESTING (DP)		R	214,507.71	
D	MAGNETIC PARTICLE TESTING (MPI)		R	225,348.04	
E	POST WELD HEAT TREATMENT		R	365,450.63	
F	MATERIAL HARDNESS TEST (HT)		R	258,533.53	
H	MECHANICAL INSTALLATION		R	701,575.84	
	Preliminaries and General	40.00%	R	58,492,612.65	
	PAINTING AND INSULATION				R 11,373,635.76
A	PAINTING AND INSULATION		R	8,424,915.37	
	Preliminaries and General	35.00%	R	2,948,720.38	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 17,428,836.20
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	12,910,249.04	
	Preliminaries and General	35.00%	R	4,518,587.16	

TOTAL COST	R	357,414,565.30

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		24,553		R 6.25	R 153,456.25	R 233,916.25
	Concrete demolitions	m3		45		R 1,788.00	R 80,460.00	
BULK EARTHWORKS	Bulk excavation	m3		12,664		R 62.00	R 785,168.00	R 1,646,727.66
	Trimming of sides	m2	2.17	5,838	4.46	R 13.91	R 81,206.22	
	Back fill and compact	m3	1.15	11,046	1.00	R 62.04	R 685,371.30	
	Overhaul	m3/km	1.68	7,538	11.24	R 5.52	R 41,580.24	
	Rip bed	m2	1.77	7,169	8.32	R 7.45	R 53,401.91	
PILING	Site establishment of rig	Item	0.00	1	195.08	R 337,879.80	R 337,879.80	R 12,894,814.77
	EO for raking equipment	Item	0.00	1	24.03	R 41,617.49	R 41,617.49	
	Number of piles	No	0.00	352	0.00		R -	
	Move rig to new position	No	1.53	229	0.18	R 308.05	R 70,673.34	
	Number of raking piles	No	18.41	19	0.00		R -	
	EO for setting up raking piles	No	0.96	20	0.28	R 492.38	R 9,859.52	
	EO for raking drilling	m	0.16	122	0.90	R 293.43	R 35,870.93	
	Auger quantity	m	0.05	7,142	0.00	R 325.00	R 2,321,159.42	
	EO for drilling in coarse gravel	m	0.53	663	0.22	R 374.85	R 248,624.75	
	EO for drilling in boulders	m	1.87	189	0.51	R 875.90	R 165,190.25	
	EO for drilling in soft rock	m	1.61	219	0.24	R 418.15	R 91,463.13	
	Temporary casings	m	0.35	1,008	0.37	R 642.08	R 647,066.70	
	EO casing to raking pile	m	0.19	101	0.51	R 1,569.93	R 159,206.89	
	Mild steel rod reinforcement	t	14.42	24.411	0.91	R 11,606.30	R 283,316.06	
	High tensile rod reinforcement	t	1.32	267.245	7.39	R 12,804.43	R 3,421,921.04	
	Concrete to piles and bases	m3	0.15	2,292	0.00	R 1,732.00	R 3,969,905.12	
	Concrete to raking piles	m3	0.07	268	1.06	R 1,833.45	R 490,854.04	
	Site establishment of test equipment	Item	0.00	1	112.96	R 195,644.25	R 195,644.25	
	Load test to pile	No	102.91	3	26.68	R 46,211.00	R 158,057.59	
	Site establishment of intergity testing	No	269.92	1	49.12	R 85,074.60	R 110,945.53	
	Integrity testing of piles	No	1.24	284	0.28	R 477.54	R 135,558.93	
ROAD WORKS	Red paving	m2	0.14	65	0.96	R 136.22	R 8,795.83	R 3,511,341.72
	Grey paving	m2	0.00	452	0.00	R 142.00	R 64,184.00	
	Kerbing	m	0.13	713	0.00	R 303.88	R 216,723.32	
	Total paving and asphalt	m2	0.00	5,547	0.00		R -	
	Remove top soil	m3	0.55	761	5.79	R 84.21	R 64,112.34	
	Asphalt	m2	0.25	1,379	0.00	R 203.37	R 280,415.06	
	Rip bed	m2	0.00	5,547	0.00	R 14.55	R 80,708.85	
	Reduce levels	m3	0.40	2,215	4.89	R 71.13	R 157,538.57	
	Selected fill	m3	1.57	1,408	0.49	R 144.53	R 203,519.69	
	Imported fill	m3	2.35	598	0.39	R 370.59	R 221,724.89	
	Wearing course	m3	3.84	578	0.22	R 328.65	R 189,804.69	
	Prime	m2	4.88	6,876	1.41	R 54.00	R 371,294.04	
	Three line road marking	m	0.83	5,727	0.15	R 44.28	R 253,572.61	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.03	733	4.14	R 12.37	R 9,069.54	
		1m Wide concrete V-drain	m	1.03	734	0.82	R 1,357.26	R 996,327.21	
		200mm Diameter PVC pipe	m	1.00	712	0.09	R 444.32	R 316,201.43	
		Road marking - STOP	No	0.17	118	0.04	R 465.59	R 55,025.61	
		Standard signage	No	0.01	7	4.47	R 587.14	R 4,187.40	
		100mm Painted line	m	2.02	1,441	1.46	R 12.59	R 18,136.65	
				0.00		1.53			
				0.00		1.93			
				0.00		0.04			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.92	375	0.73	R 1,732.00	R 649,500.00	R 2,214,736.25
		Concrete in plinths	m3	0.00	76	0.00	R 1,732.00	R 132,050.54	
		Total concrete	m3	0.00	558	0.00		R -	
		Rip and compact	m2	0.13	2,838	190.89	R 9.07	R 25,748.52	
		Formwork to plinth	m2	7.03	536	0.12	R 207.84	R 111,454.43	
		Formwork to slab	m2	0.82	309	0.15	R 253.61	R 78,258.12	
		High tensile steel	t	0.01	5.979	0.00	R 13,225.00	R 79,066.61	
		Mesh	m2	572.87	3,425	49.47	R 267.32	R 915,557.11	
		Construction joint	m	3.92	1,471	0.05	R 82.89	R 121,957.21	
		Expansion joint	m	2.16	809	0.07	R 124.95	R 101,143.72	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	13.10	8,385	0.00		R -	R 2,638,555.20
		Base excavation	m3	1.58	939	0.00	R 75.00	R 70,388.27	
		Backfill	m3	0.58	593	0.67	R 111.70	R 66,290.44	
		Working space	m2	0.45	1,624	1.42	R 78.90	R 128,145.80	
		Concrete in bases	m3	0.04	423	24.73	R 1,732.00	R 732,636.00	
		Blinding	m2	0.82	580	20.50	R 84.47	R 49,010.31	
		Concrete in sump walls	m3	0.10	41	29.27	R 1,732.00	R 71,693.67	
		Concrete in slabs	m3	0.02	8	0.93	R 1,732.00	R 14,652.72	
		Total concrete	m3	0.00	473	0.04		R -	
		Wood float	m2	0.71	662	154.24	R 11.23	R 7,433.71	
		Formwork to bases	m2	1.69	715	0.12	R 211.55	R 151,295.69	
		Formwork to sump walls	m2	12.77	529	0.12	R 212.79	R 112,485.46	
		Formwork to sides of slab	m2	5.70	48	0.18	R 308.05	R 14,843.55	
		Mild steel reinforcement	t	0.13	5.496	0.00	R 13,225.00	R 72,690.97	
		High tensile reinforcement	t	10.82	43.722	1.21	R 13,225.00	R 578,223.62	
		Cast in steel	kg	0.47	910	34.05	R 50.87	R 46,275.87	
		Waterstop	m	0.42	98	8.08	R 214.32	R 21,015.18	
		Manhole	No	0.09	39	2.67	R 5,302.39	R 206,793.37	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	455	0.12	R 647.65	R 294,680.56	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	481	0.05	R 75.00	R 36,047.41	R 2,111,698.11
		Working space	m2	0.38	1,265	0.67	R 50.04	R 63,286.24	
		Backfill	m3	4.33	111	1.38	R 103.71	R 11,521.84	
		Concrete bases	m3	1.01	285	0.00	R 1,732.00	R 493,620.00	
		Concrete plinth	m3	2.36	121	0.00	R 1,732.00	R 209,287.70	
		Total concrete	m3	0.00	406	0.00		R -	
		Wood float	m2	0.46	264	0.06	R 17.32	R 4,578.17	
		Blinding	m2	1.01	282	0.01	R 96.50	R 27,229.39	
		Formwork bases	m2	0.52	547	0.13	R 227.63	R 124,589.96	
		Formwork plinth	m2	0.57	212	0.12	R 209.08	R 44,267.36	
		High tensile reinforcement	t	9.39	43.240	7.30	R 13,225.00	R 571,845.58	
		Cast in steel	kg	0.11	3,813	0.03	R 51.96	R 198,135.06	
		HD Bolts	kg	0.08	5,360	0.03	R 53.20	R 285,141.80	
		Grout	m3	33.09	3.652	6.66	R 11,541.31	R 42,147.59	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.62	1,360	0.05	R 86.60	R 117,779.46	R 4,163,477.34
		Working space	m2	4.32	315	1.65	R 52.46	R 16,535.48	
		Backfill	m3	1.44	944	0.75	R 115.91	R 109,472.10	
		Concrete bases	m3	0.80	242	0.00	R 1,732.00	R 419,144.00	
		Concrete sump wall	m3	3.05	79	0.00	R 1,732.00	R 137,424.26	
		Concrete slab	m3	0.60	406	0.00	R 1,732.00	R 703,599.04	
		Concrete plinth	m3	4.25	57	21.49	R 1,732.00	R 98,539.31	
		Concrete column	m3	20.36	12	164.92	R 1,732.00	R 20,585.92	
		Total concrete	m3	0.00	796	1.11		R -	
		Blinding	m2	2.77	287	1.09	R 80.60	R 23,159.58	
		Wood float	m2	0.25	3,195	1.13	R 10.50	R 33,549.18	
		Formwork to bases	m2	0.44	545	1.12	R 223.24	R 121,595.96	
		Formwork to plinths	m2	0.37	156	7.76	R 221.52	R 34,461.98	
		Formwork to columns	m2	0.13	95	7.82	R 239.70	R 22,791.84	
		Formwork to sumps	m2	0.11	703	7.23	R 236.66	R 166,382.65	
		Formwork to slabs	m2	4.01	101	7.32	R 209.09	R 21,181.82	
		Formwork to slabs n/e 300mm	m	2.13	190	8.28	R 76.60	R 14,580.49	
		Mild steel reinforcement	t	0.22	7.641	22.61	R 13,225.00	R 101,057.66	
		High tensile reinforcement	t	23.08	34.510	1.07	R 13,225.00	R 456,389.43	
		Mesh	m2	0.16	2,528	63.82	R 207.23	R 523,813.07	
		Cast in items	kg	0.20	3,968	220.28	R 60.04	R 238,208.06	
		HD Bolts	kg	0.10	8,320	199.98	R 66.13	R 550,237.47	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	208.94	3.811	0.17	R 10,145.61	R 38,669.44	
		Construction joint	m	0.30	1,364	25.24	R 68.63	R 93,608.20	
		Expansion joint	m	0.44	928	15.96	R 108.55	R 100,710.92	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.72	1,283	0.05	R 91.55	R 117,493.44	R 3,078,116.86
		Working space	m2	0.45	2,870	2.30	R 210.76	R 604,922.28	
		Backfill	m3	2.64	487	0.95	R 96.29	R 46,850.29	
		Blinding	m2	0.38	904	22.29	R 77.70	R 70,281.93	
		Concrete bases	m3	6.01	345	0.00	R 1,732.00	R 597,540.00	
		Concrete plinth	m3	0.00	57	0.00	R 1,732.00	R 99,412.48	
		Total concrete	m3	0.00	402	1.36		R -	
		Wood float	m2	0.36	970	169.00	R 10.25	R 9,940.04	
		Formwork bases	m2	0.49	707	9.97	R 173.65	R 122,798.34	
		Formwork plinths	m2	0.09	609	7.04	R 245.87	R 149,678.02	
		High tensile reinforcement	t	9.14	44.043	0.00	R 13,225.00	R 582,471.25	
		HD Bolts	kg	0.03	11,780	244.35	R 54.12	R 637,610.56	
		Grout	m3	83.54	4.130	0.18	R 9,471.88	R 39,118.23	
		Restricted excavation	m3	4.20	1,532	0.05	R 94.02	R 144,014.47	R 3,921,274.16
	SIMPLE STRUCTURAL FOUNDATIONS	Working space	m2	0.49	3,126	1.80	R 52.17	R 163,087.57	
		Backfill	m3	2.68	572	0.82	R 115.37	R 65,987.42	
		Blinding	m2	0.34	1,060	21.31	R 81.27	R 86,157.81	
		Concrete bases	m3	0.00	365	0.00	R 1,732.00	R 632,180.00	
		Concrete plinth	m3	2.62	103	0.00	R 1,732.00	R 178,043.05	
		Concrete slab	m3	3.55	139	0.00	R 1,732.00	R 241,092.89	
		Total concrete	m3	0.00	607	0.00		R -	
		Wood float	m2	0.55	1,109	156.69	R 11.05	R 12,262.96	
		Formwork bases	m2	0.50	732	8.33	R 207.91	R 152,205.77	
		Formwork plinths	m2	0.11	941	8.48	R 204.28	R 192,149.36	
		High tensile reinforcement	t	13.35	45.468	0.00	R 13,225.00	R 601,311.87	
		HD Bolts	kg	0.02	16,484	219.22	R 60.33	R 994,440.86	
		Cast in items	kg	0.05	7,097	234.59	R 56.38	R 400,114.09	
		Grout	m3	67.26	5.427	0.16	R 10,729.20	R 58,226.05	
		Restricted excavation	m3	2.05	256	0.05	R 94.02	R 24,034.59	R 894,871.03
	COMPLEX STRUCTURAL FOUNDATIONS	Working space	m2	0.54	470	1.59	R 59.24	R 27,858.91	
		Backfill	m3	2.09	122	0.79	R 119.56	R 14,642.84	
		Blinding	m2	0.63	197	19.32	R 89.65	R 17,688.35	
		Concrete bases	m3	0.00	125	0.00	R 1,732.00	R 216,500.00	
		Concrete column	m3	27.71	5	0.00	R 1,732.00	R 7,814.07	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	5.45	23	0.00	R 1,732.00	R 39,709.16	
		Total concrete	m3	0.00	152	0.00		R -	
		Wood float	m2	0.60	253	156.10	R 11.10	R 2,812.28	
		Formwork bases	m2	0.53	237	8.13	R 213.15	R 50,475.42	
		Formwork plinths	m2	0.33	70	7.38	R 234.71	R 16,413.14	
		Formwork to columns	m2	0.29	16	8.16	R 212.20	R 3,342.39	
		High tensile reinforcement	t	8.92	17.087	0.00	R 13,225.00	R 225,972.47	
		HD bolts	kg	0.04	3,680	209.21	R 63.21	R 232,601.22	
		Grout	m3	109.96	1.386	0.16	R 10,825.00	R 15,006.19	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.77	678	0.06	R 101.45	R 68,810.63	R 3,477,164.45
		Working space	m2	0.31	2,224	2.18	R 46.44	R 103,287.14	
		Backfill	m3	2.17	312	0.83	R 121.80	R 37,998.67	
		Blinding	m2	0.70	352	20.37	R 85.03	R 29,944.87	
		Concrete bases	m3	0.00	245	0.00	R 1,732.00	R 424,340.00	
		Concrete column	m3	1.21	217	147.60	R 1,732.00	R 376,603.02	
		Concrete beam	m3	2.64	82	0.95	R 1,732.00	R 142,498.44	
		Total concrete	m3	2.98	545	0.95		R -	
		Wood float	m2	0.47	518	7.59	R 11.73	R 6,079.86	
		Formwork bases	m2	0.48	507	6.43	R 228.09	R 115,730.87	
		Formwork to columns	m2	0.15	1,471	7.82	R 221.38	R 325,564.05	
		Formwork to sides beams	m2	0.35	236	6.04	R 269.39	R 63,585.14	
		Formwork to soffits beams	m2	0.70	118	6.43	R 286.92	R 33,966.07	
		Formwork corbels	m2	11.31	19	5.50	R 314.79	R 6,049.57	
		High tensile reinforcement	t	8.86	61.495	0.00	R 13,225.00	R 813,268.74	
		Cast in steel	kg	0.03	18,157	268.29	R 49.29	R 895,031.19	
		HD bolts	kg	1.45	375	214.75	R 61.58	R 23,111.50	
		Grout	m3	517.44	1.053	0.16	R 10,729.20	R 11,294.70	
		Restricted excavation	m3	3.87	1,644	0.05	R 94.02	R 154,558.47	R 6,509,655.80
		Working space	m2	0.57	2,866	1.73	R 54.30	R 155,632.65	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.19	1,386	0.81	R 115.57	R 160,220.12	
		Blinding	m2	0.60	710	19.05	R 90.91	R 64,547.14	
		Concrete bases	m3	0.00	425	0.93	R 1,732.00	R 736,100.00	
		Concrete column	m3	2.27	187	1.03	R 1,732.00	R 323,865.49	
		Concrete beam	m3	0.92	204	1.01	R 1,732.00	R 352,849.56	
		Concrete surface slab	m3	1.71	249	0.95	R 1,732.00	R 431,188.28	
		Concrete wall	m3	2.60	72	1.03	R 1,732.00	R 124,392.78	
		Concrete elevated slab	m3	1.15	163	0.00	R 1,732.00	R 281,622.17	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total concrete	m3	0.00	1,299	0.00		R -	
	Wood float	m2	0.64	2,019	167.17	R 10.36	R 20,914.33	
	Formwork bases	m2	0.40	1,051	7.43	R 233.06	R 245,005.66	
	Formwork to columns	m2	0.18	1,056	6.27	R 276.33	R 291,690.27	
	Formwork to sides beams	m2	0.28	720	5.19	R 333.72	R 240,356.06	
	Formwork to soffits beams	m2	0.82	250	7.85	R 220.64	R 55,055.63	
	Formwork to soffts of slabs	m2	0.29	861	3.29	R 295.17	R 254,015.63	
	Formwork to pockets	m2	27.04	7	5.87	R 525.99	R 3,637.93	
	Formwork wall	m2	0.13	535	8.16	R 212.20	R 113,490.94	
	High tensile reinforcement	t	8.88	146.376	0.00	R 13,225.00	R 1,935,822.26	
	Cast in steel	kg	0.23	5,755	269.02	R 49.16	R 282,935.81	
	HD bolts	kg	0.42	3,072	206.90	R 63.92	R 196,368.66	
	Steel handrailing	m	2.61	56	10.25	R 1,290.33	R 72,286.34	
	Grout	m3	1,014.63	1.280	0.17	R 10,231.22	R 13,099.62	
MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.28	48	0.04	R 75.47	R 3,655.37	R 426,202.34
	Working space	m2	8.69	6	1.54	R 49.07	R 273.55	
	Backfill	m3	4.40	11	0.68	R 50.94	R 561.22	
	Blinding	m2	1.21	51	20.35	R 85.10	R 4,360.43	
	Concrete bases	m3	0.00	62	0.00	R 1,732.00	R 107,384.00	
	Concrete column	m3	31.74	2	0.00	R 1,732.00	R 3,382.93	
	Concrete beam	m3	1.40	1	0.00	R 1,732.00	R 2,422.56	
	Concrete wall	m3	11.50	5	0.00	R 1,732.00	R 9,335.42	
	Concrete elevated slabs	m3	11.06	0	0.00	R 1,732.00	R 305.85	
	Total concrete	m3	0.00	71	0.00		R -	
	Wood float	m2	0.91	78	150.16	R 11.53	R 900.34	
	Formwork bases	m2	9.87	6	7.79	R 222.36	R 1,397.48	
	Formwork to columns	m2	0.15	13	6.11	R 250.03	R 3,302.91	
	Formwork to sides beams	m2	0.18	8	5.19	R 283.70	R 2,170.09	
	Formwork to soffits beams	m2	0.58	2	6.93	R 333.63	R 809.55	
	Formwork to soffts of slabs	m2	0.14	1	3.37	R 332.48	R 434.91	
	Formwork to pockets	m2	471.21	0	5.21	R 513.73	R 67.59	
	Formwork wall	m2	0.11	48	6.64	R 260.70	R 12,610.60	
	High tensile reinforcement	t	4.36	16.258	0.00	R 13,225.00	R 215,008.22	
	Cast in steel	kg	0.17	430	213.91	R 61.82	R 26,572.78	
	HD bolts	kg	0.24	298	179.73	R 73.58	R 21,939.24	
	Galvanised grating	m2	18.97	4	0.17	R 2,293.16	R 8,572.88	
	Grout	m3	871.08	0.071	5.77	R 10,318.30	R 734.41	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.56	175	0.05	R 87.84	R 15,382.04	R 1,974,889.25
	Working space	m2	0.43	405	1.83	R 47.94	R 19,427.96	
MAJOR EQUIPMENT	Backfill	m3	2.14	82	0.83	R 105.83	R 8,668.76	
BASES AND ELEVATED	Blinding	m2	4.96	23	21.47	R 80.67	R 1,821.92	
CONCRETE STRUCTURE	Concrete bases	m3	0.00	112	0.00	R 1,732.00	R 193,984.00	
	Concrete column	m3	6.98	16	0.00	R 1,732.00	R 27,808.48	
	Concrete beam	m3	1.95	8	0.00	R 1,732.00	R 14,276.45	
	Concrete wall	m3	36.33	3	0.00	R 1,732.00	R 5,338.87	
	Concrete elevated slabs	m3	24.83	1	0.00	R 1,732.00	R 1,119.86	
	Total concrete	m3	0.00	140	0.00		R -	
	Wood float	m2	4.96	23	163.88	R 10.57	R 238.51	
	Formwork bases	m2	1.55	72	8.62	R 200.88	R 14,535.16	
	Formwork to columns	m2	0.14	112	7.02	R 251.59	R 28,275.90	
	Formwork to sides beams	m2	0.24	35	6.37	R 246.65	R 8,573.15	
	Formwork to soffits beams	m2	0.74	11	6.88	R 271.78	R 3,012.75	
	Formwork to soffts of slabs	m2	0.21	3	3.90	R 277.18	R 847.65	
	Formwork to pockets	m2	3.26	34	6.25	R 443.78	R 15,246.34	
	Formwork wall	m2	0.30	10	7.38	R 234.76	R 2,423.65	
	High tensile reinforcement	t	7.29	19.218	0.00	R 13,225.00	R 254,152.48	
	Cast in steel	kg	0.02	6,760	220.16	R 60.07	R 406,076.37	
	HD bolts	kg	0.01	9,802	201.97	R 65.48	R 641,825.78	
	Galvanised grating	m2	4.01	35	0.20	R 8,785.51	R 306,622.36	
	Grout	m3	44.08	2.541	6.42	R 2,058.59	R 5,230.80	
BUILDINGS - CONCRETE	Excavations	m3	1.84	782	0.05	R 92.79	R 72,530.26	R 6,101,508.19
FRAME	Working space	m2	2.44	320	1.88	R 49.41	R 15,810.97	
	Backfill	m3	1.29	607	0.81	R 115.26	R 69,960.95	
	Blinding	m2	3.99	107	20.37	R 85.03	R 9,064.87	
	Concrete	m3	0.00	425	0.00	R 1,732.00	R 736,100.00	
	Mesh reinforcement	m2	0.57	750	68.21	R 193.89	R 145,477.54	
	Rough formwork	m2	3.08	138	8.22	R 210.65	R 29,080.55	
	Smooth formwork	m2	0.57	752	6.83	R 253.72	R 190,851.17	
	Finish to concrete	m2	0.24	1,792	107.08	R 16.17	R 28,988.01	
	Construction joints	m	5.16	82	21.97	R 78.85	R 6,490.85	
	Movement joints	m	15.65	27	17.23	R 100.54	R 2,730.17	
	Cast in steel	kg	2.36	180	239.41	R 55.24	R 9,963.07	
	Grout	m3	957.33	0.444	0.18	R 9,622.22	R 4,271.70	
	Brick walls	m2	0.52	815	0.00	R 412.00	R 335,808.22	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.23	1,798	0.00		R -	
	Waterproofing membrane	m2	2.10	856	12.06	R 143.58	R 122,936.55	
	Roof construction	m2	2.01	896	38.17	R 346.49	R 310,615.65	
	Ceiling	m2	0.99	1,821	0.00	R 285.00	R 519,119.66	
	Doors and windows	No	473.82	4	0.16	R 2,575.00	R 9,771.53	
	Floor finish	m2	0.99	1,814	0.79	R 522.94	R 948,398.67	
	Wall finsih	m2	1.00	1,797	1.48	R 278.11	R 499,699.63	
	Rod reinforcement	t	9.37	45	0.00	R 13,225.00	R 599,716.10	
	Metalwork	Item	0.00	1	4.43	R 58,558.41	R 58,558.41	
	Structural steel	Item	0.00	1	11.47	R 151,643.52	R 151,643.52	
	Plumbing and drainage	Item	0.00	1	7.30	R 96,542.50	R 96,542.50	
	Small power and lighting	Item	0.00	1	62.20	R 822,566.66	R 822,566.66	
	External works	Item	0.00	1	175.99	R 304,810.97	R 304,810.97	
BUILDINGS - STEEL	Concrete	m3	0.00	136	0.16	R 1,732.00	R 235,552.00	R 5,327,817.53
	Earthworks	m3	2.49	338	8.39	R 206.52	R 69,897.21	
	Reinforcement	t	8.93	15	0.00	R 13,225.00	R 201,362.65	
	Mesh	m2	0.11	1,197	9.58	R 180.82	R 216,529.45	
	Formwork	m2	0.39	353	7.66	R 226.19	R 79,754.34	
	Brickwork	m2	6.14	253	5.75	R 301.48	R 76,249.58	
	Roof covering	m2	0.87	1,797	208.55	R 204.03	R 366,547.30	
	Structural steel	t	19.21	81	0.00	R 42,551.00	R 3,441,666.87	
	Side cladding	m2	1.51	1,027	0.98	R 199.22	R 204,542.56	
	Doors	No	393.98	4	0.51	R 21,609.83	R 85,237.31	
	Ridge ventilator	m	22.66	69	11.34	R 2,314.58	R 158,736.60	
	Aluminium insulation	m2	0.88	1,769	1.88	R 108.40	R 191,741.65	
	Total building area	m2	0.00	1,554	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.82	494	0.11	R 196.71	R 97,123.45	R 1,399,646.58
	Concrete	m3	0.00	175	0.00	R 1,732.00	R 303,100.00	
	Reinforcement	t	12.29	14	0.20	R 13,225.00	R 188,346.51	
	Mesh	m2	0.13	1,339	10.90	R 158.95	R 212,803.47	
	Formwork	m2	0.47	376	8.74	R 198.07	R 74,543.30	
	Brickwork	m2	5.93	24	6.30	R 275.08	R 6,723.73	
	Screed	m2	1.09	134	46.04	R 37.62	R 5,027.95	
	Structural steel	t	15.32	9	0.00	R 42,551.00	R 402,847.36	
	Cat ladders	m	2.53	4	9.54	R 4,460.94	R 16,674.26	
	Hand rail	m	0.69	14	27.42	R 1,551.74	R 21,159.83	
	Kick plates	m	0.73	13	2.66	R 583.83	R 7,586.59	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.93	157	191.68	R 221.99	R 34,798.27	
		Side cladding	m2	4.58	32	0.89	R 197.89	R 6,262.06	
		Floor grating	m2	1.06	9	16.77	R 2,537.65	R 22,649.81	
		Total buiding area	m2	0.00	145	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.23	0	7.64	R 226.57	R -	R -
		Blinding	m2	0.45	0	17.27	R 100.30	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	7.47	0	0.00	R 13,225.00	R -	
		Mesh	m2	0.48	0	50.42	R 262.29	R -	
		Formwork	m2	0.30	0	7.11	R 243.55	R -	
		Finish to concrete	m2	0.42	0	98.58	R 17.57	R -	
		Movement joints	m	2.46	0	14.96	R 115.75	R -	
		Cast in steel	kg	0.08	0	177.72	R 74.42	R -	
		Grout	m3	71.74	0.000	2.45	R 11,886.27	R -	
		Brickwork	m2	0.22	0	0.15	R 412.00	R -	
		Doors and windows	No	2.63	0	0.25	R 4,614.40	R -	
		Pipework	m	2.59	0	0.21	R 707.14	R -	
		Bolts	kg	0.10	0	0.09	R 74.42	R -	
		Structural steel	t	3.86	0	0.00	R 52,450.42	R -	
		Miscellaneous steel	t	128.57	0	0.00	R 62,762.71	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.13	0	5.92	R 292.71	R -	R -
		Blinding	m2	0.73	0	13.89	R 124.70	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	5.61	0	0.00	R 13,225.00	R -	
		Formwork	m2	0.07	0	5.20	R 333.21	R -	
		Finish to concrete	m2	0.30	0	77.81	R 22.26	R -	
		Movement joints	m	0.41	0	11.72	R 147.73	R -	
		Cast in steel	kg	22.64	0.000	149.35	R 88.55	R -	
		Grout	m3	22.23	0.000	0.63	R 13,777.27	R -	
		Bolts	kg	109.21	0.000	0.13	R 55.66	R -	
		Structural steel	t	35.28	0.000	0.21	R 62,130.87	R -	
		Miscellaneous steel	t	19.54	0.000	0.18	R 74,959.51	R -	
		Brickwork	m2	0.46	0	3.90	R 443.62	R -	
		Roof covering	m2	1.37	0	1.19	R 373.23	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.80	502	6.27	R 276.14	R 138,563.94	R 4,399,946.15
	Blinding	m2	1.23	508	16.76	R 103.33	R 52,506.34	
	Concrete	m3	0.00	625	0.00	R 1,732.00	R 1,082,500.00	
	Reinforcement	t	6.02	103.833	0.00	R 13,225.00	R 1,373,190.34	
	Formwork	m2	0.22	2,859	6.33	R 273.59	R 782,315.26	
	Movement joint	m	1.67	374	0.12	R 129.27	R 48,399.26	
	Cast in steel	kg	0.14	4,397	13.40	R 61.16	R 268,897.87	
	Bolts	kg	0.39	1,617	216.25	R 74.05	R 119,765.08	
	Chemical anchors	No	6.76	93	0.25	R 341.68	R 31,607.01	
	Miscellaneous steelwork	t	88.82	7.037	178.60	R 53,979.59	R 379,853.65	
	Pre-cast concrete	m3	33.20	19	38.71	R 5,587.10	R 105,192.36	
	Brickwork	m2	8.28	44	0.31	R 389.03	R 17,155.02	
	Total area	m2	0.00	365	4.45		R -	
EMERGENCY DAM	Earthworks	m3	0.54	0	1.48	R 105.99	R -	R -
	Lining	m2	0.64	0	1.05	R 71.75	R -	
	Paving	m2	0.65	0	0.50	R 143.10	R -	
	Pipework	m	26.68	0	0.22	R 492.98	R -	
	Manholes	No	15.66	0	0.10	R 5,112.42	R -	
	Concrete	m3	2.34	0	0.04	R 1,732.00	R -	
	Formwork	m2	0.08	0	5.94	R 291.79	R -	
	Mesh	m2	0.66	0	6.49	R 266.81	R -	
	Reinforcement	t	4.60	0.000	0.11	R 13,225.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	7.18	0	6.57	R 263.79	R -	R -
	Blinding	m2	0.99	0	16.75	R 103.41	R -	
	Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
	Reinforcement	t	5.08	0.000	0.00	R 13,225.00	R -	
	Mesh	m2	1.01	0	42.34	R 312.38	R -	
	Formwork	m2	0.18	0	6.60	R 262.28	R -	
	Cast in steel	kg	0.03	0	160.60	R 82.35	R -	
	Miscellaneous steelwork	t	13.47	0.000	0.18	R 73,181.82	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,437,873.20
	Steel	t	9.49	21.290	0.00	R 42,551.00	R 905,926.58	
	Handrail	m	1.51	134	29.18	R 1,458.08	R 195,331.88	
	Grating	m2	1.98	102	16.94	R 2,511.97	R 256,271.82	
	Kick flats	m	1.70	119	75.21	R 565.73	R 67,250.33	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.91	29	95.07	R 447.59	R 13,092.58	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,976	0.00		R -	R 5,820,059.80
		Steel	t	26.75	111.240	0.00	R 42,551.00	R 4,733,392.60	
		Handrail	m	13.74	217	31.54	R 1,349.05	R 292,211.42	
		Grating	m2	12.30	242	18.77	R 2,267.49	R 548,812.30	
		Kick flats	m	13.35	223	87.12	R 488.44	R 108,849.27	
		Cat ladder	m	97.89	30	9.46	R 4,499.69	R 136,794.21	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	12,422	0.00		R -	R 15,815,076.75
		Steel	t	78.47	158.294	0.00	R 42,551.00	R 6,735,563.34	
		Handrail	m	31.49	394	31.04	R 1,370.81	R 540,738.23	
		Grating	m2	4.02	3,090	16.31	R 2,608.43	R 8,060,188.71	
		Kick flats	m	33.31	373	80.68	R 527.40	R 196,685.21	
		Stair treads	No	240.80	52	107.93	R 394.26	R 20,338.30	
		Cat ladder	m	241.37	51	8.37	R 5,082.45	R 261,562.95	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	27.04	0.000	0.00	R 42,551.00	R -	
		Handrail	m	49.93	0	31.12	R 1,367.16	R -	
		Grating	m2	63.07	0	17.71	R 2,402.65	R -	
		Kick flats	m	50.16	0	83.85	R 507.49	R -	
		Cat ladder	m	21.67	0	8.46	R 5,027.12	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	157	0.00		R -	R 882,249.93
		Steel	t	16.35	9.602	0.00	R 42,551.00	R 408,593.70	
		Handrail	m	1.07	147	32.37	R 1,314.58	R 192,629.44	
		Grating	m2	1.94	81	17.02	R 2,500.69	R 202,449.84	
		Kick flats	m	1.15	136	84.74	R 502.11	R 68,379.70	
		Stair treads	No	5.99	26	109.40	R 388.96	R 10,197.25	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	12.31	0.000	0.00	R 42,551.00	R -	
		Handrail	m	24.71	0	30.05	R 1,416.17	R -	
		Grating	m2	7.31	0	17.19	R 2,475.75	R -	
		Kick flats	m	22.28	0	82.83	R 513.72	R -	
		Cat ladder	m	20.36	0	8.61	R 4,941.63	R -	
	PIPING INSTALLATION	Pipe length	m	0.00	124,552	0.00		R -	R 144,047,095.65
		Total work units	WU	0.35	361,020	0.00	R 399.00	R 144,047,095.65	
		Pipe supports	kg	2.73	45,623	0.00		R -	
		WU for pipe supports	WU	0.17	60,342	0.00		R -	
		Number of welds	No	0.60	74,731	0.00		R -	
		Total fittings	No	0.38	46,974	0.00		R -	
		Stud bolts	No	0.34	16,038	0.00		R -	
		Support number	No	0.19	8,603	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	361,020	0.00	R 399.00		R 419,020.22

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	56.59	6,380	6.08	R 65.68	R 419,020.22	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	361,020	0.00	R 399.00		R 214,507.71
	Number of examinations	No	163.39	2,210	4.11	R 97.08	R 214,507.71	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	361,020	0.00	R 399.00		R 225,348.04
	Number of examinations	No	297.91	1,212	2.15	R 185.95	R 225,348.04	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	361,020	0.00	R 399.00		R 365,450.63
	Number of examinations	No	53.84	6,705	7.32	R 54.50	R 365,450.63	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	361,020	0.00	R 399.00		R 258,533.53
	Number of examinations	No	116.91	3,088	4.77	R 83.72	R 258,533.53	
MECHANICAL INSTALLATION	Total work units	WU	0.00	361,020	0.00	R 399.00		R 701,575.84
	Mechanical equipment	t	255.96	1,410	0.80	R 497.42	R 701,575.84	
	Structural steel	t	214.62	1,682	55.32			
PAINTING & INSULATION	Total work units	WU	0.00	361,020	0.00	R 399.00		R 8,424,915.37
	Painting to piping	m2	17.77	20,316	0.33	R 146.50	R 2,976,311.00	
	Insulation to piping	m2	51.19	7,052	2.72	R 440.13	R 3,103,963.93	
	Mechanical equipment received	t	0.00	1,410	0.85	R 497.42	R 701,575.84	
	Painting to mechanical equipment	m2	0.25	5,658	3.66	R 135.96	R 769,246.79	
	Insulation to mechanical equipment	m2	0.69	2,038	1.16	R 428.81	R 873,817.81	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.82	75,442	0.00	R 69.00	R 5,205,498.00	R 12,910,249.04
	Electrical cable terminations	No	320.45	2,922	0.45	R 154.81	R 452,336.37	
	Electrical equipment	No	8.90	235	0.11	R 603.75	R 142,139.22	
	DB's	No	6.62	26	0.30	R 2,007.72	R 53,139.07	
	Rack	m	0.66	11,395	1.65	R 190.16	R 2,166,814.64	
	Support steel	kg	1.47	17,228	2.16	R 32.00	R 551,238.33	
	Instrumentation cable	m	26.16	65,112	0.36	R 28.50	R 1,855,692.00	
	Instruments	No	0.65	2,489	0.18	R 158.96	R 395,649.49	
	Hook-ups	No	4.05	3,838	0.17	R 168.35	R 646,067.92	
	Light fittings	No	10.26	954	0.02	R 384.86	R 367,151.19	
	Conduit	m	4.32	7,355	0.13	R 41.95	R 308,510.52	
	Instrument stands	No	0.00	576		R 1,330.00	R 766,012.29	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project D			
Location:	South Africa			
Client:			Date of estimate:	2009

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	24,553	R	6.25
2	Concrete demolitions	m3	45	R	1,788.00
3	Bulk excavation	m3	12,664	R	62.00
4	Vertical piles	No	352		
5	Raking piles	No	45		
6	Concrete in piles	m3		R	1,732.00
7	Auger pile	m		R	325.00
8	Total paving and asphalt to road works	m2	5,547		
9	Grey paving to road works	m2	452	R	142.00
10	Asphalt to road surface	m2	5,095		
11	Rip bed of road works	m2	5,547	R	14.55
12	Total concrete in paving and bunding	m3	558	R	1,732.00
13	Concrete in paving	m3	375		
14	Rod reinforcement	t		R	13,225.00
15	Concrete in plinths and bases on area finishing	m3	423		
16	Stormwater pipe to drain surface run-off	m	455		
17	Machine excavation	m3		R	75.00
18	Concrete in pump and pipe support bases	m3	285	R	1,732.00
19	Concrete in tank bases	m3	242	R	1,732.00
20	Concrete in pipe and cable rack foundations	m3	345	R	1,732.00
21	Concrete to simple structural foundations	m3	365	R	1,732.00
22	Complex structural foundations - bases	m3	125	R	1,732.00
23	Concrete pipe racks - bases	m3	245	R	1,732.00
24	Concrete structure including concrete columns and beams - bases	m3	425	R	1,732.00
25	Major equipment bases with blast proof walls - bases	m3	62	R	1,732.00
26	Major equipment bases and elevated concrete structure - bases	m3	112	R	1,732.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	425	R	1,732.00
28	One brick wall	m2		R	412.00
29	Concrete in structual steel buildings - all concrete	m3	136	R	1,732.00
30	Total building area - Structural steel buildings	m2	1,554		
31	Ceiling	m2		R	285.00
32	Structural steel	t		R	42,551.00
33	Steel canopy - concrete	m3	175	R	1,732.00
34	Steel canopy - area	m2	145		
35	Concrete in weighbridge - all concrete	m3	0	R	1,732.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,732.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	625	R	1,732.00
41	Total cooling tower area	m2	365		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,732.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	2,976		
47	Total volume of steel complex steel structure	m3	12,422		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	157		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	399.00
52	Total process pipe length	m	124,552		
53	Total electrical cable - installation only	m	75,442	R	69.00
54	Total instrumentation cable - installation only	m	65,112	R	46.50

Ratio: Variable ratio

Variables

Material	Complex	Median
Labour	Simple	Median
Engineering design	Simple	Median
Current economic conditions	Good	Median
Current economic factors	Good	Median
Level of scope definition	Good	Median
Rework	Little	Median
Scope change	Normal	Median
Weather	Good	Median
Access	Good	Median
Project size	Large	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Repitition	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project D			
Location:	South Africa			
Client:	0	Date of estimate:	2009	

	CIVIL CONSTRUCTION COST				R 92,471,437.67
A	SITE CLEARANCE AND DEMOLITIONS		R	233,916.25	
B	BULK EARTHWORKS		R	1,667,693.98	
C	PILING		R	13,474,342.66	
D	ROAD WORKS		R	3,022,594.07	
E	GENERAL PAVING AND BUNDED AREAS		R	2,252,964.22	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	2,733,856.72	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	2,144,097.71	
H	TANK BASES AND BUNDING		R	4,417,991.95	
I	RACK FOUNDATIONS		R	3,083,680.20	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	4,041,617.78	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	929,019.93	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	3,471,185.36	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	7,000,498.86	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	423,182.48	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,061,176.68	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	6,345,647.00	
Q	BUILDINGS - STEEL		R	5,568,016.85	
R	CANOPIES - STEEL		R	1,427,877.52	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	4,198,001.03	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	23,974,076.43	
	STRUCTURAL STEEL				R 36,123,775.75
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,585,732.89	
B	STRUCTURAL STEEL - PIPERACK		R	6,542,541.32	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	16,699,299.95	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	975,122.81	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	10,321,078.78	
	MECHANICAL AND PIPING				R 212,526,091.30
A	PIPING INSTALLATION		R	148,982,328.05	
B	RADIOGRAPHIC EXAMINATION (RT)		R	497,840.25	
C	DYE PENETRATION TESTING (DP)		R	279,373.87	
D	MAGNETIC PARTICLE TESTING (MPI)		R	255,460.34	
E	POST WELD HEAT TREATMENT		R	444,509.52	
F	MATERIAL HARDNESS TEST (HT)		R	517,905.45	
H	MECHANICAL INSTALLATION		R	826,933.44	
	Preliminaries and General	40.00%	R	60,721,740.37	
	PAINTING AND INSULATION				R 13,817,974.43
A	PAINTING AND INSULATION		R	10,235,536.62	
	Preliminaries and General	35.00%	R	3,582,437.82	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 18,561,264.36
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	13,749,084.71	
	Preliminaries and General	35.00%	R	4,812,179.65	

TOTAL COST	R 373,500,543.51

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		24,553		R 6.25	R 153,456.25	R 233,916.25
	Concrete demolitions	m3		45		R 1,788.00	R 80,460.00	
BULK EARTHWORKS	Bulk excavation	m3		12,664		R 62.00	R 785,168.00	R 1,667,693.98
	Trimming of sides	m2	2.16	5,877	4.39	R 14.12	R 82,954.29	
	Back fill and compact	m3	1.14	11,116	0.98	R 63.13	R 701,706.14	
	Overhaul	m3/km	1.61	7,866	11.08	R 5.59	R 44,000.44	
	Rip bed	m2	1.71	7,415	8.54	R 7.26	R 53,865.11	
PILING	Site establishment of rig	Item	0.00	1	195.98	R 339,438.60	R 339,438.60	R 13,474,342.66
	EO for raking equipment	Item	0.00	1	24.12	R 41,768.42	R 41,768.42	
	Number of piles	No	0.00	352	0.00		R -	
	Move rig to new position	No	1.53	230	0.19	R 329.08	R 75,709.91	
	Number of raking piles	No	19.18	18	0.00		R -	
	EO for setting up raking piles	No	0.94	20	0.28	R 484.96	R 9,483.07	
	EO for raking drilling	m	0.15	125	0.73	R 238.64	R 29,911.13	
	Auger quantity	m	0.05	7,467	0.00	R 325.00	R 2,426,666.67	
	EO for drilling in coarse gravel	m	0.54	649	0.22	R 379.80	R 246,596.64	
	EO for drilling in boulders	m	1.72	204	0.52	R 905.59	R 184,869.12	
	EO for drilling in soft rock	m	1.60	219	0.24	R 421.87	R 92,562.52	
	Temporary casings	m	0.35	1,016	0.37	R 642.08	R 652,403.33	
	EO casing to raking pile	m	0.18	103	0.56	R 1,208.69	R 124,226.05	
	Mild steel rod reinforcement	t	14.71	23.922	0.70	R 9,397.55	R 224,811.38	
	High tensile rod reinforcement	t	1.17	299.939	7.78	R 13,466.30	R 4,039,070.38	
	Concrete to piles and bases	m3	0.16	2,271	0.00	R 1,732.00	R 3,933,316.13	
	Concrete to raking piles	m3	0.07	249	1.07	R 1,856.95	R 463,235.24	
	Site establishment of test equipment	Item	0.00	1	115.26	R 199,636.51	R 199,636.51	
	Load test to pile	No	100.59	3	23.77	R 41,177.06	R 144,099.25	
	Site establishment of intergity testing	No	268.39	1	49.70	R 86,086.59	R 112,903.44	
	Integrity testing of piles	No	1.21	292	0.26	R 457.74	R 133,634.88	
ROAD WORKS	Red paving	m2	0.14	61	0.94	R 132.87	R 8,150.71	R 3,022,594.07
	Grey paving	m2	0.00	452	0.00	R 142.00	R 64,184.00	
	Kerbing	m	0.10	547	0.00	R 348.49	R 190,543.92	
	Total paving and asphalt	m2	0.00	5,547	0.00		R -	
	Remove top soil	m3	0.52	611	4.70	R 68.44	R 41,824.03	
	Asphalt	m2	0.21	1,169	0.00	R 198.44	R 231,939.23	
	Rip bed	m2	0.00	5,547	0.00	R 14.55	R 80,708.85	
	Reduce levels	m3	0.36	2,009	4.33	R 62.97	R 126,495.19	
	Selected fill	m3	1.44	1,398	0.45	R 140.38	R 196,219.63	
	Imported fill	m3	2.07	674	0.33	R 430.99	R 290,627.21	
	Wearing course	m3	3.91	514	0.19	R 336.48	R 173,093.08	
	Prime	m2	4.49	6,269	1.41	R 46.49	R 291,418.42	
	Three line road marking	m	0.81	5,056	0.11	R 37.59	R 190,020.87	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.00	544	3.97	R 11.45	R 6,229.43	
	1m Wide concrete V-drain	m	1.00	547	0.81	R 1,462.15	R 800,038.91	
	200mm Diameter PVC pipe	m	0.93	508	0.08	R 522.48	R 265,274.08	
	Road marking - STOP	No	0.17	95	0.03	R 539.66	R 51,426.64	
	Standard signage	No	0.01	5	4.20	R 641.22	R 3,506.01	
	100mm Painted line	m	1.86	1,018	1.50	R 10.70	R 10,893.86	
			0.00		1.55			
			0.00		1.84			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.83	375	0.70	R 1,732.00	R 649,500.00	R 2,252,964.22
		Concrete in plinths	m3	0.00	78	0.00	R 1,732.00	R 134,432.29	
		Total concrete	m3	0.00	558	0.00		R -	
		Rip and compact	m2	0.14	2,734	201.49	R 8.60	R 23,504.41	
		Formwork to plinth	m2	6.69	519	0.12	R 199.18	R 103,447.57	
		Formwork to slab	m2	0.80	299	0.14	R 246.19	R 73,725.54	
		High tensile steel	t	0.01	5.979	0.00	R 13,225.00	R 79,066.61	
		Mesh	m2	574.56	3,435	46.30	R 285.62	R 981,113.11	
		Construction joint	m	3.74	1,402	0.05	R 80.41	R 112,737.96	
		Expansion joint	m	2.06	771	0.07	R 123.71	R 95,436.73	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.48	8,281	0.00		R -	R 2,733,856.72
		Base excavation	m3	1.50	966	0.00	R 75.00	R 72,455.14	
		Backfill	m3	0.55	646	0.63	R 119.59	R 77,242.10	
		Working space	m2	0.44	1,747	1.31	R 91.54	R 159,957.32	
		Concrete in bases	m3	0.04	423	23.46	R 1,732.00	R 732,636.00	
		Blinding	m2	0.77	610	19.57	R 88.52	R 54,025.65	
		Concrete in sump walls	m3	0.10	43	30.09	R 1,732.00	R 73,786.91	
		Concrete in slabs	m3	0.02	7	0.89	R 1,732.00	R 12,036.16	
		Total concrete	m3	0.00	473	0.03		R -	
		Wood float	m2	0.64	743	131.67	R 13.15	R 9,767.04	
		Formwork to bases	m2	1.71	722	0.12	R 215.26	R 155,510.96	
		Formwork to sump walls	m2	11.30	481	0.11	R 195.47	R 94,063.71	
		Formwork to sides of slab	m2	5.44	38	0.18	R 303.10	R 11,462.94	
		Mild steel reinforcement	t	0.10	4.769	0.00	R 13,225.00	R 63,070.79	
		High tensile reinforcement	t	9.77	48.382	1.01	R 13,225.00	R 639,848.60	
		Cast in steel	kg	0.45	944	33.19	R 52.18	R 49,286.97	
		Waterstop	m	0.44	97	8.25	R 209.90	R 20,456.29	
		Manhole	No	0.08	38	2.61	R 5,430.02	R 206,476.62	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	455	0.12	R 663.24	R 301,773.52	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.55	440	0.05	R 75.00	R 33,024.38	R 2,144,097.71
		Working space	m2	0.35	1,250	0.70	R 52.29	R 65,378.88	
		Backfill	m3	4.05	109	1.33	R 99.64	R 10,827.66	
		Concrete bases	m3	0.93	285	0.00	R 1,732.00	R 493,620.00	
		Concrete plinth	m3	2.19	130	0.00	R 1,732.00	R 225,030.28	
		Total concrete	m3	0.00	415	0.00		R -	
		Wood float	m2	0.45	286	0.05	R 17.32	R 4,961.30	
		Blinding	m2	0.93	306	0.01	R 91.55	R 27,990.71	
		Formwork bases	m2	0.54	525	0.13	R 216.50	R 113,662.50	
		Formwork plinth	m2	0.56	232	0.12	R 209.08	R 48,569.75	
		High tensile reinforcement	t	9.27	44.767	6.93	R 13,225.00	R 592,042.10	
		Cast in steel	kg	0.10	3,979	0.03	R 49.49	R 196,890.49	
		HD Bolts	kg	0.08	5,532	0.03	R 51.96	R 287,460.11	
		Grout	m3	31.58	4.115	6.26	R 10,848.51	R 44,639.53	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.34	1,292	0.05	R 82.89	R 107,100.92	R 4,417,991.95
		Working space	m2	3.94	328	1.56	R 53.28	R 17,469.82	
		Backfill	m3	1.42	908	0.77	R 107.65	R 97,706.44	
		Concrete bases	m3	0.80	242	0.00	R 1,732.00	R 419,144.00	
		Concrete sump wall	m3	2.87	84	0.00	R 1,732.00	R 146,225.17	
		Concrete slab	m3	0.58	415	0.00	R 1,732.00	R 718,239.41	
		Concrete plinth	m3	3.98	61	20.79	R 1,732.00	R 105,388.22	
		Concrete column	m3	19.69	12	162.93	R 1,732.00	R 21,289.47	
		Total concrete	m3	0.00	814	1.01		R -	
		Blinding	m2	2.57	317	1.10	R 83.32	R 26,383.84	
		Wood float	m2	0.25	3,266	1.07	R 10.63	R 34,722.18	
		Formwork to bases	m2	0.42	576	1.10	R 226.34	R 130,416.01	
		Formwork to plinths	m2	0.36	171	7.65	R 231.09	R 39,608.84	
		Formwork to columns	m2	0.12	105	7.50	R 251.35	R 26,374.53	
		Formwork to sumps	m2	0.10	821	6.89	R 243.48	R 199,848.08	
		Formwork to slabs	m2	3.89	106	7.11	R 215.16	R 22,911.08	
		Formwork to slabs n/e 300mm	m	1.99	208	8.05	R 83.85	R 17,465.86	
		Mild steel reinforcement	t	0.21	7.808	20.66	R 13,225.00	R 103,256.71	
		High tensile reinforcement	t	22.20	36.680	0.99	R 13,225.00	R 485,098.62	
		Mesh	m2	0.15	2,751	59.41	R 222.59	R 612,451.53	
		Cast in items	kg	0.19	4,302	222.15	R 59.53	R 256,084.05	
		HD Bolts	kg	0.09	8,636	197.88	R 66.83	R 577,174.68	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	199.14	4.089	0.16	R 10,729.20	R 43,869.44	
	Construction joint	m	0.29	1,437	24.20	R 71.56	R 102,836.97	
	Expansion joint	m	0.44	952	15.42	R 112.35	R 106,926.08	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.45	1,190	0.05	R 87.84	R 104,569.80	R 3,083,680.20
	Working space	m2	0.40	2,960	2.08	R 182.39	R 539,936.81	
	Backfill	m3	2.57	463	0.94	R 93.09	R 43,062.11	
	Blinding	m2	0.41	840	23.68	R 73.13	R 61,431.78	
	Concrete bases	m3	5.76	345	0.00	R 1,732.00	R 597,540.00	
	Concrete plinth	m3	0.00	60	0.00	R 1,732.00	R 103,791.07	
	Total concrete	m3	0.00	405	1.32		R -	
	Wood float	m2	0.36	953	170.67	R 10.15	R 9,668.05	
	Formwork bases	m2	0.49	699	10.34	R 167.59	R 117,140.34	
	Formwork plinths	m2	0.09	655	6.84	R 253.27	R 166,001.75	
	High tensile reinforcement	t	8.98	45.074	0.00	R 13,225.00	R 596,103.74	
	HD Bolts	kg	0.03	12,075	227.30	R 58.18	R 702,568.77	
	Grout	m3	78.98	4.368	0.18	R 9,584.19	R 41,865.98	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.86	1,409	0.05	R 90.31	R 127,286.86	R 4,041,617.78
	Working space	m2	0.45	3,132	1.69	R 53.48	R 167,514.20	
	Backfill	m3	2.59	545	0.80	R 112.99	R 61,537.70	
	Blinding	m2	0.36	1,016	21.80	R 79.44	R 80,707.86	
	Concrete bases	m3	0.00	365	0.00	R 1,732.00	R 632,180.00	
	Concrete plinth	m3	2.46	109	0.00	R 1,732.00	R 189,073.27	
	Concrete slab	m3	3.34	149	0.00	R 1,732.00	R 257,432.23	
	Total concrete	m3	0.00	623	0.00		R -	
	Wood float	m2	0.54	1,161	145.04	R 11.94	R 13,863.87	
	Formwork bases	m2	0.49	749	8.28	R 209.16	R 156,717.18	
	Formwork plinths	m2	0.11	1,033	8.30	R 208.66	R 215,467.12	
	High tensile reinforcement	t	13.20	47.166	0.00	R 13,225.00	R 623,774.65	
	HD Bolts	kg	0.02	16,484	211.22	R 62.61	R 1,032,084.94	
	Cast in items	kg	0.05	7,300	226.67	R 58.34	R 425,908.48	
	Grout	m3	66.27	5.508	0.16	R 10,542.61	R 58,069.41	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.01	251	0.05	R 94.02	R 23,564.48	R 929,019.93
	Working space	m2	0.50	504	1.56	R 60.11	R 30,301.25	
	Backfill	m3	2.10	120	0.78	R 120.99	R 14,468.55	
	Blinding	m2	0.63	199	19.67	R 88.07	R 17,493.81	
	Concrete bases	m3	0.00	125	0.00	R 1,732.00	R 216,500.00	
	Concrete column	m3	26.52	5	0.00	R 1,732.00	R 8,162.99	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.02	25	0.00	R 1,732.00	R 43,158.19	
	Total concrete	m3	0.00	155	0.00		R -	
	Wood float	m2	0.59	263	158.45	R 10.93	R 2,878.83	
	Formwork bases	m2	0.50	253	7.77	R 222.99	R 56,310.76	
	Formwork plinths	m2	0.31	80	7.16	R 241.92	R 19,312.57	
	Formwork to columns	m2	0.29	17	7.85	R 220.74	R 3,650.33	
	High tensile reinforcement	t	8.71	17.747	0.00	R 13,225.00	R 234,710.29	
	HD bolts	kg	0.04	3,798	208.23	R 63.51	R 241,219.84	
	Grout	m3	100.41	1.540	0.15	R 11,225.93	R 17,288.02	
	Restricted excavation	m3	2.69	659	0.06	R 98.97	R 65,175.16	R 3,471,185.36
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.28	2,364	2.14	R 46.29	R 109,437.67	
	Backfill	m3	2.10	313	0.82	R 120.80	R 37,830.05	
	Blinding	m2	0.69	354	20.89	R 82.92	R 29,353.10	
	Concrete bases	m3	0.00	245	0.00	R 1,732.00	R 424,340.00	
	Concrete column	m3	1.15	212	142.95	R 1,732.00	R 366,552.57	
	Concrete beam	m3	2.47	86	0.87	R 1,732.00	R 148,444.78	
	Total concrete	m3	2.86	542	0.87		R -	
	Wood float	m2	0.44	559	7.41	R 12.12	R 6,768.56	
	Formwork bases	m2	0.47	527	6.34	R 233.78	R 123,176.13	
	Formwork to columns	m2	0.14	1,481	7.50	R 231.09	R 342,343.96	
	Formwork to sides beams	m2	0.34	254	5.84	R 273.03	R 69,409.21	
	Formwork to soffits beams	m2	0.68	125	6.34	R 296.72	R 37,203.23	
	Formwork corbels	m2	10.53	20	5.12	R 338.52	R 6,806.87	
	High tensile reinforcement	t	8.88	61.050	0.00	R 13,225.00	R 807,387.06	
	Cast in steel	kg	0.03	17,658	270.99	R 48.80	R 861,738.90	
	HD bolts	kg	1.44	376	212.61	R 62.20	R 23,404.45	
	Grout	m3	496.96	1.091	0.16	R 10,825.00	R 11,813.66	
	Restricted excavation	m3	3.80	1,613	0.05	R 91.55	R 147,711.99	R 7,000,498.86
	Working space	m2	0.54	2,976	1.69	R 54.03	R 160,810.85	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.17	1,376	0.80	R 114.95	R 158,133.46	
	Blinding	m2	0.61	697	18.61	R 93.05	R 64,832.67	
	Concrete bases	m3	0.00	425	0.87	R 1,732.00	R 736,100.00	
	Concrete column	m3	2.08	204	1.04	R 1,732.00	R 354,137.46	
	Concrete beam	m3	0.91	226	0.96	R 1,732.00	R 390,695.38	
	Concrete surface slab	m3	1.71	249	0.92	R 1,732.00	R 430,467.84	
	Concrete wall	m3	2.35	87	0.98	R 1,732.00	R 150,468.12	
	Concrete elevated slab	m3	1.15	178	0.00	R 1,732.00	R 308,712.60	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,369	0.00		R -	
		Wood float	m2	0.63	2,190	160.16	R 10.81	R 23,682.13	
		Formwork bases	m2	0.39	1,088	7.01	R 247.00	R 268,674.70	
		Formwork to columns	m2	0.16	1,245	6.08	R 284.73	R 354,376.12	
		Formwork to sides beams	m2	0.27	838	4.83	R 358.43	R 300,251.51	
		Formwork to soffits beams	m2	0.78	288	7.72	R 224.39	R 64,598.55	
		Formwork to soffts of slabs	m2	0.28	874	3.13	R 301.07	R 263,209.82	
		Formwork to pockets	m2	27.00	8	5.75	R 554.24	R 4,197.30	
		Formwork wall	m2	0.13	683	8.11	R 213.64	R 145,977.09	
		High tensile reinforcement	t	8.77	156.091	0.00	R 13,225.00	R 2,064,304.79	
		Cast in steel	kg	0.22	6,221	271.35	R 48.74	R 303,213.04	
		HD bolts	kg	0.41	3,315	212.07	R 62.36	R 206,736.10	
		Steel handrailing	m	2.52	62	9.74	R 1,358.20	R 84,175.95	
		Grout	m3	990.10	1.382	0.16	R 10,873.54	R 15,031.42	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.28	49	0.04	R 76.70	R 3,721.52	R 423,182.48
		Working space	m2	8.46	6	1.50	R 51.09	R 293.16	
		Backfill	m3	4.59	11	0.69	R 52.71	R 557.39	
		Blinding	m2	1.32	47	21.52	R 80.49	R 3,790.66	
		Concrete bases	m3	0.00	62	0.00	R 1,732.00	R 107,384.00	
		Concrete column	m3	32.26	2	0.00	R 1,732.00	R 3,328.78	
		Concrete beam	m3	1.32	1	0.00	R 1,732.00	R 2,521.80	
		Concrete wall	m3	12.12	5	0.00	R 1,732.00	R 8,863.72	
		Concrete elevated slabs	m3	11.40	0	0.00	R 1,732.00	R 291.89	
		Total concrete	m3	0.00	71	0.00		R -	
		Wood float	m2	0.93	76	165.48	R 10.47	R 799.57	
		Formwork bases	m2	9.98	6	7.70	R 225.08	R 1,397.80	
		Formwork to columns	m2	0.15	13	6.21	R 247.93	R 3,146.78	
		Formwork to sides beams	m2	0.19	8	5.29	R 279.13	R 2,123.06	
		Formwork to soffits beams	m2	0.59	2	6.99	R 327.41	R 805.06	
		Formwork to soffts of slabs	m2	0.14	1	3.43	R 329.10	R 404.41	
		Formwork to pockets	m2	464.47	0	5.26	R 504.64	R 67.36	
		Formwork wall	m2	0.11	46	6.76	R 256.38	R 11,774.66	
		High tensile reinforcement	t	4.27	16.546	0.00	R 13,225.00	R 218,823.46	
		Cast in steel	kg	0.17	410	215.64	R 61.33	R 25,174.88	
		HD bolts	kg	0.26	276	184.38	R 71.73	R 19,820.77	
		Galvanised grating	m2	20.08	4	0.17	R 2,101.59	R 7,395.50	
		Grout	m3	884.94	0.070	6.29	R 9,937.70	R 696.25	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.52	170	0.05	R 89.07	R 15,185.38	R 2,061,176.68
	Working space	m2	0.38	449	1.67	R 53.27	R 23,898.40	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.07	82	0.81	R 110.65	R 9,109.82	
	Blinding	m2	4.94	23	21.46	R 80.71	R 1,831.41	
	Concrete bases	m3	0.00	112	0.00	R 1,732.00	R 193,984.00	
	Concrete column	m3	6.37	18	0.00	R 1,732.00	R 30,442.51	
	Concrete beam	m3	1.77	10	0.00	R 1,732.00	R 17,206.10	
	Concrete wall	m3	35.78	3	0.00	R 1,732.00	R 5,421.68	
	Concrete elevated slabs	m3	24.21	1	0.00	R 1,732.00	R 1,257.21	
	Total concrete	m3	0.00	143	0.00		R -	
	Wood float	m2	4.62	24	158.01	R 10.96	R 265.64	
	Formwork bases	m2	1.49	75	7.99	R 216.65	R 16,324.59	
	Formwork to columns	m2	0.13	134	6.99	R 280.75	R 37,545.31	
	Formwork to sides beams	m2	0.23	43	6.23	R 247.73	R 10,601.35	
	Formwork to soffits beams	m2	0.73	14	6.17	R 278.23	R 3,767.91	
	Formwork to soffts of slabs	m2	0.21	3	3.74	R 277.72	R 966.54	
	Formwork to pockets	m2	3.03	37	6.24	R 463.46	R 17,155.30	
	Formwork wall	m2	0.29	11	7.09	R 244.21	R 2,623.16	
	High tensile reinforcement	t	7.09	20.223	0.00	R 13,225.00	R 267,449.72	
	Cast in steel	kg	0.02	6,475	203.37	R 65.03	R 421,039.23	
	HD bolts	kg	0.02	9,558	196.70	R 67.24	R 642,621.60	
	Galvanised grating	m2	3.94	36	0.19	R 9,254.96	R 337,009.71	
	Grout	m3	43.82	2.556	6.18	R 2,139.97	R 5,470.10	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.79	762	0.05	R 89.07	R 67,844.38	R 6,345,647.00
	Working space	m2	2.32	329	1.81	R 49.27	R 16,210.59	
	Backfill	m3	1.26	604	0.78	R 114.20	R 68,992.62	
	Blinding	m2	3.98	107	20.42	R 84.82	R 9,051.42	
	Concrete	m3	0.00	425	0.00	R 1,732.00	R 736,100.00	
	Mesh reinforcement	m2	0.50	845	67.56	R 195.76	R 165,452.49	
	Rough formwork	m2	2.87	148	7.86	R 220.48	R 32,632.71	
	Smooth formwork	m2	0.54	793	6.54	R 264.92	R 210,168.76	
	Finish to concrete	m2	0.23	1,877	104.10	R 16.64	R 31,228.13	
	Construction joints	m	4.89	87	20.94	R 82.72	R 7,191.31	
	Movement joints	m	14.99	28	16.69	R 103.79	R 2,941.92	
	Cast in steel	kg	2.33	183	233.10	R 56.73	R 10,361.23	
	Grout	m3	849.84	0.500	0.17	R 10,406.87	R 5,204.43	
	Brick walls	m2	0.48	878	0.00	R 412.00	R 361,563.42	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.24	1,804	0.00		R -	
	Waterproofing membrane	m2	1.99	906	11.42	R 151.61	R 137,324.38	
	Roof construction	m2	1.96	920	36.17	R 365.68	R 336,416.94	
	Ceiling	m2	0.98	1,845	0.00	R 285.00	R 525,730.28	
	Doors and windows	No	447.51	4	0.15	R 2,707.98	R 10,915.30	
	Floor finish	m2	0.97	1,866	0.77	R 536.56	R 1,001,476.05	
	Wall finsih	m2	0.99	1,829	1.41	R 291.61	R 533,245.09	
	Rod reinforcement	t	8.99	47	0.00	R 13,225.00	R 625,407.33	
	Metalwork	Item	0.00	1	4.45	R 58,907.93	R 58,907.93	
	Structural steel	Item	0.00	1	11.54	R 152,550.38	R 152,550.38	
	Plumbing and drainage	Item	0.00	1	7.34	R 97,109.29	R 97,109.29	
	Small power and lighting	Item	0.00	1	62.57	R 827,497.70	R 827,497.70	
	External works	Item	0.00	1	181.36	R 314,122.94	R 314,122.94	
BUILDINGS - STEEL	Concrete	m3	0.00	136	0.16	R 1,732.00	R 235,552.00	R 5,568,016.85
	Earthworks	m3	2.50	340	7.99	R 216.79	R 73,624.48	
	Reinforcement	t	8.54	16	0.00	R 13,225.00	R 210,626.52	
	Mesh	m2	0.11	1,261	8.91	R 194.33	R 245,030.95	
	Formwork	m2	0.38	360	7.25	R 238.80	R 85,950.82	
	Brickwork	m2	5.91	263	5.54	R 312.68	R 82,196.38	
	Roof covering	m2	0.84	1,847	206.07	R 206.49	R 381,355.72	
	Structural steel	t	18.52	84	0.00	R 42,551.00	R 3,571,112.74	
	Side cladding	m2	1.48	1,050	0.96	R 198.97	R 208,915.05	
	Doors	No	382.27	4	0.51	R 21,701.01	R 88,219.05	
	Ridge ventilator	m	21.59	72	10.79	R 2,228.16	R 160,378.10	
	Aluminium insulation	m2	0.86	1,808	1.66	R 124.44	R 225,055.05	
	Total building area	m2	0.00	1,554	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.65	463	0.11	R 181.86	R 84,269.38	R 1,427,877.52
	Concrete	m3	0.00	175	0.00	R 1,732.00	R 303,100.00	
	Reinforcement	t	12.25	14	0.19	R 13,225.00	R 188,994.69	
	Mesh	m2	0.12	1,441	10.80	R 160.41	R 231,183.16	
	Formwork	m2	0.45	388	8.26	R 209.63	R 81,393.91	
	Brickwork	m2	5.88	25	6.24	R 277.56	R 6,850.52	
	Screed	m2	1.07	135	44.43	R 38.98	R 5,264.96	
	Structural steel	t	15.11	10	0.00	R 42,551.00	R 408,312.60	
	Cat ladders	m	2.41	4	9.62	R 4,425.15	R 17,645.67	
	Hand rail	m	0.66	15	26.29	R 1,618.48	R 23,480.51	
	Kick plates	m	0.71	14	2.52	R 641.89	R 8,728.00	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.88	164	188.78	R 225.41	R 37,020.41	
		Side cladding	m2	4.30	34	0.87	R 195.78	R 6,595.32	
		Floor grating	m2	1.04	9	15.73	R 2,704.35	R 25,038.39	
		Total buiding area	m2	0.00	145	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	0	7.71	R 224.73	R -	R -
		Blinding	m2	0.48	0	18.70	R 92.64	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	7.41	0	0.00	R 13,225.00	R -	
		Mesh	m2	0.51	0	50.72	R 260.77	R -	
		Formwork	m2	0.32	0	7.28	R 238.08	R -	
		Finish to concrete	m2	0.44	0	102.50	R 16.90	R -	
		Movement joints	m	2.49	0	14.80	R 117.04	R -	
		Cast in steel	kg	0.09	0	195.75	R 67.56	R -	
		Grout	m3	75.88	0.000	2.58	R 11,546.67	R -	
		Brickwork	m2	0.23	0	0.15	R 412.00	R -	
		Doors and windows	No	2.75	0	0.26	R 4,766.94	R -	
		Pipework	m	2.87	0	0.23	R 672.43	R -	
		Bolts	kg	0.10	0	0.09	R 67.56	R -	
		Structural steel	t	4.10	0	0.00	R 51,005.51	R -	
		Miscellaneous steel	t	132.32	0	0.00	R 58,406.94	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.66	0	5.80	R 298.58	R -	R -
		Blinding	m2	0.72	0	14.19	R 122.06	R -	
		Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
		Reinforcement	t	5.59	0	0.00	R 13,225.00	R -	
		Formwork	m2	0.07	0	5.04	R 343.70	R -	
		Finish to concrete	m2	0.32	0	76.50	R 22.64	R -	
		Movement joints	m	0.40	0	12.22	R 141.69	R -	
		Cast in steel	kg	22.71	0.000	149.78	R 88.30	R -	
		Grout	m3	21.90	0.000	0.67	R 13,546.37	R -	
		Bolts	kg	114.80	0.000	0.13	R 59.47	R -	
		Structural steel	t	35.44	0.000	0.22	R 59,342.95	R -	
		Miscellaneous steel	t	20.23	0.000	0.17	R 78,453.39	R -	
		Brickwork	m2	0.48	0	4.20	R 412.24	R -	
		Roof covering	m2	1.45	0	1.16	R 355.60	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.80	502	6.92	R 250.26	R 125,578.49	R 4,198,001.03
	Blinding	m2	1.34	465	18.53	R 93.46	R 43,450.42	
	Concrete	m3	0.00	625	0.00	R 1,732.00	R 1,082,500.00	
	Reinforcement	t	5.93	105.333	0.00	R 13,225.00	R 1,393,026.97	
	Formwork	m2	0.23	2,668	6.89	R 251.43	R 670,738.03	
	Movement joint	m	1.83	342	0.12	R 120.96	R 41,423.20	
	Cast in steel	kg	0.15	4,147	14.32	R 58.74	R 243,602.09	
	Bolts	kg	0.40	1,571	225.13	R 69.32	R 108,894.50	
	Chemical anchors	No	7.38	85	0.25	R 316.37	R 26,797.70	
	Miscellaneous steelwork	t	93.47	6.686	190.78	R 53,979.59	R 360,930.93	
	Pre-cast concrete	m3	36.28	17	41.80	R 5,041.16	R 86,843.04	
	Brickwork	m2	8.93	41	0.34	R 347.74	R 14,215.66	
	Total area	m2	0.00	365	4.98		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.51	R 102.40	R -	R -
	Lining	m2	0.65	0	1.12	R 68.04	R -	
	Paving	m2	0.74	0	0.51	R 132.67	R -	
	Pipework	m	25.80	0	0.22	R 456.58	R -	
	Manholes	No	15.30	0	0.10	R 4,470.02	R -	
	Concrete	m3	2.47	0	0.04	R 1,732.00	R -	
	Formwork	m2	0.08	0	5.55	R 312.27	R -	
	Mesh	m2	0.64	0	6.68	R 259.12	R -	
	Reinforcement	t	4.85	0.000	0.11	R 13,225.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	7.54	0	6.54	R 264.95	R -	R -
	Blinding	m2	1.04	0	17.62	R 98.31	R -	
	Concrete	m3	0.00	0	0.00	R 1,732.00	R -	
	Reinforcement	t	4.71	0.000	0.00	R 13,225.00	R -	
	Mesh	m2	1.06	0	42.03	R 314.67	R -	
	Formwork	m2	0.18	0	6.64	R 260.73	R -	
	Cast in steel	kg	0.03	0	178.38	R 74.14	R -	
	Miscellaneous steelwork	t	14.63	0.000	0.19	R 68,321.03	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,585,732.89
	Steel	t	8.54	23.655	0.00	R 42,551.00	R 1,006,559.83	
	Handrail	m	1.50	135	26.83	R 1,585.95	R 213,879.95	
	Grating	m2	1.90	107	16.44	R 2,588.15	R 275,783.05	
	Kick flats	m	1.62	124	71.97	R 591.20	R 73,588.13	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.38	32	84.67	R 502.54	R 15,921.92	
	STRUCTURAL STEEL - PIPERACK Total volume	m3	0.00	2,976	0.00		R -	R 6,542,541.32
	Steel	t	23.56	126.327	0.00	R 42,551.00	R 5,375,352.06	
	Handrail	m	12.98	229	30.82	R 1,380.69	R 316,455.12	
	Grating	m2	12.00	248	17.85	R 2,384.48	R 591,244.83	
	Kick flats	m	12.78	233	84.96	R 500.83	R 116,650.64	
	Cat ladder	m	93.71	32	9.46	R 4,497.99	R 142,838.66	
	Total volume	m3	0.00	12,422	0.00		R -	R 16,699,299.95
	STRUCTURAL STEEL - COMPLEX STRUCTURES Steel	t	72.71	170.851	0.00	R 42,551.00	R 7,269,900.78	
	Handrail	m	31.73	391	30.22	R 1,407.94	R 551,133.85	
	Grating	m2	3.82	3,249	16.51	R 2,577.84	R 8,376,452.11	
	Kick flats	m	31.29	397	76.60	R 555.51	R 220,540.84	
	Stair treads	No	235.20	53	104.65	R 406.59	R 21,474.03	
	Cat ladder	m	238.10	52	8.55	R 4,979.64	R 259,798.33	
	STRUCTURAL STEEL - STACK Total volume	m3	0.00	0	0.00		R -	R -
	Steel	t	23.79	0.000	0.00	R 42,551.00	R -	
	Handrail	m	47.42	0	26.78	R 1,589.16	R -	
	Grating	m2	58.92	0	17.48	R 2,434.37	R -	
	Kick flats	m	48.17	0	78.54	R 541.79	R -	
	Cat ladder	m	21.01	0	8.30	R 5,124.86	R -	
	STRUCTURAL STEEL - WALKWAY Total volume	m3	0.00	157	0.00		R -	R 975,122.81
	Steel	t	14.41	10.898	0.00	R 42,551.00	R 463,740.07	
	Handrail	m	1.08	146	29.14	R 1,460.41	R 212,580.88	
	Grating	m2	1.89	83	16.17	R 2,631.36	R 218,584.02	
	Kick flats	m	1.15	136	84.57	R 503.13	R 68,560.78	
	Stair treads	No	5.67	28	101.15	R 420.67	R 11,657.06	
	STRUCTURAL STEEL - CABLE GANTRY Total volume	m3	0.00	0	0.00		R -	R -
	Steel	t	11.70	0.000	0.00	R 42,551.00	R -	
	Handrail	m	22.56	0	26.33	R 1,616.20	R -	
	Grating	m2	7.16	0	16.16	R 2,633.34	R -	
	Kick flats	m	22.45	0	79.00	R 538.62	R -	
	Cat ladder	m	19.88	0	8.40	R 5,066.46	R -	
	Pipe length	m	0.00	124,552	0.00		R -	R 148,982,328.05
	PIPING INSTALLATION Total work units	WU	0.33	373,389	0.00	R 399.00	R 148,982,328.05	
	Pipe supports	kg	2.60	47,826	0.00		R -	
	WU for pipe supports	WU	0.17	62,676	0.00		R -	
	Number of welds	No	0.57	71,084	0.00		R -	
	Total fittings	No	0.37	45,906	0.00		R -	
	Stud bolts	No	0.35	15,903	0.00		R -	
	Support number	No	0.19	9,189	0.00		R -	
	RADIOGRAPHIC Total work units	WU	0.00	373,389	0.00	R 399.00		R 497,840.25

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	52.79	7,074	5.67	R 70.38	R 497,840.25	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	373,389	0.00	R 399.00		R 279,373.87
	Number of examinations	No	162.69	2,295	3.28	R 121.73	R 279,373.87	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	373,389	0.00	R 399.00		R 255,460.34
	Number of examinations	No	286.98	1,301	2.03	R 196.34	R 255,460.34	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	373,389	0.00	R 399.00		R 444,509.52
	Number of examinations	No	48.75	7,659	6.88	R 58.04	R 444,509.52	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	373,389	0.00	R 399.00		R 517,905.45
	Number of examinations	No	109.98	3,395	2.62	R 152.54	R 517,905.45	
MECHANICAL INSTALLATION	Total work units	WU	0.00	373,389	0.00	R 399.00		R 826,933.44
	Mechanical equipment	t	235.51	1,585	0.77	R 521.57	R 826,933.44	
	Structural steel	t	204.60	1,825	54.04			
PAINTING & INSULATION	Total work units	WU	0.00	373,389	0.00	R 399.00		R 10,235,536.62
	Painting to piping	m2	17.11	21,829	0.30	R 149.76	R 3,269,120.14	
	Insulation to piping	m2	46.10	8,099	2.66	R 501.58	R 4,062,417.95	
	Mechanical equipment received	t	0.00	1,585	0.82	R 521.57	R 826,933.44	
	Painting to mechanical equipment	m2	0.24	6,726	3.42	R 152.63	R 1,026,647.88	
	Insulation to mechanical equipment	m2	0.67	2,356	1.17	R 445.79	R 1,050,417.20	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	23.54	75,442	0.00	R 69.00	R 5,205,498.00	R 13,749,084.71
	Electrical cable terminations	No	294.73	3,205	0.42	R 165.69	R 531,025.41	
	Electrical equipment	No	8.39	256	0.11	R 644.00	R 164,843.40	
	DB's	No	6.33	31	0.27	R 2,354.05	R 71,831.15	
	Rack	m	0.64	11,922	1.61	R 200.00	R 2,384,440.68	
	Support steel	kg	1.34	18,670	2.09	R 33.04	R 616,803.46	
	Instrumentation cable	m	23.10	65,112	0.35	R 28.50	R 1,855,692.00	
	Instruments	No	0.58	2,818	0.17	R 164.20	R 462,752.25	
	Hook-ups	No	3.82	4,829	0.17	R 168.35	R 813,041.00	
	Light fittings	No	9.96	978	0.02	R 397.53	R 388,777.49	
	Conduit	m	4.17	7,572	0.12	R 42.88	R 324,672.29	
	Instrument stands	No	0.00	676		R 1,375.86	R 929,707.58	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project E				
Location:	South Africa				
Client:				Date of estimate:	2008

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,445	R	4.28
2	Concrete demolitions	m3	85	R	1,602.00
3	Bulk excavation	m3	5,562	R	34.93
4	Vertical piles	No	25		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,487.00
7	Auger pile	m		R	310.49
8	Total paving and asphalt to road works	m2	2,995		
9	Grey paving to road works	m2	195	R	135.84
10	Asphalt to road surface	m2	2,800		
11	Rip bed of road works	m2	2,995	R	11.64
12	Total concrete in paving and bunding	m3	325	R	1,487.00
13	Concrete in paving	m3	175		
14	Rod reinforcement	t		R	12,005.00
15	Concrete in plinths and bases on area finishing	m3	220		
16	Stormwater pipe to drain surface run-off	m	321		
17	Machine excavation	m3		R	65.98
18	Concrete in pump and pipe support bases	m3	155	R	1,487.00
19	Concrete in tank bases	m3	75	R	1,487.00
20	Concrete in pipe and cable rack foundations	m3	155	R	1,487.00
21	Concrete to simple structural foundations	m3	212	R	1,487.00
22	Complex structural foundations - bases	m3	68	R	1,487.00
23	Concrete pipe racks - bases	m3	0	R	1,487.00
24	Concrete structure including concrete columns and beams - bases	m3	242	R	1,487.00
25	Major equipment bases with blast proof walls - bases	m3	322	R	1,487.00
26	Major equipment bases and elevated concrete structure - bases	m3	145	R	1,487.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	45	R	1,487.00
28	One brick wall	m2		R	349.30
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,487.00
30	Total building area - Structural steel buildings	m2	685		
31	Ceiling	m2		R	275.56
32	Structural steel	t		R	42,692.32
33	Steel canopy - concrete	m3	62	R	1,487.00
34	Steel canopy - area	m2	622		
35	Concrete in weighbridge - all concrete	m3	52	R	1,487.00
36	Total weighbridge area	m2	105		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	24	R	1,487.00
39	Total pump house area	m2	18		
40	Concrete in cooling tower	m3	322	R	1,487.00
41	Total cooling tower area	m2	212		
42	Emergency earth dam area - top of berm	m2	802		
43	Concrete in cable tunnel	m3	0	R	1,487.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	45		
46	Total volume of steel pipe rack	m3	855		
47	Total volume of steel complex steel structure	m3	7,225		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	202		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	338.43
52	Total process pipe length	m	62,125		
53	Total electrical cable - installation only	m	42,115	R	60.54
54	Total instrumentation cable - installation only	m	32,415	R	40.36

Ratio: Project Ratio Mean

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Complex	Mean
Current economic conditions	Normal	Mean
Current economic factors	Good	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasiona	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project E			
Location:	South Africa			
Client:	0	Date of estimate:	2008	

	CIVIL CONSTRUCTION COST				R 40,233,800.54
A	SITE CLEARANCE AND DEMOLITIONS		R	210,834.60	
B	BULK EARTHWORKS		R	410,721.82	
C	PILING		R	1,252,247.39	
D	ROAD WORKS		R	1,508,006.90	
E	GENERAL PAVING AND BUNDED AREAS		R	985,399.51	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,267,372.92	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	980,404.80	
H	TANK BASES AND BUNDING		R	1,182,467.64	
I	RACK FOUNDATIONS		R	1,209,948.38	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,092,011.52	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	431,480.76	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,209,667.79	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	2,165,230.22	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,644,218.98	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,737,488.64	
Q	BUILDINGS - STEEL		R	2,444,831.32	
R	CANOPIES - STEEL		R	2,604,846.81	
S	WEIGHBRIDGE		R	536,917.24	
T	PUMP HOUSE		R	353,359.98	
U	COOLING TOWER		R	2,115,821.70	
V	EMERGENCY DAM		R	459,536.28	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	10,430,985.33	
	STRUCTURAL STEEL				R 17,792,394.20
A	STRUCTURAL STEEL - BASIC PLATFORM		R	323,507.40	
B	STRUCTURAL STEEL - PIPERACK		R	1,630,315.85	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	9,621,431.77	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	1,133,597.98	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	5,083,541.20	
	MECHANICAL AND PIPING				R 90,562,461.42
A	PIPING INSTALLATION		R	63,712,011.36	
B	RADIOGRAPHIC EXAMINATION (RT)		R	179,126.63	
C	DYE PENETRATION TESTING (DP)		R	64,366.02	
D	MAGNETIC PARTICLE TESTING (MPI)		R	99,876.49	
E	POST WELD HEAT TREATMENT		R	173,628.94	
F	MATERIAL HARDNESS TEST (HT)		R	133,695.83	
H	MECHANICAL INSTALLATION		R	324,767.17	
	Preliminaries and General	40.00%	R	25,874,988.98	
	PAINTING AND INSULATION				R 5,182,277.09
A	PAINTING AND INSULATION		R	3,838,723.77	
	Preliminaries and General	35.00%	R	1,343,553.32	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 8,788,821.24
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	6,510,237.95	
	Preliminaries and General	35.00%	R	2,278,583.28	

TOTAL COST	R	162,559,754.50

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,445		R 4.28	R 74,664.60	R 210,834.60
	Concrete demolitions	m3		85		R 1,602.00	R 136,170.00	
BULK EARTHWORKS	Bulk excavation	m3		5,562		R 34.93	R 194,280.66	R 410,721.82
	Trimming of sides	m2	2.18	2,551	4.30	R 8.12	R 20,725.48	
	Back fill and compact	m3	1.15	4,837	0.98	R 35.64	R 172,387.45	
	Overhaul	m3/km	1.73	3,215	11.34	R 3.08	R 9,903.08	
	Rip bed	m2	1.78	3,125	8.13	R 4.30	R 13,425.15	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 285,950.10	R 285,950.10	R 1,252,247.39
	EO for raking equipment	Item	0.00	1	23.89	R 35,524.43	R 35,524.43	
	Number of piles	No	0.00	25	0.00		R -	
	Move rig to new position	No	1.50	17	0.18	R 267.66	R 4,461.00	
	Number of raking piles	No	18.41	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.28	R 416.36	R 607.96	
	EO for raking drilling	m	0.15	9	0.89	R 276.34	R 2,501.68	
	Auger quantity	m	0.05	500	0.00	R 310.49	R 155,245.00	
	EO for drilling in coarse gravel	m	0.53	47	0.22	R 327.14	R 15,431.13	
	EO for drilling in boulders	m	1.84	14	0.50	R 743.50	R 10,101.90	
	EO for drilling in soft rock	m	1.63	15	0.24	R 356.88	R 5,473.62	
	Temporary casings	m	0.36	69	0.36	R 535.32	R 37,175.00	
	EO casing to raking pile	m	0.18	8	0.51	R 1,382.91	R 10,432.96	
	Mild steel rod reinforcement	t	14.29	1.749	0.93	R 9,998.44	R 17,492.02	
	High tensile rod reinforcement	t	1.32	18.939	7.23	R 10,751.01	R 203,617.61	
	Concrete to piles and bases	m3	0.15	167	0.00	R 1,487.00	R 247,833.33	
	Concrete to raking piles	m3	0.07	19	1.06	R 1,576.22	R 30,577.71	
	Site establishment of test equipment	Item	0.00	1	110.73	R 164,655.51	R 164,655.51	
	Load test to pile	No	99.34	0	27.07	R 40,253.09	R 10,130.13	
	Site establishment of intergity testing	No	258.87	0	48.79	R 72,550.73	R 7,006.48	
	Integrity testing of piles	No	1.25	20	0.27	R 401.49	R 8,029.80	
ROAD WORKS	Red paving	m2	0.15	29	0.97	R 131.76	R 3,854.12	R 1,508,006.90
	Grey paving	m2	0.00	195	0.00	R 135.84	R 26,488.80	
	Kerbing	m	0.13	389	0.00	R 227.61	R 88,621.33	
	Total paving and asphalt	m2	0.00	2,995	0.00		R -	
	Remove top soil	m3	0.55	428	5.83	R 67.86	R 29,063.93	
	Asphalt	m2	0.26	779	0.00	R 161.10	R 125,448.41	
	Rip bed	m2	0.00	2,995	0.00	R 11.64	R 34,861.80	
	Reduce levels	m3	0.42	1,258	4.99	R 58.08	R 73,063.36	
	Selected fill	m3	1.65	762	0.53	R 109.59	R 83,548.73	
	Imported fill	m3	2.23	342	0.39	R 281.00	R 96,066.14	
	Wearing course	m3	3.86	326	0.29	R 200.29	R 65,270.11	
	Prime	m2	4.74	3,614	1.47	R 56.20	R 203,087.67	
	Three line road marking	m	0.83	2,999	0.20	R 45.52	R 136,535.84	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	397	4.19	R 11.38	R 4,519.69	
	1m Wide concrete V-drain	m	0.97	378	0.81	R 1,019.71	R 385,112.84	
	200mm Diameter PVC pipe	m	0.96	374	0.11	R 323.21	R 120,808.59	
	Road marking - STOP	No	0.15	58	0.05	R 345.97	R 20,205.66	
	Standard signage	No	0.01	4	4.48	R 441.57	R 1,719.25	
	100mm Painted line	m	1.83	713	1.42	R 13.66	R 9,730.62	
			0.00		1.52			
			0.00		1.94			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	175	0.74	R 1,487.00	R 260,225.00	R 985,399.51
		Concrete in plinths	m3	0.00	35	0.00	R 1,487.00	R 51,837.65	
		Total concrete	m3	0.00	325	0.00		R -	
		Rip and compact	m2	0.13	1,346	187.19	R 7.94	R 10,693.58	
		Formwork to plinth	m2	7.26	253	0.12	R 178.44	R 45,160.96	
		Formwork to slab	m2	0.83	145	0.15	R 223.05	R 32,398.01	
		High tensile steel	t	0.01	3.250	0.00	R 12,005.00	R 39,016.25	
		Mesh	m2	585.35	1,902	51.00	R 235.39	R 447,807.10	
		Construction joint	m	4.00	700	0.05	R 74.35	R 52,045.00	
		Expansion joint	m	2.22	389	0.08	R 118.96	R 46,215.96	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	4,341	0.00		R -	R 1,267,372.92
		Base excavation	m3	1.50	489	0.00	R 65.98	R 32,256.89	
		Backfill	m3	0.59	326	0.64	R 103.09	R 33,600.93	
		Working space	m2	0.45	829	1.43	R 72.09	R 59,738.52	
		Concrete in bases	m3	0.04	220	25.24	R 1,487.00	R 327,140.00	
		Blinding	m2	0.83	297	20.88	R 71.22	R 21,141.85	
		Concrete in sump walls	m3	0.10	22	29.51	R 1,487.00	R 32,714.00	
		Concrete in slabs	m3	0.02	4	0.91	R 1,487.00	R 6,542.80	
		Total concrete	m3	0.00	246	0.04		R -	
		Wood float	m2	0.70	352	158.37	R 9.39	R 3,305.07	
		Formwork to bases	m2	1.69	372	0.12	R 178.44	R 66,343.99	
		Formwork to sump walls	m2	12.63	278	0.12	R 178.44	R 49,581.34	
		Formwork to sides of slab	m2	5.81	26	0.18	R 267.66	R 6,842.46	
		Mild steel reinforcement	t	0.12	2.769	0.00	R 12,005.00	R 33,236.31	
		High tensile reinforcement	t	10.68	23.071	1.19	R 12,005.00	R 276,969.29	
		Cast in steel	kg	0.46	478	34.10	R 43.61	R 20,855.54	
		Waterstop	m	0.43	51	8.10	R 183.58	R 9,392.48	
		Manhole	No	0.08	26	2.68	R 4,268.08	R 109,604.36	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	321	0.13	R 554.85	R 178,107.09	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	262	0.05	R 65.98	R 17,283.46	R 980,404.80
	Working space	m2	0.38	689	0.67	R 44.21	R 30,473.47	
	Backfill	m3	4.42	59	1.32	R 87.09	R 5,161.58	
	Concrete bases	m3	1.01	155	0.00	R 1,487.00	R 230,485.00	
	Concrete plinth	m3	2.29	68	0.00	R 1,487.00	R 100,648.47	
	Total concrete	m3	0.00	223	0.00		R -	
	Wood float	m2	0.47	144	0.05	R 14.87	R 2,141.46	
	Blinding	m2	1.01	153	0.01	R 74.35	R 11,410.15	
	Formwork bases	m2	0.49	316	0.13	R 193.31	R 61,149.08	
	Formwork plinth	m2	0.58	117	0.12	R 178.44	R 20,823.82	
	High tensile reinforcement	t	10.00	22.269	7.15	R 12,005.00	R 267,334.05	
	Cast in steel	kg	0.11	2,024	0.03	R 44.61	R 90,309.13	
	HD Bolts	kg	0.08	2,784	0.03	R 44.61	R 124,175.05	
	Grout	m3	34.52	1.961	6.52	R 9,695.24	R 19,010.08	
TANK BASES AND BUNDING	Restricted excavation	m3	5.84	438	0.05	R 74.35	R 32,565.30	R 1,182,467.64
	Working space	m2	4.36	100	1.63	R 45.61	R 4,582.27	
	Backfill	m3	1.38	317	0.72	R 103.26	R 32,775.06	
	Concrete bases	m3	0.75	75	0.00	R 1,487.00	R 111,525.00	
	Concrete sump wall	m3	2.86	26	0.00	R 1,487.00	R 38,994.76	
	Concrete slab	m3	0.57	132	0.00	R 1,487.00	R 195,657.89	
	Concrete plinth	m3	4.11	18	21.05	R 1,487.00	R 27,135.04	
	Concrete column	m3	19.22	4	164.76	R 1,487.00	R 5,802.55	
	Total concrete	m3	0.00	255	1.11		R -	
	Blinding	m2	2.67	95	1.05	R 70.64	R 6,745.40	
	Wood float	m2	0.25	1,020	1.12	R 9.03	R 9,204.06	
	Formwork to bases	m2	0.42	179	1.14	R 183.13	R 32,701.44	
	Formwork to plinths	m2	0.35	52	8.12	R 194.89	R 10,161.03	
	Formwork to columns	m2	0.12	33	7.63	R 209.44	R 6,810.50	
	Formwork to sumps	m2	0.11	238	7.10	R 203.14	R 48,428.66	
	Formwork to slabs	m2	4.07	32	7.32	R 181.12	R 5,855.44	
	Formwork to slabs n/e 300mm	m	2.17	61	8.21	R 63.12	R 3,827.03	
	Mild steel reinforcement	t	0.23	2.540	23.56	R 12,005.00	R 30,487.82	
	High tensile reinforcement	t	23.09	11.042	1.02	R 12,005.00	R 132,555.73	
	Mesh	m2	0.16	822	61.15	R 196.32	R 161,447.80	
	Cast in items	kg	0.19	1,342	214.69	R 55.92	R 75,033.81	
	HD Bolts	kg	0.10	2,550	207.02	R 57.99	R 147,846.19	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	1.249	0.17	R 8,747.06	R 10,923.78	
	Construction joint	m	0.30	439	24.89	R 59.74	R 26,203.01	
	Expansion joint	m	0.46	286	16.88	R 88.09	R 25,198.06	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	575	0.05	R 74.35	R 42,754.97	R 1,209,948.38
	Working space	m2	0.41	1,403	1.98	R 147.21	R 206,475.21	
	Backfill	m3	2.45	235	0.87	R 85.46	R 20,058.63	
	Blinding	m2	0.37	419	22.19	R 67.01	R 28,072.66	
	Concrete bases	m3	5.81	155	0.00	R 1,487.00	R 230,485.00	
	Concrete plinth	m3	0.00	27	0.00	R 1,487.00	R 39,670.40	
	Total concrete	m3	0.00	182	1.34		R -	
	Wood float	m2	0.35	443	173.00	R 8.60	R 3,806.52	
	Formwork bases	m2	0.47	330	9.63	R 154.41	R 50,923.53	
	Formwork plinths	m2	0.09	296	6.99	R 212.73	R 63,058.97	
	High tensile reinforcement	t	9.33	19.472	0.00	R 12,005.00	R 233,767.00	
	HD Bolts	kg	0.03	5,167	225.70	R 53.19	R 274,815.39	
	Grout	m3	79.73	1.944	0.18	R 8,261.11	R 16,060.11	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	909	0.06	R 89.22	R 81,143.81	R 2,092,011.52
	Working space	m2	0.50	1,819	1.90	R 46.96	R 85,414.53	
	Backfill	m3	2.66	342	0.80	R 111.53	R 38,131.49	
	Blinding	m2	0.33	642	21.39	R 69.52	R 44,660.35	
	Concrete bases	m3	0.00	212	0.00	R 1,487.00	R 315,244.00	
	Concrete plinth	m3	2.58	58	0.00	R 1,487.00	R 86,844.08	
	Concrete slab	m3	3.63	82	0.00	R 1,487.00	R 122,187.60	
	Total concrete	m3	0.00	353	0.00		R -	
	Wood float	m2	0.55	641	161.77	R 9.19	R 5,892.49	
	Formwork bases	m2	0.49	433	8.32	R 178.73	R 77,326.33	
	Formwork plinths	m2	0.11	531	8.34	R 178.30	R 94,663.26	
	High tensile reinforcement	t	13.32	26.469	0.00	R 12,005.00	R 317,765.45	
	HD Bolts	kg	0.02	10,600	217.74	R 55.13	R 584,426.38	
	Cast in items	kg	0.05	4,240	241.09	R 49.79	R 211,129.45	
	Grout	m3	68.22	3.108	0.17	R 8,747.06	R 27,182.30	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	141	0.05	R 74.35	R 10,516.06	R 431,480.76
	Working space	m2	0.56	253	1.66	R 44.79	R 11,312.46	
	Backfill	m3	2.15	66	0.79	R 94.11	R 6,191.38	
	Blinding	m2	0.65	105	20.36	R 73.04	R 7,640.62	
	Concrete bases	m3	0.00	68	0.00	R 1,487.00	R 101,116.00	
	Concrete column	m3	28.05	2	0.00	R 1,487.00	R 3,604.85	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	13	0.00	R 1,487.00	R 19,333.84	
	Total concrete	m3	0.00	83	0.00		R -	
	Wood float	m2	0.60	139	158.85	R 9.36	R 1,301.59	
	Formwork bases	m2	0.52	131	8.23	R 180.68	R 23,627.44	
	Formwork plinths	m2	0.33	39	7.44	R 199.87	R 7,874.65	
	Formwork to columns	m2	0.28	9	8.09	R 183.81	R 1,591.40	
	High tensile reinforcement	t	9.06	9.208	0.00	R 12,005.00	R 110,544.26	
	HD bolts	kg	0.04	2,086	209.18	R 57.39	R 119,697.27	
	Grout	m3	108.76	0.767	0.16	R 9,293.75	R 7,128.92	
	Restricted excavation	m3	2.80	0	0.06	R 89.22	R -	R -
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.30	0	2.12	R 42.08	R -	
	Backfill	m3	2.06	0	0.82	R 108.80	R -	
	Blinding	m2	0.67	0	19.99	R 74.39	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,487.00	R -	
	Concrete column	m3	1.19	0	151.33	R 1,487.00	R -	
	Concrete beam	m3	2.68	0	0.95	R 1,487.00	R -	
	Total concrete	m3	2.97	0	0.95		R -	
	Wood float	m2	0.47	0	7.50	R 9.83	R -	
	Formwork bases	m2	0.48	0	6.55	R 198.27	R -	
	Formwork to columns	m2	0.15	0	7.98	R 186.34	R -	
	Formwork to sides beams	m2	0.33	0	6.11	R 227.02	R -	
	Formwork to soffits beams	m2	0.69	0	6.55	R 243.37	R -	
	Formwork corbels	m2	10.88	0	5.37	R 276.91	R -	
	High tensile reinforcement	t	9.10	0.000	0.00	R 12,005.00	R -	
	Cast in steel	kg	0.03	0	262.64	R 45.71	R -	
	HD bolts	kg	1.48	0	215.28	R 55.76	R -	
	Grout	m3	505.30	0.000	0.16	R 9,293.75	R -	
	Restricted excavation	m3	3.84	929	0.05	R 74.35	R 69,091.97	R 3,209,667.79
	Working space	m2	0.61	1,523	1.79	R 41.54	R 63,276.83	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	808	0.79	R 94.11	R 76,050.60	
	Blinding	m2	0.61	397	20.06	R 74.13	R 29,408.01	
	Concrete bases	m3	0.00	242	0.97	R 1,487.00	R 359,854.00	
	Concrete column	m3	2.44	99	1.07	R 1,487.00	R 147,481.15	
	Concrete beam	m3	0.84	118	1.02	R 1,487.00	R 175,572.79	
	Concrete surface slab	m3	1.68	144	0.97	R 1,487.00	R 214,198.81	
	Concrete wall	m3	2.50	40	1.05	R 1,487.00	R 58,992.46	
	Concrete elevated slab	m3	1.10	90	0.00	R 1,487.00	R 134,073.77	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	733	0.00		R -	
		Wood float	m2	0.64	1,146	169.32	R 8.78	R 10,060.21	
		Formwork bases	m2	0.41	590	7.65	R 194.38	R 114,731.07	
		Formwork to columns	m2	0.17	583	6.34	R 234.54	R 136,835.36	
		Formwork to sides beams	m2	0.30	394	5.15	R 288.74	R 113,639.35	
		Formwork to soffits beams	m2	0.84	141	7.57	R 196.43	R 27,610.99	
		Formwork to soffts of slabs	m2	0.31	465	3.23	R 258.61	R 120,167.64	
		Formwork to pockets	m2	26.55	4	5.75	R 460.37	R 1,719.77	
		Formwork wall	m2	0.13	305	8.09	R 183.81	R 56,092.48	
		High tensile reinforcement	t	8.87	82.653	0.00	R 12,005.00	R 992,254.30	
		Cast in steel	kg	0.22	3,332	255.59	R 46.97	R 156,523.69	
		HD bolts	kg	0.41	1,788	201.38	R 59.61	R 106,597.35	
		Steel handrailing	m	2.58	32	9.71	R 1,236.35	R 39,608.10	
		Grout	m3	1,039.37	0.705	0.18	R 8,261.11	R 5,827.10	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	262	0.04	R 59.48	R 15,571.19	R 2,165,230.22
		Working space	m2	7.92	33	1.42	R 41.89	R 1,384.55	
		Backfill	m3	4.13	63	0.63	R 37.47	R 2,375.27	
		Blinding	m2	1.05	307	17.95	R 82.84	R 25,404.64	
		Concrete bases	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
		Concrete column	m3	26.31	12	0.00	R 1,487.00	R 18,198.94	
		Concrete beam	m3	1.43	9	0.00	R 1,487.00	R 12,726.53	
		Concrete wall	m3	10.41	31	0.00	R 1,487.00	R 45,995.58	
		Concrete elevated slabs	m3	10.92	1	0.00	R 1,487.00	R 1,666.57	
		Total concrete	m3	0.00	375	0.00		R -	
		Wood float	m2	0.82	457	138.41	R 10.74	R 4,911.19	
		Formwork bases	m2	8.50	38	6.94	R 214.27	R 8,116.87	
		Formwork to columns	m2	0.14	87	5.63	R 236.03	R 20,633.71	
		Formwork to sides beams	m2	0.17	50	4.72	R 264.12	R 13,296.97	
		Formwork to soffits beams	m2	0.50	17	6.30	R 315.04	R 5,392.60	
		Formwork to soffts of slabs	m2	0.13	9	2.98	R 306.60	R 2,643.25	
		Formwork to pockets	m2	418.49	1	4.85	R 498.99	R 383.94	
		Formwork wall	m2	0.10	309	6.38	R 233.07	R 72,093.39	
		High tensile reinforcement	t	4.05	92.555	0.00	R 12,005.00	R 1,111,128.78	
		Cast in steel	kg	0.15	2,499	200.08	R 60.00	R 149,942.41	
		HD bolts	kg	0.22	1,704	167.91	R 71.50	R 121,820.44	
		Galvanised grating	m2	17.15	22	0.15	R 2,223.15	R 48,591.64	
		Grout	m3	771.45	0.417	5.40	R 9,913.33	R 4,137.78	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	229	0.05	R 74.35	R 17,033.59	R 2,644,218.98
	Working space	m2	0.42	545	1.76	R 42.24	R 23,043.27	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	112	0.80	R 92.94	R 10,437.25	
	Blinding	m2	4.82	30	20.78	R 71.56	R 2,152.71	
	Concrete bases	m3	0.00	145	0.00	R 1,487.00	R 215,615.00	
	Concrete column	m3	6.67	22	0.00	R 1,487.00	R 32,326.09	
	Concrete beam	m3	1.99	11	0.00	R 1,487.00	R 16,244.26	
	Concrete wall	m3	35.85	4	0.00	R 1,487.00	R 6,014.37	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,487.00	R 1,306.63	
	Total concrete	m3	0.00	183	0.00		R -	
	Wood float	m2	4.82	30	162.71	R 9.14	R 274.93	
	Formwork bases	m2	1.44	101	8.18	R 181.78	R 18,304.72	
	Formwork to columns	m2	0.14	155	6.98	R 217.08	R 33,708.12	
	Formwork to sides beams	m2	0.23	47	6.34	R 213.04	R 10,118.52	
	Formwork to soffits beams	m2	0.75	15	6.85	R 234.54	R 3,416.25	
	Formwork to soffts of slabs	m2	0.22	4	3.87	R 241.00	R 962.60	
	Formwork to pockets	m2	3.09	47	6.17	R 384.24	R 18,030.57	
	Formwork wall	m2	0.29	14	7.54	R 197.21	R 2,750.56	
	High tensile reinforcement	t	7.31	24.978	0.00	R 12,005.00	R 299,856.74	
	Cast in steel	kg	0.02	9,129	212.67	R 56.45	R 515,341.31	
	HD bolts	kg	0.01	18,259	208.59	R 57.55	R 1,050,842.68	
	Galvanised grating	m2	3.97	46	0.19	R 7,826.32	R 359,944.78	
	Grout	m3	42.08	3.446	6.37	R 1,884.62	R 6,494.04	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	82	0.05	R 74.35	R 6,089.27	R 1,737,488.64
	Working space	m2	2.50	33	1.84	R 40.41	R 1,323.75	
	Backfill	m3	1.25	66	0.79	R 94.11	R 6,166.34	
	Blinding	m2	3.86	12	20.30	R 73.25	R 853.97	
	Concrete	m3	0.00	45	0.00	R 1,487.00	R 66,915.00	
	Mesh reinforcement	m2	0.51	88	65.77	R 182.53	R 16,105.59	
	Rough formwork	m2	3.09	15	8.61	R 172.71	R 2,515.14	
	Smooth formwork	m2	0.57	79	6.80	R 218.68	R 17,263.93	
	Finish to concrete	m2	0.23	196	105.40	R 14.11	R 2,760.29	
	Construction joints	m	4.97	9	21.29	R 69.84	R 632.40	
	Movement joints	m	15.36	3	17.11	R 86.91	R 254.61	
	Cast in steel	kg	2.35	19	232.74	R 51.58	R 987.72	
	Grout	m3	882.88	0.051	0.18	R 8,261.11	R 421.07	
	Brick walls	m2	0.50	90	0.00	R 349.30	R 31,437.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	201	0.00		R -	
	Waterproofing membrane	m2	2.22	91	12.03	R 123.61	R 11,199.86	
	Roof construction	m2	2.04	99	38.22	R 314.10	R 30,971.44	
	Ceiling	m2	0.98	205	0.00	R 275.56	R 56,560.10	
	Doors and windows	No	474.69	0	0.17	R 2,054.71	R 870.68	
	Floor finish	m2	1.03	195	0.79	R 442.15	R 86,348.40	
	Wall finsih	m2	1.04	193	1.47	R 237.62	R 45,958.72	
	Rod reinforcement	t	9.25	5	0.00	R 12,005.00	R 58,402.70	
	Metalwork	Item	0.00	1	4.44	R 53,302.20	R 53,302.20	
	Structural steel	Item	0.00	1	11.50	R 138,057.50	R 138,057.50	
	Plumbing and drainage	Item	0.00	1	7.32	R 87,876.60	R 87,876.60	
	Small power and lighting	Item	0.00	1	62.40	R 749,112.00	R 749,112.00	
	External works	Item	0.00	1	178.28	R 265,102.36	R 265,102.36	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.17	R 1,487.00	R 126,395.00	R 2,444,831.32
	Earthworks	m3	2.37	201	9.13	R 162.87	R 32,810.09	
	Reinforcement	t	8.82	10	0.00	R 12,005.00	R 115,694.44	
	Mesh	m2	0.12	708	10.27	R 144.79	R 102,560.05	
	Formwork	m2	0.40	213	8.06	R 184.49	R 39,204.40	
	Brickwork	m2	6.11	112	6.08	R 244.57	R 27,419.32	
	Roof covering	m2	0.87	787	208.48	R 204.78	R 161,234.02	
	Structural steel	t	18.83	36	0.00	R 42,692.32	R 1,553,066.34	
	Side cladding	m2	1.54	445	0.98	R 200.68	R 89,265.02	
	Doors	No	405.94	2	0.51	R 21,773.08	R 36,740.80	
	Ridge ventilator	m	21.95	31	11.48	R 2,350.86	R 73,364.05	
	Aluminium insulation	m2	0.89	770	1.81	R 113.14	R 87,077.78	
	Total building area	m2	0.00	685	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	193	0.13	R 193.31	R 37,393.89	R 2,604,846.81
	Concrete	m3	0.00	62	0.00	R 1,487.00	R 92,194.00	
	Reinforcement	t	11.42	5	0.18	R 12,005.00	R 65,176.01	
	Mesh	m2	0.12	517	10.21	R 145.64	R 75,248.12	
	Formwork	m2	0.45	138	8.51	R 174.74	R 24,074.68	
	Brickwork	m2	5.94	105	5.91	R 251.61	R 26,346.77	
	Screed	m2	1.12	555	43.13	R 34.48	R 19,147.14	
	Structural steel	t	14.72	42	0.00	R 42,692.32	R 1,803,982.54	
	Cat ladders	m	2.74	15	9.66	R 4,419.49	R 68,156.09	
	Hand rail	m	0.73	58	27.40	R 1,558.11	R 90,190.11	
	Kick plates	m	0.76	56	2.76	R 564.53	R 31,387.67	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.91	684	195.47	R 218.41	R 149,285.85	
	Side cladding	m2	4.76	131	0.93	R 203.12	R 26,542.15	
	Floor grating	m2	1.09	39	17.29	R 2,469.19	R 95,721.80	
	Total buiding area	m2	0.00	622	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.30	172	8.02	R 185.41	R 31,816.61	R 536,917.24
	Blinding	m2	0.47	111	18.72	R 79.43	R 8,788.42	
	Concrete	m3	0.00	52	0.00	R 1,487.00	R 77,324.00	
	Reinforcement	t	7.97	7	0.00	R 12,005.00	R 78,326.22	
	Mesh	m2	0.49	106	50.23	R 239.00	R 25,363.33	
	Formwork	m2	0.31	168	7.58	R 196.17	R 32,906.63	
	Finish to concrete	m2	0.44	118	103.65	R 14.35	R 1,695.48	
	Movement joints	m	2.46	21	15.35	R 96.87	R 2,047.72	
	Cast in steel	kg	0.09	578	179.47	R 66.89	R 38,648.37	
	Grout	m3	71.08	0.732	2.53	R 9,913.33	R 7,252.30	
	Brickwork	m2	0.24	38	0.15	R 349.30	R 13,098.75	
	Doors and windows	No	2.74	3	0.26	R 4,366.25	R 14,341.70	
	Pipework	m	2.59	41	0.21	R 587.75	R 23,827.58	
	Bolts	kg	0.11	473	0.08	R 66.89	R 31,621.39	
	Structural steel	t	3.99	2	0.00	R 46,173.08	R 104,149.80	
	Miscellaneous steel	t	131.32	1	0.00	R 57,166.67	R 45,708.96	
	Total bridge area	m2	0.00	105	0.00		R -	
	Total control room area	m2	0.00	9	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.59	206	6.07	R 244.98	R 50,504.11	R 353,359.98
	Blinding	m2	0.71	34	14.50	R 102.55	R 3,466.54	
	Concrete	m3	0.00	24	0.00	R 1,487.00	R 35,688.00	
	Reinforcement	t	5.75	4	0.00	R 12,005.00	R 50,107.83	
	Formwork	m2	0.07	343	5.72	R 259.97	R 89,130.87	
	Finish to concrete	m2	0.31	77	77.96	R 19.07	R 1,476.69	
	Movement joints	m	0.42	57	12.46	R 119.34	R 6,819.54	
	Cast in steel	kg	23.71	1.012	163.17	R 73.57	R 74.47	
	Grout	m3	22.24	1.079	0.62	R 11,438.46	R 12,343.66	
	Bolts	kg	109.85	0.218	0.13	R 45.62	R 9.97	
	Structural steel	t	35.84	0.502	0.22	R 54,568.18	R 27,405.89	
	Miscellaneous steel	t	20.04	0.898	0.18	R 66,694.44	R 59,905.19	
	Brickwork	m2	0.49	37	4.24	R 350.71	R 12,883.13	
	Roof covering	m2	1.46	12	1.22	R 287.47	R 3,544.09	
	Total pump house area	m2	0.00	18	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	254	6.10	R 243.77	R 62,010.34	R 2,115,821.70
	Blinding	m2	1.17	275	16.23	R 91.62	R 25,215.20	
	Concrete	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
	Reinforcement	t	5.89	54.669	0.00	R 12,005.00	R 656,300.51	
	Formwork	m2	0.21	1,533	6.04	R 246.19	R 377,494.48	
	Movement joint	m	1.61	200	0.12	R 115.45	R 23,090.06	
	Cast in steel	kg	0.13	2,477	12.88	R 61.20	R 151,587.79	
	Bolts	kg	0.37	870	196.16	R 73.91	R 64,324.56	
	Chemical anchors	No	6.13	53	0.22	R 333.66	R 17,526.55	
	Miscellaneous steelwork	t	88.98	3.619	162.42	R 54,568.18	R 197,470.83	
	Pre-cast concrete	m3	30.27	11	35.98	R 4,956.67	R 52,727.01	
	Brickwork	m2	7.79	27	0.30	R 340.27	R 9,260.36	
	Total area	m2	0.00	212	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	1,458	1.68	R 99.93	R 145,710.86	R 459,536.28
	Lining	m2	0.70	1,146	1.16	R 59.48	R 68,147.09	
	Paving	m2	0.65	1,234	0.53	R 112.23	R 138,470.13	
	Pipework	m	28.23	28	0.24	R 416.36	R 11,828.58	
	Manholes	No	16.47	2	0.10	R 4,163.60	R 7,181.89	
	Concrete	m3	2.43	12	0.04	R 1,487.00	R 17,384.74	
	Formwork	m2	0.08	146	5.85	R 254.19	R 37,146.88	
	Mesh	m2	0.70	17	6.64	R 223.95	R 3,740.26	
	Reinforcement	t	4.69	2.493	0.12	R 12,005.00	R 29,925.85	
	Dam area (to top of berm)	m2	0.00	802	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	0	5.56	R 267.45	R -	R -
	Blinding	m2	0.85	0	13.49	R 110.23	R -	
	Concrete	m3	0.00	0	0.00	R 1,487.00	R -	
	Reinforcement	t	4.52	0.000	0.00	R 12,005.00	R -	
	Mesh	m2	0.90	0	38.60	R 311.01	R -	
	Formwork	m2	0.15	0	5.36	R 277.43	R -	
	Cast in steel	kg	0.02	0	140.16	R 85.65	R -	
	Miscellaneous steelwork	t	11.14	0.000	0.16	R 75,031.25	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	45	0.00		R -	R 323,507.40
	Steel	t	9.58	4.697	0.00	R 42,692.32	R 200,538.04	
	Handrail	m	1.45	31	28.73	R 1,485.98	R 46,116.74	
	Grating	m2	1.91	24	16.97	R 2,515.75	R 59,271.66	
	Kick flats	m	1.71	26	76.94	R 554.88	R 14,602.05	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stair treads	No	6.72	7	95.97	R 444.85	R 2,978.91	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	855	0.00		R -	R 1,630,315.85
		Steel	t	27.86	30.689	0.00	R 42,692.32	R 1,310,191.44	
		Handrail	m	13.37	64	30.43	R 1,402.97	R 89,718.60	
		Grating	m2	12.47	69	18.55	R 2,301.47	R 157,799.46	
		Kick flats	m	13.35	64	84.90	R 502.85	R 32,205.27	
		Cat ladder	m	98.85	9	9.14	R 4,670.93	R 40,401.08	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	7,225	0.00		R -	R 9,621,431.77
		Steel	t	76.43	94.531	0.00	R 42,692.32	R 4,035,745.28	
		Handrail	m	31.26	231	30.84	R 1,384.32	R 319,951.58	
		Grating	m2	3.84	1,882	16.10	R 2,651.70	R 4,989,195.33	
		Kick flats	m	34.08	212	83.17	R 513.31	R 108,823.16	
		Stair treads	No	230.28	31	101.90	R 418.96	R 13,144.90	
		Cat ladder	m	238.13	30	8.38	R 5,094.55	R 154,571.52	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	25.51	0.000	0.00	R 42,692.32	R -	
		Handrail	m	45.84	0	30.11	R 1,417.88	R -	
		Grating	m2	60.74	0	17.06	R 2,502.48	R -	
		Kick flats	m	46.49	0	79.97	R 533.85	R -	
		Cat ladder	m	20.35	0	8.64	R 4,941.24	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	202	0.00		R -	R 1,133,597.98
		Steel	t	16.54	12.213	0.00	R 42,692.32	R 521,393.51	
		Handrail	m	1.10	184	31.41	R 1,359.20	R 249,597.66	
		Grating	m2	1.98	102	16.95	R 2,518.72	R 256,960.42	
		Kick flats	m	1.16	174	80.43	R 530.80	R 92,432.58	
		Stair treads	No	6.10	33	106.99	R 399.03	R 13,213.81	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	12.73	0.000	0.00	R 42,692.32	R -	
		Handrail	m	25.10	0	32.05	R 1,332.05	R -	
		Grating	m2	7.46	0	17.66	R 2,417.46	R -	
		Kick flats	m	22.84	0	84.46	R 505.47	R -	
		Cat ladder	m	20.48	0	8.85	R 4,823.99	R -	
	PIPING INSTALLATION	Pipe length	m	0.00	62,125	0.00		R -	R 63,712,011.36
		Total work units	WU	0.33	188,258	0.00	R 338.43	R 63,712,011.36	
		Pipe supports	kg	2.61	23,803	0.00		R -	
		WU for pipe supports	WU	0.16	30,121	0.00		R -	
		Number of welds	No	0.61	37,896	0.00		R -	
		Total fittings	No	0.38	23,608	0.00		R -	
		Stud bolts	No	0.34	8,027	0.00		R -	
		Support number	No	0.19	4,523	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	188,258	0.00	R 338.43		R 179,126.63

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	3,139	5.93	R 57.07	R 179,126.63	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	188,258	0.00	R 338.43		R 64,366.02
	Number of examinations	No	168.34	1,118	5.88	R 57.56	R 64,366.02	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	188,258	0.00	R 338.43		R 99,876.49
	Number of examinations	No	300.90	626	2.12	R 159.64	R 99,876.49	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	188,258	0.00	R 338.43		R 173,628.94
	Number of examinations	No	52.95	3,555	6.93	R 48.84	R 173,628.94	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	188,258	0.00	R 338.43		R 133,695.83
	Number of examinations	No	114.83	1,639	4.15	R 81.55	R 133,695.83	
MECHANICAL INSTALLATION	Total work units	WU	0.00	188,258	0.00	R 338.43		R 324,767.17
	Mechanical equipment	t	261.57	720	0.75	R 451.24	R 324,767.17	
	Structural steel	t	218.09	863	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	188,258	0.00	R 338.43		R 3,838,723.77
	Painting to piping	m2	17.88	10,529	0.34	R 130.17	R 1,370,504.46	
	Insulation to piping	m2	51.67	3,643	2.60	R 382.84	R 1,394,859.90	
	Mechanical equipment received	t	0.00	720	0.82	R 451.24	R 324,767.17	
	Painting to mechanical equipment	m2	0.25	2,879	3.69	R 122.29	R 352,051.13	
	Insulation to mechanical equipment	m2	0.70	1,028	1.17	R 385.68	R 396,541.11	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	42,115	0.00	R 60.54	R 2,549,642.10	R 6,510,237.95
	Electrical cable terminations	No	311.25	1,673	0.43	R 140.79	R 235,574.11	
	Electrical equipment	No	9.05	135	0.11	R 550.36	R 74,469.28	
	DB's	No	6.39	15	0.32	R 1,719.89	R 25,714.53	
	Rack	m	0.69	6,591	1.65	R 172.97	R 1,140,014.35	
	Support steel	kg	1.42	9,552	2.13	R 28.42	R 271,487.39	
	Instrumentation cable	m	27.43	32,415	0.35	R 28.50	R 923,827.50	
	Instruments	No	0.58	1,182	0.18	R 158.33	R 187,108.09	
	Hook-ups	No	3.98	2,037	0.16	R 178.13	R 362,925.18	
	Light fittings	No	10.26	539	0.02	R 336.33	R 181,125.85	
	Conduit	m	4.13	4,105	0.13	R 36.69	R 150,607.96	
	Instrument stands	No	0.00	286		R 1,425.00	R 407,741.61	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project E				
Location:	South Africa				
Client:				Date of estimate:	2008

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,445	R	4.28
2	Concrete demolitions	m3	85	R	1,602.00
3	Bulk excavation	m3	5,562	R	34.93
4	Vertical piles	No	25		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,487.00
7	Auger pile	m		R	310.49
8	Total paving and asphalt to road works	m2	2,995		
9	Grey paving to road works	m2	195	R	135.84
10	Asphalt to road surface	m2	2,800		
11	Rip bed of road works	m2	2,995	R	11.64
12	Total concrete in paving and bunding	m3	325	R	1,487.00
13	Concrete in paving	m3	175		
14	Rod reinforcement	t		R	12,005.00
15	Concrete in plinths and bases on area finishing	m3	220		
16	Stormwater pipe to drain surface run-off	m	321		
17	Machine excavation	m3		R	65.98
18	Concrete in pump and pipe support bases	m3	155	R	1,487.00
19	Concrete in tank bases	m3	75	R	1,487.00
20	Concrete in pipe and cable rack foundations	m3	155	R	1,487.00
21	Concrete to simple structural foundations	m3	212	R	1,487.00
22	Complex structural foundations - bases	m3	68	R	1,487.00
23	Concrete pipe racks - bases	m3	0	R	1,487.00
24	Concrete structure including concrete columns and beams - bases	m3	242	R	1,487.00
25	Major equipment bases with blast proof walls - bases	m3	322	R	1,487.00
26	Major equipment bases and elevated concrete structure - bases	m3	145	R	1,487.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	45	R	1,487.00
28	One brick wall	m2		R	349.30
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,487.00
30	Total building area - Structural steel buildings	m2	685		
31	Ceiling	m2		R	275.56
32	Structural steel	t		R	42,692.32
33	Steel canopy - concrete	m3	62	R	1,487.00
34	Steel canopy - area	m2	622		
35	Concrete in weighbridge - all concrete	m3	52	R	1,487.00
36	Total weighbridge area	m2	105		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	24	R	1,487.00
39	Total pump house area	m2	18		
40	Concrete in cooling tower	m3	322	R	1,487.00
41	Total cooling tower area	m2	212		
42	Emergency earth dam area - top of berm	m2	802		
43	Concrete in cable tunnel	m3	0	R	1,487.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	45		
46	Total volume of steel pipe rack	m3	855		
47	Total volume of steel complex steel structure	m3	7,225		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	202		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	338.43
52	Total process pipe length	m	62,125		
53	Total electrical cable - installation only	m	42,115	R	60.54
54	Total instrumentation cable - installation only	m	32,415	R	40.36

Ratio: Project Ratio Median

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Complex	Mean
Current economic conditions	Normal	Mean
Current economic factors	Good	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasiona	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project E			
Location:	South Africa			
Client:	0	Date of estimate:	2008	

	CIVIL CONSTRUCTION COST				R 41,501,788.40
A	SITE CLEARANCE AND DEMOLITIONS		R	210,834.60	
B	BULK EARTHWORKS		R	421,918.81	
C	PILING		R	1,254,461.95	
D	ROAD WORKS		R	1,140,476.95	
E	GENERAL PAVING AND BUNDED AREAS		R	1,066,330.10	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,334,497.56	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,028,317.77	
H	TANK BASES AND BUNDING		R	1,293,492.07	
I	RACK FOUNDATIONS		R	1,232,499.63	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,262,459.23	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	451,442.81	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,765,290.21	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	2,057,355.98	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,963,747.04	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,808,396.23	
Q	BUILDINGS - STEEL		R	2,587,897.97	
R	CANOPIES - STEEL		R	2,635,975.33	
S	WEIGHBRIDGE		R	492,026.35	
T	PUMP HOUSE		R	314,723.01	
U	COOLING TOWER		R	1,990,051.80	
V	EMERGENCY DAM		R	429,870.09	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	10,759,722.92	
	STRUCTURAL STEEL				R 20,056,387.32
A	STRUCTURAL STEEL - BASIC PLATFORM		R	358,064.13	
B	STRUCTURAL STEEL - PIPERACK		R	1,914,625.32	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	10,705,764.19	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	1,347,537.30	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	5,730,396.38	
	MECHANICAL AND PIPING				R 100,101,332.61
A	PIPING INSTALLATION		R	70,083,212.50	
B	RADIOGRAPHIC EXAMINATION (RT)		R	228,349.54	
C	DYE PENETRATION TESTING (DP)		R	140,889.16	
D	MAGNETIC PARTICLE TESTING (MPI)		R	135,406.48	
E	POST WELD HEAT TREATMENT		R	231,921.55	
F	MATERIAL HARDNESS TEST (HT)		R	274,925.18	
H	MECHANICAL INSTALLATION		R	406,247.46	
	Preliminaries and General	40.00%	R	28,600,380.75	
	PAINTING AND INSULATION				R 6,967,829.10
A	PAINTING AND INSULATION		R	5,161,354.89	
	Preliminaries and General	35.00%	R	1,806,474.21	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 9,837,954.82
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	7,287,373.94	
	Preliminaries and General	35.00%	R	2,550,580.88	

TOTAL COST	R 178,465,292.26

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,445		R 4.28	R 74,664.60	R 210,834.60
	Concrete demolitions	m3		85		R 1,602.00	R 136,170.00	
BULK EARTHWORKS	Bulk excavation	m3		5,562		R 34.93	R 194,280.66	R 421,918.81
	Trimming of sides	m2	2.20	2,528	4.18	R 8.36	R 21,126.65	
	Back fill and compact	m3	1.12	4,966	0.95	R 36.77	R 182,594.61	
	Overhaul	m3/km	1.62	3,433	11.35	R 3.08	R 10,566.20	
	Rip bed	m2	1.71	3,253	8.51	R 4.10	R 13,350.70	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 286,083.93	R 286,083.93	R 1,254,461.95
	EO for raking equipment	Item	0.00	1	24.25	R 36,059.75	R 36,059.75	
	Number of piles	No	0.00	25	0.00		R -	
	Move rig to new position	No	1.48	17	0.19	R 282.53	R 4,772.47	
	Number of raking piles	No	19.43	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.24	R 356.88	R 493.75	
	EO for raking drilling	m	0.14	9	0.61	R 189.40	R 1,740.67	
	Auger quantity	m	0.05	500	0.00	R 310.49	R 155,245.00	
	EO for drilling in coarse gravel	m	0.55	45	0.22	R 327.14	R 14,870.00	
	EO for drilling in boulders	m	1.65	15	0.51	R 758.37	R 11,490.45	
	EO for drilling in soft rock	m	1.57	16	0.23	R 342.01	R 5,446.02	
	Temporary casings	m	0.38	66	0.31	R 460.97	R 30,326.97	
	EO casing to raking pile	m	0.17	8	0.57	R 1,040.90	R 7,878.21	
	Mild steel rod reinforcement	t	14.65	1.706	0.70	R 7,556.93	R 12,895.79	
	High tensile rod reinforcement	t	1.16	21.552	7.26	R 10,795.62	R 232,664.22	
	Concrete to piles and bases	m3	0.16	156	0.00	R 1,487.00	R 232,343.75	
	Concrete to raking piles	m3	0.08	16	1.08	R 1,605.96	R 25,829.26	
	Site establishment of test equipment	Item	0.00	1	115.74	R 172,105.38	R 172,105.38	
	Load test to pile	No	93.50	0	22.16	R 32,951.92	R 8,810.67	
	Site establishment of intergity testing	No	255.00	0	49.96	R 74,290.52	R 7,283.38	
	Integrity testing of piles	No	1.19	21	0.26	R 386.62	R 8,122.27	
ROAD WORKS	Red paving	m2	0.14	27	0.93	R 126.33	R 3,448.84	R 1,140,476.95
	Grey paving	m2	0.00	195	0.00	R 135.84	R 26,488.80	
	Kerbing	m	0.09	270	0.00	R 257.18	R 69,324.00	
	Total paving and asphalt	m2	0.00	2,995	0.00		R -	
	Remove top soil	m3	0.49	294	4.45	R 51.80	R 15,203.23	
	Asphalt	m2	0.20	599	0.00	R 159.95	R 95,809.32	
	Rip bed	m2	0.00	2,995	0.00	R 11.64	R 34,861.80	
	Reduce levels	m3	0.36	1,078	4.30	R 50.05	R 53,966.07	
	Selected fill	m3	1.50	719	0.46	R 108.81	R 78,211.69	
	Imported fill	m3	1.94	371	0.33	R 329.72	R 122,167.59	
	Wearing course	m3	3.89	277	0.20	R 250.26	R 69,365.12	
	Prime	m2	4.34	3,120	1.47	R 32.97	R 102,860.22	
	Three line road marking	m	0.78	2,433	0.10	R 25.72	R 62,580.16	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.99	267	4.06	R 7.72	R 2,058.92	
	1m Wide concrete V-drain	m	1.00	270	0.78	R 1,100.75	R 296,706.71	
	200mm Diameter PVC pipe	m	0.93	251	0.09	R 342.05	R 85,746.85	
	Road marking - STOP	No	0.15	40	0.03	R 421.78	R 17,053.70	
	Standard signage	No	0.01	3	4.28	R 473.22	R 1,275.56	
	100mm Painted line	m	1.61	434	1.33	R 7.72	R 3,348.35	
			0.00		1.64			
			0.00		1.84			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	175	0.75	R 1,487.00	R 260,225.00	R 1,066,330.10
		Concrete in plinths	m3	0.00	36	0.00	R 1,487.00	R 53,324.80	
		Total concrete	m3	0.00	325	0.00		R -	
		Rip and compact	m2	0.13	1,346	193.57	R 7.68	R 10,341.12	
		Formwork to plinth	m2	6.92	248	0.12	R 178.44	R 44,280.91	
		Formwork to slab	m2	0.80	140	0.15	R 223.05	R 31,227.00	
		High tensile steel	t	0.01	3.250	0.00	R 12,005.00	R 39,016.25	
		Mesh	m2	607.27	1,974	43.37	R 276.80	R 546,308.47	
		Construction joint	m	3.64	637	0.04	R 59.48	R 37,888.76	
		Expansion joint	m	2.10	368	0.08	R 118.96	R 43,717.80	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	4,341	0.00		R -	R 1,334,497.56
		Base excavation	m3	1.42	512	0.00	R 65.98	R 33,757.21	
		Backfill	m3	0.56	360	0.63	R 104.73	R 37,734.42	
		Working space	m2	0.43	914	1.35	R 77.58	R 70,876.81	
		Concrete in bases	m3	0.04	220	23.71	R 1,487.00	R 327,140.00	
		Blinding	m2	0.71	350	19.17	R 77.57	R 27,160.12	
		Concrete in sump walls	m3	0.11	24	31.87	R 1,487.00	R 35,985.40	
		Concrete in slabs	m3	0.02	4	0.81	R 1,487.00	R 6,542.80	
		Total concrete	m3	0.00	249	0.03		R -	
		Wood float	m2	0.61	408	123.90	R 12.00	R 4,891.15	
		Formwork to bases	m2	1.73	381	0.12	R 178.44	R 67,914.26	
		Formwork to sump walls	m2	11.18	271	0.12	R 178.44	R 48,278.01	
		Formwork to sides of slab	m2	5.67	25	0.17	R 252.79	R 6,306.60	
		Mild steel reinforcement	t	0.08	2.123	0.00	R 12,005.00	R 25,480.84	
		High tensile reinforcement	t	9.37	26.531	0.92	R 12,005.00	R 318,510.46	
		Cast in steel	kg	0.45	489	33.55	R 44.32	R 21,668.49	
		Waterstop	m	0.44	55	8.37	R 177.66	R 9,771.21	
		Manhole	No	0.08	26	2.72	R 4,555.76	R 116,991.91	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	321	0.12	R 546.69	R 175,487.87	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS							R 1,028,317.77
	Restricted base excavation	m3	1.61	250	0.05	R 65.98	R 16,465.31	
	Working space	m2	0.33	756	0.68	R 44.87	R 33,928.52	
	Backfill	m3	3.97	63	1.27	R 83.79	R 5,267.24	
	Concrete bases	m3	0.93	155	0.00	R 1,487.00	R 230,485.00	
	Concrete plinth	m3	2.01	77	0.00	R 1,487.00	R 114,669.15	
	Total concrete	m3	0.00	232	0.00		R -	
	Wood float	m2	0.46	168	0.05	R 14.87	R 2,492.81	
	Blinding	m2	0.93	167	0.01	R 74.35	R 12,391.67	
	Formwork bases	m2	0.47	330	0.12	R 178.44	R 58,847.23	
	Formwork plinth	m2	0.53	145	0.12	R 178.44	R 25,962.83	
	High tensile reinforcement	t	10.15	22.868	6.60	R 12,005.00	R 274,535.34	
	Cast in steel	kg	0.10	2,321	0.03	R 44.61	R 103,546.25	
	HD Bolts	kg	0.08	2,901	0.03	R 44.61	R 129,432.81	
	Grout	m3	33.79	2.282	5.98	R 8,892.26	R 20,293.62	
	TANK BASES AND BUNDING							R 1,293,492.07
	Restricted excavation	m3	5.54	416	0.05	R 74.35	R 30,892.43	
	Working space	m2	3.95	105	1.56	R 47.66	R 5,013.38	
	Backfill	m3	1.34	310	0.75	R 99.13	R 30,738.73	
	Concrete bases	m3	0.70	75	0.00	R 1,487.00	R 111,525.00	
	Concrete sump wall	m3	2.55	29	0.00	R 1,487.00	R 43,735.29	
	Concrete slab	m3	0.56	134	0.00	R 1,487.00	R 199,151.79	
	Concrete plinth	m3	3.73	20	19.74	R 1,487.00	R 29,899.46	
	Concrete column	m3	19.00	4	160.09	R 1,487.00	R 5,869.74	
	Total concrete	m3	0.00	262	0.99		R -	
	Blinding	m2	2.44	108	1.05	R 75.33	R 8,100.83	
	Wood float	m2	0.25	1,050	1.05	R 9.29	R 9,749.05	
	Formwork to bases	m2	0.39	192	1.05	R 196.69	R 37,825.60	
	Formwork to plinths	m2	0.34	59	7.56	R 205.96	R 12,180.00	
	Formwork to columns	m2	0.11	36	7.22	R 217.08	R 7,789.96	
	Formwork to sumps	m2	0.10	294	6.85	R 203.14	R 59,747.67	
	Formwork to slabs	m2	3.83	35	7.32	R 184.72	R 6,459.36	
	Formwork to slabs n/e 300mm	m	2.05	65	8.05	R 67.59	R 4,415.78	
	Mild steel reinforcement	t	0.22	2.610	22.00	R 12,005.00	R 31,329.62	
	High tensile reinforcement	t	22.12	11.862	0.90	R 12,005.00	R 142,407.38	
	Mesh	m2	0.15	893	54.97	R 218.39	R 194,992.72	
	Cast in items	kg	0.19	1,381	218.75	R 54.88	R 75,790.71	
	HD Bolts	kg	0.09	2,915	198.48	R 60.48	R 176,343.06	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio		Rate		Sub-total		Total
		Grout	m3	200.00	1.312	0.16	R	9,293.75	R	12,193.17		
		Construction joint	m	0.29	462	24.07	R	61.78	R	28,530.55		
		Expansion joint	m	0.44	304	15.71	R	94.65	R	28,810.80		
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	508	0.05	R	74.35	R	37,799.54	R	1,232,499.63
		Working space	m2	0.30	1,695	1.58	R	117.47	R	199,077.58		
		Backfill	m3	2.36	215	0.78	R	95.32	R	20,534.30		
		Blinding	m2	0.40	388	24.38	R	60.99	R	23,634.64		
		Concrete bases	m3	5.73	155	0.00	R	1,487.00	R	230,485.00		
		Concrete plinth	m3	0.00	27	0.00	R	1,487.00	R	40,224.26		
		Total concrete	m3	0.00	182	1.35			R	-		
		Wood float	m2	0.35	443	182.61	R	8.14	R	3,606.20		
		Formwork bases	m2	0.49	316	11.01	R	135.06	R	42,722.76		
		Formwork plinths	m2	0.09	301	6.94	R	214.27	R	64,400.03		
		High tensile reinforcement	t	9.11	19.984	0.00	R	12,005.00	R	239,903.14		
		HD Bolts	kg	0.03	5,167	198.55	R	60.46	R	312,394.02		
		Grout	m3	76.52	2.026	0.17	R	8,747.06	R	17,718.17		
		Restricted excavation	m3	3.89	825	0.05	R	74.35	R	61,314.96	R	2,262,459.23
	SIMPLE STRUCTURAL FOUNDATIONS	Working space	m2	0.45	1,833	1.88	R	39.55	R	72,476.31		
		Backfill	m3	2.48	333	0.78	R	95.32	R	31,697.15		
		Blinding	m2	0.35	606	21.52	R	69.10	R	41,853.96		
		Concrete bases	m3	0.00	212	0.00	R	1,487.00	R	315,244.00		
		Concrete plinth	m3	2.36	72	0.00	R	1,487.00	R	106,501.35		
		Concrete slab	m3	2.96	90	0.00	R	1,487.00	R	133,577.97		
		Total concrete	m3	0.00	373	0.00			R	-		
		Wood float	m2	0.51	732	155.50	R	9.56	R	7,002.37		
		Formwork bases	m2	0.45	471	8.00	R	185.88	R	87,567.78		
		Formwork plinths	m2	0.10	716	7.78	R	191.13	R	136,891.20		
		High tensile reinforcement	t	12.87	29.017	0.00	R	12,005.00	R	348,352.20		
		HD Bolts	kg	0.02	10,600	190.91	R	62.88	R	666,560.16		
		Cast in items	kg	0.05	4,240	225.21	R	53.31	R	226,016.61		
		Grout	m3	67.67	3.133	0.17	R	8,747.06	R	27,403.23		
		Restricted excavation	m3	2.03	138	0.05	R	74.35	R	10,263.27	R	451,442.81
	COMPLEX STRUCTURAL FOUNDATIONS	Working space	m2	0.50	276	1.64	R	45.34	R	12,516.19		
		Backfill	m3	2.15	64	0.76	R	97.83	R	6,281.07		
		Blinding	m2	0.66	103	20.25	R	73.43	R	7,565.73		
		Concrete bases	m3	0.00	68	0.00	R	1,487.00	R	101,116.00		
		Concrete column	m3	27.56	2	0.00	R	1,487.00	R	3,668.94		

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	15	0.00	R 1,487.00	R 21,652.25	
	Total concrete	m3	0.00	85	0.00		R -	
	Wood float	m2	0.59	144	157.14	R 9.46	R 1,363.75	
	Formwork bases	m2	0.49	139	7.78	R 191.13	R 26,524.32	
	Formwork plinths	m2	0.31	47	7.42	R 200.40	R 9,413.20	
	Formwork to columns	m2	0.29	9	7.75	R 191.87	R 1,632.45	
	High tensile reinforcement	t	8.97	9.479	0.00	R 12,005.00	R 113,797.73	
	HD bolts	kg	0.04	2,126	200.18	R 59.97	R 127,480.97	
	Grout	m3	96.76	0.879	0.16	R 9,293.75	R 8,166.93	
	Restricted excavation	m3	2.62	0	0.05	R 74.35	R -	R -
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.25	0	2.02	R 36.81	R -	
	Backfill	m3	1.91	0	0.79	R 94.11	R -	
	Blinding	m2	0.68	0	20.00	R 74.35	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,487.00	R -	
	Concrete column	m3	1.08	0	145.46	R 1,487.00	R -	
	Concrete beam	m3	2.50	0	0.88	R 1,487.00	R -	
	Total concrete	m3	2.76	0	0.88		R -	
	Wood float	m2	0.44	0	7.44	R 10.22	R -	
	Formwork bases	m2	0.45	0	6.41	R 199.87	R -	
	Formwork to columns	m2	0.14	0	7.35	R 202.31	R -	
	Formwork to sides beams	m2	0.32	0	5.90	R 231.98	R -	
	Formwork to soffits beams	m2	0.68	0	6.41	R 252.03	R -	
	Formwork corbels	m2	10.42	0	4.87	R 305.34	R -	
	High tensile reinforcement	t	8.81	0.000	0.00	R 12,005.00	R -	
	Cast in steel	kg	0.03	0	260.94	R 46.01	R -	
	HD bolts	kg	1.43	0	199.28	R 60.24	R -	
	Grout	m3	476.47	0.000	0.16	R 9,293.75	R -	
	Restricted excavation	m3	3.71	898	0.05	R 74.35	R 66,752.92	R 3,765,290.21
	Working space	m2	0.58	1,548	1.69	R 43.99	R 68,101.32	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	781	0.78	R 95.32	R 74,417.97	
	Blinding	m2	0.62	390	19.41	R 76.61	R 29,902.61	
	Concrete bases	m3	0.00	242	0.88	R 1,487.00	R 359,854.00	
	Concrete column	m3	2.01	120	1.07	R 1,487.00	R 179,031.84	
	Concrete beam	m3	0.83	145	1.00	R 1,487.00	R 215,701.01	
	Concrete surface slab	m3	1.64	148	0.92	R 1,487.00	R 219,423.17	
	Concrete wall	m3	2.14	56	1.00	R 1,487.00	R 83,659.74	
	Concrete elevated slab	m3	0.97	124	0.00	R 1,487.00	R 184,568.91	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	835	0.00		R -	
		Wood float	m2	0.60	1,392	152.05	R 9.78	R 13,616.56	
		Formwork bases	m2	0.39	621	7.60	R 195.66	R 121,408.23	
		Formwork to columns	m2	0.15	803	6.20	R 239.84	R 192,507.36	
		Formwork to sides beams	m2	0.29	500	4.91	R 302.85	R 151,486.07	
		Formwork to soffits beams	m2	0.79	184	7.19	R 206.82	R 37,974.86	
		Formwork to soffts of slabs	m2	0.30	492	3.11	R 263.19	R 129,453.20	
		Formwork to pockets	m2	25.00	5	5.65	R 478.14	R 2,302.66	
		Formwork wall	m2	0.12	469	7.88	R 188.71	R 88,472.65	
		High tensile reinforcement	t	8.60	97.139	0.00	R 12,005.00	R 1,166,159.06	
		Cast in steel	kg	0.21	3,978	251.20	R 47.79	R 190,115.41	
		HD bolts	kg	0.39	2,142	193.52	R 62.03	R 132,881.88	
		Steel handrailing	m	2.48	39	9.30	R 1,290.86	R 50,561.87	
		Grout	m3	994.87	0.840	0.18	R 8,261.11	R 6,936.91	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	246	0.04	R 59.48	R 14,620.27	R 2,057,355.98
		Working space	m2	7.47	33	1.41	R 42.18	R 1,388.08	
		Backfill	m3	4.63	53	0.74	R 44.02	R 2,336.72	
		Blinding	m2	1.22	264	19.45	R 76.45	R 20,178.43	
		Concrete bases	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
		Concrete column	m3	28.46	11	0.00	R 1,487.00	R 16,824.10	
		Concrete beam	m3	1.44	8	0.00	R 1,487.00	R 11,683.41	
		Concrete wall	m3	11.19	29	0.00	R 1,487.00	R 42,789.45	
		Concrete elevated slabs	m3	11.80	1	0.00	R 1,487.00	R 1,425.77	
		Total concrete	m3	0.00	371	0.00		R -	
		Wood float	m2	0.88	421	160.92	R 9.24	R 3,894.77	
		Formwork bases	m2	8.70	37	6.92	R 214.88	R 7,953.19	
		Formwork to columns	m2	0.15	75	5.95	R 233.81	R 17,635.33	
		Formwork to sides beams	m2	0.17	46	5.05	R 249.92	R 11,550.57	
		Formwork to soffits beams	m2	0.51	15	6.36	R 294.46	R 4,536.36	
		Formwork to soffts of slabs	m2	0.14	7	3.22	R 277.94	R 1,903.57	
		Formwork to pockets	m2	450.00	1	5.35	R 461.80	R 330.44	
		Formwork wall	m2	0.11	262	6.97	R 213.34	R 55,809.91	
		High tensile reinforcement	t	4.12	90.026	0.00	R 12,005.00	R 1,080,757.91	
		Cast in steel	kg	0.16	2,318	209.64	R 57.26	R 132,749.08	
		HD bolts	kg	0.24	1,545	171.78	R 69.89	R 108,004.49	
		Galvanised grating	m2	18.82	20	0.16	R 1,955.21	R 38,533.43	
		Grout	m3	822.89	0.391	6.14	R 9,293.75	R 3,636.68	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.48	215	0.05	R 74.35	R 15,955.51	R 2,963,747.04
	Working space	m2	0.38	565	1.56	R 47.66	R 26,915.50	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.98	108	0.78	R 95.32	R 10,331.20	
	Blinding	m2	4.71	31	21.03	R 70.71	R 2,176.80	
	Concrete bases	m3	0.00	145	0.00	R 1,487.00	R 215,615.00	
	Concrete column	m3	6.03	24	0.00	R 1,487.00	R 35,757.05	
	Concrete beam	m3	1.73	14	0.00	R 1,487.00	R 20,668.81	
	Concrete wall	m3	33.33	4	0.00	R 1,487.00	R 6,469.10	
	Concrete elevated slabs	m3	24.00	1	0.00	R 1,487.00	R 1,489.88	
	Total concrete	m3	0.00	188	0.00		R -	
	Wood float	m2	4.62	31	151.91	R 9.79	R 307.22	
	Formwork bases	m2	1.43	101	7.62	R 195.14	R 19,787.36	
	Formwork to columns	m2	0.13	185	6.99	R 237.54	R 43,938.37	
	Formwork to sides beams	m2	0.23	60	5.94	R 212.73	R 12,856.14	
	Formwork to soffits beams	m2	0.69	20	6.26	R 250.34	R 5,042.90	
	Formwork to soffts of slabs	m2	0.20	5	3.67	R 259.97	R 1,302.34	
	Formwork to pockets	m2	2.86	51	5.72	R 405.18	R 20,542.20	
	Formwork wall	m2	0.29	15	7.33	R 202.86	R 3,043.28	
	High tensile reinforcement	t	7.10	26.521	0.00	R 12,005.00	R 318,383.55	
	Cast in steel	kg	0.02	9,415	188.96	R 63.53	R 598,148.61	
	HD bolts	kg	0.01	18,830	197.35	R 60.83	R 1,145,438.67	
	Galvanised grating	m2	3.64	52	0.17	R 8,747.06	R 452,488.42	
	Grout	m3	40.32	3.596	6.09	R 1,971.26	R 7,089.12	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	78	0.05	R 74.35	R 5,788.15	R 1,808,396.23
	Working space	m2	2.26	34	1.69	R 43.99	R 1,515.46	
	Backfill	m3	1.23	63	0.76	R 97.83	R 6,191.86	
	Blinding	m2	3.82	12	19.66	R 75.64	R 891.00	
	Concrete	m3	0.00	45	0.00	R 1,487.00	R 66,915.00	
	Mesh reinforcement	m2	0.40	113	61.78	R 194.32	R 21,860.84	
	Rough formwork	m2	2.73	16	7.94	R 187.28	R 3,087.03	
	Smooth formwork	m2	0.56	80	6.78	R 219.32	R 17,624.05	
	Finish to concrete	m2	0.22	205	108.86	R 13.66	R 2,794.04	
	Construction joints	m	4.61	10	19.60	R 75.87	R 740.57	
	Movement joints	m	14.81	3	15.71	R 94.65	R 287.60	
	Cast in steel	kg	2.30	20	221.43	R 54.22	R 1,060.74	
	Grout	m3	803.00	0.056	0.16	R 9,293.75	R 520.82	
	Brick walls	m2	0.46	98	0.00	R 349.30	R 34,170.65	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	198	0.00		R -	
	Waterproofing membrane	m2	2.00	99	11.21	R 132.65	R 13,132.29	
	Roof construction	m2	1.99	99	34.10	R 352.05	R 35,028.37	
	Ceiling	m2	0.97	204	0.00	R 275.56	R 56,248.33	
	Doors and windows	No	434.63	0	0.15	R 2,328.67	R 1,060.85	
	Floor finish	m2	1.00	198	0.77	R 453.64	R 89,820.00	
	Wall finsih	m2	1.01	196	1.37	R 254.96	R 49,982.94	
	Rod reinforcement	t	8.63	5	0.00	R 12,005.00	R 62,598.49	
	Metalwork	Item	0.00	1	4.56	R 54,742.80	R 54,742.80	
	Structural steel	Item	0.00	1	11.81	R 141,779.05	R 141,779.05	
	Plumbing and drainage	Item	0.00	1	7.52	R 90,277.60	R 90,277.60	
	Small power and lighting	Item	0.00	1	64.07	R 769,160.35	R 769,160.35	
	External works	Item	0.00	1	189.05	R 281,117.35	R 281,117.35	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.16	R 1,487.00	R 126,395.00	R 2,587,897.97
	Earthworks	m3	2.30	196	8.34	R 178.30	R 34,857.13	
	Reinforcement	t	8.29	10	0.00	R 12,005.00	R 123,091.07	
	Mesh	m2	0.11	773	9.20	R 161.63	R 124,896.25	
	Formwork	m2	0.40	213	7.44	R 199.87	R 42,471.44	
	Brickwork	m2	5.73	120	5.65	R 263.19	R 31,462.88	
	Roof covering	m2	0.83	825	202.02	R 211.33	R 174,408.59	
	Structural steel	t	17.93	38	0.00	R 42,692.32	R 1,631,022.82	
	Side cladding	m2	1.49	460	0.95	R 200.76	R 92,296.09	
	Doors	No	371.00	2	0.49	R 20,919.24	R 38,624.47	
	Ridge ventilator	m	20.62	33	10.67	R 2,254.86	R 74,906.88	
	Aluminium insulation	m2	0.88	778	1.76	R 120.07	R 93,465.35	
	Total building area	m2	0.00	685	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	171	0.12	R 178.44	R 30,534.65	R 2,635,975.33
	Concrete	m3	0.00	62	0.00	R 1,487.00	R 92,194.00	
	Reinforcement	t	10.55	6	0.16	R 12,005.00	R 70,550.71	
	Mesh	m2	0.11	564	9.84	R 151.12	R 85,175.54	
	Formwork	m2	0.41	151	8.08	R 184.03	R 27,829.63	
	Brickwork	m2	5.78	108	5.59	R 266.01	R 28,626.07	
	Screed	m2	1.10	565	39.96	R 37.21	R 21,041.81	
	Structural steel	t	14.85	42	0.00	R 42,692.32	R 1,788,190.10	
	Cat ladders	m	2.52	17	9.58	R 4,456.40	R 74,070.90	
	Hand rail	m	0.72	58	26.40	R 1,617.13	R 94,075.66	
	Kick plates	m	0.73	57	2.64	R 612.55	R 35,146.57	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	715	193.17	R 221.01	R 158,008.78	
		Side cladding	m2	4.70	132	0.92	R 203.33	R 26,908.56	
		Floor grating	m2	1.06	40	16.28	R 2,622.38	R 103,622.35	
		Total buiding area	m2	0.00	622	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	176	7.88	R 188.71	R 33,265.02	R 492,026.35
		Blinding	m2	0.48	108	20.45	R 72.71	R 7,877.34	
		Concrete	m3	0.00	52	0.00	R 1,487.00	R 77,324.00	
		Reinforcement	t	8.00	7	0.00	R 12,005.00	R 78,032.50	
		Mesh	m2	0.50	104	48.38	R 248.14	R 25,806.53	
		Formwork	m2	0.35	149	7.78	R 191.13	R 28,396.62	
		Finish to concrete	m2	0.46	113	108.02	R 13.77	R 1,556.15	
		Movement joints	m	2.57	20	15.71	R 94.65	R 1,915.16	
		Cast in steel	kg	0.09	578	204.99	R 58.56	R 33,836.88	
		Grout	m3	72.28	0.719	2.62	R 8,747.06	R 6,292.85	
		Brickwork	m2	0.25	36	0.17	R 349.30	R 12,574.80	
		Doors and windows	No	3.00	3	0.28	R 3,881.11	R 11,643.33	
		Pipework	m	2.93	36	0.22	R 567.56	R 20,339.08	
		Bolts	kg	0.11	473	0.09	R 58.56	R 27,684.72	
		Structural steel	t	4.50	2	0.00	R 42,875.00	R 85,750.00	
		Miscellaneous steel	t	144.21	1	0.00	R 54,568.18	R 39,731.36	
		Total bridge area	m2	0.00	105	0.00		R -	
		Total control room area	m2	0.00	9	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.76	186	6.28	R 236.78	R 44,098.55	R 314,723.01
		Blinding	m2	0.82	29	15.92	R 93.40	R 2,733.79	
		Concrete	m3	0.00	24	0.00	R 1,487.00	R 35,688.00	
		Reinforcement	t	5.77	4	0.00	R 12,005.00	R 49,934.14	
		Formwork	m2	0.07	343	5.92	R 251.18	R 86,119.69	
		Finish to concrete	m2	0.34	71	81.15	R 18.32	R 1,293.47	
		Movement joints	m	0.46	52	15.43	R 96.37	R 5,028.04	
		Cast in steel	kg	28.85	0.832	181.80	R 66.03	R 54.93	
		Grout	m3	24.19	0.992	0.79	R 9,293.75	R 9,220.75	
		Bolts	kg	121.43	0.198	0.16	R 52.17	R 10.31	
		Structural steel	t	43.33	0.415	0.26	R 46,173.08	R 19,181.06	
		Miscellaneous steel	t	24.14	0.746	0.18	R 66,694.44	R 49,730.74	
		Brickwork	m2	0.60	30	4.81	R 309.15	R 9,274.43	
		Roof covering	m2	1.79	10	1.32	R 234.20	R 2,355.11	
		Total pump house area	m2	0.00	18	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	293	7.10	R 209.44	R 61,369.12	R 1,990,051.80
	Blinding	m2	1.40	230	19.02	R 78.18	R 17,981.60	
	Concrete	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
	Reinforcement	t	5.77	55.806	0.00	R 12,005.00	R 669,949.74	
	Formwork	m2	0.20	1,610	7.01	R 212.13	R 341,522.11	
	Movement joint	m	1.86	173	0.13	R 101.36	R 17,547.84	
	Cast in steel	kg	0.15	2,147	14.67	R 56.05	R 120,317.16	
	Bolts	kg	0.39	826	214.19	R 69.72	R 57,566.62	
	Chemical anchors	No	7.24	44	0.25	R 292.45	R 13,006.68	
	Miscellaneous steelwork	t	91.86	3.505	172.18	R 48,020.00	R 168,326.15	
	Pre-cast concrete	m3	36.75	9	41.05	R 4,130.56	R 36,191.53	
	Brickwork	m2	8.86	24	0.36	R 311.74	R 7,459.24	
	Total area	m2	0.00	212	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	1,234	1.69	R 125.65	R 155,034.62	R 429,870.09
	Lining	m2	0.82	978	1.50	R 74.35	R 72,717.93	
	Paving	m2	0.84	955	0.59	R 126.02	R 120,316.18	
	Pipework	m	28.97	28	0.26	R 483.28	R 13,378.89	
	Manholes	No	17.25	2	0.11	R 4,393.41	R 7,050.80	
	Concrete	m3	2.90	10	0.05	R 1,487.00	R 14,195.11	
	Formwork	m2	0.10	95	5.83	R 255.06	R 24,348.39	
	Mesh	m2	0.78	12	7.36	R 202.04	R 2,472.67	
	Reinforcement	t	5.63	1.696	0.14	R 12,005.00	R 20,355.49	
	Dam area (to top of berm)	m2	0.00	802	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	0	5.85	R 254.19	R -	R -
	Blinding	m2	0.92	0	13.72	R 108.38	R -	
	Concrete	m3	0.00	0	0.00	R 1,487.00	R -	
	Reinforcement	t	4.44	0.000	0.00	R 12,005.00	R -	
	Mesh	m2	1.14	0	41.22	R 291.24	R -	
	Formwork	m2	0.15	0	5.63	R 264.12	R -	
	Cast in steel	kg	0.03	0	157.23	R 76.35	R -	
	Miscellaneous steelwork	t	13.35	0.000	0.18	R 66,694.44	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	45	0.00		R -	R 358,064.13
	Steel	t	8.75	5.143	0.00	R 42,692.32	R 219,560.50	
	Handrail	m	1.45	31	25.58	R 1,668.97	R 51,795.70	
	Grating	m2	1.79	25	15.88	R 2,688.43	R 67,586.31	
	Kick flats	m	1.64	27	75.83	R 563.00	R 15,448.18	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	8	90.17	R 473.46	R 3,673.43	
	STRUCTURAL STEEL - PIPERACK Total volume	m3	0.00	855	0.00		R -	R 1,914,625.32
	Steel	t	23.48	36.414	0.00	R 42,692.32	R 1,554,596.83	
	Handrail	m	12.68	67	29.85	R 1,430.23	R 96,438.91	
	Grating	m2	12.33	69	16.37	R 2,607.96	R 180,844.00	
	Kick flats	m	12.52	68	77.41	R 551.51	R 37,662.96	
	Cat ladder	m	94.92	9	8.53	R 5,004.96	R 45,082.62	
	STRUCTURAL STEEL - COMPLEX STRUCTURES Total volume	m3	0.00	7,225	0.00		R -	R 10,705,764.19
	Steel	t	64.24	112.469	0.00	R 42,692.32	R 4,801,556.85	
	Handrail	m	29.15	248	28.17	R 1,515.52	R 375,631.67	
	Grating	m2	3.70	1,953	15.96	R 2,674.96	R 5,223,396.53	
	Kick flats	m	32.29	224	77.41	R 551.51	R 123,402.08	
	Stair treads	No	217.41	33	91.87	R 464.70	R 15,443.10	
	Cat ladder	m	228.94	32	8.10	R 5,270.66	R 166,333.95	
	STRUCTURAL STEEL - STACK Total volume	m3	0.00	0	0.00		R -	R -
	Steel	t	22.16	0.000	0.00	R 42,692.32	R -	
	Handrail	m	45.11	0	26.08	R 1,636.98	R -	
	Grating	m2	58.13	0	15.86	R 2,691.82	R -	
	Kick flats	m	42.58	0	77.41	R 551.51	R -	
	Cat ladder	m	19.44	0	8.11	R 5,264.16	R -	
	STRUCTURAL STEEL - WALKWAY Total volume	m3	0.00	202	0.00		R -	R 1,347,537.30
	Steel	t	13.69	14.755	0.00	R 42,692.32	R 629,937.81	
	Handrail	m	1.04	194	26.86	R 1,589.44	R 308,717.88	
	Grating	m2	1.91	106	15.68	R 2,722.72	R 287,953.06	
	Kick flats	m	1.08	187	76.30	R 559.53	R 104,653.28	
	Stair treads	No	5.57	36	95.13	R 448.78	R 16,275.28	
	STRUCTURAL STEEL - CABLE GANTRY Total volume	m3	0.00	0	0.00		R -	R -
	Steel	t	11.98	0.000	0.00	R 42,692.32	R -	
	Handrail	m	22.00	0	26.10	R 1,635.72	R -	
	Grating	m2	7.32	0	15.97	R 2,673.28	R -	
	Kick flats	m	22.59	0	78.04	R 547.06	R -	
	Cat ladder	m	18.87	0	8.22	R 5,193.71	R -	
	Pipe length	m	0.00	62,125	0.00		R -	R 70,083,212.50
	PIPING INSTALLATION Total work units	WU	0.30	207,083	0.00	R 338.43	R 70,083,212.50	
	Pipe supports	kg	2.49	24,950	0.00		R -	
	WU for pipe supports	WU	0.16	33,133	0.00		R -	
	Number of welds	No	0.56	34,790	0.00		R -	
	Total fittings	No	0.39	24,229	0.00		R -	
	Stud bolts	No	0.35	8,480	0.00		R -	
	Support number	No	0.19	4,740	0.00		R -	
	RADIOGRAPHIC Total work units	WU	0.00	207,083	0.00	R 338.43		R 228,349.54

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	3,725	5.52	R 61.31	R 228,349.54	
DYE PENETRATION	Total work units	WU	0.00	207,083	0.00	R 338.43		R 140,889.16
TESTING (DP)	Number of examinations	No	164.17	1,261	3.03	R 111.69	R 140,889.16	
MAGNETIC PARTICLE	Total work units	WU	0.00	207,083	0.00	R 338.43		R 135,406.48
TESTING (MPI)	Number of examinations	No	273.85	756	1.89	R 179.06	R 135,406.48	
POST WELD HEAT	Total work units	WU	0.00	207,083	0.00	R 338.43		R 231,921.55
TREATMENT	Number of examinations	No	46.49	4,454	6.50	R 52.07	R 231,921.55	
MATERIAL HARDNESS	Total work units	WU	0.00	207,083	0.00	R 338.43		R 274,925.18
TEST (HT)	Number of examinations	No	106.66	1,942	2.39	R 141.60	R 274,925.18	
MECHANICAL	Total work units	WU	0.00	207,083	0.00	R 338.43		R 406,247.46
INSTALLATION	Mechanical equipment	t	236.32	876	0.73	R 463.60	R 406,247.46	
	Structural steel	t	192.98	1,073	54.54			
	Total work units	WU	0.00	207,083	0.00	R 338.43		R 5,161,354.89
PAINTING & INSULATION	Painting to piping	m2	16.80	12,326	0.32	R 144.01	R 1,775,157.36	
	Insulation to piping	m2	48.21	4,295	2.35	R 450.04	R 1,933,120.96	
	Mechanical equipment received	t	0.00	876	0.81	R 463.60	R 406,247.46	
	Painting to mechanical equipment	m2	0.23	3,810	3.37	R 137.57	R 524,122.65	
	Insulation to mechanical equipment	m2	0.67	1,308	1.16	R 399.66	R 522,706.46	
ELECTRICAL &	Electrical cable	m	22.74	42,115	0.00	R 60.54	R 2,549,642.10	R 7,287,373.94
INSTRUMENTATION -	Electrical cable terminations	No	276.76	1,852	0.38	R 159.32	R 295,056.49	
INSTALLATION ONLY	Electrical equipment	No	8.25	152	0.10	R 605.40	R 92,124.66	
	DB's	No	5.97	18	0.28	R 2,162.14	R 39,880.81	
	Rack	m	0.59	7,054	1.65	R 189.19	R 1,334,611.65	
	Support steel	kg	1.34	11,957	1.99	R 30.42	R 363,747.32	
	Instrumentation cable	m	23.73	32,415	0.32	R 28.50	R 923,827.50	
	Instruments	No	0.44	1,366	0.16	R 178.13	R 243,317.40	
	Hook-ups	No	3.69	3,105	0.15	R 190.00	R 589,860.36	
	Light fittings	No	9.97	562	0.02	R 378.38	R 212,462.50	
	Conduit	m	3.99	4,224	0.11	R 36.69	R 154,988.73	
	Instrument stands	No	0.00	342		R 1,425.00	R 487,854.43	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project E				
Location:	South Africa				
Client:				Date of estimate:	2008

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,445	R	4.28
2	Concrete demolitions	m3	85	R	1,602.00
3	Bulk excavation	m3	5,562	R	34.93
4	Vertical piles	No	25		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,487.00
7	Auger pile	m		R	310.49
8	Total paving and asphalt to road works	m2	2,995		
9	Grey paving to road works	m2	195	R	135.84
10	Asphalt to road surface	m2	2,800		
11	Rip bed of road works	m2	2,995	R	11.64
12	Total concrete in paving and bunding	m3	325	R	1,487.00
13	Concrete in paving	m3	175		
14	Rod reinforcement	t		R	12,005.00
15	Concrete in plinths and bases on area finishing	m3	220		
16	Stormwater pipe to drain surface run-off	m	321		
17	Machine excavation	m3		R	65.98
18	Concrete in pump and pipe support bases	m3	155	R	1,487.00
19	Concrete in tank bases	m3	75	R	1,487.00
20	Concrete in pipe and cable rack foundations	m3	155	R	1,487.00
21	Concrete to simple structural foundations	m3	212	R	1,487.00
22	Complex structural foundations - bases	m3	68	R	1,487.00
23	Concrete pipe racks - bases	m3	0	R	1,487.00
24	Concrete structure including concrete columns and beams - bases	m3	242	R	1,487.00
25	Major equipment bases with blast proof walls - bases	m3	322	R	1,487.00
26	Major equipment bases and elevated concrete structure - bases	m3	145	R	1,487.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	45	R	1,487.00
28	One brick wall	m2		R	349.30
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,487.00
30	Total building area - Structural steel buildings	m2	685		
31	Ceiling	m2		R	275.56
32	Structural steel	t		R	42,692.32
33	Steel canopy - concrete	m3	62	R	1,487.00
34	Steel canopy - area	m2	622		
35	Concrete in weighbridge - all concrete	m3	52	R	1,487.00
36	Total weighbridge area	m2	105		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	24	R	1,487.00
39	Total pump house area	m2	18		
40	Concrete in cooling tower	m3	322	R	1,487.00
41	Total cooling tower area	m2	212		
42	Emergency earth dam area - top of berm	m2	802		
43	Concrete in cable tunnel	m3	0	R	1,487.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	45		
46	Total volume of steel pipe rack	m3	855		
47	Total volume of steel complex steel structure	m3	7,225		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	202		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	338.43
52	Total process pipe length	m	62,125		
53	Total electrical cable - installation only	m	42,115	R	60.54
54	Total instrumentation cable - installation only	m	32,415	R	40.36

Ratio: Variable ratio

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Complex	Mean
Current economic conditions	Normal	Mean
Current economic factors	Good	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project E			
Location:	South Africa			
Client:	0	Date of estimate:	2008	

	CIVIL CONSTRUCTION COST				R 40,116,033.26
A	SITE CLEARANCE AND DEMOLITIONS		R	210,834.60	
B	BULK EARTHWORKS		R	412,393.24	
C	PILING		R	1,247,676.25	
D	ROAD WORKS		R	1,499,174.29	
E	GENERAL PAVING AND BUNDED AREAS		R	988,845.16	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,276,550.82	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	979,764.13	
H	TANK BASES AND BUNDING		R	1,196,587.19	
I	RACK FOUNDATIONS		R	1,226,695.58	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,090,999.62	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	430,963.49	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,218,041.17	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	2,122,860.68	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,546,838.15	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,755,936.57	
Q	BUILDINGS - STEEL		R	2,457,635.65	
R	CANOPIES - STEEL		R	2,600,869.67	
S	WEIGHBRIDGE		R	534,891.57	
T	PUMP HOUSE		R	357,809.02	
U	COOLING TOWER		R	2,049,332.62	
V	EMERGENCY DAM		R	510,880.72	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	10,400,453.07	
	STRUCTURAL STEEL				R 17,754,464.49
A	STRUCTURAL STEEL - BASIC PLATFORM		R	323,208.31	
B	STRUCTURAL STEEL - PIPERACK		R	1,651,666.90	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	9,589,181.84	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	1,117,703.31	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	5,072,704.14	
	MECHANICAL AND PIPING				R 90,385,206.64
A	PIPING INSTALLATION		R	63,574,404.43	
B	RADIOGRAPHIC EXAMINATION (RT)		R	178,482.16	
C	DYE PENETRATION TESTING (DP)		R	69,211.24	
D	MAGNETIC PARTICLE TESTING (MPI)		R	98,110.36	
E	POST WELD HEAT TREATMENT		R	169,507.12	
F	MATERIAL HARDNESS TEST (HT)		R	150,135.80	
H	MECHANICAL INSTALLATION		R	321,010.79	
	Preliminaries and General	40.00%	R	25,824,344.76	
	PAINTING AND INSULATION				R 5,095,765.97
A	PAINTING AND INSULATION		R	3,774,641.46	
	Preliminaries and General	35.00%	R	1,321,124.51	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 8,710,691.73
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	6,452,364.24	
	Preliminaries and General	35.00%	R	2,258,327.48	

TOTAL COST	R	162,062,162.10

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,445		R 4.28	R 74,664.60	R 210,834.60
	Concrete demolitions	m3		85		R 1,602.00	R 136,170.00	
BULK EARTHWORKS	Bulk excavation	m3		5,562		R 34.93	R 194,280.66	R 412,393.24
	Trimming of sides	m2	2.16	2,574	4.29	R 8.15	R 20,980.17	
	Back fill and compact	m3	1.14	4,864	0.98	R 35.62	R 173,230.27	
	Overhaul	m3/km	1.70	3,269	11.21	R 3.12	R 10,188.10	
	Rip bed	m2	1.76	3,163	8.06	R 4.34	R 13,714.04	
PILING	Site establishment of rig	Item	0.00	1	191.99	R 285,488.07	R 285,488.07	R 1,247,676.25
	EO for raking equipment	Item	0.00	1	23.91	R 35,553.11	R 35,553.11	
	Number of piles	No	0.00	25	0.00		R -	
	Move rig to new position	No	1.50	17	0.18	R 268.72	R 4,478.70	
	Number of raking piles	No	18.39	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.28	R 414.24	R 605.39	
	EO for raking drilling	m	0.16	9	0.90	R 280.55	R 2,448.81	
	Auger quantity	m	0.05	500	0.00	R 310.49	R 155,245.00	
	EO for drilling in coarse gravel	m	0.53	47	0.22	R 323.95	R 15,301.45	
	EO for drilling in boulders	m	1.83	14	0.50	R 745.62	R 10,166.28	
	EO for drilling in soft rock	m	1.61	16	0.24	R 353.69	R 5,494.57	
	Temporary casings	m	0.35	71	0.36	R 534.26	R 37,699.65	
	EO casing to raking pile	m	0.18	7	0.50	R 1,385.03	R 10,375.97	
	Mild steel rod reinforcement	t	14.26	1.753	0.93	R 10,042.49	R 17,601.64	
	High tensile rod reinforcement	t	1.32	18.909	7.25	R 10,781.81	R 203,870.03	
	Concrete to piles and bases	m3	0.15	163	0.00	R 1,487.00	R 242,069.77	
	Concrete to raking piles	m3	0.07	19	1.07	R 1,583.66	R 30,438.79	
	Site establishment of test equipment	Item	0.00	1	111.63	R 165,994.87	R 165,994.87	
	Load test to pile	No	101.82	0	27.13	R 40,341.25	R 9,904.69	
	Site establishment of intergity testing	No	262.92	0	48.83	R 72,605.96	R 6,903.90	
	Integrity testing of piles	No	1.26	20	0.27	R 403.61	R 8,035.55	
ROAD WORKS	Red paving	m2	0.15	29	0.96	R 130.02	R 3,766.82	R 1,499,174.29
	Grey paving	m2	0.00	195	0.00	R 135.84	R 26,488.80	
	Kerbing	m	0.13	385	0.00	R 215.39	R 82,941.27	
	Total paving and asphalt	m2	0.00	2,995	0.00		R -	
	Remove top soil	m3	0.55	428	5.74	R 66.81	R 28,615.79	
	Asphalt	m2	0.26	781	0.00	R 157.66	R 123,109.72	
	Rip bed	m2	0.00	2,995	0.00	R 11.64	R 34,861.80	
	Reduce levels	m3	0.43	1,284	4.98	R 57.96	R 74,394.37	
	Selected fill	m3	1.67	767	0.55	R 106.07	R 81,350.91	
	Imported fill	m3	2.25	341	0.40	R 268.04	R 91,397.87	
	Wearing course	m3	3.90	329	0.31	R 185.26	R 60,983.02	
	Prime	m2	4.76	3,650	1.49	R 60.50	R 220,808.77	
	Three line road marking	m	0.85	3,089	0.23	R 48.62	R 150,186.58	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.03	398	4.19	R 12.15	R 4,840.72	
	1m Wide concrete V-drain	m	1.01	387	0.80	R 955.88	R 370,184.83	
	200mm Diameter PVC pipe	m	0.98	376	0.12	R 304.63	R 114,453.87	
	Road marking - STOP	No	0.16	61	0.06	R 324.78	R 19,742.18	
	Standard signage	No	0.01	4	4.44	R 414.94	R 1,597.80	
	100mm Painted line	m	1.88	723	1.41	R 13.08	R 9,449.17	
			0.00		1.51			
			0.00		1.93			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.00	175	0.75	R 1,487.00	R 260,225.00	R 988,845.16
		Concrete in plinths	m3	0.00	35	0.00	R 1,487.00	R 52,007.85	
		Total concrete	m3	0.00	325	0.00		R -	
		Rip and compact	m2	0.13	1,332	188.86	R 7.87	R 10,483.69	
		Formwork to plinth	m2	7.15	250	0.12	R 182.69	R 45,666.93	
		Formwork to slab	m2	0.82	144	0.15	R 217.74	R 31,381.67	
		High tensile steel	t	0.01	3.250	0.00	R 12,005.00	R 39,016.25	
		Mesh	m2	592.70	1,926	50.50	R 237.71	R 457,889.81	
		Construction joint	m	3.89	680	0.05	R 73.29	R 49,863.23	
		Expansion joint	m	2.21	387	0.07	R 109.40	R 42,310.73	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.77	4,327	0.00		R -	R 1,276,550.82
		Base excavation	m3	1.51	487	0.00	R 65.98	R 32,104.01	
		Backfill	m3	0.58	322	0.64	R 102.41	R 33,014.85	
		Working space	m2	0.45	833	1.43	R 71.47	R 59,518.59	
		Concrete in bases	m3	0.04	220	25.22	R 1,487.00	R 327,140.00	
		Blinding	m2	0.83	296	21.04	R 70.67	R 20,948.96	
		Concrete in sump walls	m3	0.10	22	29.72	R 1,487.00	R 32,480.33	
		Concrete in slabs	m3	0.02	4	0.92	R 1,487.00	R 6,542.80	
		Total concrete	m3	0.00	246	0.04		R -	
		Wood float	m2	0.69	355	158.48	R 9.38	R 3,334.61	
		Formwork to bases	m2	1.70	375	0.12	R 182.69	R 68,440.36	
		Formwork to sump walls	m2	12.57	275	0.12	R 179.50	R 49,284.95	
		Formwork to sides of slab	m2	5.71	25	0.18	R 271.91	R 6,833.99	
		Mild steel reinforcement	t	0.12	2.775	0.00	R 12,005.00	R 33,312.07	
		High tensile reinforcement	t	10.52	23.402	1.22	R 12,005.00	R 280,945.20	
		Cast in steel	kg	0.46	478	34.11	R 43.59	R 20,848.12	
		Waterstop	m	0.43	51	8.19	R 181.58	R 9,316.57	
		Manhole	No	0.08	26	2.68	R 4,444.73	R 114,140.64	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	321	0.13	R 555.59	R 178,344.76	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS							R 979,764.13
	Restricted base excavation	m3	1.67	259	0.05	R 65.98	R 17,086.23	
	Working space	m2	0.38	681	0.67	R 44.07	R 30,029.37	
	Backfill	m3	4.38	59	1.33	R 87.66	R 5,179.33	
	Concrete bases	m3	1.03	155	0.00	R 1,487.00	R 230,485.00	
	Concrete plinth	m3	2.34	66	0.00	R 1,487.00	R 98,467.81	
	Total concrete	m3	0.00	221	0.00		R -	
	Wood float	m2	0.45	146	0.06	R 14.87	R 2,167.53	
	Blinding	m2	1.03	151	0.01	R 82.85	R 12,528.10	
	Formwork bases	m2	0.50	312	0.13	R 197.56	R 61,683.76	
	Formwork plinth	m2	0.57	115	0.12	R 177.38	R 20,452.89	
	High tensile reinforcement	t	9.99	22.152	7.15	R 12,005.00	R 265,934.44	
	Cast in steel	kg	0.11	2,051	0.03	R 44.61	R 91,496.81	
	HD Bolts	kg	0.08	2,816	0.03	R 44.61	R 125,600.16	
	Grout	m3	34.31	1.930	6.50	R 9,665.50	R 18,652.70	
	TANK BASES AND BUNDING							R 1,196,587.19
	Restricted excavation	m3	5.83	437	0.05	R 73.29	R 32,045.12	
	Working space	m2	4.30	102	1.61	R 45.44	R 4,622.13	
	Backfill	m3	1.39	315	0.73	R 100.99	R 31,800.06	
	Concrete bases	m3	0.75	75	0.00	R 1,487.00	R 111,525.00	
	Concrete sump wall	m3	2.84	26	0.00	R 1,487.00	R 39,328.72	
	Concrete slab	m3	0.57	133	0.00	R 1,487.00	R 197,389.38	
	Concrete plinth	m3	4.07	18	20.86	R 1,487.00	R 27,430.60	
	Concrete column	m3	18.84	4	162.67	R 1,487.00	R 5,919.14	
	Total concrete	m3	0.00	257	1.10		R -	
	Blinding	m2	2.66	97	1.05	R 71.30	R 6,885.89	
	Wood float	m2	0.25	1,018	1.10	R 9.14	R 9,303.29	
	Formwork to bases	m2	0.41	181	1.12	R 184.64	R 33,425.95	
	Formwork to plinths	m2	0.35	52	8.05	R 194.42	R 10,205.12	
	Formwork to columns	m2	0.12	33	7.65	R 210.71	R 6,907.30	
	Formwork to sumps	m2	0.11	236	7.06	R 202.45	R 47,747.03	
	Formwork to slabs	m2	4.11	32	7.35	R 181.66	R 5,863.05	
	Formwork to slabs n/e 300mm	m	2.14	62	8.19	R 63.45	R 3,929.35	
	Mild steel reinforcement	t	0.23	2.521	23.44	R 12,005.00	R 30,268.82	
	High tensile reinforcement	t	22.97	11.171	1.04	R 12,005.00	R 134,102.35	
	Mesh	m2	0.16	819	60.70	R 197.76	R 161,904.08	
	Cast in items	kg	0.19	1,356	213.42	R 56.25	R 76,259.52	
	HD Bolts	kg	0.10	2,661	204.14	R 58.81	R 156,501.71	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	203.70	1.260	0.17	R 8,896.58	R 11,207.75	
	Construction joint	m	0.30	440	24.76	R 60.05	R 26,445.46	
	Expansion joint	m	0.46	289	16.78	R 88.61	R 25,570.37	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.70	573	0.05	R 75.41	R 43,223.82	R 1,226,695.58
	Working space	m2	0.42	1,372	2.04	R 153.79	R 210,947.00	
	Backfill	m3	2.45	234	0.88	R 85.77	R 20,029.40	
	Blinding	m2	0.37	420	22.15	R 67.13	R 28,175.94	
	Concrete bases	m3	5.83	155	0.00	R 1,487.00	R 230,485.00	
	Concrete plinth	m3	0.00	27	0.00	R 1,487.00	R 39,534.31	
	Total concrete	m3	0.00	182	1.34		R -	
	Wood float	m2	0.36	435	171.56	R 8.67	R 3,769.29	
	Formwork bases	m2	0.47	329	9.71	R 153.15	R 50,354.64	
	Formwork plinths	m2	0.09	291	6.98	R 212.91	R 61,911.34	
	High tensile reinforcement	t	9.39	19.332	0.00	R 12,005.00	R 232,085.65	
	HD Bolts	kg	0.03	5,564	230.06	R 52.18	R 290,340.81	
	Grout	m3	79.90	1.940	0.18	R 8,163.92	R 15,838.39	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.36	923	0.05	R 80.72	R 74,528.19	R 2,090,999.62
	Working space	m2	0.50	1,831	1.88	R 42.86	R 78,462.44	
	Backfill	m3	2.67	346	0.81	R 100.19	R 34,690.42	
	Blinding	m2	0.32	658	21.50	R 69.15	R 45,508.00	
	Concrete bases	m3	0.00	212	0.00	R 1,487.00	R 315,244.00	
	Concrete plinth	m3	2.55	59	0.00	R 1,487.00	R 87,169.98	
	Concrete slab	m3	3.62	83	0.00	R 1,487.00	R 123,798.49	
	Total concrete	m3	0.00	354	0.00		R -	
	Wood float	m2	0.55	647	163.93	R 9.07	R 5,866.91	
	Formwork bases	m2	0.48	442	8.28	R 179.54	R 79,416.30	
	Formwork plinths	m2	0.11	536	8.30	R 179.23	R 96,141.83	
	High tensile reinforcement	t	13.20	26.817	0.00	R 12,005.00	R 321,943.32	
	HD Bolts	kg	0.02	10,600	215.31	R 55.76	R 591,012.44	
	Cast in items	kg	0.05	4,180	239.76	R 50.07	R 209,307.37	
	Grout	m3	67.58	3.137	0.17	R 8,896.58	R 27,909.96	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.07	141	0.05	R 76.47	R 10,760.81	R 430,963.49
	Working space	m2	0.55	256	1.64	R 46.73	R 11,940.47	
	Backfill	m3	2.15	66	0.79	R 97.33	R 6,378.51	
	Blinding	m2	0.65	105	20.03	R 74.25	R 7,828.11	
	Concrete bases	m3	0.00	68	0.00	R 1,487.00	R 101,116.00	
	Concrete column	m3	28.24	2	0.00	R 1,487.00	R 3,580.41	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Concrete plinth	m3	5.23	13	0.00	R 1,487.00	R 19,352.34	
		Total concrete	m3	0.00	83	0.00		R -	
		Wood float	m2	0.59	142	158.26	R 9.40	R 1,330.12	
		Formwork bases	m2	0.52	130	8.31	R 178.85	R 23,228.38	
		Formwork plinths	m2	0.33	40	7.41	R 200.81	R 8,006.09	
		Formwork to columns	m2	0.28	9	8.19	R 181.66	R 1,558.16	
		High tensile reinforcement	t	8.91	9.360	0.00	R 12,005.00	R 112,363.87	
		HD bolts	kg	0.04	2,049	210.85	R 56.94	R 116,657.96	
		Grout	m3	109.09	0.765	0.17	R 8,973.28	R 6,862.26	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.79	0	0.06	R 86.03	R -	R -
		Working space	m2	0.30	0	2.12	R 40.58	R -	
		Backfill	m3	2.09	0	0.83	R 104.19	R -	
		Blinding	m2	0.67	0	20.02	R 74.28	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,487.00	R -	
		Concrete column	m3	1.19	0	152.63	R 1,487.00	R -	
		Concrete beam	m3	2.67	0	0.96	R 1,487.00	R -	
		Total concrete	m3	2.98	0	0.96		R -	
		Wood float	m2	0.47	0	7.60	R 9.74	R -	
		Formwork bases	m2	0.48	0	6.47	R 195.58	R -	
		Formwork to columns	m2	0.15	0	7.94	R 187.21	R -	
		Formwork to sides beams	m2	0.33	0	6.07	R 229.86	R -	
		Formwork to soffits beams	m2	0.69	0	6.47	R 244.92	R -	
		Formwork corbels	m2	10.91	0	5.28	R 281.67	R -	
		High tensile reinforcement	t	9.05	0.000	0.00	R 12,005.00	R -	
		Cast in steel	kg	0.03	0	261.79	R 45.86	R -	
		HD bolts	kg	1.48	0	213.19	R 56.31	R -	
		Grout	m3	505.20	0.000	0.16	R 9,211.50	R -	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.87	935	0.05	R 77.54	R 72,522.15	R 3,218,041.17
		Working space	m2	0.60	1,548	1.79	R 43.25	R 66,939.53	
		Backfill	m3	1.16	808	0.79	R 98.41	R 79,549.27	
		Blinding	m2	0.62	393	20.18	R 73.71	R 28,935.44	
		Concrete bases	m3	0.00	242	0.97	R 1,487.00	R 359,854.00	
		Concrete column	m3	2.41	101	1.08	R 1,487.00	R 149,583.02	
		Concrete beam	m3	0.85	119	1.02	R 1,487.00	R 176,424.79	
		Concrete surface slab	m3	1.67	145	0.98	R 1,487.00	R 215,205.30	
		Concrete wall	m3	2.54	40	1.05	R 1,487.00	R 58,841.31	
		Concrete elevated slab	m3	1.12	90	0.00	R 1,487.00	R 133,983.51	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	736	0.00		R -	
		Wood float	m2	0.64	1,151	170.28	R 8.73	R 10,048.63	
		Formwork bases	m2	0.42	578	7.74	R 192.07	R 111,044.12	
		Formwork to columns	m2	0.17	592	6.24	R 238.38	R 141,058.07	
		Formwork to sides beams	m2	0.30	397	5.11	R 291.00	R 115,635.31	
		Formwork to soffits beams	m2	0.84	142	7.52	R 197.81	R 28,035.43	
		Formwork to soffts of slabs	m2	0.31	467	3.24	R 259.16	R 120,987.79	
		Formwork to pockets	m2	26.96	4	5.74	R 459.56	R 1,714.53	
		Formwork wall	m2	0.13	303	8.00	R 185.86	R 56,263.99	
		High tensile reinforcement	t	8.93	82.398	0.00	R 12,005.00	R 989,186.95	
		Cast in steel	kg	0.22	3,290	259.39	R 46.28	R 152,286.31	
		HD bolts	kg	0.42	1,773	202.74	R 59.21	R 104,965.29	
		Steel handrailing	m	2.57	32	9.84	R 1,220.37	R 39,083.53	
		Grout	m3	1,039.52	0.708	0.18	R 8,327.20	R 5,892.93	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.24	260	0.04	R 59.48	R 15,454.52	R 2,122,860.68
		Working space	m2	7.96	33	1.42	R 41.85	R 1,366.63	
		Backfill	m3	4.20	62	0.64	R 37.77	R 2,336.18	
		Blinding	m2	1.09	295	18.54	R 80.20	R 23,661.65	
		Concrete bases	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
		Concrete column	m3	26.85	12	0.00	R 1,487.00	R 17,832.92	
		Concrete beam	m3	1.46	8	0.00	R 1,487.00	R 12,250.29	
		Concrete wall	m3	10.52	31	0.00	R 1,487.00	R 45,520.82	
		Concrete elevated slabs	m3	11.21	1	0.00	R 1,487.00	R 1,590.60	
		Total concrete	m3	0.00	374	0.00		R -	
		Wood float	m2	0.84	444	139.70	R 10.64	R 4,730.17	
		Formwork bases	m2	8.52	38	6.93	R 214.44	R 8,107.89	
		Formwork to columns	m2	0.14	85	5.72	R 226.75	R 19,227.53	
		Formwork to sides beams	m2	0.17	47	4.76	R 259.77	R 12,329.54	
		Formwork to soffits beams	m2	0.52	16	6.56	R 312.39	R 4,976.56	
		Formwork to soffts of slabs	m2	0.13	8	3.04	R 292.92	R 2,384.04	
		Formwork to pockets	m2	437.11	1	5.08	R 489.60	R 360.67	
		Formwork wall	m2	0.10	294	6.47	R 229.75	R 67,443.04	
		High tensile reinforcement	t	4.15	90.053	0.00	R 12,005.00	R 1,081,086.51	
		Cast in steel	kg	0.15	2,481	198.44	R 60.50	R 150,090.16	
		HD bolts	kg	0.22	1,705	168.18	R 71.38	R 121,715.59	
		Galvanised grating	m2	17.43	21	0.15	R 2,214.94	R 47,505.85	
		Grout	m3	779.52	0.413	5.42	R 9,866.35	R 4,075.53	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.61	234	0.05	R 77.54	R 18,141.03	R 2,546,838.15
	Working space	m2	0.42	552	1.79	R 43.42	R 23,984.10	
MAJOR EQUIPMENT	Backfill	m3	2.04	115	0.81	R 96.15	R 11,011.79	
BASES AND ELEVATED	Blinding	m2	4.70	31	20.54	R 72.40	R 2,231.44	
CONCRETE STRUCTURE	Concrete bases	m3	0.00	145	0.00	R 1,487.00	R 215,615.00	
	Concrete column	m3	6.57	22	0.00	R 1,487.00	R 32,814.55	
	Concrete beam	m3	2.00	11	0.00	R 1,487.00	R 16,448.39	
	Concrete wall	m3	35.36	4	0.00	R 1,487.00	R 6,096.97	
	Concrete elevated slabs	m3	25.15	1	0.00	R 1,487.00	R 1,304.86	
	Total concrete	m3	0.00	183	0.00		R -	
	Wood float	m2	4.65	31	161.28	R 9.22	R 287.59	
	Formwork bases	m2	1.42	102	8.11	R 183.40	R 18,680.72	
	Formwork to columns	m2	0.14	154	7.01	R 219.09	R 33,675.29	
	Formwork to sides beams	m2	0.23	48	6.33	R 212.13	R 10,138.85	
	Formwork to soffits beams	m2	0.75	15	6.79	R 234.81	R 3,479.65	
	Formwork to soffts of slabs	m2	0.21	4	3.88	R 239.84	R 985.44	
	Formwork to pockets	m2	3.03	48	6.20	R 383.67	R 18,377.83	
	Formwork wall	m2	0.29	14	7.39	R 201.12	R 2,829.62	
	High tensile reinforcement	t	7.31	25.037	0.00	R 12,005.00	R 300,564.07	
	Cast in steel	kg	0.02	9,155	209.67	R 57.26	R 524,200.37	
	HD bolts	kg	0.01	16,022	206.83	R 58.04	R 929,943.57	
	Galvanised grating	m2	3.94	46	0.19	R 7,945.80	R 369,472.54	
	Grout	m3	42.10	3.444	6.31	R 1,903.18	R 6,554.46	
BUILDINGS - CONCRETE	Excavations	m3	1.81	82	0.05	R 75.41	R 6,149.59	R 1,755,936.57
FRAME	Working space	m2	2.49	33	1.83	R 41.24	R 1,352.95	
	Backfill	m3	1.24	66	0.79	R 95.29	R 6,244.74	
	Blinding	m2	3.90	12	20.30	R 73.26	R 845.48	
	Concrete	m3	0.00	45	0.00	R 1,487.00	R 66,915.00	
	Mesh reinforcement	m2	0.51	88	64.64	R 185.73	R 16,250.94	
	Rough formwork	m2	3.05	15	8.56	R 173.80	R 2,561.29	
	Smooth formwork	m2	0.58	78	6.81	R 218.31	R 17,063.90	
	Finish to concrete	m2	0.23	197	105.26	R 14.13	R 2,781.12	
	Construction joints	m	5.00	9	21.39	R 69.53	R 626.15	
	Movement joints	m	15.33	3	17.08	R 87.04	R 255.53	
	Cast in steel	kg	2.37	19	228.82	R 52.46	R 997.97	
	Grout	m3	886.39	0.051	0.17	R 8,531.97	R 433.15	
	Brick walls	m2	0.50	90	0.00	R 349.30	R 31,481.97	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.46	200	0.00		R -	
	Waterproofing membrane	m2	2.19	92	11.98	R 124.17	R 11,370.18	
	Roof construction	m2	2.04	98	37.42	R 320.83	R 31,539.67	
	Ceiling	m2	0.98	204	0.00	R 275.56	R 56,288.24	
	Doors and windows	No	469.54	0	0.17	R 2,089.83	R 892.27	
	Floor finish	m2	1.03	194	0.80	R 436.24	R 84,789.50	
	Wall finsih	m2	1.03	195	1.45	R 240.30	R 46,869.43	
	Rod reinforcement	t	9.39	5	0.00	R 12,005.00	R 57,505.70	
	Metalwork	Item	0.00	1	4.53	R 54,322.63	R 54,322.63	
	Structural steel	Item	0.00	1	11.71	R 140,612.85	R 140,612.85	
	Plumbing and drainage	Item	0.00	1	7.46	R 89,523.00	R 89,523.00	
	Small power and lighting	Item	0.00	1	63.54	R 762,797.70	R 762,797.70	
	External works	Item	0.00	1	178.52	R 265,465.61	R 265,465.61	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.17	R 1,487.00	R 126,395.00	R 2,457,635.65
	Earthworks	m3	2.40	204	9.18	R 162.05	R 32,988.44	
	Reinforcement	t	8.79	10	0.00	R 12,005.00	R 116,136.49	
	Mesh	m2	0.11	744	10.15	R 146.56	R 109,007.23	
	Formwork	m2	0.40	214	8.14	R 182.68	R 39,168.82	
	Brickwork	m2	6.14	112	6.02	R 246.86	R 27,563.41	
	Roof covering	m2	0.86	796	205.85	R 207.40	R 165,056.81	
	Structural steel	t	18.84	36	0.00	R 42,692.32	R 1,552,536.30	
	Side cladding	m2	1.55	442	0.99	R 205.17	R 90,715.75	
	Doors	No	407.92	2	0.51	R 21,803.58	R 36,613.80	
	Ridge ventilator	m	21.99	31	11.28	R 2,339.29	R 72,872.38	
	Aluminium insulation	m2	0.89	773	1.81	R 114.63	R 88,581.20	
	Total building area	m2	0.00	685	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.07	190	0.12	R 183.75	R 34,983.25	R 2,600,869.67
	Concrete	m3	0.00	62	0.00	R 1,487.00	R 92,194.00	
	Reinforcement	t	11.59	5	0.19	R 12,005.00	R 64,204.19	
	Mesh	m2	0.12	502	10.36	R 143.59	R 72,045.11	
	Formwork	m2	0.46	136	8.62	R 172.56	R 23,440.48	
	Brickwork	m2	5.91	105	6.04	R 246.28	R 25,900.98	
	Screed	m2	1.11	561	43.40	R 34.27	R 19,238.16	
	Structural steel	t	14.68	42	0.00	R 42,692.32	R 1,809,162.11	
	Cat ladders	m	2.73	16	9.66	R 4,420.80	R 68,604.49	
	Hand rail	m	0.74	57	27.63	R 1,545.14	R 88,741.00	
	Kick plates	m	0.75	56	2.77	R 557.38	R 31,344.16	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.90	691	197.39	R 216.28	R 149,357.81	
		Side cladding	m2	4.69	133	0.93	R 201.30	R 26,696.76	
		Floor grating	m2	1.09	39	17.43	R 2,448.86	R 94,957.16	
		Total buiding area	m2	0.00	622	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.35	174	8.12	R 183.06	R 31,848.89	R 534,891.57
		Blinding	m2	0.48	108	19.02	R 78.20	R 8,483.81	
		Concrete	m3	0.00	52	0.00	R 1,487.00	R 77,324.00	
		Reinforcement	t	8.00	7	0.00	R 12,005.00	R 78,053.41	
		Mesh	m2	0.50	104	50.55	R 237.48	R 24,662.78	
		Formwork	m2	0.32	164	7.63	R 194.91	R 31,957.70	
		Finish to concrete	m2	0.44	118	105.18	R 14.14	R 1,662.73	
		Movement joints	m	2.54	21	15.73	R 94.55	R 1,938.31	
		Cast in steel	kg	0.09	597	179.84	R 66.75	R 39,832.93	
		Grout	m3	71.98	0.722	2.59	R 9,462.73	R 6,836.36	
		Brickwork	m2	0.24	38	0.16	R 349.30	R 13,137.85	
		Doors and windows	No	2.77	3	0.26	R 3,943.71	R 12,823.42	
		Pipework	m	2.59	41	0.21	R 574.92	R 23,333.47	
		Bolts	kg	0.11	492	0.09	R 66.75	R 32,835.25	
		Structural steel	t	4.00	2	0.00	R 46,686.11	R 104,950.04	
		Miscellaneous steel	t	130.11	1	0.00	R 56,023.33	R 45,210.62	
		Total bridge area	m2	0.00	105	0.00		R -	
		Total control room area	m2	0.00	9	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.37	201	6.00	R 247.80	R 49,749.10	R 357,809.02
		Blinding	m2	0.71	34	14.40	R 103.27	R 3,480.28	
		Concrete	m3	0.00	24	0.00	R 1,487.00	R 35,688.00	
		Reinforcement	t	5.75	4	0.00	R 12,005.00	R 50,101.60	
		Formwork	m2	0.07	357	5.70	R 260.94	R 93,273.10	
		Finish to concrete	m2	0.31	77	76.59	R 19.41	R 1,499.56	
		Movement joints	m	0.42	57	12.31	R 120.75	R 6,911.99	
		Cast in steel	kg	23.52	1.020	159.60	R 75.22	R 76.74	
		Grout	m3	22.24	1.079	0.60	R 11,761.58	R 12,691.54	
		Bolts	kg	110.06	0.218	0.13	R 45.45	R 9.91	
		Structural steel	t	36.36	0.495	0.22	R 54,745.93	R 27,101.94	
		Miscellaneous steel	t	20.05	0.898	0.18	R 67,770.16	R 60,854.05	
		Brickwork	m2	0.50	36	4.20	R 354.11	R 12,729.70	
		Roof covering	m2	1.45	12	1.21	R 293.34	R 3,641.51	
		Total pump house area	m2	0.00	18	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	254	6.30	R 236.19	R 60,082.63	R 2,049,332.62
	Blinding	m2	1.21	267	16.50	R 90.15	R 24,060.96	
	Concrete	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
	Reinforcement	t	6.15	52.327	0.00	R 12,005.00	R 628,189.67	
	Formwork	m2	0.21	1,523	6.15	R 241.93	R 368,451.50	
	Movement joint	m	1.65	195	0.12	R 112.36	R 21,936.66	
	Cast in steel	kg	0.14	2,300	13.23	R 60.69	R 139,598.06	
	Bolts	kg	0.37	867	197.79	R 74.40	R 64,496.09	
	Chemical anchors	No	6.36	51	0.23	R 336.50	R 17,042.21	
	Miscellaneous steelwork	t	91.12	3.534	161.37	R 52,852.20	R 186,779.44	
	Pre-cast concrete	m3	31.14	10	35.68	R 4,909.91	R 50,770.38	
	Brickwork	m2	7.77	27	0.30	R 333.84	R 9,111.03	
	Total area	m2	0.00	212	4.45		R -	
EMERGENCY DAM	Earthworks	m3	0.53	1,505	1.64	R 109.98	R 165,529.59	R 510,880.72
	Lining	m2	0.70	1,148	1.14	R 66.92	R 76,822.25	
	Paving	m2	0.65	1,241	0.53	R 127.28	R 157,916.51	
	Pipework	m	27.90	29	0.23	R 470.86	R 13,536.17	
	Manholes	No	16.15	2	0.10	R 4,546.24	R 8,093.23	
	Concrete	m3	2.44	12	0.05	R 1,487.00	R 17,535.02	
	Formwork	m2	0.08	144	5.81	R 255.75	R 36,714.71	
	Mesh	m2	0.68	17	6.55	R 226.95	R 3,915.07	
	Reinforcement	t	4.59	2.567	0.12	R 12,005.00	R 30,818.18	
	Dam area (to top of berm)	m2	0.00	802	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.26	0	5.93	R 250.82	R -	R -
	Blinding	m2	0.88	0	14.37	R 103.47	R -	
	Concrete	m3	0.00	0	0.00	R 1,487.00	R -	
	Reinforcement	t	4.64	0.000	0.00	R 12,005.00	R -	
	Mesh	m2	0.95	0	39.96	R 300.40	R -	
	Formwork	m2	0.16	0	5.51	R 269.73	R -	
	Cast in steel	kg	0.02	0	145.80	R 82.34	R -	
	Miscellaneous steelwork	t	11.30	0.000	0.17	R 72,443.97	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	45	0.00		R -	R 323,208.31
	Steel	t	9.63	4.675	0.00	R 42,692.32	R 199,600.46	
	Handrail	m	1.46	31	28.64	R 1,490.77	R 46,015.78	
	Grating	m2	1.92	23	16.69	R 2,557.30	R 59,892.19	
	Kick flats	m	1.71	26	76.00	R 561.78	R 14,820.78	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.85	7	97.44	R 438.13	R 2,879.11	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	855	0.00		R -	R 1,651,666.90
		Steel	t	27.56	31.026	0.00	R 42,692.32	R 1,324,590.64	
		Handrail	m	13.30	64	30.39	R 1,404.81	R 90,309.52	
		Grating	m2	12.23	70	18.38	R 2,323.03	R 162,384.22	
		Kick flats	m	13.16	65	83.67	R 510.23	R 33,154.78	
		Cat ladder	m	98.47	9	8.99	R 4,748.11	R 41,227.74	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	7,225	0.00		R -	R 9,589,181.84
		Steel	t	78.02	92.606	0.00	R 42,692.32	R 3,953,571.65	
		Handrail	m	31.32	231	30.13	R 1,417.17	R 326,970.17	
		Grating	m2	3.92	1,841	15.62	R 2,732.56	R 5,030,911.42	
		Kick flats	m	34.08	212	83.14	R 513.48	R 108,844.06	
		Stair treads	No	234.63	31	101.34	R 421.29	R 12,973.01	
		Cat ladder	m	239.20	30	8.27	R 5,161.87	R 155,911.53	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	25.89	0.000	0.00	R 42,692.32	R -	
		Handrail	m	46.29	0	29.87	R 1,429.31	R -	
		Grating	m2	60.47	0	17.15	R 2,488.83	R -	
		Kick flats	m	47.39	0	80.55	R 530.02	R -	
		Cat ladder	m	20.38	0	8.59	R 4,969.59	R -	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	202	0.00		R -	R 1,117,703.31
		Steel	t	16.76	12.051	0.00	R 42,692.32	R 514,505.59	
		Handrail	m	1.12	181	31.33	R 1,362.70	R 246,243.25	
		Grating	m2	2.01	100	17.05	R 2,503.74	R 251,619.50	
		Kick flats	m	1.17	173	79.61	R 536.30	R 92,535.82	
		Stair treads	No	6.20	33	108.71	R 392.71	R 12,799.16	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	0	0.00		R -	R -
		Steel	t	12.85	0.000	0.00	R 42,692.32	R -	
		Handrail	m	25.63	0	31.08	R 1,373.47	R -	
		Grating	m2	7.61	0	17.57	R 2,429.55	R -	
		Kick flats	m	22.96	0	82.58	R 516.99	R -	
		Cat ladder	m	20.53	0	8.65	R 4,933.08	R -	
	PIPING INSTALLATION	Pipe length	m	0.00	62,125	0.00		R -	R 63,574,404.43
		Total work units	WU	0.33	187,851	0.00	R 338.43	R 63,574,404.43	
		Pipe supports	kg	2.68	23,175	0.00		R -	
		WU for pipe supports	WU	0.16	30,190	0.00		R -	
		Number of welds	No	0.61	37,630	0.00		R -	
		Total fittings	No	0.38	23,785	0.00		R -	
		Stud bolts	No	0.34	8,019	0.00		R -	
		Support number	No	0.19	4,420	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	187,851	0.00	R 338.43		R 178,482.16

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	60.24	3,118	5.91	R 57.24	R 178,482.16	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	187,851	0.00	R 338.43		R 69,211.24
	Number of examinations	No	169.90	1,106	5.41	R 62.60	R 69,211.24	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	187,851	0.00	R 338.43		R 98,110.36
	Number of examinations	No	308.99	608	2.10	R 161.38	R 98,110.36	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	187,851	0.00	R 338.43		R 169,507.12
	Number of examinations	No	53.49	3,512	7.01	R 48.26	R 169,507.12	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	187,851	0.00	R 338.43		R 150,135.80
	Number of examinations	No	116.84	1,608	3.62	R 93.38	R 150,135.80	
MECHANICAL INSTALLATION	Total work units	WU	0.00	187,851	0.00	R 338.43		R 321,010.79
	Mechanical equipment	t	263.06	714	0.75	R 449.53	R 321,010.79	
	Structural steel	t	220.21	853	54.53			
PAINTING & INSULATION	Total work units	WU	0.00	187,851	0.00	R 338.43		R 3,774,641.46
	Painting to piping	m2	18.25	10,296	0.34	R 130.52	R 1,343,825.39	
	Insulation to piping	m2	52.59	3,572	2.59	R 384.70	R 1,374,133.94	
	Mechanical equipment received	t	0.00	714	0.83	R 449.53	R 321,010.79	
	Painting to mechanical equipment	m2	0.25	2,906	3.75	R 119.87	R 348,383.80	
	Insulation to mechanical equipment	m2	0.70	1,016	1.18	R 381.19	R 387,287.54	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.43	42,115	0.00	R 60.54	R 2,549,642.10	R 6,452,364.24
	Electrical cable terminations	No	313.29	1,656	0.43	R 139.86	R 231,652.54	
	Electrical equipment	No	9.10	134	0.11	R 529.73	R 71,209.47	
	DB's	No	6.53	15	0.32	R 1,681.67	R 24,838.06	
	Rack	m	0.68	6,447	1.66	R 173.68	R 1,119,655.13	
	Support steel	kg	1.45	9,421	2.14	R 28.34	R 266,962.47	
	Instrumentation cable	m	27.38	32,415	0.35	R 28.50	R 923,827.50	
	Instruments	No	0.59	1,184	0.18	R 160.24	R 189,698.31	
	Hook-ups	No	3.94	2,009	0.16	R 174.24	R 350,026.90	
	Light fittings	No	10.42	529	0.02	R 340.39	R 180,054.15	
	Conduit	m	4.10	4,043	0.13	R 36.58	R 147,877.75	
	Instrument stands	No	0.00	288		R 1,375.86	R 396,919.85	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project E				
Location:	South Africa				
Client:				Date of estimate:	2008

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	17,445	R	4.28
2	Concrete demolitions	m3	85	R	1,602.00
3	Bulk excavation	m3	5,562	R	34.93
4	Vertical piles	No	25		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,487.00
7	Auger pile	m		R	310.49
8	Total paving and asphalt to road works	m2	2,995		
9	Grey paving to road works	m2	195	R	135.84
10	Asphalt to road surface	m2	2,800		
11	Rip bed of road works	m2	2,995	R	11.64
12	Total concrete in paving and bunding	m3	325	R	1,487.00
13	Concrete in paving	m3	175		
14	Rod reinforcement	t		R	12,005.00
15	Concrete in plinths and bases on area finishing	m3	220		
16	Stormwater pipe to drain surface run-off	m	321		
17	Machine excavation	m3		R	65.98
18	Concrete in pump and pipe support bases	m3	155	R	1,487.00
19	Concrete in tank bases	m3	75	R	1,487.00
20	Concrete in pipe and cable rack foundations	m3	155	R	1,487.00
21	Concrete to simple structural foundations	m3	212	R	1,487.00
22	Complex structural foundations - bases	m3	68	R	1,487.00
23	Concrete pipe racks - bases	m3	0	R	1,487.00
24	Concrete structure including concrete columns and beams - bases	m3	242	R	1,487.00
25	Major equipment bases with blast proof walls - bases	m3	322	R	1,487.00
26	Major equipment bases and elevated concrete structure - bases	m3	145	R	1,487.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	45	R	1,487.00
28	One brick wall	m2		R	349.30
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,487.00
30	Total building area - Structural steel buildings	m2	685		
31	Ceiling	m2		R	275.56
32	Structural steel	t		R	42,692.32
33	Steel canopy - concrete	m3	62	R	1,487.00
34	Steel canopy - area	m2	622		
35	Concrete in weighbridge - all concrete	m3	52	R	1,487.00
36	Total weighbridge area	m2	105		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	24	R	1,487.00
39	Total pump house area	m2	18		
40	Concrete in cooling tower	m3	322	R	1,487.00
41	Total cooling tower area	m2	212		
42	Emergency earth dam area - top of berm	m2	802		
43	Concrete in cable tunnel	m3	0	R	1,487.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	45		
46	Total volume of steel pipe rack	m3	855		
47	Total volume of steel complex steel structure	m3	7,225		
48	Total volume of steel in stack	m3	0		
49	Total volume of steel in walkway	m3	202		
50	Total volume of steel in cable gantry	m3	0		
51	Piping work unit cost	WU		R	338.43
52	Total process pipe length	m	62,125		
53	Total electrical cable - installation only	m	42,115	R	60.54
54	Total instrumentation cable - installation only	m	32,415	R	40.36

Ratio: Variable ratio

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Complex	Median
Current economic conditions	Normal	Median
Current economic factors	Good	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Normal	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Medium	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project E			
Location:	South Africa			
Client:	0	Date of estimate:	2008	

	CIVIL CONSTRUCTION COST				R 41,172,667.46
A	SITE CLEARANCE AND DEMOLITIONS		R	210,834.60	
B	BULK EARTHWORKS		R	422,253.71	
C	PILING		R	1,274,718.44	
D	ROAD WORKS		R	1,227,572.40	
E	GENERAL PAVING AND BUNDED AREAS		R	1,047,540.28	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,326,920.71	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,036,018.92	
H	TANK BASES AND BUNDING		R	1,291,785.70	
I	RACK FOUNDATIONS		R	1,245,778.49	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,238,184.24	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	453,117.88	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,639,401.66	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	2,008,122.13	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,866,004.05	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,821,063.61	
Q	BUILDINGS - STEEL		R	2,590,076.74	
R	CANOPIES - STEEL		R	2,653,451.21	
S	WEIGHBRIDGE		R	499,636.20	
T	PUMP HOUSE		R	322,666.59	
U	COOLING TOWER		R	1,889,796.21	
V	EMERGENCY DAM		R	433,328.42	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	10,674,395.27	
	STRUCTURAL STEEL				R 19,321,745.37
A	STRUCTURAL STEEL - BASIC PLATFORM		R	356,899.77	
B	STRUCTURAL STEEL - PIPERACK		R	1,864,876.51	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	10,272,656.18	
D	STRUCTURAL STEEL - STACK		R	-	
E	STRUCTURAL STEEL - WALKWAY		R	1,306,814.23	
F	STRUCTURAL STEEL - CABLE GANTRY		R	-	
	Preliminaries and General	40.00%	R	5,520,498.68	
	MECHANICAL AND PIPING				R 99,370,843.87
A	PIPING INSTALLATION		R	69,586,168.44	
B	RADIOGRAPHIC EXAMINATION (RT)		R	228,736.99	
C	DYE PENETRATION TESTING (DP)		R	138,151.65	
D	MAGNETIC PARTICLE TESTING (MPI)		R	131,239.75	
E	POST WELD HEAT TREATMENT		R	229,604.95	
F	MATERIAL HARDNESS TEST (HT)		R	260,231.83	
H	MECHANICAL INSTALLATION		R	405,040.58	
	Preliminaries and General	40.00%	R	28,391,669.68	
	PAINTING AND INSULATION				R 6,948,707.29
A	PAINTING AND INSULATION		R	5,147,190.58	
	Preliminaries and General	35.00%	R	1,801,516.70	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 9,647,555.33
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	7,146,337.28	
	Preliminaries and General	35.00%	R	2,501,218.05	

TOTAL COST	R	176,461,519.33

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		17,445		R 4.28	R 74,664.60	R 210,834.60
	Concrete demolitions	m3		85		R 1,602.00	R 136,170.00	
BULK EARTHWORKS	Bulk excavation	m3		5,562		R 34.93	R 194,280.66	R 422,253.71
	Trimming of sides	m2	2.17	2,559	4.24	R 8.24	R 21,088.04	
	Back fill and compact	m3	1.12	4,960	0.95	R 36.77	R 182,362.00	
	Overhaul	m3/km	1.57	3,546	11.21	R 3.12	R 11,049.62	
	Rip bed	m2	1.69	3,283	8.51	R 4.10	R 13,473.39	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 286,083.93	R 286,083.93	R 1,274,718.44
	EO for raking equipment	Item	0.00	1	24.05	R 35,761.29	R 35,761.29	
	Number of piles	No	0.00	25	0.00		R -	
	Move rig to new position	No	1.50	17	0.19	R 282.53	R 4,697.65	
	Number of raking piles	No	19.30	1	0.00		R -	
	EO for setting up raking piles	No	0.92	1	0.25	R 374.94	R 526.25	
	EO for raking drilling	m	0.14	9	0.73	R 227.54	R 2,073.52	
	Auger quantity	m	0.05	515	0.00	R 310.49	R 159,811.03	
	EO for drilling in coarse gravel	m	0.55	45	0.22	R 327.14	R 14,831.48	
	EO for drilling in boulders	m	1.71	15	0.52	R 767.93	R 11,227.04	
	EO for drilling in soft rock	m	1.59	16	0.24	R 351.57	R 5,545.26	
	Temporary casings	m	0.35	71	0.32	R 470.53	R 33,472.61	
	EO casing to raking pile	m	0.17	8	0.56	R 1,038.78	R 7,948.19	
	Mild steel rod reinforcement	t	14.81	1.689	0.70	R 7,844.24	R 13,245.93	
	High tensile rod reinforcement	t	1.16	21.552	7.55	R 11,228.97	R 242,003.76	
	Concrete to piles and bases	m3	0.16	160	0.00	R 1,487.00	R 237,648.40	
	Concrete to raking piles	m3	0.08	17	1.08	R 1,598.53	R 27,346.91	
	Site establishment of test equipment	Item	0.00	1	113.56	R 168,857.35	R 168,857.35	
	Load test to pile	No	97.71	0	22.82	R 33,934.40	R 8,682.11	
	Site establishment of intergity testing	No	259.93	0	49.62	R 73,791.31	R 7,097.27	
	Integrity testing of piles	No	1.22	21	0.26	R 382.37	R 7,858.49	
ROAD WORKS	Red paving	m2	0.14	27	0.93	R 126.43	R 3,469.10	R 1,227,572.40
	Grey paving	m2	0.00	195	0.00	R 135.84	R 26,488.80	
	Kerbing	m	0.10	285	0.00	R 261.77	R 74,479.74	
	Total paving and asphalt	m2	0.00	2,995	0.00		R -	
	Remove top soil	m3	0.49	301	4.57	R 53.21	R 15,999.27	
	Asphalt	m2	0.20	612	0.00	R 159.49	R 97,580.12	
	Rip bed	m2	0.00	2,995	0.00	R 11.64	R 34,861.80	
	Reduce levels	m3	0.37	1,112	4.27	R 49.66	R 55,244.57	
	Selected fill	m3	1.49	748	0.46	R 108.13	R 80,921.26	
	Imported fill	m3	1.90	394	0.32	R 337.14	R 132,847.69	
	Wearing course	m3	3.93	283	0.20	R 252.82	R 71,550.63	
	Prime	m2	4.32	3,230	1.48	R 36.12	R 116,670.27	
	Three line road marking	m	0.84	2,704	0.11	R 28.05	R 75,833.53	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.01	288	4.09	R 8.97	R 2,584.60	
		1m Wide concrete V-drain	m	0.99	281	0.78	R 1,120.37	R 315,357.86	
		200mm Diameter PVC pipe	m	0.93	265	0.09	R 374.33	R 99,050.61	
		Road marking - STOP	No	0.17	48	0.03	R 406.68	R 19,422.68	
		Standard signage	No	0.01	3	4.28	R 485.39	R 1,381.07	
		100mm Painted line	m	1.71	488	1.43	R 7.85	R 3,828.79	
				0.00		1.55			
				0.00		1.85			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.89	175	0.73	R 1,487.00	R 260,225.00	R 1,047,540.28
		Concrete in plinths	m3	0.00	36	0.00	R 1,487.00	R 53,254.64	
		Total concrete	m3	0.00	325	0.00		R -	
		Rip and compact	m2	0.14	1,289	199.17	R 7.47	R 9,627.26	
		Formwork to plinth	m2	6.76	242	0.11	R 169.94	R 41,129.97	
		Formwork to slab	m2	0.80	139	0.14	R 214.55	R 29,849.67	
		High tensile steel	t	0.01	3.250	0.00	R 12,005.00	R 39,016.25	
		Mesh	m2	603.63	1,962	44.30	R 270.98	R 531,612.92	
		Construction joint	m	3.65	638	0.04	R 65.85	R 42,022.35	
		Expansion joint	m	2.11	369	0.07	R 110.46	R 40,802.22	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.15	4,284	0.00		R -	R 1,326,920.71
		Base excavation	m3	1.45	510	0.00	R 65.98	R 33,645.43	
		Backfill	m3	0.55	352	0.64	R 103.91	R 36,559.34	
		Working space	m2	0.43	925	1.35	R 77.13	R 71,326.26	
		Concrete in bases	m3	0.04	220	23.71	R 1,487.00	R 327,140.00	
		Blinding	m2	0.74	334	19.02	R 78.20	R 26,153.24	
		Concrete in sump walls	m3	0.11	24	31.06	R 1,487.00	R 35,518.06	
		Concrete in slabs	m3	0.02	4	0.85	R 1,487.00	R 5,374.44	
		Total concrete	m3	0.00	248	0.03		R -	
		Wood float	m2	0.61	404	125.09	R 11.89	R 4,800.70	
		Formwork to bases	m2	1.73	380	0.12	R 181.63	R 69,041.39	
		Formwork to sump walls	m2	11.42	273	0.11	R 167.82	R 45,762.37	
		Formwork to sides of slab	m2	5.65	20	0.17	R 255.98	R 5,224.58	
		Mild steel reinforcement	t	0.08	2.235	0.00	R 12,005.00	R 26,829.88	
		High tensile reinforcement	t	9.26	26.742	0.94	R 12,005.00	R 321,041.33	
		Cast in steel	kg	0.45	490	33.19	R 44.81	R 21,940.23	
		Waterstop	m	0.44	55	8.41	R 176.86	R 9,695.32	
		Manhole	No	0.08	25	2.69	R 4,452.45	R 109,234.49	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	321	0.12	R 553.38	R 177,633.65	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.58	244	0.05	R 65.98	R 16,114.67	R 1,036,018.92
		Working space	m2	0.33	737	0.69	R 45.76	R 33,722.73	
		Backfill	m3	3.96	62	1.27	R 83.61	R 5,160.19	
		Concrete bases	m3	0.96	155	0.00	R 1,487.00	R 230,485.00	
		Concrete plinth	m3	2.04	76	0.00	R 1,487.00	R 113,022.42	
		Total concrete	m3	0.00	231	0.00		R -	
		Wood float	m2	0.46	166	0.05	R 14.87	R 2,468.51	
		Blinding	m2	0.96	161	0.01	R 75.41	R 12,121.80	
		Formwork bases	m2	0.48	321	0.13	R 189.06	R 60,689.84	
		Formwork plinth	m2	0.53	144	0.12	R 181.63	R 26,117.34	
		High tensile reinforcement	t	9.93	23.274	6.76	R 12,005.00	R 279,399.45	
		Cast in steel	kg	0.10	2,262	0.03	R 43.55	R 98,488.14	
		HD Bolts	kg	0.08	3,080	0.03	R 44.61	R 137,402.97	
		Grout	m3	33.20	2.290	6.12	R 9,096.19	R 20,825.87	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.46	410	0.05	R 71.16	R 29,160.54	R 1,291,785.70
		Working space	m2	3.93	104	1.52	R 46.82	R 4,886.01	
		Backfill	m3	1.34	305	0.75	R 94.98	R 28,965.93	
		Concrete bases	m3	0.72	75	0.00	R 1,487.00	R 111,525.00	
		Concrete sump wall	m3	2.56	29	0.00	R 1,487.00	R 43,552.30	
		Concrete slab	m3	0.56	135	0.00	R 1,487.00	R 200,687.66	
		Concrete plinth	m3	3.73	20	19.84	R 1,487.00	R 29,939.60	
		Concrete column	m3	18.33	4	160.65	R 1,487.00	R 6,084.76	
		Total concrete	m3	0.00	263	1.01		R -	
		Blinding	m2	2.42	109	1.04	R 74.97	R 8,147.73	
		Wood float	m2	0.25	1,045	1.03	R 9.26	R 9,671.98	
		Formwork to bases	m2	0.39	193	1.06	R 198.30	R 38,346.16	
		Formwork to plinths	m2	0.35	58	7.50	R 205.16	R 11,948.65	
		Formwork to columns	m2	0.11	37	7.25	R 221.40	R 8,130.34	
		Formwork to sumps	m2	0.10	285	6.72	R 203.68	R 57,997.77	
		Formwork to slabs	m2	3.90	35	7.30	R 185.78	R 6,425.32	
		Formwork to slabs n/e 300mm	m	2.02	67	8.00	R 68.89	R 4,609.27	
		Mild steel reinforcement	t	0.22	2.591	21.59	R 12,005.00	R 31,110.80	
		High tensile reinforcement	t	22.22	11.856	0.94	R 12,005.00	R 142,337.02	
		Mesh	m2	0.15	900	55.04	R 218.10	R 196,231.34	
		Cast in items	kg	0.19	1,419	215.59	R 55.69	R 79,001.81	
		HD Bolts	kg	0.09	2,837	197.07	R 60.92	R 172,848.81	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	199.97	1.318	0.16	R 9,252.44	R 12,190.57	
		Construction joint	m	0.29	472	24.09	R 61.73	R 29,157.61	
		Expansion joint	m	0.44	308	15.87	R 93.68	R 28,828.71	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.33	516	0.05	R 72.23	R 37,287.30	R 1,245,778.49
		Working space	m2	0.34	1,515	1.69	R 121.91	R 184,716.74	
		Backfill	m3	2.35	219	0.81	R 89.40	R 19,610.97	
		Blinding	m2	0.40	385	24.00	R 61.95	R 23,878.79	
		Concrete bases	m3	5.72	155	0.00	R 1,487.00	R 230,485.00	
		Concrete plinth	m3	0.00	27	0.00	R 1,487.00	R 40,304.65	
		Total concrete	m3	0.00	182	1.32		R -	
		Wood float	m2	0.36	436	176.26	R 8.44	R 3,676.06	
		Formwork bases	m2	0.48	324	10.12	R 146.88	R 47,644.29	
		Formwork plinths	m2	0.09	301	6.89	R 215.95	R 65,037.47	
		High tensile reinforcement	t	9.16	19.871	0.00	R 12,005.00	R 238,552.86	
		HD Bolts	kg	0.03	5,865	208.96	R 57.45	R 336,944.60	
		Grout	m3	75.28	2.059	0.17	R 8,567.08	R 17,639.78	
		Restricted excavation	m3	3.96	839	0.05	R 76.47	R 64,132.21	R 2,238,184.24
	SIMPLE STRUCTURAL FOUNDATIONS	Working space	m2	0.47	1,798	1.81	R 42.15	R 75,785.37	
		Backfill	m3	2.46	341	0.78	R 97.86	R 33,323.28	
		Blinding	m2	0.33	647	21.97	R 67.68	R 43,765.52	
		Concrete bases	m3	0.00	212	0.00	R 1,487.00	R 315,244.00	
		Concrete plinth	m3	2.32	68	0.00	R 1,487.00	R 101,715.05	
		Concrete slab	m3	3.10	91	0.00	R 1,487.00	R 135,755.64	
		Total concrete	m3	0.00	372	0.00		R -	
		Wood float	m2	0.52	716	152.92	R 9.72	R 6,960.37	
		Formwork bases	m2	0.45	470	7.96	R 186.86	R 87,752.93	
		Formwork plinths	m2	0.10	674	7.89	R 188.53	R 127,146.73	
		High tensile reinforcement	t	12.95	28.695	0.00	R 12,005.00	R 344,478.94	
		HD Bolts	kg	0.02	10,600	195.78	R 61.32	R 649,970.08	
		Cast in items	kg	0.05	4,240	226.59	R 52.98	R 224,640.81	
		Grout	m3	67.40	3.145	0.17	R 8,747.06	R 27,513.30	
		Restricted excavation	m3	2.02	138	0.05	R 77.54	R 10,669.23	R 453,117.88
	COMPLEX STRUCTURAL FOUNDATIONS	Working space	m2	0.50	278	1.61	R 48.03	R 13,332.80	
		Backfill	m3	2.15	64	0.76	R 102.41	R 6,543.29	
		Blinding	m2	0.65	104	20.54	R 72.41	R 7,550.62	
		Concrete bases	m3	0.00	68	0.00	R 1,487.00	R 101,116.00	
		Concrete column	m3	27.08	3	0.00	R 1,487.00	R 3,734.37	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.68	15	0.00	R 1,487.00	R 21,619.18	
	Total concrete	m3	0.00	85	0.00		R -	
	Wood float	m2	0.58	146	152.73	R 9.74	R 1,420.70	
	Formwork bases	m2	0.49	139	7.91	R 188.06	R 26,174.13	
	Formwork plinths	m2	0.31	47	7.15	R 207.95	R 9,708.04	
	Formwork to columns	m2	0.28	9	7.85	R 189.50	R 1,730.50	
	High tensile reinforcement	t	8.86	9.602	0.00	R 12,005.00	R 115,277.23	
	HD bolts	kg	0.04	2,126	202.49	R 59.29	R 126,058.92	
	Grout	m3	97.47	0.873	0.16	R 9,377.48	R 8,182.88	
	Restricted excavation	m3	2.63	0	0.05	R 76.47	R -	R -
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.28	0	2.05	R 37.37	R -	
	Backfill	m3	1.99	0	0.81	R 94.75	R -	
	Blinding	m2	0.69	0	20.29	R 73.30	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,487.00	R -	
	Concrete column	m3	1.08	0	149.43	R 1,487.00	R -	
	Concrete beam	m3	2.46	0	0.90	R 1,487.00	R -	
	Total concrete	m3	2.79	0	0.90		R -	
	Wood float	m2	0.44	0	7.46	R 9.95	R -	
	Formwork bases	m2	0.46	0	6.33	R 199.29	R -	
	Formwork to columns	m2	0.14	0	7.29	R 203.92	R -	
	Formwork to sides beams	m2	0.32	0	5.87	R 235.10	R -	
	Formwork to soffits beams	m2	0.69	0	6.33	R 253.32	R -	
	Formwork corbels	m2	10.45	0	4.95	R 300.40	R -	
	High tensile reinforcement	t	8.88	0.000	0.00	R 12,005.00	R -	
	Cast in steel	kg	0.03	0	255.07	R 47.07	R -	
	HD bolts	kg	1.43	0	199.25	R 60.25	R -	
	Grout	m3	485.45	0.000	0.16	R 9,252.44	R -	
	Restricted excavation	m3	3.70	896	0.05	R 73.29	R 65,647.28	R 3,639,401.66
	Working space	m2	0.56	1,591	1.67	R 43.81	R 69,720.38	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	776	0.77	R 94.65	R 73,497.24	
	Blinding	m2	0.62	389	19.61	R 75.84	R 29,498.92	
	Concrete bases	m3	0.00	242	0.91	R 1,487.00	R 359,854.00	
	Concrete column	m3	2.08	116	1.08	R 1,487.00	R 172,947.34	
	Concrete beam	m3	0.82	143	0.98	R 1,487.00	R 212,205.32	
	Concrete surface slab	m3	1.66	146	0.95	R 1,487.00	R 217,434.44	
	Concrete wall	m3	2.28	51	1.01	R 1,487.00	R 75,735.46	
	Concrete elevated slab	m3	1.02	114	0.00	R 1,487.00	R 169,082.59	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	812	0.00		R -	
		Wood float	m2	0.61	1,331	156.67	R 9.49	R 12,632.02	
		Formwork bases	m2	0.40	599	7.57	R 196.51	R 117,626.73	
		Formwork to columns	m2	0.16	744	6.07	R 245.06	R 182,205.91	
		Formwork to sides beams	m2	0.29	499	4.83	R 308.00	R 153,840.23	
		Formwork to soffits beams	m2	0.81	176	7.33	R 202.81	R 35,793.73	
		Formwork to soffts of slabs	m2	0.30	492	3.08	R 263.05	R 129,447.91	
		Formwork to pockets	m2	25.76	5	5.65	R 482.34	R 2,177.96	
		Formwork wall	m2	0.12	424	7.92	R 187.77	R 79,695.17	
		High tensile reinforcement	t	8.69	93.449	0.00	R 12,005.00	R 1,121,860.96	
		Cast in steel	kg	0.21	3,814	253.70	R 47.32	R 180,488.84	
		HD bolts	kg	0.39	2,063	201.89	R 59.46	R 122,665.53	
		Steel handrailing	m	2.48	38	9.34	R 1,285.92	R 48,371.54	
		Grout	m3	989.46	0.821	0.18	R 8,497.14	R 6,972.15	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.35	238	0.04	R 62.67	R 14,939.20	R 2,008,122.13
		Working space	m2	7.69	31	1.41	R 44.47	R 1,378.61	
		Backfill	m3	4.68	51	0.71	R 44.31	R 2,255.58	
		Blinding	m2	1.25	259	20.08	R 74.07	R 19,156.27	
		Concrete bases	m3	0.00	322	0.00	R 1,487.00	R 478,814.00	
		Concrete column	m3	27.81	12	0.00	R 1,487.00	R 17,215.12	
		Concrete beam	m3	1.42	8	0.00	R 1,487.00	R 12,135.53	
		Concrete wall	m3	11.20	29	0.00	R 1,487.00	R 42,751.25	
		Concrete elevated slabs	m3	11.77	1	0.00	R 1,487.00	R 1,462.54	
		Total concrete	m3	0.00	371	0.00		R -	
		Wood float	m2	0.89	420	159.64	R 9.31	R 3,909.84	
		Formwork bases	m2	8.60	37	7.03	R 211.63	R 7,927.10	
		Formwork to columns	m2	0.15	75	5.97	R 226.92	R 17,106.81	
		Formwork to sides beams	m2	0.18	46	4.89	R 249.14	R 11,340.78	
		Formwork to soffits beams	m2	0.54	15	6.55	R 304.00	R 4,558.23	
		Formwork to soffts of slabs	m2	0.14	7	3.19	R 277.83	R 1,961.88	
		Formwork to pockets	m2	466.25	1	5.35	R 465.83	R 321.71	
		Formwork wall	m2	0.11	255	7.01	R 212.00	R 54,005.29	
		High tensile reinforcement	t	4.32	86.046	0.00	R 12,005.00	R 1,032,979.01	
		Cast in steel	kg	0.16	2,291	202.52	R 59.28	R 135,804.61	
		HD bolts	kg	0.24	1,548	176.08	R 68.18	R 105,529.03	
		Galvanised grating	m2	19.04	20	0.16	R 1,996.79	R 38,957.55	
		Grout	m3	832.19	0.387	6.01	R 9,335.43	R 3,612.18	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.52	220	0.05	R 75.41	R 16,581.78	R 2,866,004.05
	Working space	m2	0.39	569	1.64	R 46.00	R 26,176.25	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.03	108	0.77	R 97.85	R 10,579.82	
	Blinding	m2	4.54	32	20.72	R 71.76	R 2,292.58	
	Concrete bases	m3	0.00	145	0.00	R 1,487.00	R 215,615.00	
	Concrete column	m3	5.89	25	0.00	R 1,487.00	R 36,611.40	
	Concrete beam	m3	1.75	14	0.00	R 1,487.00	R 20,955.01	
	Concrete wall	m3	33.56	4	0.00	R 1,487.00	R 6,424.49	
	Concrete elevated slabs	m3	24.71	1	0.00	R 1,487.00	R 1,481.39	
	Total concrete	m3	0.00	189	0.00		R -	
	Wood float	m2	4.44	33	154.38	R 9.63	R 314.87	
	Formwork bases	m2	1.40	103	7.34	R 202.63	R 20,954.40	
	Formwork to columns	m2	0.13	185	7.04	R 236.70	R 43,865.56	
	Formwork to sides beams	m2	0.23	62	6.02	R 211.11	R 13,139.04	
	Formwork to soffits beams	m2	0.71	20	6.28	R 247.04	R 4,933.03	
	Formwork to soffts of slabs	m2	0.21	5	3.68	R 257.71	R 1,214.31	
	Formwork to pockets	m2	2.85	51	5.77	R 404.39	R 20,558.77	
	Formwork wall	m2	0.29	15	7.18	R 207.12	R 3,070.61	
	High tensile reinforcement	t	7.12	26.536	0.00	R 12,005.00	R 318,562.48	
	Cast in steel	kg	0.02	9,802	185.16	R 64.83	R 635,476.43	
	HD bolts	kg	0.01	16,540	195.96	R 61.26	R 1,013,299.37	
	Galvanised grating	m2	3.67	52	0.17	R 8,674.17	R 446,778.16	
	Grout	m3	40.38	3.591	6.06	R 1,982.43	R 7,119.29	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.74	78	0.05	R 73.29	R 5,752.57	R 1,821,063.61
	Working space	m2	2.26	35	1.71	R 42.89	R 1,490.72	
	Backfill	m3	1.21	65	0.77	R 95.71	R 6,201.51	
	Blinding	m2	3.92	11	19.99	R 74.38	R 854.03	
	Concrete	m3	0.00	45	0.00	R 1,487.00	R 66,915.00	
	Mesh reinforcement	m2	0.42	106	61.79	R 194.28	R 20,640.72	
	Rough formwork	m2	2.77	16	7.95	R 186.99	R 3,040.15	
	Smooth formwork	m2	0.57	80	6.79	R 219.09	R 17,427.67	
	Finish to concrete	m2	0.22	201	103.43	R 14.38	R 2,893.77	
	Construction joints	m	4.75	9	19.83	R 74.99	R 710.97	
	Movement joints	m	14.79	3	15.97	R 93.12	R 283.36	
	Cast in steel	kg	2.35	19	222.61	R 53.93	R 1,033.30	
	Grout	m3	816.43	0.055	0.16	R 9,090.83	R 501.07	
	Brick walls	m2	0.47	96	0.00	R 349.30	R 33,699.69	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.43	199	0.00		R -	
	Waterproofing membrane	m2	1.99	100	11.07	R 134.39	R 13,498.49	
	Roof construction	m2	2.00	100	33.73	R 355.88	R 35,503.11	
	Ceiling	m2	0.97	205	0.00	R 275.56	R 56,474.63	
	Doors and windows	No	433.09	0	0.16	R 2,253.55	R 1,037.47	
	Floor finish	m2	1.00	200	0.77	R 453.22	R 90,687.05	
	Wall finsih	m2	1.02	195	1.39	R 251.42	R 49,043.52	
	Rod reinforcement	t	8.84	5	0.00	R 12,005.00	R 61,141.07	
	Metalwork	Item	0.00	1	4.64	R 55,660.33	R 55,660.33	
	Structural steel	Item	0.00	1	12.01	R 144,137.18	R 144,137.18	
	Plumbing and drainage	Item	0.00	1	7.65	R 91,778.23	R 91,778.23	
	Small power and lighting	Item	0.00	1	65.13	R 781,911.38	R 781,911.38	
	External works	Item	0.00	1	187.46	R 278,746.65	R 278,746.65	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.16	R 1,487.00	R 126,395.00	R 2,590,076.74
	Earthworks	m3	2.37	201	8.39	R 177.33	R 35,711.43	
	Reinforcement	t	8.34	10	0.00	R 12,005.00	R 122,300.74	
	Mesh	m2	0.11	778	9.23	R 161.17	R 125,352.46	
	Formwork	m2	0.38	225	7.43	R 200.12	R 44,931.56	
	Brickwork	m2	5.74	119	5.63	R 264.09	R 31,496.05	
	Roof covering	m2	0.83	823	198.81	R 214.74	R 176,769.50	
	Structural steel	t	17.99	38	0.00	R 42,692.32	R 1,625,776.71	
	Side cladding	m2	1.50	458	0.94	R 202.47	R 92,637.72	
	Doors	No	372.86	2	0.49	R 20,766.76	R 38,151.97	
	Ridge ventilator	m	20.96	33	10.53	R 2,261.83	R 73,937.33	
	Aluminium insulation	m2	0.88	782	1.74	R 123.52	R 96,616.27	
	Total building area	m2	0.00	685	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.68	166	0.12	R 173.13	R 28,813.17	R 2,653,451.21
	Concrete	m3	0.00	62	0.00	R 1,487.00	R 92,194.00	
	Reinforcement	t	10.96	6	0.17	R 12,005.00	R 67,884.95	
	Mesh	m2	0.11	553	9.94	R 149.64	R 82,731.24	
	Formwork	m2	0.43	146	8.00	R 185.92	R 27,123.15	
	Brickwork	m2	5.71	109	5.79	R 256.92	R 28,003.94	
	Screed	m2	1.09	573	40.86	R 36.39	R 20,849.47	
	Structural steel	t	14.66	42	0.00	R 42,692.32	R 1,811,365.83	
	Cat ladders	m	2.53	17	9.66	R 4,417.53	R 74,208.25	
	Hand rail	m	0.73	58	26.34	R 1,620.90	R 94,671.89	
	Kick plates	m	0.73	58	2.66	R 610.51	R 35,693.06	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.86	724	196.77	R 216.97	R 157,182.73	
	Side cladding	m2	4.47	139	0.90	R 195.58	R 27,236.56	
	Floor grating	m2	1.06	40	16.20	R 2,635.56	R 105,492.99	
	Total buiding area	m2	0.00	622	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.45	179	8.10	R 183.50	R 32,892.52	R 499,636.20
	Blinding	m2	0.50	104	20.71	R 71.80	R 7,445.52	
	Concrete	m3	0.00	52	0.00	R 1,487.00	R 77,324.00	
	Reinforcement	t	7.86	7	0.00	R 12,005.00	R 79,415.17	
	Mesh	m2	0.51	101	48.95	R 245.23	R 24,829.84	
	Formwork	m2	0.35	150	7.95	R 187.01	R 28,128.84	
	Finish to concrete	m2	0.46	114	108.44	R 13.71	R 1,562.19	
	Movement joints	m	2.63	20	15.69	R 94.79	R 1,871.06	
	Cast in steel	kg	0.09	569	200.69	R 59.82	R 34,022.21	
	Grout	m3	74.11	0.702	2.71	R 8,858.72	R 6,216.05	
	Brickwork	m2	0.25	36	0.17	R 349.30	R 12,574.80	
	Doors and windows	No	2.91	3	0.27	R 4,109.41	R 12,703.28	
	Pipework	m	2.90	36	0.22	R 548.27	R 19,856.23	
	Bolts	kg	0.11	470	0.09	R 59.82	R 28,095.76	
	Structural steel	t	4.40	2	0.00	R 44,699.47	R 91,341.76	
	Miscellaneous steel	t	135.89	1	0.00	R 53,525.48	R 41,356.96	
	Total bridge area	m2	0.00	105	0.00		R -	
	Total control room area	m2	0.00	9	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.11	195	6.20	R 239.84	R 46,673.98	R 322,666.59
	Blinding	m2	0.79	30	15.69	R 94.77	R 2,878.94	
	Concrete	m3	0.00	24	0.00	R 1,487.00	R 35,688.00	
	Reinforcement	t	5.92	4	0.00	R 12,005.00	R 48,698.30	
	Formwork	m2	0.07	333	5.68	R 261.93	R 87,136.29	
	Finish to concrete	m2	0.35	68	76.33	R 19.48	R 1,333.20	
	Movement joints	m	0.45	54	14.28	R 104.10	R 5,596.44	
	Cast in steel	kg	26.58	0.903	176.64	R 67.96	R 61.37	
	Grout	m3	23.27	1.031	0.71	R 10,008.65	R 10,320.73	
	Bolts	kg	122.80	0.195	0.15	R 48.11	R 9.40	
	Structural steel	t	41.62	0.433	0.25	R 48,435.16	R 20,949.97	
	Miscellaneous steel	t	23.61	0.763	0.18	R 66,694.44	R 50,857.87	
	Brickwork	m2	0.57	32	4.73	R 314.61	R 9,922.74	
	Roof covering	m2	1.75	10	1.28	R 246.48	R 2,539.37	
	Total pump house area	m2	0.00	18	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.01	7	87.93	R 485.55	R 3,636.43	
	STRUCTURAL STEEL - PIPERACK Total volume	m3	0.00	855	0.00		R -	R 1,864,876.51
	Steel	t	24.20	35.324	0.00	R 42,692.32	R 1,508,077.29	
	Handrail	m	12.62	68	29.50	R 1,447.30	R 98,065.27	
	Grating	m2	12.17	70	16.79	R 2,543.37	R 178,641.98	
	Kick flats	m	12.45	69	79.31	R 538.29	R 36,954.32	
	Cat ladder	m	98.13	9	8.62	R 4,951.06	R 43,137.66	
	STRUCTURAL STEEL - COMPLEX STRUCTURES Total volume	m3	0.00	7,225	0.00		R -	R 10,272,656.18
	Steel	t	71.08	101.640	0.00	R 42,692.32	R 4,339,243.32	
	Handrail	m	30.46	237	28.10	R 1,519.53	R 360,477.98	
	Grating	m2	3.69	1,959	15.85	R 2,692.79	R 5,274,517.40	
	Kick flats	m	33.14	218	76.81	R 555.79	R 121,182.50	
	Stair treads	No	227.11	32	93.58	R 456.19	R 14,512.54	
	Cat ladder	m	233.08	31	8.13	R 5,249.36	R 162,722.44	
	STRUCTURAL STEEL - STACK Total volume	m3	0.00	0	0.00		R -	R -
	Steel	t	22.40	0.000	0.00	R 42,692.32	R -	
	Handrail	m	45.23	0	25.89	R 1,649.31	R -	
	Grating	m2	57.84	0	16.44	R 2,597.08	R -	
	Kick flats	m	44.35	0	77.59	R 550.20	R -	
	Cat ladder	m	19.93	0	8.26	R 5,167.67	R -	
	STRUCTURAL STEEL - WALKWAY Total volume	m3	0.00	202	0.00		R -	R 1,306,814.23
	Steel	t	13.99	14.436	0.00	R 42,692.32	R 616,303.63	
	Handrail	m	1.10	183	27.12	R 1,574.49	R 288,198.07	
	Grating	m2	1.91	106	15.88	R 2,688.07	R 283,969.50	
	Kick flats	m	1.10	184	76.77	R 556.13	R 102,524.68	
	Stair treads	No	5.65	36	96.52	R 442.33	R 15,818.35	
	STRUCTURAL STEEL - CABLE GANTRY Total volume	m3	0.00	0	0.00		R -	R -
	Steel	t	12.05	0.000	0.00	R 42,692.32	R -	
	Handrail	m	22.47	0	25.82	R 1,653.37	R -	
	Grating	m2	7.39	0	16.29	R 2,620.65	R -	
	Kick flats	m	22.65	0	78.07	R 546.88	R -	
	Cat ladder	m	19.61	0	8.14	R 5,242.00	R -	
	Pipe length	m	0.00	62,125	0.00		R -	R 69,586,168.44
	PIPING INSTALLATION Total work units	WU	0.30	205,615	0.00	R 338.43	R 69,586,168.44	
	Pipe supports	kg	2.50	24,871	0.00		R -	
	WU for pipe supports	WU	0.15	31,577	0.00		R -	
	Number of welds	No	0.56	34,790	0.00		R -	
	Total fittings	No	0.38	23,297	0.00		R -	
	Stud bolts	No	0.33	7,788	0.00		R -	
	Support number	No	0.19	4,690	0.00		R -	
	RADIOGRAPHIC Total work units	WU	0.00	205,615	0.00	R 338.43		R 228,736.99

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.13	3,730	5.52	R 61.33	R 228,736.99	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	205,615	0.00	R 338.43		R 138,151.65
	Number of examinations	No	165.18	1,245	3.05	R 110.99	R 138,151.65	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	205,615	0.00	R 338.43		R 131,239.75
	Number of examinations	No	280.12	734	1.89	R 178.79	R 131,239.75	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	205,615	0.00	R 338.43		R 229,604.95
	Number of examinations	No	46.72	4,401	6.49	R 52.18	R 229,604.95	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	205,615	0.00	R 338.43		R 260,231.83
	Number of examinations	No	107.89	1,906	2.48	R 136.54	R 260,231.83	
MECHANICAL INSTALLATION	Total work units	WU	0.00	205,615	0.00	R 338.43		R 405,040.58
	Mechanical equipment	t	238.14	863	0.72	R 469.11	R 405,040.58	
	Structural steel	t	203.73	1,009	54.98			
PAINTING & INSULATION	Total work units	WU	0.00	205,615	0.00	R 338.43		R 5,147,190.58
	Painting to piping	m2	16.84	12,208	0.31	R 143.06	R 1,746,404.60	
	Insulation to piping	m2	48.23	4,263	2.37	R 455.18	R 1,940,551.45	
	Mechanical equipment received	t	0.00	863	0.82	R 469.11	R 405,040.58	
	Painting to mechanical equipment	m2	0.22	3,899	3.41	R 137.40	R 535,753.50	
	Insulation to mechanical equipment	m2	0.67	1,280	1.16	R 405.65	R 519,440.45	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	23.44	42,115	0.00	R 60.54	R 2,549,642.10	R 7,146,337.28
	Electrical cable terminations	No	279.97	1,797	0.39	R 154.95	R 278,446.48	
	Electrical equipment	No	8.31	150	0.10	R 588.58	R 88,538.73	
	DB's	No	6.02	18	0.28	R 2,096.73	R 37,948.37	
	Rack	m	0.61	6,991	1.64	R 189.19	R 1,322,585.27	
	Support steel	kg	1.36	11,528	2.03	R 29.81	R 343,672.82	
	Instrumentation cable	m	23.61	32,415	0.32	R 28.50	R 923,827.50	
	Instruments	No	0.48	1,373	0.16	R 176.55	R 242,353.23	
	Hook-ups	No	3.65	2,877	0.16	R 178.92	R 514,759.01	
	Light fittings	No	10.34	548	0.02	R 375.03	R 205,629.23	
	Conduit	m	4.01	4,072	0.12	R 37.03	R 150,772.08	
	Instrument stands	No	0.00	343		R 1,425.00	R 488,162.47	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:						
Project name:	Project F					
Location:	South Africa					
Client:				Date of estimate:	2007	

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	14,223	R	4.32
2	Concrete demolitions	m3	0	R	1,545.00
3	Bulk excavation	m3	4,855	R	44.00
4	Vertical piles	No	48		
5	Raking piles	No	6		
6	Concrete in piles	m3		R	1,402.00
7	Auger pile	m		R	342.00
8	Total paving and asphalt to road works	m2	2,555		
9	Grey paving to road works	m2	0	R	144.20
10	Asphalt to road surface	m2	2,555		
11	Rip bed of road works	m2	2,555	R	11.32
12	Total concrete in paving and bunding	m3	302	R	1,402.00
13	Concrete in paving	m3	155		
14	Rod reinforcement	t		R	11,485.00
15	Concrete in plinths and bases on area finishing	m3	199		
16	Stormwater pipe to drain surface run-off	m	85		
17	Machine excavation	m3		R	58.22
18	Concrete in pump and pipe support bases	m3	125	R	1,402.00
19	Concrete in tank bases	m3	185	R	1,402.00
20	Concrete in pipe and cable rack foundations	m3	196	R	1,402.00
21	Concrete to simple structural foundations	m3	255	R	1,402.00
22	Complex structural foundations - bases	m3	0	R	1,402.00
23	Concrete pipe racks - bases	m3	45	R	1,402.00
24	Concrete structure including concrete columns and beams - bases	m3	223	R	1,402.00
25	Major equipment bases with blast proof walls - bases	m3	174	R	1,402.00
26	Major equipment bases and elevated concrete structure - bases	m3	142	R	1,402.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	0	R	1,402.00
28	One brick wall	m2		R	331.20
29	Concrete in structual steel buildings - all concrete	m3	72	R	1,402.00
30	Total building area - Structural steel buildings	m2	558		
31	Ceiling	m2		R	233.32
32	Structural steel	t		R	41,225.00
33	Steel canopy - concrete	m3	130	R	1,402.00
34	Steel canopy - area	m2	875		
35	Concrete in weighbridge - all concrete	m3	0	R	1,402.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,402.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	302	R	1,402.00
41	Total cooling tower area	m2	188		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,402.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	142		
46	Total volume of steel pipe rack	m3	1,945		
47	Total volume of steel complex steel structure	m3	4,885		
48	Total volume of steel in stack	m3	645		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	455		
51	Piping work unit cost	WU		R	329.55
52	Total process pipe length	m	52,441		
53	Total electrical cable - installation only	m	30,225	R	52.33
54	Total instrumentation cable - installation only	m	24,665	R	38.45

Ratio: Project Ratio Mean

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Normal	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Good	Mean
Rework	Extensive	Mean
Scope change	Few	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Good	Mean
Complexity	Simple	Mean
Repitition	None	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project F			
Location:	South Africa			
Client:	0	Date of estimate:	2007	

	CIVIL CONSTRUCTION COST				R 36,725,060.30
A	SITE CLEARANCE AND DEMOLITIONS		R	61,443.36	
B	BULK EARTHWORKS		R	451,606.43	
C	PILING		R	1,893,254.82	
D	ROAD WORKS		R	1,225,923.05	
E	GENERAL PAVING AND BUNDED AREAS		R	849,130.13	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	904,342.46	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	745,859.40	
H	TANK BASES AND BUNDING		R	2,768,721.54	
I	RACK FOUNDATIONS		R	1,451,446.33	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,391,038.45	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	540,736.69	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	2,805,126.12	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,113,860.80	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,466,881.32	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	-	
Q	BUILDINGS - STEEL		R	1,928,970.69	
R	CANOPIES - STEEL		R	3,720,762.03	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	1,884,644.74	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	9,521,311.93	
	STRUCTURAL STEEL				R 21,403,497.88
A	STRUCTURAL STEEL - BASIC PLATFORM		R	985,759.48	
B	STRUCTURAL STEEL - PIPERACK		R	3,581,262.47	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	6,281,701.99	
D	STRUCTURAL STEEL - STACK		R	1,245,650.24	
E	STRUCTURAL STEEL - WALKWAY		R	1,441,452.17	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,752,386.42	
	Preliminaries and General	40.00%	R	6,115,285.11	
	MECHANICAL AND PIPING				R 74,439,807.74
A	PIPING INSTALLATION		R	52,369,489.55	
B	RADIOGRAPHIC EXAMINATION (RT)		R	147,237.08	
C	DYE PENETRATION TESTING (DP)		R	52,907.07	
D	MAGNETIC PARTICLE TESTING (MPI)		R	82,095.68	
E	POST WELD HEAT TREATMENT		R	142,718.13	
F	MATERIAL HARDNESS TEST (HT)		R	109,894.23	
H	MECHANICAL INSTALLATION		R	266,949.52	
	Preliminaries and General	40.00%	R	21,268,516.50	
	PAINTING AND INSULATION				R 4,259,686.68
A	PAINTING AND INSULATION		R	3,155,323.47	
	Preliminaries and General	35.00%	R	1,104,363.21	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 5,809,207.86
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	4,303,116.94	
	Preliminaries and General	35.00%	R	1,506,090.93	

TOTAL COST	R	142,637,260.46

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		14,223		R 4.32	R 61,443.36	R 61,443.36
	Concrete demolitions	m3		0		R 1,545.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		4,855		R 44.00	R 213,620.00	R 451,606.43
	Trimming of sides	m2	2.18	2,227	4.30	R 10.23	R 22,788.56	
	Back fill and compact	m3	1.15	4,222	0.98	R 44.90	R 189,547.47	
	Overhaul	m3/km	1.73	2,806	11.34	R 3.88	R 10,888.87	
	Rip bed	m2	1.78	2,728	8.13	R 5.41	R 14,761.53	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 269,604.60	R 269,604.60	R 1,893,254.82
	EO for raking equipment	Item	0.00	1	23.89	R 33,493.78	R 33,493.78	
	Number of piles	No	0.00	48	0.00		R -	
	Move rig to new position	No	1.50	32	0.18	R 252.36	R 8,075.52	
	Number of raking piles	No	18.41	3	0.00		R -	
	EO for setting up raking piles	No	0.93	3	0.28	R 392.56	R 1,100.55	
	EO for raking drilling	m	0.15	17	0.89	R 304.38	R 5,290.69	
	Auger quantity	m	0.05	960	0.00	R 342.00	R 328,320.00	
	EO for drilling in coarse gravel	m	0.53	91	0.22	R 308.44	R 27,934.19	
	EO for drilling in boulders	m	1.84	26	0.50	R 701.00	R 18,286.96	
	EO for drilling in soft rock	m	1.63	29	0.24	R 336.48	R 9,908.61	
	Temporary casings	m	0.36	133	0.36	R 504.72	R 67,296.00	
	EO casing to raking pile	m	0.18	14	0.51	R 1,303.86	R 18,886.26	
	Mild steel rod reinforcement	t	14.29	3.359	0.93	R 9,426.91	R 31,664.91	
	High tensile rod reinforcement	t	1.32	36.364	7.23	R 10,136.46	R 368,598.55	
	Concrete to piles and bases	m3	0.15	320	0.00	R 1,402.00	R 448,640.00	
	Concrete to raking piles	m3	0.07	37	1.06	R 1,486.12	R 55,353.27	
	Site establishment of test equipment	Item	0.00	1	110.73	R 155,243.46	R 155,243.46	
	Load test to pile	No	99.34	0	27.07	R 37,952.14	R 18,338.06	
	Site establishment of intergity testing	No	258.87	0	48.79	R 68,403.58	R 12,683.48	
	Integrity testing of piles	No	1.25	38	0.27	R 378.54	R 14,535.94	
ROAD WORKS	Red paving	m2	0.15	0	0.97	R 139.87	R -	R 1,225,923.05
	Grey paving	m2	0.00	0	0.00	R 144.20	R -	
	Kerbing	m	0.13	332	0.00	R 221.36	R 73,523.43	
	Total paving and asphalt	m2	0.00	2,555	0.00		R -	
	Remove top soil	m3	0.55	365	5.83	R 66.00	R 24,112.48	
	Asphalt	m2	0.26	664	0.00	R 156.67	R 104,076.50	
	Rip bed	m2	0.00	2,555	0.00	R 11.32	R 28,922.60	
	Reduce levels	m3	0.42	1,073	4.99	R 56.49	R 60,615.99	
	Selected fill	m3	1.65	650	0.53	R 106.58	R 69,315.02	
	Imported fill	m3	2.23	292	0.39	R 273.28	R 79,699.92	
	Wearing course	m3	3.86	278	0.29	R 194.78	R 54,150.42	
	Prime	m2	4.74	3,083	1.47	R 54.66	R 168,488.82	
	Three line road marking	m	0.83	2,559	0.20	R 44.27	R 113,275.03	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	339	4.19	R 11.07	R 3,749.70	
	1m Wide concrete V-drain	m	0.97	322	0.81	R 991.68	R 319,503.43	
	200mm Diameter PVC pipe	m	0.96	319	0.11	R 314.33	R 100,227.14	
	Road marking - STOP	No	0.15	50	0.05	R 336.46	R 16,763.34	
	Standard signage	No	0.01	3	4.48	R 429.43	R 1,426.35	
	100mm Painted line	m	1.83	608	1.42	R 13.28	R 8,072.87	
			0.00		1.52			
			0.00		1.94			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	155	0.74	R 1,402.00	R 217,310.00	R 849,130.13
		Concrete in plinths	m3	0.00	31	0.00	R 1,402.00	R 43,288.84	
		Total concrete	m3	0.00	302	0.00		R -	
		Rip and compact	m2	0.13	1,192	187.19	R 7.49	R 8,930.05	
		Formwork to plinth	m2	7.26	224	0.12	R 168.24	R 37,713.24	
		Formwork to slab	m2	0.83	129	0.15	R 210.30	R 27,055.10	
		High tensile steel	t	0.01	3.020	0.00	R 11,485.00	R 34,684.70	
		Mesh	m2	585.35	1,768	51.00	R 225.20	R 398,091.94	
		Construction joint	m	4.00	620	0.05	R 70.10	R 43,462.00	
		Expansion joint	m	2.22	344	0.08	R 112.16	R 38,594.26	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	3,747	0.00		R -	R 904,342.46
		Base excavation	m3	1.50	442	0.00	R 58.22	R 25,746.18	
		Backfill	m3	0.59	295	0.64	R 90.97	R 26,818.94	
		Working space	m2	0.45	750	1.43	R 63.61	R 47,680.93	
		Concrete in bases	m3	0.04	199	25.24	R 1,402.00	R 278,998.00	
		Blinding	m2	0.83	269	20.88	R 67.15	R 18,030.61	
		Concrete in sump walls	m3	0.10	20	29.51	R 1,402.00	R 27,899.80	
		Concrete in slabs	m3	0.02	4	0.91	R 1,402.00	R 5,579.96	
		Total concrete	m3	0.00	223	0.04		R -	
		Wood float	m2	0.70	318	158.37	R 8.85	R 2,818.70	
		Formwork to bases	m2	1.69	336	0.12	R 168.24	R 56,580.79	
		Formwork to sump walls	m2	12.63	251	0.12	R 168.24	R 42,284.94	
		Formwork to sides of slab	m2	5.81	23	0.18	R 252.36	R 5,835.52	
		Mild steel reinforcement	t	0.12	2.504	0.00	R 11,485.00	R 28,761.54	
		High tensile reinforcement	t	10.68	20.869	1.19	R 11,485.00	R 239,679.48	
		Cast in steel	kg	0.46	433	34.10	R 41.11	R 17,786.43	
		Waterstop	m	0.43	46	8.10	R 173.09	R 8,010.28	
		Manhole	No	0.08	7	2.68	R 4,024.11	R 27,363.95	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	85	0.13	R 523.13	R 44,466.42	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	211	0.05	R 58.22	R 12,298.98	R 745,859.40
		Working space	m2	0.38	556	0.67	R 39.01	R 21,685.03	
		Backfill	m3	4.42	48	1.32	R 76.85	R 3,673.00	
		Concrete bases	m3	1.01	125	0.00	R 1,402.00	R 175,250.00	
		Concrete plinth	m3	2.29	55	0.00	R 1,402.00	R 76,528.38	
		Total concrete	m3	0.00	180	0.00		R -	
		Wood float	m2	0.47	116	0.05	R 14.02	R 1,628.26	
		Blinding	m2	1.01	124	0.01	R 70.10	R 8,675.74	
		Formwork bases	m2	0.49	255	0.13	R 182.26	R 46,494.90	
		Formwork plinth	m2	0.58	94	0.12	R 168.24	R 15,833.46	
		High tensile reinforcement	t	10.00	17.959	7.15	R 11,485.00	R 206,253.55	
		Cast in steel	kg	0.11	1,633	0.03	R 42.06	R 68,666.83	
		HD Bolts	kg	0.08	2,245	0.03	R 42.06	R 94,416.89	
		Grout	m3	34.52	1.581	6.52	R 9,141.04	R 14,454.38	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.84	1,080	0.05	R 70.10	R 75,736.04	R 2,768,721.54
		Working space	m2	4.36	248	1.63	R 43.01	R 10,656.84	
		Backfill	m3	1.38	783	0.72	R 97.36	R 76,223.87	
		Concrete bases	m3	0.75	185	0.00	R 1,402.00	R 259,370.00	
		Concrete sump wall	m3	2.86	65	0.00	R 1,402.00	R 90,688.81	
		Concrete slab	m3	0.57	325	0.00	R 1,402.00	R 455,035.09	
		Concrete plinth	m3	4.11	45	21.05	R 1,402.00	R 63,107.06	
		Concrete column	m3	19.22	10	164.76	R 1,402.00	R 13,494.80	
		Total concrete	m3	0.00	629	1.11		R -	
		Blinding	m2	2.67	236	1.05	R 66.60	R 15,687.56	
		Wood float	m2	0.25	2,516	1.12	R 8.51	R 21,405.58	
		Formwork to bases	m2	0.42	440	1.14	R 172.66	R 76,052.66	
		Formwork to plinths	m2	0.35	129	8.12	R 183.75	R 23,631.18	
		Formwork to columns	m2	0.12	80	7.63	R 197.46	R 15,838.96	
		Formwork to sumps	m2	0.11	588	7.10	R 191.53	R 112,628.93	
		Formwork to slabs	m2	4.07	80	7.32	R 170.77	R 13,617.81	
		Formwork to slabs n/e 300mm	m	2.17	150	8.21	R 59.51	R 8,900.41	
		Mild steel reinforcement	t	0.23	6.264	23.56	R 11,485.00	R 71,945.83	
		High tensile reinforcement	t	23.09	27.236	1.02	R 11,485.00	R 312,807.96	
		Mesh	m2	0.16	2,029	61.15	R 187.82	R 380,988.12	
		Cast in items	kg	0.19	3,310	214.69	R 53.50	R 177,066.47	
		HD Bolts	kg	0.10	6,289	207.02	R 55.48	R 348,890.73	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	204.15	3.081	0.17	R 8,247.06	R 25,405.07	
		Construction joint	m	0.30	1,082	24.89	R 56.33	R 60,939.48	
		Expansion joint	m	0.46	706	16.88	R 83.06	R 58,602.29	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	727	0.05	R 70.10	R 50,973.92	R 1,451,446.33
		Working space	m2	0.41	1,774	1.98	R 138.80	R 246,166.72	
		Backfill	m3	2.45	297	0.87	R 80.57	R 23,914.57	
		Blinding	m2	0.37	530	22.19	R 63.18	R 33,469.18	
		Concrete bases	m3	5.81	196	0.00	R 1,402.00	R 274,792.00	
		Concrete plinth	m3	0.00	34	0.00	R 1,402.00	R 47,296.39	
		Total concrete	m3	0.00	230	1.34		R -	
		Wood float	m2	0.35	560	173.00	R 8.10	R 4,538.27	
		Formwork bases	m2	0.47	417	9.63	R 145.59	R 60,712.75	
		Formwork plinths	m2	0.09	375	6.99	R 200.57	R 75,181.03	
		High tensile reinforcement	t	9.33	24.623	0.00	R 11,485.00	R 282,798.05	
		HD Bolts	kg	0.03	6,533	225.70	R 50.89	R 332,456.06	
		Grout	m3	79.73	2.458	0.18	R 7,788.89	R 19,147.40	
		Restricted excavation	m3	4.29	1,094	0.06	R 84.12	R 92,023.07	R 2,391,038.45
	SIMPLE STRUCTURAL FOUNDATIONS	Working space	m2	0.50	2,188	1.90	R 44.27	R 96,866.39	
		Backfill	m3	2.66	411	0.80	R 105.15	R 43,243.93	
		Blinding	m2	0.33	773	21.39	R 65.54	R 50,648.14	
		Concrete bases	m3	0.00	255	0.00	R 1,402.00	R 357,510.00	
		Concrete plinth	m3	2.58	70	0.00	R 1,402.00	R 98,487.60	
		Concrete slab	m3	3.63	99	0.00	R 1,402.00	R 138,569.77	
		Total concrete	m3	0.00	424	0.00		R -	
		Wood float	m2	0.55	771	161.77	R 8.67	R 6,682.52	
		Formwork bases	m2	0.49	520	8.32	R 168.51	R 87,693.78	
		Formwork plinths	m2	0.11	639	8.34	R 168.11	R 107,355.14	
		High tensile reinforcement	t	13.32	31.838	0.00	R 11,485.00	R 365,662.00	
		HD Bolts	kg	0.02	12,750	217.74	R 52.75	R 672,516.53	
		Cast in items	kg	0.05	5,100	241.09	R 47.64	R 242,952.84	
		Grout	m3	68.22	3.738	0.17	R 8,247.06	R 30,826.74	
		Restricted excavation	m3	2.08	0	0.05	R 70.10	R -	R -
	COMPLEX STRUCTURAL FOUNDATIONS	Working space	m2	0.56	0	1.66	R 42.23	R -	
		Backfill	m3	2.15	0	0.79	R 88.73	R -	
		Blinding	m2	0.65	0	20.36	R 68.86	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,402.00	R -	
		Concrete column	m3	28.05	0	0.00	R 1,402.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	0	0.00	R 1,402.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.60	0	158.85	R 8.83	R -	
	Formwork bases	m2	0.52	0	8.23	R 170.35	R -	
	Formwork plinths	m2	0.33	0	7.44	R 188.44	R -	
	Formwork to columns	m2	0.28	0	8.09	R 173.30	R -	
	High tensile reinforcement	t	9.06	0.000	0.00	R 11,485.00	R -	
	HD bolts	kg	0.04	0	209.18	R 54.90	R -	
	Grout	m3	108.76	0.000	0.16	R 8,762.50	R -	
	Restricted excavation	m3	2.80	126	0.06	R 84.12	R 10,599.12	R 540,736.69
CONCRETE PIPE RACKS AND FOUNDATIONS	Working space	m2	0.30	420	2.12	R 39.68	R 16,665.28	
	Backfill	m3	2.06	61	0.82	R 102.59	R 6,274.64	
	Blinding	m2	0.67	67	19.99	R 70.14	R 4,710.56	
	Concrete bases	m3	0.00	45	0.00	R 1,402.00	R 63,090.00	
	Concrete column	m3	1.19	41	151.33	R 1,402.00	R 56,929.70	
	Concrete beam	m3	2.68	15	0.95	R 1,402.00	R 21,242.42	
	Total concrete	m3	2.97	101	0.95		R -	
	Wood float	m2	0.47	96	7.50	R 9.26	R 887.03	
	Formwork bases	m2	0.48	94	6.55	R 186.93	R 17,525.00	
	Formwork to columns	m2	0.15	271	7.98	R 175.69	R 47,560.31	
	Formwork to sides beams	m2	0.33	46	6.11	R 214.05	R 9,827.63	
	Formwork to soffits beams	m2	0.69	22	6.55	R 229.46	R 5,038.65	
	Formwork corbels	m2	10.88	4	5.37	R 261.08	R 974.40	
	High tensile reinforcement	t	9.10	11.072	0.00	R 11,485.00	R 127,164.92	
	Cast in steel	kg	0.03	3,359	262.64	R 43.73	R 146,867.80	
	HD bolts	kg	1.48	68	215.28	R 53.35	R 3,631.98	
	Grout	m3	505.30	0.199	0.16	R 8,762.50	R 1,747.26	
	Restricted excavation	m3	3.84	856	0.05	R 70.10	R 60,028.03	R 2,805,126.12
	Working space	m2	0.61	1,404	1.79	R 39.16	R 54,975.76	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	745	0.79	R 88.73	R 66,073.78	
	Blinding	m2	0.61	366	20.06	R 69.89	R 25,550.07	
	Concrete bases	m3	0.00	223	0.97	R 1,402.00	R 312,646.00	
	Concrete column	m3	2.44	91	1.07	R 1,402.00	R 128,133.61	
	Concrete beam	m3	0.84	109	1.02	R 1,402.00	R 152,540.01	
	Concrete surface slab	m3	1.68	133	0.97	R 1,402.00	R 186,098.81	
	Concrete wall	m3	2.50	37	1.05	R 1,402.00	R 51,253.44	
	Concrete elevated slab	m3	1.10	83	0.00	R 1,402.00	R 116,485.10	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total concrete	m3	0.00	676	0.00		R -	
	Wood float	m2	0.64	1,056	169.32	R 8.28	R 8,740.45	
	Formwork bases	m2	0.41	544	7.65	R 183.27	R 99,679.90	
	Formwork to columns	m2	0.17	538	6.34	R 221.14	R 118,884.40	
	Formwork to sides beams	m2	0.30	363	5.15	R 272.23	R 98,731.40	
	Formwork to soffits beams	m2	0.84	130	7.57	R 185.20	R 23,988.80	
	Formwork to soffts of slabs	m2	0.31	428	3.23	R 243.83	R 104,403.26	
	Formwork to pockets	m2	26.55	3	5.75	R 434.06	R 1,494.16	
	Formwork wall	m2	0.13	281	8.09	R 173.30	R 48,733.90	
	High tensile reinforcement	t	8.87	76.164	0.00	R 11,485.00	R 874,744.71	
	Cast in steel	kg	0.22	3,071	255.59	R 44.94	R 137,987.07	
	HD bolts	kg	0.41	1,648	201.38	R 57.03	R 93,973.36	
	Steel handrailing	m	2.58	30	9.71	R 1,182.80	R 34,917.44	
	Grout	m3	1,039.37	0.650	0.18	R 7,788.89	R 5,062.67	
MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	141	0.04	R 56.08	R 7,933.27	R 1,113,860.80
	Working space	m2	7.92	18	1.42	R 39.49	R 705.41	
	Backfill	m3	4.13	34	0.63	R 35.33	R 1,210.16	
	Blinding	m2	1.05	166	17.95	R 78.11	R 12,943.26	
	Concrete bases	m3	0.00	174	0.00	R 1,402.00	R 243,948.00	
	Concrete column	m3	26.31	7	0.00	R 1,402.00	R 9,272.06	
	Concrete beam	m3	1.43	5	0.00	R 1,402.00	R 6,483.96	
	Concrete wall	m3	10.41	17	0.00	R 1,402.00	R 23,434.01	
	Concrete elevated slabs	m3	10.92	1	0.00	R 1,402.00	R 849.09	
	Total concrete	m3	0.00	203	0.00		R -	
	Wood float	m2	0.82	247	138.41	R 10.13	R 2,502.17	
	Formwork bases	m2	8.50	20	6.94	R 202.02	R 4,135.41	
	Formwork to columns	m2	0.14	47	5.63	R 222.54	R 10,512.54	
	Formwork to sides beams	m2	0.17	27	4.72	R 249.02	R 6,774.59	
	Formwork to soffits beams	m2	0.50	9	6.30	R 297.03	R 2,747.44	
	Formwork to soffts of slabs	m2	0.13	5	2.98	R 289.07	R 1,346.69	
	Formwork to pockets	m2	418.49	0	4.85	R 470.47	R 195.61	
	Formwork wall	m2	0.10	167	6.38	R 219.75	R 36,730.42	
	High tensile reinforcement	t	4.05	50.014	0.00	R 11,485.00	R 574,416.10	
	Cast in steel	kg	0.15	1,350	200.08	R 57.40	R 77,515.17	
	HD bolts	kg	0.22	921	167.91	R 68.40	R 62,977.06	
	Galvanised grating	m2	17.15	12	0.15	R 2,126.85	R 25,120.24	
	Grout	m3	771.45	0.226	5.40	R 9,346.67	R 2,108.13	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	224	0.05	R 70.10	R 15,727.64	R 2,466,881.32
	Working space	m2	0.42	534	1.76	R 39.83	R 21,276.56	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	110	0.80	R 87.63	R 9,637.03	
	Blinding	m2	4.82	29	20.78	R 67.47	R 1,987.67	
	Concrete bases	m3	0.00	142	0.00	R 1,402.00	R 199,084.00	
	Concrete column	m3	6.67	21	0.00	R 1,402.00	R 29,847.68	
	Concrete beam	m3	1.99	11	0.00	R 1,402.00	R 14,998.83	
	Concrete wall	m3	35.85	4	0.00	R 1,402.00	R 5,553.25	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,402.00	R 1,206.45	
	Total concrete	m3	0.00	179	0.00		R -	
	Wood float	m2	4.82	29	162.71	R 8.62	R 253.85	
	Formwork bases	m2	1.44	99	8.18	R 171.39	R 16,901.32	
	Formwork to columns	m2	0.14	152	6.98	R 204.67	R 31,123.75	
	Formwork to sides beams	m2	0.23	47	6.34	R 200.86	R 9,342.74	
	Formwork to soffits beams	m2	0.75	14	6.85	R 221.14	R 3,154.33	
	Formwork to soffts of slabs	m2	0.22	4	3.87	R 227.23	R 888.80	
	Formwork to pockets	m2	3.09	46	6.17	R 362.27	R 16,648.19	
	Formwork wall	m2	0.29	14	7.54	R 185.94	R 2,539.67	
	High tensile reinforcement	t	7.31	24.461	0.00	R 11,485.00	R 280,933.15	
	Cast in steel	kg	0.02	8,940	212.67	R 54.00	R 482,818.76	
	HD bolts	kg	0.01	17,881	208.59	R 55.06	R 984,525.30	
	Galvanised grating	m2	3.97	45	0.19	R 7,378.95	R 332,348.15	
	Grout	m3	42.08	3.375	6.37	R 1,802.98	R 6,084.21	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	0	0.05	R 70.10	R -	R -
	Working space	m2	2.50	0	1.84	R 38.10	R -	
	Backfill	m3	1.25	0	0.79	R 88.73	R -	
	Blinding	m2	3.86	0	20.30	R 69.06	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Mesh reinforcement	m2	0.51	0	65.77	R 174.62	R -	
	Rough formwork	m2	3.09	0	8.61	R 162.83	R -	
	Smooth formwork	m2	0.57	0	6.80	R 206.18	R -	
	Finish to concrete	m2	0.23	0	105.40	R 13.30	R -	
	Construction joints	m	4.97	0	21.29	R 65.85	R -	
	Movement joints	m	15.36	0	17.11	R 81.94	R -	
	Cast in steel	kg	2.35	0	232.74	R 49.35	R -	
	Grout	m3	882.88	0.000	0.18	R 7,788.89	R -	
	Brick walls	m2	0.50	0	0.00	R 331.20	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	0	0.00		R -	
	Waterproofing membrane	m2	2.22	0	12.03	R 116.54	R -	
	Roof construction	m2	2.04	0	38.22	R 300.50	R -	
	Ceiling	m2	0.98	0	0.00	R 233.32	R -	
	Doors and windows	No	474.69	0	0.17	R 1,948.24	R -	
	Floor finish	m2	1.03	0	0.79	R 419.24	R -	
	Wall finsih	m2	1.04	0	1.47	R 225.31	R -	
	Rod reinforcement	t	9.25	0	0.00	R 11,485.00	R -	
	Metalwork	Item	0.00	0	4.44	R 50,993.40	R -	
	Structural steel	Item	0.00	0	11.50	R 132,077.50	R -	
	Plumbing and drainage	Item	0.00	0	7.32	R 84,070.20	R -	
	Small power and lighting	Item	0.00	0	62.40	R 716,664.00	R -	
	External works	Item	0.00	0	178.28	R 249,948.56	R -	
BUILDINGS - STEEL	Concrete	m3	0.00	72	0.17	R 1,402.00	R 100,944.00	R 1,928,970.69
	Earthworks	m3	2.37	171	9.13	R 153.56	R 26,203.43	
	Reinforcement	t	8.82	8	0.00	R 11,485.00	R 93,755.10	
	Mesh	m2	0.12	600	10.27	R 136.51	R 81,908.47	
	Formwork	m2	0.40	180	8.06	R 173.95	R 31,310.17	
	Brickwork	m2	6.11	91	6.08	R 230.59	R 21,058.98	
	Roof covering	m2	0.87	641	208.48	R 197.74	R 126,826.85	
	Structural steel	t	18.83	30	0.00	R 41,225.00	R 1,221,643.65	
	Side cladding	m2	1.54	362	0.98	R 193.79	R 70,215.96	
	Doors	No	405.94	1	0.51	R 21,024.75	R 28,900.36	
	Ridge ventilator	m	21.95	25	11.48	R 2,270.06	R 57,708.24	
	Aluminium insulation	m2	0.89	627	1.81	R 109.25	R 68,495.48	
	Total building area	m2	0.00	558	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	406	0.13	R 182.26	R 73,924.66	R 3,720,762.03
	Concrete	m3	0.00	130	0.00	R 1,402.00	R 182,260.00	
	Reinforcement	t	11.42	11	0.18	R 11,485.00	R 130,739.93	
	Mesh	m2	0.12	1,083	10.21	R 137.32	R 148,759.39	
	Formwork	m2	0.45	289	8.51	R 164.75	R 47,593.68	
	Brickwork	m2	5.94	147	5.91	R 237.23	R 34,944.77	
	Screed	m2	1.12	781	43.13	R 32.51	R 25,395.61	
	Structural steel	t	14.72	59	0.00	R 41,225.00	R 2,450,534.99	
	Cat ladders	m	2.74	22	9.66	R 4,267.60	R 92,583.42	
	Hand rail	m	0.73	81	27.40	R 1,504.56	R 122,514.50	
	Kick plates	m	0.76	78	2.76	R 545.13	R 42,637.10	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	962	195.47	R 210.90	R 202,790.32	
		Side cladding	m2	4.76	184	0.93	R 196.14	R 36,054.93	
		Floor grating	m2	1.09	55	17.29	R 2,384.33	R 130,028.76	
		Total buiding area	m2	0.00	875	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	0	8.02	R 174.81	R -	R -
		Blinding	m2	0.47	0	18.72	R 74.89	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	7.97	0	0.00	R 11,485.00	R -	
		Mesh	m2	0.49	0	50.23	R 228.65	R -	
		Formwork	m2	0.31	0	7.58	R 184.96	R -	
		Finish to concrete	m2	0.44	0	103.65	R 13.53	R -	
		Movement joints	m	2.46	0	15.35	R 91.34	R -	
		Cast in steel	kg	0.09	0	179.47	R 63.99	R -	
		Grout	m3	71.08	0.000	2.53	R 9,346.67	R -	
		Brickwork	m2	0.24	0	0.15	R 331.20	R -	
		Doors and windows	No	2.74	0	0.26	R 4,140.00	R -	
		Pipework	m	2.59	0	0.21	R 554.15	R -	
		Bolts	kg	0.11	0	0.08	R 63.99	R -	
		Structural steel	t	3.99	0	0.00	R 44,173.08	R -	
		Miscellaneous steel	t	131.32	0	0.00	R 54,690.48	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	0	6.07	R 230.97	R -	R -
		Blinding	m2	0.71	0	14.50	R 96.69	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	5.75	0	0.00	R 11,485.00	R -	
		Formwork	m2	0.07	0	5.72	R 245.10	R -	
		Finish to concrete	m2	0.31	0	77.96	R 17.98	R -	
		Movement joints	m	0.42	0	12.46	R 112.52	R -	
		Cast in steel	kg	23.71	0.000	163.17	R 70.39	R -	
		Grout	m3	22.24	0.000	0.62	R 10,784.62	R -	
		Bolts	kg	109.85	0.000	0.13	R 43.64	R -	
		Structural steel	t	35.84	0.000	0.22	R 52,204.55	R -	
		Miscellaneous steel	t	20.04	0.000	0.18	R 63,805.56	R -	
		Brickwork	m2	0.49	0	4.24	R 330.66	R -	
		Roof covering	m2	1.46	0	1.22	R 271.03	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	239	6.10	R 229.84	R 54,834.29	R 1,884,644.74
	Blinding	m2	1.17	258	16.23	R 86.38	R 22,297.21	
	Concrete	m3	0.00	302	0.00	R 1,402.00	R 423,404.00	
	Reinforcement	t	5.89	51.273	0.00	R 11,485.00	R 588,874.36	
	Formwork	m2	0.21	1,438	6.04	R 232.12	R 333,809.52	
	Movement joint	m	1.61	188	0.12	R 108.85	R 20,418.00	
	Cast in steel	kg	0.13	2,323	12.88	R 58.55	R 136,014.16	
	Bolts	kg	0.37	816	196.16	R 70.71	R 57,716.06	
	Chemical anchors	No	6.13	49	0.22	R 319.21	R 15,725.93	
	Miscellaneous steelwork	t	88.98	3.394	162.42	R 52,204.55	R 177,183.33	
	Pre-cast concrete	m3	30.27	10	35.98	R 4,673.33	R 46,625.26	
	Brickwork	m2	7.79	24	0.30	R 320.82	R 7,742.60	
	Total area	m2	0.00	188	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.68	R 94.21	R -	R -
	Lining	m2	0.70	0	1.16	R 56.08	R -	
	Paving	m2	0.65	0	0.53	R 105.81	R -	
	Pipework	m	28.23	0	0.24	R 392.56	R -	
	Manholes	No	16.47	0	0.10	R 3,925.60	R -	
	Concrete	m3	2.43	0	0.04	R 1,402.00	R -	
	Formwork	m2	0.08	0	5.85	R 239.66	R -	
	Mesh	m2	0.70	0	6.64	R 211.14	R -	
	Reinforcement	t	4.69	0.000	0.12	R 11,485.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	0	5.56	R 252.16	R -	R -
	Blinding	m2	0.85	0	13.49	R 103.93	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Reinforcement	t	4.52	0.000	0.00	R 11,485.00	R -	
	Mesh	m2	0.90	0	38.60	R 297.54	R -	
	Formwork	m2	0.15	0	5.36	R 261.57	R -	
	Cast in steel	kg	0.02	0	140.16	R 81.94	R -	
	Miscellaneous steelwork	t	11.14	0.000	0.16	R 71,781.25	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	142	0.00		R -	R 985,759.48
	Steel	t	9.58	14.823	0.00	R 41,225.00	R 611,059.50	
	Handrail	m	1.45	98	28.73	R 1,434.91	R 140,522.34	
	Grating	m2	1.91	74	16.97	R 2,429.29	R 180,606.68	
	Kick flats	m	1.71	83	76.94	R 535.81	R 44,493.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	21	95.97	R 429.56	R 9,077.04	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,945	0.00		R -	R 3,581,262.47
		Steel	t	27.86	69.813	0.00	R 41,225.00	R 2,878,055.46	
		Handrail	m	13.37	145	30.43	R 1,354.75	R 197,081.98	
		Grating	m2	12.47	156	18.55	R 2,222.37	R 346,633.00	
		Kick flats	m	13.35	146	84.90	R 485.57	R 70,744.28	
		Cat ladder	m	98.85	20	9.14	R 4,510.39	R 88,747.76	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	4,885	0.00		R -	R 6,281,701.99
		Steel	t	76.43	63.915	0.00	R 41,225.00	R 2,634,883.23	
		Handrail	m	31.26	156	30.84	R 1,336.74	R 208,892.04	
		Grating	m2	3.84	1,272	16.10	R 2,560.56	R 3,257,377.80	
		Kick flats	m	34.08	143	83.17	R 495.67	R 71,049.16	
		Stair treads	No	230.28	21	101.90	R 404.56	R 8,582.12	
		Cat ladder	m	238.13	21	8.38	R 4,919.45	R 100,917.64	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	645	0.00		R -	R 1,245,650.24
		Steel	t	25.51	25.284	0.00	R 41,225.00	R 1,042,341.24	
		Handrail	m	45.84	14	30.11	R 1,369.15	R 19,264.82	
		Grating	m2	60.74	11	17.06	R 2,416.47	R 25,660.59	
		Kick flats	m	46.49	14	79.97	R 515.51	R 7,152.10	
		Cat ladder	m	20.35	32	8.64	R 4,771.41	R 151,231.49	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 1,441,452.17
		Steel	t	16.54	16.082	0.00	R 41,225.00	R 662,989.72	
		Handrail	m	1.10	242	31.41	R 1,312.48	R 317,381.55	
		Grating	m2	1.98	134	16.95	R 2,432.15	R 326,743.84	
		Kick flats	m	1.16	229	80.43	R 512.56	R 117,534.74	
		Stair treads	No	6.10	44	106.99	R 385.32	R 16,802.32	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	455	0.00		R -	R 1,752,386.42
		Steel	t	12.73	35.742	0.00	R 41,225.00	R 1,473,478.00	
		Handrail	m	25.10	18	32.05	R 1,286.27	R 23,316.87	
		Grating	m2	7.46	61	17.66	R 2,334.37	R 142,377.88	
		Kick flats	m	22.84	20	84.46	R 488.10	R 9,723.55	
		Cat ladder	m	20.48	22	8.85	R 4,658.19	R 103,490.11	
	PIPING INSTALLATION	Pipe length	m	0.00	52,441	0.00		R -	R 52,369,489.55
		Total work units	WU	0.33	158,912	0.00	R 329.55	R 52,369,489.55	
		Pipe supports	kg	2.61	20,092	0.00		R -	
		WU for pipe supports	WU	0.16	25,426	0.00		R -	
		Number of welds	No	0.61	31,989	0.00		R -	
		Total fittings	No	0.38	19,928	0.00		R -	
		Stud bolts	No	0.34	6,775	0.00		R -	
		Support number	No	0.19	3,818	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	158,912	0.00	R 329.55		R 147,237.08

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	2,649	5.93	R 55.57	R 147,237.08	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	158,912	0.00	R 329.55		R 52,907.07
	Number of examinations	No	168.34	944	5.88	R 56.05	R 52,907.07	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	158,912	0.00	R 329.55		R 82,095.68
	Number of examinations	No	300.90	528	2.12	R 155.45	R 82,095.68	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	158,912	0.00	R 329.55		R 142,718.13
	Number of examinations	No	52.95	3,001	6.93	R 47.55	R 142,718.13	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	158,912	0.00	R 329.55		R 109,894.23
	Number of examinations	No	114.83	1,384	4.15	R 79.41	R 109,894.23	
MECHANICAL INSTALLATION	Total work units	WU	0.00	158,912	0.00	R 329.55		R 266,949.52
	Mechanical equipment	t	261.57	608	0.75	R 439.40	R 266,949.52	
	Structural steel	t	218.09	729	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	158,912	0.00	R 329.55		R 3,155,323.47
	Painting to piping	m2	17.88	8,888	0.34	R 126.75	R 1,126,516.30	
	Insulation to piping	m2	51.67	3,076	2.60	R 372.79	R 1,146,535.78	
	Mechanical equipment received	t	0.00	608	0.82	R 439.40	R 266,949.52	
	Painting to mechanical equipment	m2	0.25	2,430	3.69	R 119.08	R 289,376.17	
	Insulation to mechanical equipment	m2	0.70	868	1.17	R 375.56	R 325,945.69	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	30,225	0.00	R 52.33	R 1,581,674.25	R 4,303,116.94
	Electrical cable terminations	No	311.25	1,201	0.43	R 121.70	R 146,138.74	
	Electrical equipment	No	9.05	97	0.11	R 475.73	R 46,197.13	
	DB's	No	6.39	11	0.32	R 1,486.65	R 15,952.05	
	Rack	m	0.69	4,730	1.65	R 149.51	R 707,209.59	
	Support steel	kg	1.42	6,855	2.13	R 24.57	R 168,417.61	
	Instrumentation cable	m	27.43	24,665	0.35	R 28.50	R 702,952.50	
	Instruments	No	0.58	899	0.18	R 158.33	R 142,373.01	
	Hook-ups	No	3.98	1,550	0.16	R 178.13	R 276,154.55	
	Light fittings	No	10.26	386	0.02	R 290.72	R 112,361.69	
	Conduit	m	4.13	2,946	0.13	R 31.72	R 93,429.87	
	Instrument stands	No	0.00	218		R 1,425.00	R 310,255.95	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project F			
Location:	South Africa			
Client:			Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	14,223	R	4.32
2	Concrete demolitions	m3	0	R	1,545.00
3	Bulk excavation	m3	4,855	R	44.00
4	Vertical piles	No	48		
5	Raking piles	No	6		
6	Concrete in piles	m3		R	1,402.00
7	Auger pile	m		R	342.00
8	Total paving and asphalt to road works	m2	2,555		
9	Grey paving to road works	m2	0	R	144.20
10	Asphalt to road surface	m2	2,555		
11	Rip bed of road works	m2	2,555	R	11.32
12	Total concrete in paving and bunding	m3	302	R	1,402.00
13	Concrete in paving	m3	155		
14	Rod reinforcement	t		R	11,485.00
15	Concrete in plinths and bases on area finishing	m3	199		
16	Stormwater pipe to drain surface run-off	m	85		
17	Machine excavation	m3		R	58.22
18	Concrete in pump and pipe support bases	m3	125	R	1,402.00
19	Concrete in tank bases	m3	185	R	1,402.00
20	Concrete in pipe and cable rack foundations	m3	196	R	1,402.00
21	Concrete to simple structural foundations	m3	255	R	1,402.00
22	Complex structural foundations - bases	m3	0	R	1,402.00
23	Concrete pipe racks - bases	m3	45	R	1,402.00
24	Concrete structure including concrete columns and beams - bases	m3	223	R	1,402.00
25	Major equipment bases with blast proof walls - bases	m3	174	R	1,402.00
26	Major equipment bases and elevated concrete structure - bases	m3	142	R	1,402.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	0	R	1,402.00
28	One brick wall	m2		R	331.20
29	Concrete in structual steel buildings - all concrete	m3	72	R	1,402.00
30	Total building area - Structural steel buildings	m2	558		
31	Ceiling	m2		R	233.32
32	Structural steel	t		R	41,225.00
33	Steel canopy - concrete	m3	130	R	1,402.00
34	Steel canopy - area	m2	875		
35	Concrete in weighbridge - all concrete	m3	0	R	1,402.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,402.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	302	R	1,402.00
41	Total cooling tower area	m2	188		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,402.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	142		
46	Total volume of steel pipe rack	m3	1,945		
47	Total volume of steel complex steel structure	m3	4,885		
48	Total volume of steel in stack	m3	645		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	455		
51	Piping work unit cost	WU		R	329.55
52	Total process pipe length	m	52,441		
53	Total electrical cable - installation only	m	30,225	R	52.33
54	Total instrumentation cable - installation only	m	24,665	R	38.45

Ratio: Project Ratio Median

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Normal	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Good	Median
Rework	Extensive	Median
Scope change	Few	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Medium	Median
Project conditions	Good	Median
Complexity	Simple	Median
Repitition	None	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project F				
Location:	South Africa				
Client:	0		Date of estimate:	2007	
	CIVIL CONSTRUCTION COST			R	38,277,060.68
A	SITE CLEARANCE AND DEMOLITIONS		R 61,443.36		
B	BULK EARTHWORKS		R 463,918.00		
C	PILING		R 1,889,989.38		
D	ROAD WORKS		R 921,343.25		
E	GENERAL PAVING AND BUNDED AREAS		R 922,022.87		
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R 958,218.95		
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R 782,236.90		
H	TANK BASES AND BUNDING		R 3,029,437.54		
I	RACK FOUNDATIONS		R 1,479,098.12		
J	SIMPLE STRUCTURAL FOUNDATIONS		R 2,586,464.10		
K	COMPLEX STRUCTURAL FOUNDATIONS		R -		
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R 559,965.41		
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R 3,290,981.08		
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R 1,058,366.08		
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R 2,764,576.41		
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R -		
Q	BUILDINGS - STEEL		R 2,041,940.65		
R	CANOPIES - STEEL		R 3,770,613.86		
S	WEIGHBRIDGE		R -		
T	PUMP HOUSE		R -		
U	COOLING TOWER		R 1,772,762.33		
V	EMERGENCY DAM		R -		
W	HEAVY DUTY CABLE TUNNEL		R -		
	Preliminaries and General	35.00%	R 9,923,682.40		
	STRUCTURAL STEEL			R	24,245,886.41
A	STRUCTURAL STEEL - BASIC PLATFORM		R 1,091,057.29		
B	STRUCTURAL STEEL - PIPERACK		R 4,205,795.94		
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R 6,989,647.88		
D	STRUCTURAL STEEL - STACK		R 1,428,082.14		
E	STRUCTURAL STEEL - WALKWAY		R 1,713,491.57		
F	STRUCTURAL STEEL - CABLE GANTRY		R 1,890,415.47		
	Preliminaries and General	40.00%	R 6,927,396.12		
	MECHANICAL AND PIPING			R	82,280,492.79
A	PIPING INSTALLATION		R 57,606,438.50		
B	RADIOGRAPHIC EXAMINATION (RT)		R 187,696.92		
C	DYE PENETRATION TESTING (DP)		R 115,806.94		
D	MAGNETIC PARTICLE TESTING (MPI)		R 111,300.34		
E	POST WELD HEAT TREATMENT		R 190,633.02		
F	MATERIAL HARDNESS TEST (HT)		R 225,980.80		
H	MECHANICAL INSTALLATION		R 333,924.04		
	Preliminaries and General	40.00%	R 23,508,712.23		
	PAINTING AND INSULATION			R	5,727,360.44
A	PAINTING AND INSULATION		R 4,242,489.21		
	Preliminaries and General	35.00%	R 1,484,871.22		
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY			R	6,528,970.52
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R 4,836,274.46		
	Preliminaries and General	35.00%	R 1,692,696.06		
	TOTAL COST			R	157,059,770.84

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		14,223		R 4.32	R 61,443.36	R 61,443.36
	Concrete demolitions	m3		0		R 1,545.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		4,855		R 44.00	R 213,620.00	R 463,918.00
	Trimming of sides	m2	2.20	2,207	4.18	R 10.53	R 23,229.67	
	Back fill and compact	m3	1.12	4,335	0.95	R 46.32	R 200,770.68	
	Overhaul	m3/km	1.62	2,997	11.35	R 3.88	R 11,617.99	
	Rip bed	m2	1.71	2,839	8.51	R 5.17	R 14,679.67	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 269,730.78	R 269,730.78	R 1,889,989.38
	EO for raking equipment	Item	0.00	1	24.25	R 33,998.50	R 33,998.50	
	Number of piles	No	0.00	48	0.00		R -	
	Move rig to new position	No	1.48	32	0.19	R 266.38	R 8,639.35	
	Number of raking piles	No	19.43	2	0.00		R -	
	EO for setting up raking piles	No	0.93	3	0.24	R 336.48	R 893.81	
	EO for raking drilling	m	0.14	18	0.61	R 208.62	R 3,681.26	
	Auger quantity	m	0.05	960	0.00	R 342.00	R 328,320.00	
	EO for drilling in coarse gravel	m	0.55	87	0.22	R 308.44	R 26,918.40	
	EO for drilling in boulders	m	1.65	29	0.51	R 715.02	R 20,800.58	
	EO for drilling in soft rock	m	1.57	31	0.23	R 322.46	R 9,858.65	
	Temporary casings	m	0.38	126	0.31	R 434.62	R 54,899.37	
	EO casing to raking pile	m	0.17	15	0.57	R 981.40	R 14,261.51	
	Mild steel rod reinforcement	t	14.65	3.276	0.70	R 7,124.96	R 23,344.59	
	High tensile rod reinforcement	t	1.16	41.379	7.26	R 10,178.52	R 421,180.14	
	Concrete to piles and bases	m3	0.16	300	0.00	R 1,402.00	R 420,600.00	
	Concrete to raking piles	m3	0.08	31	1.08	R 1,514.16	R 46,757.39	
	Site establishment of test equipment	Item	0.00	1	115.74	R 162,267.48	R 162,267.48	
	Load test to pile	No	93.50	1	22.16	R 31,068.32	R 15,949.51	
	Site establishment of intergity testing	No	255.00	0	49.96	R 70,043.92	R 13,184.74	
	Integrity testing of piles	No	1.19	40	0.26	R 364.52	R 14,703.33	
ROAD WORKS	Red paving	m2	0.14	0	0.93	R 134.11	R -	R 921,343.25
	Grey paving	m2	0.00	0	0.00	R 144.20	R -	
	Kerbing	m	0.09	230	0.00	R 250.11	R 57,513.68	
	Total paving and asphalt	m2	0.00	2,555	0.00		R -	
	Remove top soil	m3	0.49	250	4.45	R 50.37	R 12,613.15	
	Asphalt	m2	0.20	511	0.00	R 155.55	R 79,486.85	
	Rip bed	m2	0.00	2,555	0.00	R 11.32	R 28,922.60	
	Reduce levels	m3	0.36	920	4.30	R 48.68	R 44,772.18	
	Selected fill	m3	1.50	613	0.46	R 105.82	R 64,887.22	
	Imported fill	m3	1.94	316	0.33	R 320.66	R 101,354.61	
	Wearing course	m3	3.89	236	0.20	R 243.38	R 57,547.80	
	Prime	m2	4.34	2,661	1.47	R 32.07	R 85,336.53	
	Three line road marking	m	0.78	2,076	0.10	R 25.01	R 51,918.75	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	228	4.06	R 7.50	R 1,708.16	
		1m Wide concrete V-drain	m	1.00	230	0.78	R 1,070.49	R 246,158.53	
		200mm Diameter PVC pipe	m	0.93	214	0.09	R 332.65	R 71,138.67	
		Road marking - STOP	No	0.15	34	0.03	R 410.19	R 14,148.36	
		Standard signage	No	0.01	2	4.28	R 460.21	R 1,058.25	
		100mm Painted line	m	1.61	370	1.33	R 7.50	R 2,777.91	
				0.00		1.64			
				0.00		1.84			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	155	0.75	R 1,402.00	R 217,310.00	R 922,022.87
		Concrete in plinths	m3	0.00	32	0.00	R 1,402.00	R 44,530.74	
		Total concrete	m3	0.00	302	0.00		R -	
		Rip and compact	m2	0.13	1,192	193.57	R 7.24	R 8,635.72	
		Formwork to plinth	m2	6.92	220	0.12	R 168.24	R 36,978.32	
		Formwork to slab	m2	0.80	124	0.15	R 210.30	R 26,077.20	
		High tensile steel	t	0.01	3.020	0.00	R 11,485.00	R 34,684.70	
		Mesh	m2	607.27	1,834	43.37	R 264.81	R 485,657.78	
		Construction joint	m	3.64	564	0.04	R 56.08	R 31,640.34	
		Expansion joint	m	2.10	326	0.08	R 112.16	R 36,508.08	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	3,747	0.00		R -	R 958,218.95
		Base excavation	m3	1.42	463	0.00	R 58.22	R 26,943.67	
		Backfill	m3	0.56	326	0.63	R 92.41	R 30,118.12	
		Working space	m2	0.43	826	1.35	R 68.45	R 56,571.08	
		Concrete in bases	m3	0.04	199	23.71	R 1,402.00	R 278,998.00	
		Blinding	m2	0.71	317	19.17	R 73.14	R 23,163.23	
		Concrete in sump walls	m3	0.11	22	31.87	R 1,402.00	R 30,689.78	
		Concrete in slabs	m3	0.02	4	0.81	R 1,402.00	R 5,579.96	
		Total concrete	m3	0.00	225	0.03		R -	
		Wood float	m2	0.61	369	123.90	R 11.32	R 4,171.37	
		Formwork to bases	m2	1.73	344	0.12	R 168.24	R 57,919.98	
		Formwork to sump walls	m2	11.18	245	0.12	R 168.24	R 41,173.41	
		Formwork to sides of slab	m2	5.67	23	0.17	R 238.34	R 5,378.52	
		Mild steel reinforcement	t	0.08	1.920	0.00	R 11,485.00	R 22,050.22	
		High tensile reinforcement	t	9.37	23.999	0.92	R 11,485.00	R 275,627.74	
		Cast in steel	kg	0.45	442	33.55	R 41.79	R 18,479.75	
		Waterstop	m	0.44	50	8.37	R 167.50	R 8,333.27	
		Manhole	No	0.08	7	2.72	R 4,295.34	R 29,208.33	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	85	0.12	R 515.44	R 43,812.50	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	201	0.05	R 58.22	R 11,716.78	R 782,236.90
	Working space	m2	0.33	610	0.68	R 39.59	R 24,143.66	
	Backfill	m3	3.97	51	1.27	R 73.94	R 3,748.19	
	Concrete bases	m3	0.93	125	0.00	R 1,402.00	R 175,250.00	
	Concrete plinth	m3	2.01	62	0.00	R 1,402.00	R 87,189.05	
	Total concrete	m3	0.00	187	0.00		R -	
	Wood float	m2	0.46	135	0.05	R 14.02	R 1,895.41	
	Blinding	m2	0.93	134	0.01	R 70.10	R 9,422.04	
	Formwork bases	m2	0.47	266	0.12	R 168.24	R 44,744.68	
	Formwork plinth	m2	0.53	117	0.12	R 168.24	R 19,740.92	
	High tensile reinforcement	t	10.15	18.442	6.60	R 11,485.00	R 211,809.49	
	Cast in steel	kg	0.10	1,872	0.03	R 42.06	R 78,731.72	
	HD Bolts	kg	0.08	2,340	0.03	R 42.06	R 98,414.65	
	Grout	m3	33.79	1.840	5.98	R 8,383.96	R 15,430.32	
TANK BASES AND BUNDING	Restricted excavation	m3	5.54	1,025	0.05	R 70.10	R 71,845.49	R 3,029,437.54
	Working space	m2	3.95	259	1.56	R 44.94	R 11,659.44	
	Backfill	m3	1.34	765	0.75	R 93.47	R 71,488.05	
	Concrete bases	m3	0.70	185	0.00	R 1,402.00	R 259,370.00	
	Concrete sump wall	m3	2.55	73	0.00	R 1,402.00	R 101,713.73	
	Concrete slab	m3	0.56	330	0.00	R 1,402.00	R 463,160.71	
	Concrete plinth	m3	3.73	50	19.74	R 1,402.00	R 69,536.19	
	Concrete column	m3	19.00	10	160.09	R 1,402.00	R 13,651.05	
	Total concrete	m3	0.00	647	0.99		R -	
	Blinding	m2	2.44	265	1.05	R 71.02	R 18,839.83	
	Wood float	m2	0.25	2,589	1.05	R 8.76	R 22,673.04	
	Formwork to bases	m2	0.39	474	1.05	R 185.45	R 87,969.75	
	Formwork to plinths	m2	0.34	146	7.56	R 194.18	R 28,326.62	
	Formwork to columns	m2	0.11	89	7.22	R 204.67	R 18,116.86	
	Formwork to sumps	m2	0.10	725	6.85	R 191.53	R 138,953.18	
	Formwork to slabs	m2	3.83	86	7.32	R 174.16	R 15,022.32	
	Formwork to slabs n/e 300mm	m	2.05	161	8.05	R 63.73	R 10,269.64	
	Mild steel reinforcement	t	0.22	6.437	22.00	R 11,485.00	R 73,932.35	
	High tensile reinforcement	t	22.12	29.260	0.90	R 11,485.00	R 336,056.12	
	Mesh	m2	0.15	2,202	54.97	R 208.93	R 460,148.18	
	Cast in items	kg	0.19	3,407	218.75	R 52.50	R 178,852.60	
	HD Bolts	kg	0.09	7,192	198.48	R 57.86	R 416,138.28	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	200.00	3.236	0.16	R 8,762.50	R 28,357.24	
		Construction joint	m	0.29	1,139	24.07	R 58.25	R 66,352.55	
		Expansion joint	m	0.44	751	15.71	R 89.24	R 67,004.33	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	643	0.05	R 70.10	R 45,065.89	R 1,479,098.12
		Working space	m2	0.30	2,143	1.58	R 110.76	R 237,347.01	
		Backfill	m3	2.36	272	0.78	R 89.87	R 24,481.69	
		Blinding	m2	0.40	490	24.38	R 57.51	R 28,178.01	
		Concrete bases	m3	5.73	196	0.00	R 1,402.00	R 274,792.00	
		Concrete plinth	m3	0.00	34	0.00	R 1,402.00	R 47,956.72	
		Total concrete	m3	0.00	230	1.35		R -	
		Wood float	m2	0.35	560	182.61	R 7.68	R 4,299.44	
		Formwork bases	m2	0.49	400	11.01	R 127.34	R 50,935.51	
		Formwork plinths	m2	0.09	380	6.94	R 202.02	R 76,779.89	
		High tensile reinforcement	t	9.11	25.270	0.00	R 11,485.00	R 290,221.20	
		HD Bolts	kg	0.03	6,533	198.55	R 57.84	R 377,916.56	
		Grout	m3	76.52	2.561	0.17	R 8,247.06	R 21,124.20	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	992	0.05	R 70.10	R 69,535.70	R 2,586,464.10
		Working space	m2	0.45	2,204	1.88	R 37.29	R 82,193.49	
		Backfill	m3	2.48	400	0.78	R 89.87	R 35,946.91	
		Blinding	m2	0.35	729	21.52	R 65.15	R 47,465.48	
		Concrete bases	m3	0.00	255	0.00	R 1,402.00	R 357,510.00	
		Concrete plinth	m3	2.36	86	0.00	R 1,402.00	R 120,780.41	
		Concrete slab	m3	2.96	108	0.00	R 1,402.00	R 151,487.29	
		Total concrete	m3	0.00	449	0.00		R -	
		Wood float	m2	0.51	881	155.50	R 9.02	R 7,941.21	
		Formwork bases	m2	0.45	567	8.00	R 175.25	R 99,308.33	
		Formwork plinths	m2	0.10	861	7.78	R 180.21	R 155,244.74	
		High tensile reinforcement	t	12.87	34.903	0.00	R 11,485.00	R 400,859.07	
		HD Bolts	kg	0.02	12,750	190.91	R 60.16	R 767,030.28	
		Cast in items	kg	0.05	5,100	225.21	R 51.00	R 260,083.92	
		Grout	m3	67.67	3.768	0.17	R 8,247.06	R 31,077.29	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	0	0.05	R 70.10	R -	R -
		Working space	m2	0.50	0	1.64	R 42.74	R -	
		Backfill	m3	2.15	0	0.76	R 92.24	R -	
		Blinding	m2	0.66	0	20.25	R 69.23	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,402.00	R -	
		Concrete column	m3	27.56	0	0.00	R 1,402.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	0	0.00	R 1,402.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.59	0	157.14	R 8.92	R -	
	Formwork bases	m2	0.49	0	7.78	R 180.21	R -	
	Formwork plinths	m2	0.31	0	7.42	R 188.95	R -	
	Formwork to columns	m2	0.29	0	7.75	R 180.90	R -	
	High tensile reinforcement	t	8.97	0.000	0.00	R 11,485.00	R -	
	HD bolts	kg	0.04	0	200.18	R 57.37	R -	
	Grout	m3	96.76	0.000	0.16	R 8,762.50	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	118	0.05	R 70.10	R 8,264.79	R 559,965.41
	Working space	m2	0.25	472	2.02	R 34.70	R 16,365.92	
	Backfill	m3	1.91	62	0.79	R 88.73	R 5,477.36	
	Blinding	m2	0.68	66	20.00	R 70.10	R 4,638.97	
	Concrete bases	m3	0.00	45	0.00	R 1,402.00	R 63,090.00	
	Concrete column	m3	1.08	41	145.46	R 1,402.00	R 57,146.74	
	Concrete beam	m3	2.50	16	0.88	R 1,402.00	R 22,858.70	
	Total concrete	m3	2.76	102	0.88		R -	
	Wood float	m2	0.44	102	7.44	R 9.64	R 985.74	
	Formwork bases	m2	0.45	100	6.41	R 188.44	R 18,844.09	
	Formwork to columns	m2	0.14	291	7.35	R 190.75	R 55,536.19	
	Formwork to sides beams	m2	0.32	51	5.90	R 218.72	R 11,144.06	
	Formwork to soffits beams	m2	0.68	24	6.41	R 237.63	R 5,697.58	
	Formwork corbels	m2	10.42	4	4.87	R 287.89	R 1,126.15	
	High tensile reinforcement	t	8.81	11.585	0.00	R 11,485.00	R 133,055.51	
	Cast in steel	kg	0.03	3,402	260.94	R 44.01	R 149,743.11	
	HD bolts	kg	1.43	71	199.28	R 57.63	R 4,113.48	
	Grout	m3	476.47	0.214	0.16	R 8,762.50	R 1,877.03	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	827	0.05	R 70.10	R 57,995.83	R 3,290,981.08
	Working space	m2	0.58	1,426	1.69	R 41.48	R 59,167.35	
	Backfill	m3	1.15	719	0.78	R 89.87	R 64,655.33	
	Blinding	m2	0.62	360	19.41	R 72.23	R 25,979.79	
	Concrete bases	m3	0.00	223	0.88	R 1,402.00	R 312,646.00	
	Concrete column	m3	2.01	111	1.07	R 1,402.00	R 155,545.27	
	Concrete beam	m3	0.83	134	1.00	R 1,402.00	R 187,403.94	
	Concrete surface slab	m3	1.64	136	0.92	R 1,402.00	R 190,637.80	
	Concrete wall	m3	2.14	52	1.00	R 1,402.00	R 72,684.71	
	Concrete elevated slab	m3	0.97	114	0.00	R 1,402.00	R 160,355.95	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	770	0.00		R -	
		Wood float	m2	0.60	1,283	152.05	R 9.22	R 11,830.25	
		Formwork bases	m2	0.39	572	7.60	R 184.47	R 105,481.11	
		Formwork to columns	m2	0.15	740	6.20	R 226.13	R 167,252.98	
		Formwork to sides beams	m2	0.29	461	4.91	R 285.54	R 131,613.14	
		Formwork to soffits beams	m2	0.79	169	7.19	R 194.99	R 32,993.07	
		Formwork to soffts of slabs	m2	0.30	453	3.11	R 248.14	R 112,470.68	
		Formwork to pockets	m2	25.00	4	5.65	R 450.80	R 2,000.58	
		Formwork wall	m2	0.12	432	7.88	R 177.92	R 76,866.23	
		High tensile reinforcement	t	8.60	89.513	0.00	R 11,485.00	R 1,028,054.46	
		Cast in steel	kg	0.21	3,666	251.20	R 45.72	R 167,600.63	
		HD bolts	kg	0.39	1,974	193.52	R 59.35	R 117,145.10	
		Steel handrailing	m	2.48	36	9.30	R 1,234.95	R 44,573.99	
		Grout	m3	994.87	0.774	0.18	R 7,788.89	R 6,026.88	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	133	0.04	R 56.08	R 7,448.79	R 1,058,366.08
		Working space	m2	7.47	18	1.41	R 39.77	R 707.21	
		Backfill	m3	4.63	29	0.74	R 41.50	R 1,190.52	
		Blinding	m2	1.22	143	19.45	R 72.08	R 10,280.58	
		Concrete bases	m3	0.00	174	0.00	R 1,402.00	R 243,948.00	
		Concrete column	m3	28.46	6	0.00	R 1,402.00	R 8,571.61	
		Concrete beam	m3	1.44	4	0.00	R 1,402.00	R 5,952.51	
		Concrete wall	m3	11.19	16	0.00	R 1,402.00	R 21,800.54	
		Concrete elevated slabs	m3	11.80	1	0.00	R 1,402.00	R 726.41	
		Total concrete	m3	0.00	200	0.00		R -	
		Wood float	m2	0.88	228	160.92	R 8.71	R 1,984.32	
		Formwork bases	m2	8.70	20	6.92	R 202.60	R 4,052.02	
		Formwork to columns	m2	0.15	41	5.95	R 220.44	R 8,984.92	
		Formwork to sides beams	m2	0.17	25	5.05	R 235.63	R 5,884.83	
		Formwork to soffits beams	m2	0.51	8	6.36	R 277.62	R 2,311.20	
		Formwork to soffts of slabs	m2	0.14	4	3.22	R 262.06	R 969.84	
		Formwork to pockets	m2	450.00	0	5.35	R 435.40	R 168.36	
		Formwork wall	m2	0.11	141	6.97	R 201.15	R 28,434.25	
		High tensile reinforcement	t	4.12	48.647	0.00	R 11,485.00	R 558,715.39	
		Cast in steel	kg	0.16	1,253	209.64	R 54.78	R 68,626.80	
		HD bolts	kg	0.24	835	171.78	R 66.86	R 55,834.68	
		Galvanised grating	m2	18.82	11	0.16	R 1,870.52	R 19,920.48	
		Grout	m3	822.89	0.211	6.14	R 8,762.50	R 1,852.83	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.48	210	0.05	R 70.10	R 14,732.22	R 2,764,576.41
	Working space	m2	0.38	553	1.56	R 44.94	R 24,851.92	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.98	106	0.78	R 89.87	R 9,539.12	
	Blinding	m2	4.71	30	21.03	R 66.67	R 2,009.91	
	Concrete bases	m3	0.00	142	0.00	R 1,402.00	R 199,084.00	
	Concrete column	m3	6.03	24	0.00	R 1,402.00	R 33,015.59	
	Concrete beam	m3	1.73	14	0.00	R 1,402.00	R 19,084.16	
	Concrete wall	m3	33.33	4	0.00	R 1,402.00	R 5,973.12	
	Concrete elevated slabs	m3	24.00	1	0.00	R 1,402.00	R 1,375.65	
	Total concrete	m3	0.00	184	0.00		R -	
	Wood float	m2	4.62	31	151.91	R 9.23	R 283.67	
	Formwork bases	m2	1.43	99	7.62	R 183.99	R 18,270.29	
	Formwork to columns	m2	0.13	181	6.99	R 223.96	R 40,569.66	
	Formwork to sides beams	m2	0.23	59	5.94	R 200.57	R 11,870.47	
	Formwork to soffits beams	m2	0.69	20	6.26	R 236.03	R 4,656.26	
	Formwork to soffts of slabs	m2	0.20	5	3.67	R 245.10	R 1,202.49	
	Formwork to pockets	m2	2.86	50	5.72	R 382.02	R 18,967.25	
	Formwork wall	m2	0.29	15	7.33	R 191.27	R 2,809.95	
	High tensile reinforcement	t	7.10	25.972	0.00	R 11,485.00	R 298,290.76	
	Cast in steel	kg	0.02	9,220	188.96	R 60.78	R 560,400.19	
	HD bolts	kg	0.01	18,440	197.35	R 58.20	R 1,073,151.46	
	Galvanised grating	m2	3.64	51	0.17	R 8,247.06	R 417,796.56	
	Grout	m3	40.32	3.522	6.09	R 1,885.88	R 6,641.73	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	0	0.05	R 70.10	R -	R -
	Working space	m2	2.26	0	1.69	R 41.48	R -	
	Backfill	m3	1.23	0	0.76	R 92.24	R -	
	Blinding	m2	3.82	0	19.66	R 71.31	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Mesh reinforcement	m2	0.40	0	61.78	R 185.90	R -	
	Rough formwork	m2	2.73	0	7.94	R 176.57	R -	
	Smooth formwork	m2	0.56	0	6.78	R 206.78	R -	
	Finish to concrete	m2	0.22	0	108.86	R 12.88	R -	
	Construction joints	m	4.61	0	19.60	R 71.53	R -	
	Movement joints	m	14.81	0	15.71	R 89.24	R -	
	Cast in steel	kg	2.30	0	221.43	R 51.87	R -	
	Grout	m3	803.00	0.000	0.16	R 8,762.50	R -	
	Brick walls	m2	0.46	0	0.00	R 331.20	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	0	0.00		R -	
	Waterproofing membrane	m2	2.00	0	11.21	R 125.07	R -	
	Roof construction	m2	1.99	0	34.10	R 336.80	R -	
	Ceiling	m2	0.97	0	0.00	R 233.32	R -	
	Doors and windows	No	434.63	0	0.15	R 2,208.00	R -	
	Floor finish	m2	1.00	0	0.77	R 430.13	R -	
	Wall finsih	m2	1.01	0	1.37	R 241.75	R -	
	Rod reinforcement	t	8.63	0	0.00	R 11,485.00	R -	
	Metalwork	Item	0.00	0	4.56	R 52,371.60	R -	
	Structural steel	Item	0.00	0	11.81	R 135,637.85	R -	
	Plumbing and drainage	Item	0.00	0	7.52	R 86,367.20	R -	
	Small power and lighting	Item	0.00	0	64.07	R 735,843.95	R -	
	External works	Item	0.00	0	189.05	R 265,048.10	R -	
BUILDINGS - STEEL	Concrete	m3	0.00	72	0.16	R 1,402.00	R 100,944.00	R 2,041,940.65
	Earthworks	m3	2.30	166	8.34	R 168.11	R 27,838.27	
	Reinforcement	t	8.29	9	0.00	R 11,485.00	R 99,749.10	
	Mesh	m2	0.11	655	9.20	R 152.39	R 99,747.04	
	Formwork	m2	0.40	180	7.44	R 188.44	R 33,919.35	
	Brickwork	m2	5.73	97	5.65	R 248.14	R 24,164.57	
	Roof covering	m2	0.83	672	202.02	R 204.06	R 137,189.98	
	Structural steel	t	17.93	31	0.00	R 41,225.00	R 1,282,964.31	
	Side cladding	m2	1.49	374	0.95	R 193.86	R 72,600.20	
	Doors	No	371.00	2	0.49	R 20,200.25	R 30,382.05	
	Ridge ventilator	m	20.62	27	10.67	R 2,177.36	R 58,921.83	
	Aluminium insulation	m2	0.88	634	1.76	R 115.95	R 73,519.94	
	Total building area	m2	0.00	558	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	359	0.12	R 168.24	R 60,364.51	R 3,770,613.86
	Concrete	m3	0.00	130	0.00	R 1,402.00	R 182,260.00	
	Reinforcement	t	10.55	12	0.16	R 11,485.00	R 141,521.33	
	Mesh	m2	0.11	1,182	9.84	R 142.48	R 168,385.07	
	Formwork	m2	0.41	317	8.08	R 173.51	R 55,016.90	
	Brickwork	m2	5.78	151	5.59	R 250.81	R 37,967.89	
	Screed	m2	1.10	795	39.96	R 35.09	R 27,908.59	
	Structural steel	t	14.85	59	0.00	R 41,225.00	R 2,429,082.49	
	Cat ladders	m	2.52	23	9.58	R 4,303.24	R 100,618.12	
	Hand rail	m	0.72	82	26.40	R 1,561.55	R 127,792.64	
	Kick plates	m	0.73	81	2.64	R 591.50	R 47,743.20	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	1,006	193.17	R 213.41	R 214,639.57	
		Side cladding	m2	4.70	186	0.92	R 196.34	R 36,552.66	
		Floor grating	m2	1.06	56	16.28	R 2,532.25	R 140,760.89	
		Total buiding area	m2	0.00	875	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.39	0	7.88	R 177.92	R -	R -
		Blinding	m2	0.48	0	20.45	R 68.56	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	8.00	0	0.00	R 11,485.00	R -	
		Mesh	m2	0.50	0	48.38	R 237.39	R -	
		Formwork	m2	0.35	0	7.78	R 180.21	R -	
		Finish to concrete	m2	0.46	0	108.02	R 12.98	R -	
		Movement joints	m	2.57	0	15.71	R 89.24	R -	
		Cast in steel	kg	0.09	0	204.99	R 56.03	R -	
		Grout	m3	72.28	0.000	2.62	R 8,247.06	R -	
		Brickwork	m2	0.25	0	0.17	R 331.20	R -	
		Doors and windows	No	3.00	0	0.28	R 3,680.00	R -	
		Pipework	m	2.93	0	0.22	R 535.11	R -	
		Bolts	kg	0.11	0	0.09	R 56.03	R -	
		Structural steel	t	4.50	0	0.00	R 41,017.86	R -	
		Miscellaneous steel	t	144.21	0	0.00	R 52,204.55	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	7.76	0	6.28	R 223.25	R -	R -
		Blinding	m2	0.82	0	15.92	R 88.07	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	5.77	0	0.00	R 11,485.00	R -	
		Formwork	m2	0.07	0	5.92	R 236.82	R -	
		Finish to concrete	m2	0.34	0	81.15	R 17.28	R -	
		Movement joints	m	0.46	0	15.43	R 90.86	R -	
		Cast in steel	kg	28.85	0.000	181.80	R 63.17	R -	
		Grout	m3	24.19	0.000	0.79	R 8,762.50	R -	
		Bolts	kg	121.43	0.000	0.16	R 49.91	R -	
		Structural steel	t	43.33	0.000	0.26	R 44,173.08	R -	
		Miscellaneous steel	t	24.14	0.000	0.18	R 63,805.56	R -	
		Brickwork	m2	0.60	0	4.81	R 291.48	R -	
		Roof covering	m2	1.79	0	1.32	R 220.82	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	275	7.10	R 197.46	R 54,267.27	R 1,772,762.33
	Blinding	m2	1.40	216	19.02	R 73.71	R 15,900.71	
	Concrete	m3	0.00	302	0.00	R 1,402.00	R 423,404.00	
	Reinforcement	t	5.77	52.340	0.00	R 11,485.00	R 601,121.32	
	Formwork	m2	0.20	1,510	7.01	R 200.00	R 302,000.00	
	Movement joint	m	1.86	162	0.13	R 95.57	R 15,517.15	
	Cast in steel	kg	0.15	2,013	14.67	R 53.62	R 107,956.18	
	Bolts	kg	0.39	774	214.19	R 66.70	R 51,652.42	
	Chemical anchors	No	7.24	42	0.25	R 279.78	R 11,670.41	
	Miscellaneous steelwork	t	91.86	3.288	172.18	R 45,940.00	R 151,032.88	
	Pre-cast concrete	m3	36.75	8	41.05	R 3,894.44	R 32,003.33	
	Brickwork	m2	8.86	21	0.36	R 293.92	R 6,236.68	
	Total area	m2	0.00	188	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	0	1.69	R 118.47	R -	R -
	Lining	m2	0.82	0	1.50	R 70.10	R -	
	Paving	m2	0.84	0	0.59	R 118.81	R -	
	Pipework	m	28.97	0	0.26	R 455.65	R -	
	Manholes	No	17.25	0	0.11	R 4,142.27	R -	
	Concrete	m3	2.90	0	0.05	R 1,402.00	R -	
	Formwork	m2	0.10	0	5.83	R 240.48	R -	
	Mesh	m2	0.78	0	7.36	R 190.49	R -	
	Reinforcement	t	5.63	0.000	0.14	R 11,485.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	0	5.85	R 239.66	R -	R -
	Blinding	m2	0.92	0	13.72	R 102.19	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Reinforcement	t	4.44	0.000	0.00	R 11,485.00	R -	
	Mesh	m2	1.14	0	41.22	R 278.63	R -	
	Formwork	m2	0.15	0	5.63	R 249.02	R -	
	Cast in steel	kg	0.03	0	157.23	R 73.05	R -	
	Miscellaneous steelwork	t	13.35	0.000	0.18	R 63,805.56	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	142	0.00		R -	R 1,091,057.29
	Steel	t	8.75	16.229	0.00	R 41,225.00	R 669,022.86	
	Handrail	m	1.45	98	25.58	R 1,611.61	R 157,826.70	
	Grating	m2	1.79	79	15.88	R 2,596.03	R 205,942.26	
	Kick flats	m	1.64	87	75.83	R 543.65	R 47,072.16	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	24	90.17	R 457.19	R 11,193.32	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,945	0.00		R -	R 4,205,795.94
	Steel	t	23.48	82.836	0.00	R 41,225.00	R 3,414,932.92	
	Handrail	m	12.68	153	29.85	R 1,381.07	R 211,844.25	
	Grating	m2	12.33	158	16.37	R 2,518.33	R 397,254.22	
	Kick flats	m	12.52	155	77.41	R 532.55	R 82,733.02	
	Cat ladder	m	94.92	20	8.53	R 4,832.94	R 99,031.53	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	4,885	0.00		R -	R 6,989,647.88
	Steel	t	64.24	76.043	0.00	R 41,225.00	R 3,134,871.19	
	Handrail	m	29.15	168	28.17	R 1,463.44	R 245,244.81	
	Grating	m2	3.70	1,320	15.96	R 2,583.02	R 3,410,284.58	
	Kick flats	m	32.29	151	77.41	R 532.55	R 80,567.54	
	Stair treads	No	217.41	22	91.87	R 448.73	R 10,082.59	
	Cat ladder	m	228.94	21	8.10	R 5,089.51	R 108,597.18	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	645	0.00		R -	R 1,428,082.14
	Steel	t	22.16	29.106	0.00	R 41,225.00	R 1,199,915.39	
	Handrail	m	45.11	14	26.08	R 1,580.71	R 22,601.64	
	Grating	m2	58.13	11	15.86	R 2,599.31	R 28,841.44	
	Kick flats	m	42.58	15	77.41	R 532.55	R 8,067.10	
	Cat ladder	m	19.44	33	8.11	R 5,083.23	R 168,656.57	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 1,713,491.57
	Steel	t	13.69	19.430	0.00	R 41,225.00	R 801,011.69	
	Handrail	m	1.04	256	26.86	R 1,534.81	R 392,557.21	
	Grating	m2	1.91	139	15.68	R 2,629.15	R 366,153.23	
	Kick flats	m	1.08	246	76.30	R 540.30	R 133,074.24	
	Stair treads	No	5.57	48	95.13	R 433.35	R 20,695.20	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	455	0.00		R -	R 1,890,415.47
	Steel	t	11.98	37.980	0.00	R 41,225.00	R 1,565,724.12	
	Handrail	m	22.00	21	26.10	R 1,579.50	R 32,666.97	
	Grating	m2	7.32	62	15.97	R 2,581.40	R 160,456.04	
	Kick flats	m	22.59	20	78.04	R 528.25	R 10,639.93	
	Cat ladder	m	18.87	24	8.22	R 5,015.21	R 120,928.41	
PIPING INSTALLATION	Pipe length	m	0.00	52,441	0.00		R -	R 57,606,438.50
	Total work units	WU	0.30	174,803	0.00	R 329.55	R 57,606,438.50	
	Pipe supports	kg	2.49	21,061	0.00		R -	
	WU for pipe supports	WU	0.16	27,969	0.00		R -	
	Number of welds	No	0.56	29,367	0.00		R -	
	Total fittings	No	0.39	20,452	0.00		R -	
	Stud bolts	No	0.35	7,158	0.00		R -	
	Support number	No	0.19	4,002	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	174,803	0.00	R 329.55		R 187,696.92

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	3,144	5.52	R 59.70	R 187,696.92	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	174,803	0.00	R 329.55		R 115,806.94
	Number of examinations	No	164.17	1,065	3.03	R 108.76	R 115,806.94	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	174,803	0.00	R 329.55		R 111,300.34
	Number of examinations	No	273.85	638	1.89	R 174.37	R 111,300.34	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	174,803	0.00	R 329.55		R 190,633.02
	Number of examinations	No	46.49	3,760	6.50	R 50.70	R 190,633.02	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	174,803	0.00	R 329.55		R 225,980.80
	Number of examinations	No	106.66	1,639	2.39	R 137.89	R 225,980.80	
MECHANICAL INSTALLATION	Total work units	WU	0.00	174,803	0.00	R 329.55		R 333,924.04
	Mechanical equipment	t	236.32	740	0.73	R 451.44	R 333,924.04	
	Structural steel	t	192.98	906	54.54			
PAINTING & INSULATION	Total work units	WU	0.00	174,803	0.00	R 329.55		R 4,242,489.21
	Painting to piping	m2	16.80	10,405	0.32	R 140.23	R 1,459,129.65	
	Insulation to piping	m2	48.21	3,626	2.35	R 438.23	R 1,588,971.30	
	Mechanical equipment received	t	0.00	740	0.81	R 451.44	R 333,924.04	
	Painting to mechanical equipment	m2	0.23	3,216	3.37	R 133.96	R 430,814.14	
	Insulation to mechanical equipment	m2	0.67	1,104	1.16	R 389.17	R 429,650.08	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.74	30,225	0.00	R 52.33	R 1,581,674.25	R 4,836,274.46
	Electrical cable terminations	No	276.76	1,329	0.38	R 137.71	R 183,038.73	
	Electrical equipment	No	8.25	109	0.10	R 523.30	R 57,149.67	
	DB's	No	5.97	13	0.28	R 1,868.93	R 24,740.12	
	Rack	m	0.59	5,063	1.65	R 163.53	R 827,928.31	
	Support steel	kg	1.34	8,581	1.99	R 26.30	R 225,651.19	
	Instrumentation cable	m	23.73	24,665	0.32	R 28.50	R 702,952.50	
	Instruments	No	0.44	1,039	0.16	R 178.13	R 185,143.41	
	Hook-ups	No	3.69	2,362	0.15	R 190.00	R 448,832.51	
	Light fittings	No	9.97	403	0.02	R 327.06	R 131,801.43	
	Conduit	m	3.99	3,032	0.11	R 31.72	R 96,147.49	
	Instrument stands	No	0.00	261		R 1,425.00	R 371,214.86	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:			
Project name:	Project F		
Location:	South Africa		
Client:		Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	14,223	R	4.32
2	Concrete demolitions	m3	0	R	1,545.00
3	Bulk excavation	m3	4,855	R	44.00
4	Vertical piles	No	48		
5	Raking piles	No	6		
6	Concrete in piles	m3		R	1,402.00
7	Auger pile	m		R	342.00
8	Total paving and asphalt to road works	m2	2,555		
9	Grey paving to road works	m2	0	R	144.20
10	Asphalt to road surface	m2	2,555		
11	Rip bed of road works	m2	2,555	R	11.32
12	Total concrete in paving and bunding	m3	302	R	1,402.00
13	Concrete in paving	m3	155		
14	Rod reinforcement	t		R	11,485.00
15	Concrete in plinths and bases on area finishing	m3	199		
16	Stormwater pipe to drain surface run-off	m	85		
17	Machine excavation	m3		R	58.22
18	Concrete in pump and pipe support bases	m3	125	R	1,402.00
19	Concrete in tank bases	m3	185	R	1,402.00
20	Concrete in pipe and cable rack foundations	m3	196	R	1,402.00
21	Concrete to simple structural foundations	m3	255	R	1,402.00
22	Complex structural foundations - bases	m3	0	R	1,402.00
23	Concrete pipe racks - bases	m3	45	R	1,402.00
24	Concrete structure including concrete columns and beams - bases	m3	223	R	1,402.00
25	Major equipment bases with blast proof walls - bases	m3	174	R	1,402.00
26	Major equipment bases and elevated concrete structure - bases	m3	142	R	1,402.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	0	R	1,402.00
28	One brick wall	m2		R	331.20
29	Concrete in structual steel buildings - all concrete	m3	72	R	1,402.00
30	Total building area - Structural steel buildings	m2	558		
31	Ceiling	m2		R	233.32
32	Structural steel	t		R	41,225.00
33	Steel canopy - concrete	m3	130	R	1,402.00
34	Steel canopy - area	m2	875		
35	Concrete in weighbridge - all concrete	m3	0	R	1,402.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,402.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	302	R	1,402.00
41	Total cooling tower area	m2	188		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,402.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	142		
46	Total volume of steel pipe rack	m3	1,945		
47	Total volume of steel complex steel structure	m3	4,885		
48	Total volume of steel in stack	m3	645		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	455		
51	Piping work unit cost	WU		R	329.55
52	Total process pipe length	m	52,441		
53	Total electrical cable - installation only	m	30,225	R	52.33
54	Total instrumentation cable - installation only	m	24,665	R	38.45

Ratio: Variable ratio

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Normal	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Good	Mean
Rework	Extensive	Mean
Scope change	Few	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Medium	Mean
Project conditions	Good	Mean
Complexity	Simple	Mean
Repitition	None	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project F			
Location:	South Africa			
Client:	0	Date of estimate:	2007	

	CIVIL CONSTRUCTION COST				R 36,809,633.18
A	SITE CLEARANCE AND DEMOLITIONS		R	61,443.36	
B	BULK EARTHWORKS		R	452,245.84	
C	PILING		R	1,881,262.77	
D	ROAD WORKS		R	1,189,266.42	
E	GENERAL PAVING AND BUNDED AREAS		R	835,282.35	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	894,740.39	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	769,341.76	
H	TANK BASES AND BUNDING		R	2,813,475.60	
I	RACK FOUNDATIONS		R	1,523,944.90	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,408,619.88	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	542,348.12	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	2,866,498.17	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,132,293.02	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,250,983.54	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	-	
Q	BUILDINGS - STEEL		R	1,964,342.08	
R	CANOPIES - STEEL		R	3,783,239.62	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	1,897,067.13	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	9,543,238.23	
	STRUCTURAL STEEL				R 21,472,037.98
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,025,084.53	
B	STRUCTURAL STEEL - PIPERACK		R	3,563,805.55	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	6,274,524.95	
D	STRUCTURAL STEEL - STACK		R	1,268,056.53	
E	STRUCTURAL STEEL - WALKWAY		R	1,446,690.75	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,759,007.67	
	Preliminaries and General	40.00%	R	6,134,868.00	
	MECHANICAL AND PIPING				R 76,096,236.61
A	PIPING INSTALLATION		R	53,528,106.57	
B	RADIOGRAPHIC EXAMINATION (RT)		R	144,071.87	
C	DYE PENETRATION TESTING (DP)		R	71,633.88	
D	MAGNETIC PARTICLE TESTING (MPI)		R	81,723.78	
E	POST WELD HEAT TREATMENT		R	142,978.55	
F	MATERIAL HARDNESS TEST (HT)		R	128,695.47	
H	MECHANICAL INSTALLATION		R	257,244.60	
	Preliminaries and General	40.00%	R	21,741,781.89	
	PAINTING AND INSULATION				R 4,254,938.32
A	PAINTING AND INSULATION		R	3,151,806.17	
	Preliminaries and General	35.00%	R	1,103,132.16	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 5,869,787.41
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	4,347,990.68	
	Preliminaries and General	35.00%	R	1,521,796.74	
	TOTAL COST			R	144,502,633.52

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		14,223		R 4.32	R 61,443.36	R 61,443.36
	Concrete demolitions	m3		0		R 1,545.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		4,855		R 44.00	R 213,620.00	R 452,245.84
	Trimming of sides	m2	2.20	2,209	4.21	R 10.46	R 23,102.30	
	Back fill and compact	m3	1.15	4,238	0.98	R 44.83	R 189,979.56	
	Overhaul	m3/km	1.75	2,779	11.33	R 3.89	R 10,796.31	
	Rip bed	m2	1.79	2,708	8.08	R 5.45	R 14,747.66	
PILING	Site establishment of rig	Item	0.00	1	192.89	R 270,424.77	R 270,424.77	R 1,881,262.77
	EO for raking equipment	Item	0.00	1	23.91	R 33,523.82	R 33,523.82	
	Number of piles	No	0.00	48	0.00		R -	
	Move rig to new position	No	1.50	32	0.18	R 255.36	R 8,175.55	
	Number of raking piles	No	18.45	3	0.00		R -	
	EO for setting up raking piles	No	0.95	3	0.28	R 390.56	R 1,067.91	
	EO for raking drilling	m	0.15	18	0.91	R 310.49	R 5,543.31	
	Auger quantity	m	0.05	960	0.00	R 342.00	R 328,320.00	
	EO for drilling in coarse gravel	m	0.53	90	0.22	R 307.44	R 27,806.02	
	EO for drilling in boulders	m	1.81	27	0.51	R 717.02	R 19,022.48	
	EO for drilling in soft rock	m	1.63	29	0.23	R 323.46	R 9,508.58	
	Temporary casings	m	0.36	133	0.35	R 492.70	R 65,693.71	
	EO casing to raking pile	m	0.18	15	0.52	R 1,267.81	R 18,544.30	
	Mild steel rod reinforcement	t	14.55	3.299	0.90	R 9,256.81	R 30,540.94	
	High tensile rod reinforcement	t	1.30	37.025	7.30	R 10,236.60	R 379,008.11	
	Concrete to piles and bases	m3	0.16	307	0.00	R 1,402.00	R 430,202.74	
	Concrete to raking piles	m3	0.07	36	1.07	R 1,504.15	R 54,240.62	
	Site establishment of test equipment	Item	0.00	1	109.38	R 153,346.75	R 153,346.75	
	Load test to pile	No	96.50	0	27.86	R 39,059.72	R 19,428.81	
	Site establishment of intergity testing	No	257.58	0	48.80	R 68,417.60	R 12,749.68	
	Integrity testing of piles	No	1.29	37	0.27	R 379.54	R 14,114.66	
ROAD WORKS	Red paving	m2	0.15	0	0.97	R 139.77	R -	R 1,189,266.42
	Grey paving	m2	0.00	0	0.00	R 144.20	R -	
	Kerbing	m	0.13	339	0.00	R 225.24	R 76,456.08	
	Total paving and asphalt	m2	0.00	2,555	0.00		R -	
	Remove top soil	m3	0.56	371	5.75	R 65.13	R 24,182.60	
	Asphalt	m2	0.26	659	0.00	R 148.20	R 97,639.47	
	Rip bed	m2	0.00	2,555	0.00	R 11.32	R 28,922.60	
	Reduce levels	m3	0.42	1,073	4.79	R 54.27	R 58,238.55	
	Selected fill	m3	1.69	634	0.52	R 104.37	R 66,158.69	
	Imported fill	m3	2.17	292	0.39	R 268.59	R 78,358.27	
	Wearing course	m3	3.86	278	0.27	R 198.38	R 55,150.89	
	Prime	m2	4.65	2,946	1.42	R 51.42	R 151,463.78	
	Three line road marking	m	0.83	2,458	0.19	R 43.12	R 105,965.30	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.03	351	4.08	R 10.94	R 3,840.90	
	1m Wide concrete V-drain	m	0.95	322	0.84	R 996.50	R 320,867.12	
	200mm Diameter PVC pipe	m	0.95	323	0.10	R 299.24	R 96,643.60	
	Road marking - STOP	No	0.15	50	0.05	R 332.87	R 16,787.26	
	Standard signage	No	0.01	3	4.42	R 421.99	R 1,432.46	
	100mm Painted line	m	1.80	610	1.33	R 11.74	R 7,158.86	
			0.00		1.48			
			0.00		1.87			
			0.00		0.05			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	155	0.74	R 1,402.00	R 217,310.00	R 835,282.35
		Concrete in plinths	m3	0.00	31	0.00	R 1,402.00	R 43,301.17	
		Total concrete	m3	0.00	302	0.00		R -	
		Rip and compact	m2	0.13	1,167	184.89	R 7.58	R 8,846.63	
		Formwork to plinth	m2	7.40	229	0.13	R 179.26	R 40,980.95	
		Formwork to slab	m2	0.82	128	0.15	R 212.30	R 27,124.72	
		High tensile steel	t	0.01	3.020	0.00	R 11,485.00	R 34,684.70	
		Mesh	m2	566.73	1,712	52.01	R 220.84	R 377,966.95	
		Construction joint	m	4.21	652	0.05	R 73.10	R 47,688.01	
		Expansion joint	m	2.21	342	0.08	R 109.16	R 37,379.20	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.32	3,722	0.00		R -	R 894,740.39
		Base excavation	m3	1.48	434	0.00	R 58.22	R 25,264.94	
		Backfill	m3	0.60	293	0.62	R 93.69	R 27,483.69	
		Working space	m2	0.46	722	1.47	R 63.79	R 46,085.47	
		Concrete in bases	m3	0.04	199	25.69	R 1,402.00	R 278,998.00	
		Blinding	m2	0.88	254	21.43	R 65.42	R 16,628.98	
		Concrete in sump walls	m3	0.10	20	29.02	R 1,402.00	R 27,501.23	
		Concrete in slabs	m3	0.02	4	0.89	R 1,402.00	R 5,579.96	
		Total concrete	m3	0.00	223	0.04		R -	
		Wood float	m2	0.72	309	162.55	R 8.63	R 2,666.55	
		Formwork to bases	m2	1.67	333	0.12	R 165.24	R 55,006.73	
		Formwork to sump walls	m2	12.39	243	0.13	R 175.25	R 42,575.34	
		Formwork to sides of slab	m2	5.85	23	0.19	R 267.38	R 6,221.64	
		Mild steel reinforcement	t	0.12	2.448	0.00	R 11,485.00	R 28,117.45	
		High tensile reinforcement	t	10.91	20.402	1.23	R 11,485.00	R 234,312.05	
		Cast in steel	kg	0.45	440	34.20	R 41.00	R 18,044.49	
		Waterstop	m	0.42	47	7.87	R 178.11	R 8,361.24	
		Manhole	No	0.08	7	2.67	R 4,041.34	R 27,235.77	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	85	0.13	R 525.37	R 44,656.85	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.78	223	0.05	R 58.22	R 12,979.94	R 769,341.76
		Working space	m2	0.38	582	0.67	R 39.17	R 22,811.76	
		Backfill	m3	4.53	49	1.30	R 75.69	R 3,725.52	
		Concrete bases	m3	0.96	125	0.00	R 1,402.00	R 175,250.00	
		Concrete plinth	m3	2.09	60	0.00	R 1,402.00	R 83,794.40	
		Total concrete	m3	0.00	185	0.00		R -	
		Wood float	m2	0.49	123	0.06	R 14.02	R 1,727.72	
		Blinding	m2	0.96	131	0.01	R 77.11	R 10,085.39	
		Formwork bases	m2	0.45	275	0.13	R 186.27	R 51,252.36	
		Formwork plinth	m2	0.61	98	0.11	R 160.23	R 15,680.82	
		High tensile reinforcement	t	10.19	18.125	7.13	R 11,485.00	R 208,161.49	
		Cast in steel	kg	0.11	1,724	0.03	R 42.06	R 72,532.43	
		HD Bolts	kg	0.08	2,289	0.03	R 42.06	R 96,281.99	
		Grout	m3	35.46	1.686	6.37	R 8,932.74	R 15,057.94	
	TANK BASES AND BUNDING	Restricted excavation	m3	6.09	1,127	0.05	R 69.10	R 77,895.56	R 2,813,475.60
		Working space	m2	4.44	254	1.62	R 42.58	R 10,817.55	
		Backfill	m3	1.38	819	0.73	R 94.56	R 77,488.43	
		Concrete bases	m3	0.72	185	0.00	R 1,402.00	R 259,370.00	
		Concrete sump wall	m3	2.75	67	0.00	R 1,402.00	R 94,218.47	
		Concrete slab	m3	0.55	337	0.00	R 1,402.00	R 472,195.06	
		Concrete plinth	m3	3.97	47	20.95	R 1,402.00	R 65,273.77	
		Concrete column	m3	18.29	10	161.31	R 1,402.00	R 14,184.85	
		Total concrete	m3	0.00	646	1.09		R -	
		Blinding	m2	2.64	245	1.03	R 66.92	R 16,375.59	
		Wood float	m2	0.26	2,504	1.13	R 8.69	R 21,763.37	
		Formwork to bases	m2	0.41	454	1.14	R 170.06	R 77,136.27	
		Formwork to plinths	m2	0.34	137	8.24	R 186.19	R 25,442.13	
		Formwork to columns	m2	0.13	80	7.53	R 197.60	R 15,903.32	
		Formwork to sumps	m2	0.12	574	7.10	R 190.64	R 109,365.35	
		Formwork to slabs	m2	4.01	84	7.35	R 166.48	R 13,967.78	
		Formwork to slabs n/e 300mm	m	2.23	151	8.42	R 58.62	R 8,859.02	
		Mild steel reinforcement	t	0.22	6.302	23.92	R 11,485.00	R 72,373.50	
		High tensile reinforcement	t	22.91	28.186	1.00	R 11,485.00	R 323,715.35	
		Mesh	m2	0.17	2,041	61.47	R 186.83	R 381,361.71	
		Cast in items	kg	0.19	3,323	218.42	R 52.58	R 174,746.63	
		HD Bolts	kg	0.10	6,598	212.70	R 54.00	R 356,282.94	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	202.83	3.183	0.17	R 8,388.03	R 26,702.72	
	Construction joint	m	0.30	1,117	26.11	R 53.71	R 60,008.58	
	Expansion joint	m	0.47	718	17.34	R 80.85	R 58,027.65	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.67	719	0.05	R 69.10	R 49,684.64	R 1,523,944.90
	Working space	m2	0.40	1,817	1.81	R 124.72	R 226,630.10	
	Backfill	m3	2.39	301	0.82	R 84.49	R 25,425.91	
	Blinding	m2	0.36	542	21.15	R 66.30	R 35,952.57	
	Concrete bases	m3	5.79	196	0.00	R 1,402.00	R 274,792.00	
	Concrete plinth	m3	0.00	34	0.00	R 1,402.00	R 47,471.47	
	Total concrete	m3	0.00	230	1.30		R -	
	Wood float	m2	0.35	562	170.04	R 8.25	R 4,636.21	
	Formwork bases	m2	0.47	422	9.19	R 152.58	R 64,313.65	
	Formwork plinths	m2	0.09	376	7.02	R 199.67	R 75,121.58	
	High tensile reinforcement	t	9.26	24.834	0.00	R 11,485.00	R 285,222.73	
	HD Bolts	kg	0.03	7,840	216.90	R 52.95	R 415,125.04	
	Grout	m3	79.59	2.463	0.18	R 7,946.56	R 19,569.01	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.43	1,130	0.06	R 83.12	R 93,940.31	R 2,408,619.88
	Working space	m2	0.49	2,320	1.97	R 42.25	R 98,030.17	
	Backfill	m3	2.63	431	0.81	R 103.16	R 44,416.22	
	Blinding	m2	0.31	813	21.16	R 66.27	R 53,891.96	
	Concrete bases	m3	0.00	255	0.00	R 1,402.00	R 357,510.00	
	Concrete plinth	m3	2.49	73	0.00	R 1,402.00	R 102,669.54	
	Concrete slab	m3	3.48	102	0.00	R 1,402.00	R 143,413.75	
	Total concrete	m3	0.00	431	0.00		R -	
	Wood float	m2	0.54	793	158.44	R 8.85	R 7,017.81	
	Formwork bases	m2	0.47	547	8.13	R 172.55	R 94,336.48	
	Formwork plinths	m2	0.11	674	8.30	R 168.96	R 113,962.01	
	High tensile reinforcement	t	13.48	31.940	0.00	R 11,485.00	R 366,826.34	
	HD Bolts	kg	0.02	12,310	215.49	R 53.30	R 656,119.18	
	Cast in items	kg	0.05	5,100	240.67	R 47.72	R 243,378.99	
	Grout	m3	66.31	3.846	0.16	R 8,608.77	R 33,107.09	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.11	0	0.05	R 72.10	R -	R -
	Working space	m2	0.56	0	1.67	R 43.19	R -	
	Backfill	m3	2.19	0	0.80	R 90.05	R -	
	Blinding	m2	0.65	0	21.30	R 65.83	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,402.00	R -	
	Concrete column	m3	27.90	0	0.00	R 1,402.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.32	0	0.00	R 1,402.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.60	0	161.04	R 8.71	R -	
	Formwork bases	m2	0.52	0	8.32	R 168.48	R -	
	Formwork plinths	m2	0.32	0	7.47	R 187.61	R -	
	Formwork to columns	m2	0.29	0	8.08	R 173.55	R -	
	High tensile reinforcement	t	9.26	0.000	0.00	R 11,485.00	R -	
	HD bolts	kg	0.04	0	210.92	R 54.45	R -	
	Grout	m3	108.58	0.000	0.17	R 8,388.03	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.77	125	0.06	R 79.11	R 9,853.79	R 542,348.12
	Working space	m2	0.29	435	2.06	R 38.40	R 16,700.12	
	Backfill	m3	1.99	63	0.78	R 100.87	R 6,322.66	
	Blinding	m2	0.67	68	20.16	R 69.55	R 4,696.37	
	Concrete bases	m3	0.00	45	0.00	R 1,402.00	R 63,090.00	
	Concrete column	m3	1.17	42	152.85	R 1,402.00	R 58,354.02	
	Concrete beam	m3	2.71	15	0.95	R 1,402.00	R 21,527.18	
	Total concrete	m3	2.93	102	0.95		R -	
	Wood float	m2	0.47	96	7.41	R 9.17	R 880.91	
	Formwork bases	m2	0.48	93	6.44	R 189.31	R 17,617.04	
	Formwork to columns	m2	0.16	258	7.97	R 175.96	R 45,367.92	
	Formwork to sides beams	m2	0.34	46	6.09	R 217.68	R 9,955.96	
	Formwork to soffits beams	m2	0.69	22	6.44	R 230.27	R 5,150.82	
	Formwork corbels	m2	11.01	4	5.42	R 258.88	R 978.90	
	High tensile reinforcement	t	9.01	11.319	0.00	R 11,485.00	R 129,999.35	
	Cast in steel	kg	0.03	3,482	272.99	R 42.07	R 146,496.32	
	HD bolts	kg	1.45	70	223.52	R 51.38	R 3,610.10	
	Grout	m3	502.61	0.203	0.16	R 8,608.77	R 1,746.66	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.93	877	0.05	R 75.11	R 65,835.11	R 2,866,498.17
	Working space	m2	0.63	1,399	1.82	R 41.19	R 57,631.94	
	Backfill	m3	1.14	767	0.78	R 96.29	R 73,853.49	
	Blinding	m2	0.60	370	20.22	R 69.35	R 25,685.00	
	Concrete bases	m3	0.00	223	1.02	R 1,402.00	R 312,646.00	
	Concrete column	m3	2.51	89	1.07	R 1,402.00	R 124,383.18	
	Concrete beam	m3	0.80	111	0.99	R 1,402.00	R 155,478.97	
	Concrete surface slab	m3	1.64	136	1.02	R 1,402.00	R 190,471.89	
	Concrete wall	m3	2.36	38	1.08	R 1,402.00	R 52,672.85	
	Concrete elevated slab	m3	1.09	82	0.00	R 1,402.00	R 114,638.87	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	678	0.00		R -	
		Wood float	m2	0.63	1,078	168.58	R 8.32	R 8,967.86	
		Formwork bases	m2	0.40	558	7.43	R 188.68	R 105,187.06	
		Formwork to columns	m2	0.16	540	6.55	R 214.07	R 115,602.68	
		Formwork to sides beams	m2	0.30	371	5.16	R 271.71	R 100,919.18	
		Formwork to soffits beams	m2	0.86	129	7.31	R 191.89	R 24,682.39	
		Formwork to soffts of slabs	m2	0.32	430	3.30	R 244.10	R 105,039.98	
		Formwork to pockets	m2	25.06	4	5.74	R 424.66	R 1,503.63	
		Formwork wall	m2	0.13	280	7.96	R 176.07	R 49,259.28	
		High tensile reinforcement	t	8.59	78.900	0.00	R 11,485.00	R 906,172.08	
		Cast in steel	kg	0.22	3,091	254.74	R 45.09	R 139,357.79	
		HD bolts	kg	0.40	1,677	203.71	R 56.38	R 94,524.03	
		Steel handrailing	m	2.53	31	9.62	R 1,194.22	R 37,179.97	
		Grout	m3	1,048.80	0.646	0.19	R 7,434.85	R 4,804.93	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.29	135	0.04	R 55.08	R 7,441.56	R 1,132,293.02
		Working space	m2	7.96	17	1.41	R 39.10	R 663.76	
		Backfill	m3	4.23	32	0.62	R 34.15	R 1,091.65	
		Blinding	m2	1.02	171	17.92	R 78.24	R 13,366.03	
		Concrete bases	m3	0.00	174	0.00	R 1,402.00	R 243,948.00	
		Concrete column	m3	25.20	7	0.00	R 1,402.00	R 9,679.65	
		Concrete beam	m3	1.43	5	0.00	R 1,402.00	R 6,755.49	
		Concrete wall	m3	10.37	17	0.00	R 1,402.00	R 23,529.26	
		Concrete elevated slabs	m3	10.77	1	0.00	R 1,402.00	R 898.52	
		Total concrete	m3	0.00	203	0.00		R -	
		Wood float	m2	0.80	254	138.34	R 10.13	R 2,573.43	
		Formwork bases	m2	8.19	21	6.85	R 204.69	R 4,350.68	
		Formwork to columns	m2	0.13	52	5.79	R 223.60	R 11,682.84	
		Formwork to sides beams	m2	0.17	28	4.70	R 242.08	R 6,890.50	
		Formwork to soffits beams	m2	0.47	10	6.27	R 298.43	R 3,041.08	
		Formwork to soffts of slabs	m2	0.13	5	3.06	R 292.04	R 1,416.38	
		Formwork to pockets	m2	413.46	0	4.80	R 457.53	R 192.54	
		Formwork wall	m2	0.10	170	6.21	R 225.79	R 38,442.85	
		High tensile reinforcement	t	3.99	50.932	0.00	R 11,485.00	R 584,954.73	
		Cast in steel	kg	0.15	1,394	204.16	R 56.25	R 78,426.40	
		HD bolts	kg	0.21	961	166.59	R 68.94	R 66,240.17	
		Galvanised grating	m2	17.19	12	0.15	R 2,077.39	R 24,548.94	
		Grout	m3	757.04	0.230	5.53	R 9,391.39	R 2,158.55	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.54	218	0.05	R 71.10	R 15,519.61	R 2,250,983.54
	Working space	m2	0.41	529	1.77	R 40.25	R 21,280.66	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.00	109	0.76	R 93.55	R 10,217.57	
	Blinding	m2	4.96	29	20.92	R 67.02	R 1,920.57	
	Concrete bases	m3	0.00	142	0.00	R 1,402.00	R 199,084.00	
	Concrete column	m3	6.67	21	0.00	R 1,402.00	R 29,841.28	
	Concrete beam	m3	2.02	11	0.00	R 1,402.00	R 14,783.37	
	Concrete wall	m3	37.95	4	0.00	R 1,402.00	R 5,245.46	
	Concrete elevated slabs	m3	24.72	1	0.00	R 1,402.00	R 1,207.24	
	Total concrete	m3	0.00	178	0.00		R -	
	Wood float	m2	4.93	29	162.12	R 8.65	R 249.27	
	Formwork bases	m2	1.46	97	8.09	R 173.39	R 16,872.43	
	Formwork to columns	m2	0.15	146	7.00	R 193.70	R 28,294.72	
	Formwork to sides beams	m2	0.23	45	6.38	R 200.43	R 9,076.03	
	Formwork to soffits beams	m2	0.76	14	7.24	R 219.72	R 3,034.27	
	Formwork to soffts of slabs	m2	0.22	4	3.84	R 225.35	R 884.90	
	Formwork to pockets	m2	3.15	45	6.22	R 365.17	R 16,487.90	
	Formwork wall	m2	0.28	14	7.49	R 187.24	R 2,540.78	
	High tensile reinforcement	t	7.41	24.091	0.00	R 11,485.00	R 276,690.58	
	Cast in steel	kg	0.02	8,922	211.57	R 54.29	R 484,310.10	
	HD bolts	kg	0.01	14,694	217.59	R 52.78	R 775,627.81	
	Galvanised grating	m2	4.03	44	0.19	R 7,491.60	R 331,814.91	
	Grout	m3	41.95	3.385	6.48	R 1,772.38	R 6,000.08	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.91	0	0.05	R 70.10	R -	R -
	Working space	m2	2.66	0	1.84	R 38.11	R -	
	Backfill	m3	1.31	0	0.81	R 87.00	R -	
	Blinding	m2	3.74	0	20.57	R 68.17	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Mesh reinforcement	m2	0.50	0	67.54	R 170.04	R -	
	Rough formwork	m2	3.04	0	8.65	R 162.04	R -	
	Smooth formwork	m2	0.56	0	6.96	R 201.33	R -	
	Finish to concrete	m2	0.23	0	107.62	R 13.03	R -	
	Construction joints	m	4.85	0	21.19	R 66.15	R -	
	Movement joints	m	15.62	0	17.79	R 78.79	R -	
	Cast in steel	kg	2.29	0	237.22	R 48.42	R -	
	Grout	m3	859.71	0.000	0.18	R 7,788.89	R -	
	Brick walls	m2	0.49	0	0.00	R 331.20	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.60	0	0.00		R -	
	Waterproofing membrane	m2	2.27	0	12.15	R 115.35	R -	
	Roof construction	m2	2.09	0	39.00	R 294.50	R -	
	Ceiling	m2	0.99	0	0.00	R 233.32	R -	
	Doors and windows	No	486.13	0	0.16	R 2,016.00	R -	
	Floor finish	m2	1.04	0	0.80	R 413.26	R -	
	Wall finsih	m2	1.06	0	1.46	R 226.41	R -	
	Rod reinforcement	t	8.92	0	0.00	R 11,485.00	R -	
	Metalwork	Item	0.00	0	4.29	R 49,237.84	R -	
	Structural steel	Item	0.00	0	11.10	R 127,458.89	R -	
	Plumbing and drainage	Item	0.00	0	7.07	R 81,157.93	R -	
	Small power and lighting	Item	0.00	0	60.21	R 691,511.85	R -	
	External works	Item	0.00	0	174.40	R 244,509.80	R -	
BUILDINGS - STEEL	Concrete	m3	0.00	72	0.18	R 1,402.00	R 100,944.00	R 1,964,342.08
	Earthworks	m3	2.29	165	9.30	R 150.82	R 24,852.05	
	Reinforcement	t	8.91	8	0.00	R 11,485.00	R 92,837.85	
	Mesh	m2	0.12	615	10.11	R 138.62	R 85,198.02	
	Formwork	m2	0.41	177	8.18	R 171.50	R 30,381.45	
	Brickwork	m2	6.15	91	6.15	R 227.99	R 20,691.09	
	Roof covering	m2	0.88	637	210.50	R 195.84	R 124,787.62	
	Structural steel	t	18.30	30	0.00	R 41,225.00	R 1,256,975.53	
	Side cladding	m2	1.51	370	0.98	R 191.36	R 70,849.63	
	Doors	No	410.53	1	0.50	R 20,789.18	R 28,257.04	
	Ridge ventilator	m	21.54	26	11.97	R 2,343.78	R 60,708.15	
	Aluminium insulation	m2	0.90	620	1.79	R 109.45	R 67,859.67	
	Total building area	m2	0.00	558	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.34	434	0.13	R 183.26	R 79,470.01	R 3,783,239.62
	Concrete	m3	0.00	130	0.00	R 1,402.00	R 182,260.00	
	Reinforcement	t	11.12	12	0.18	R 11,485.00	R 134,275.71	
	Mesh	m2	0.12	1,071	10.18	R 137.68	R 147,401.14	
	Formwork	m2	0.42	308	8.37	R 167.47	R 51,574.18	
	Brickwork	m2	5.85	150	5.71	R 245.66	R 36,752.55	
	Screed	m2	1.13	773	42.78	R 32.77	R 25,343.49	
	Structural steel	t	14.40	61	0.00	R 41,225.00	R 2,504,991.32	
	Cat ladders	m	2.87	21	9.66	R 4,267.28	R 90,437.31	
	Hand rail	m	0.76	80	27.49	R 1,499.52	R 120,229.29	
	Kick plates	m	0.77	79	2.69	R 557.44	R 43,786.97	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.92	947	195.20	R 211.19	R 199,927.77	
		Side cladding	m2	4.81	182	0.92	R 193.24	R 35,183.78	
		Floor grating	m2	1.11	55	17.13	R 2,407.20	R 131,606.09	
		Total buiding area	m2	0.00	875	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.34	0	7.87	R 178.23	R -	R -
		Blinding	m2	0.48	0	18.59	R 75.41	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	8.29	0	0.00	R 11,485.00	R -	
		Mesh	m2	0.50	0	52.75	R 217.74	R -	
		Formwork	m2	0.31	0	7.48	R 187.56	R -	
		Finish to concrete	m2	0.46	0	100.66	R 13.93	R -	
		Movement joints	m	2.49	0	15.38	R 91.14	R -	
		Cast in steel	kg	0.09	0	182.75	R 62.84	R -	
		Grout	m3	71.52	0.000	2.48	R 9,482.13	R -	
		Brickwork	m2	0.23	0	0.15	R 331.20	R -	
		Doors and windows	No	2.75	0	0.27	R 3,963.08	R -	
		Pipework	m	2.65	0	0.22	R 565.97	R -	
		Bolts	kg	0.11	0	0.08	R 62.84	R -	
		Structural steel	t	3.96	0	0.00	R 43,223.12	R -	
		Miscellaneous steel	t	136.02	0	0.00	R 52,545.75	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.75	0	6.43	R 217.92	R -	R -
		Blinding	m2	0.74	0	15.43	R 90.87	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	5.93	0	0.00	R 11,485.00	R -	
		Formwork	m2	0.07	0	6.29	R 222.89	R -	
		Finish to concrete	m2	0.32	0	83.03	R 16.89	R -	
		Movement joints	m	0.43	0	13.23	R 106.00	R -	
		Cast in steel	kg	24.43	0.000	171.29	R 67.05	R -	
		Grout	m3	22.64	0.000	0.65	R 10,784.62	R -	
		Bolts	kg	109.09	0.000	0.13	R 43.78	R -	
		Structural steel	t	37.06	0.000	0.23	R 50,722.40	R -	
		Miscellaneous steel	t	20.74	0.000	0.19	R 61,370.23	R -	
		Brickwork	m2	0.50	0	4.50	R 311.61	R -	
		Roof covering	m2	1.49	0	1.26	R 246.47	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.87	264	6.05	R 231.71	R 61,078.94	R 1,897,067.13
	Blinding	m2	1.16	261	16.37	R 85.64	R 22,337.39	
	Concrete	m3	0.00	302	0.00	R 1,402.00	R 423,404.00	
	Reinforcement	t	5.80	52.095	0.00	R 11,485.00	R 598,306.80	
	Formwork	m2	0.20	1,484	6.08	R 230.78	R 342,366.96	
	Movement joint	m	1.60	189	0.13	R 109.76	R 20,698.32	
	Cast in steel	kg	0.14	2,225	12.77	R 58.50	R 130,172.54	
	Bolts	kg	0.38	805	196.33	R 69.69	R 56,121.68	
	Chemical anchors	No	6.05	50	0.22	R 327.07	R 16,336.36	
	Miscellaneous steelwork	t	89.92	3.359	164.81	R 51,370.61	R 172,539.88	
	Pre-cast concrete	m3	30.27	10	35.11	R 4,662.23	R 46,509.03	
	Brickwork	m2	8.08	23	0.30	R 309.30	R 7,195.25	
	Total area	m2	0.00	188	4.53		R -	
EMERGENCY DAM	Earthworks	m3	0.57	0	1.86	R 124.80	R -	R -
	Lining	m2	0.73	0	1.25	R 67.10	R -	
	Paving	m2	0.66	0	0.54	R 124.75	R -	
	Pipework	m	28.78	0	0.26	R 489.40	R -	
	Manholes	No	16.90	0	0.11	R 4,567.77	R -	
	Concrete	m3	2.45	0	0.05	R 1,402.00	R -	
	Formwork	m2	0.09	0	5.70	R 246.03	R -	
	Mesh	m2	0.75	0	6.76	R 207.51	R -	
	Reinforcement	t	4.87	0.000	0.12	R 11,485.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	5.57	0	5.06	R 277.00	R -	R -
	Blinding	m2	0.79	0	12.34	R 113.62	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Reinforcement	t	4.39	0.000	0.00	R 11,485.00	R -	
	Mesh	m2	0.84	0	36.70	R 312.94	R -	
	Formwork	m2	0.14	0	4.95	R 283.23	R -	
	Cast in steel	kg	0.02	0	129.65	R 88.58	R -	
	Miscellaneous steelwork	t	10.41	0.000	0.15	R 75,488.26	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	142	0.00		R -	R 1,025,084.53
	Steel	t	9.00	15.780	0.00	R 41,225.00	R 650,542.15	
	Handrail	m	1.44	99	29.63	R 1,391.23	R 137,668.33	
	Grating	m2	1.82	78	17.50	R 2,356.39	R 183,489.95	
	Kick flats	m	1.67	85	80.11	R 514.63	R 43,815.39	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.55	22	93.43	R 441.23	R 9,568.71	
	STRUCTURAL STEEL - PIPERACK							
	Total volume	m3	0.00	1,945	0.00		R -	R 3,563,805.55
	Steel	t	28.10	69.221	0.00	R 41,225.00	R 2,853,619.27	
	Handrail	m	12.85	151	29.97	R 1,375.35	R 208,117.03	
	Grating	m2	12.55	155	18.86	R 2,186.17	R 338,929.20	
	Kick flats	m	13.18	148	85.10	R 484.45	R 71,519.09	
	Cat ladder	m	97.43	20	8.98	R 4,589.66	R 91,620.97	
	STRUCTURAL STEEL - COMPLEX STRUCTURES							
	Total volume	m3	0.00	4,885	0.00		R -	R 6,274,524.95
	Steel	t	74.73	65.372	0.00	R 41,225.00	R 2,694,977.58	
	Handrail	m	30.96	158	31.58	R 1,305.24	R 205,945.93	
	Grating	m2	3.87	1,261	16.25	R 2,536.81	R 3,198,608.83	
	Kick flats	m	34.54	141	85.76	R 480.68	R 67,985.77	
	Stair treads	No	224.87	22	97.80	R 421.52	R 9,156.78	
	Cat ladder	m	238.15	21	8.64	R 4,770.23	R 97,850.04	
	STRUCTURAL STEEL - STACK							
	Total volume	m3	0.00	645	0.00		R -	R 1,268,056.53
	Steel	t	24.85	25.951	0.00	R 41,225.00	R 1,069,840.64	
	Handrail	m	44.84	14	31.37	R 1,314.30	R 18,905.27	
	Grating	m2	60.18	11	17.65	R 2,335.88	R 25,036.83	
	Kick flats	m	45.20	14	79.19	R 520.60	R 7,428.60	
	Cat ladder	m	20.39	32	8.88	R 4,642.45	R 146,845.20	
	STRUCTURAL STEEL - WALKWAY							
	Total volume	m3	0.00	266	0.00		R -	R 1,446,690.75
	Steel	t	16.57	16.052	0.00	R 41,225.00	R 661,760.85	
	Handrail	m	1.12	238	30.62	R 1,346.15	R 320,939.62	
	Grating	m2	1.97	135	16.92	R 2,436.98	R 329,173.52	
	Kick flats	m	1.17	227	78.99	R 521.92	R 118,224.69	
	Stair treads	No	6.23	43	106.11	R 388.51	R 16,592.07	
	STRUCTURAL STEEL - CABLE GANTRY							
	Total volume	m3	0.00	455	0.00		R -	R 1,759,007.67
	Steel	t	12.63	36.023	0.00	R 41,225.00	R 1,485,060.51	
	Handrail	m	25.58	18	32.86	R 1,254.51	R 22,315.02	
	Grating	m2	7.51	61	17.72	R 2,326.19	R 140,947.44	
	Kick flats	m	22.63	20	85.28	R 483.43	R 9,718.91	
	Cat ladder	m	20.24	22	9.18	R 4,491.79	R 100,965.80	
	PIPING INSTALLATION							
	Pipe length	m	0.00	52,441	0.00		R -	R 53,528,106.57
	Total work units	WU	0.32	162,428	0.00	R 329.55	R 53,528,106.57	
	Pipe supports	kg	2.59	20,281	0.00		R -	
	WU for pipe supports	WU	0.16	25,408	0.00		R -	
	Number of welds	No	0.60	31,202	0.00		R -	
	Total fittings	No	0.38	19,778	0.00		R -	
	Stud bolts	No	0.34	6,724	0.00		R -	
	Support number	No	0.20	3,998	0.00		R -	
	RADIOGRAPHIC							
	Total work units	WU	0.00	162,428	0.00	R 329.55		R 144,071.87

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	62.32	2,606	5.96	R 55.28	R 144,071.87	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	162,428	0.00	R 329.55		R 71,633.88
	Number of examinations	No	172.77	940	4.33	R 76.20	R 71,633.88	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	162,428	0.00	R 329.55		R 81,723.78
	Number of examinations	No	306.99	529	2.13	R 154.46	R 81,723.78	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	162,428	0.00	R 329.55		R 142,978.55
	Number of examinations	No	53.49	3,036	7.00	R 47.09	R 142,978.55	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	162,428	0.00	R 329.55		R 128,695.47
	Number of examinations	No	116.25	1,397	3.58	R 92.11	R 128,695.47	
MECHANICAL INSTALLATION	Total work units	WU	0.00	162,428	0.00	R 329.55		R 257,244.60
	Mechanical equipment	t	273.54	594	0.76	R 433.21	R 257,244.60	
	Structural steel	t	223.69	726	54.56			
PAINTING & INSULATION	Total work units	WU	0.00	162,428	0.00	R 329.55		R 3,151,806.17
	Painting to piping	m2	18.16	8,943	0.33	R 126.33	R 1,129,827.29	
	Insulation to piping	m2	53.07	3,060	2.61	R 380.36	R 1,164,061.48	
	Mechanical equipment received	t	0.00	594	0.82	R 433.21	R 257,244.60	
	Painting to mechanical equipment	m2	0.25	2,368	3.62	R 119.81	R 283,774.32	
	Insulation to mechanical equipment	m2	0.71	842	1.15	R 376.24	R 316,898.48	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.08	30,225	0.00	R 52.33	R 1,581,674.25	R 4,347,990.68
	Electrical cable terminations	No	305.49	1,205	0.41	R 127.19	R 153,261.55	
	Electrical equipment	No	9.43	99	0.10	R 508.76	R 50,337.62	
	DB's	No	6.42	10	0.34	R 1,496.36	R 15,698.90	
	Rack	m	0.67	4,706	1.62	R 152.95	R 719,829.44	
	Support steel	kg	1.42	7,032	2.05	R 25.57	R 179,816.25	
	Instrumentation cable	m	26.81	24,665	0.34	R 28.50	R 702,952.50	
	Instruments	No	0.59	920	0.17	R 163.52	R 150,417.36	
	Hook-ups	No	3.92	1,567	0.16	R 183.87	R 288,060.87	
	Light fittings	No	10.33	387	0.02	R 300.25	R 116,347.10	
	Conduit	m	4.14	2,927	0.12	R 32.25	R 94,394.50	
	Instrument stands	No	0.00	222		R 1,330.00	R 295,200.33	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project F				
Location:	South Africa				
Client:				Date of estimate:	2007

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	14,223	R	4.32
2	Concrete demolitions	m3	0	R	1,545.00
3	Bulk excavation	m3	4,855	R	44.00
4	Vertical piles	No	48		
5	Raking piles	No	6		
6	Concrete in piles	m3		R	1,402.00
7	Auger pile	m		R	342.00
8	Total paving and asphalt to road works	m2	2,555		
9	Grey paving to road works	m2	0	R	144.20
10	Asphalt to road surface	m2	2,555		
11	Rip bed of road works	m2	2,555	R	11.32
12	Total concrete in paving and bunding	m3	302	R	1,402.00
13	Concrete in paving	m3	155		
14	Rod reinforcement	t		R	11,485.00
15	Concrete in plinths and bases on area finishing	m3	199		
16	Stormwater pipe to drain surface run-off	m	85		
17	Machine excavation	m3		R	58.22
18	Concrete in pump and pipe support bases	m3	125	R	1,402.00
19	Concrete in tank bases	m3	185	R	1,402.00
20	Concrete in pipe and cable rack foundations	m3	196	R	1,402.00
21	Concrete to simple structural foundations	m3	255	R	1,402.00
22	Complex structural foundations - bases	m3	0	R	1,402.00
23	Concrete pipe racks - bases	m3	45	R	1,402.00
24	Concrete structure including concrete columns and beams - bases	m3	223	R	1,402.00
25	Major equipment bases with blast proof walls - bases	m3	174	R	1,402.00
26	Major equipment bases and elevated concrete structure - bases	m3	142	R	1,402.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	0	R	1,402.00
28	One brick wall	m2		R	331.20
29	Concrete in structual steel buildings - all concrete	m3	72	R	1,402.00
30	Total building area - Structural steel buildings	m2	558		
31	Ceiling	m2		R	233.32
32	Structural steel	t		R	41,225.00
33	Steel canopy - concrete	m3	130	R	1,402.00
34	Steel canopy - area	m2	875		
35	Concrete in weighbridge - all concrete	m3	0	R	1,402.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	0	R	1,402.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	302	R	1,402.00
41	Total cooling tower area	m2	188		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	0	R	1,402.00
44	Total lengh of cable tunnel	m	0		
45	Total volume of basic steel platform	m3	142		
46	Total volume of steel pipe rack	m3	1,945		
47	Total volume of steel complex steel structure	m3	4,885		
48	Total volume of steel in stack	m3	645		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	455		
51	Piping work unit cost	WU		R	329.55
52	Total process pipe length	m	52,441		
53	Total electrical cable - installation only	m	30,225	R	52.33
54	Total instrumentation cable - installation only	m	24,665	R	38.45

Ratio: Variable ratio

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Normal	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Good	Median
Rework	Extensive	Median
Scope change	Few	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Medium	Median
Project conditions	Good	Median
Complexity	Simple	Median
Repitition	None	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

Project name:	Project F				
Location:	South Africa				
Client:	0	Date of estimate:	2007		

	CIVIL CONSTRUCTION COST				R 38,387,079.63
A	SITE CLEARANCE AND DEMOLITIONS		R	61,443.36	
B	BULK EARTHWORKS		R	461,962.30	
C	PILING		R	1,933,591.78	
D	ROAD WORKS		R	1,104,643.02	
E	GENERAL PAVING AND BUNDED AREAS		R	856,260.85	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	934,841.01	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	821,100.37	
H	TANK BASES AND BUNDING		R	3,068,487.82	
I	RACK FOUNDATIONS		R	1,528,580.32	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,586,469.18	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	557,889.40	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,223,994.71	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,075,874.18	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,490,216.68	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	-	
Q	BUILDINGS - STEEL		R	2,060,931.37	
R	CANOPIES - STEEL		R	3,858,053.44	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	1,810,534.02	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	-	
	Preliminaries and General	35.00%	R	9,952,205.83	
	STRUCTURAL STEEL				R 23,567,141.72
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,124,069.31	
B	STRUCTURAL STEEL - PIPERACK		R	3,972,833.15	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	6,799,267.04	
D	STRUCTURAL STEEL - STACK		R	1,414,239.92	
E	STRUCTURAL STEEL - WALKWAY		R	1,667,393.68	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,855,869.56	
	Preliminaries and General	40.00%	R	6,733,469.06	
	MECHANICAL AND PIPING				R 81,980,710.28
A	PIPING INSTALLATION		R	57,469,606.10	
B	RADIOGRAPHIC EXAMINATION (RT)		R	175,541.79	
C	DYE PENETRATION TESTING (DP)		R	112,532.15	
D	MAGNETIC PARTICLE TESTING (MPI)		R	98,406.15	
E	POST WELD HEAT TREATMENT		R	168,174.11	
F	MATERIAL HARDNESS TEST (HT)		R	215,987.35	
H	MECHANICAL INSTALLATION		R	317,402.55	
	Preliminaries and General	40.00%	R	23,423,060.08	
	PAINTING AND INSULATION				R 5,429,887.66
A	PAINTING AND INSULATION		R	4,022,139.01	
	Preliminaries and General	35.00%	R	1,407,748.65	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 6,444,471.25
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	4,773,682.40	
	Preliminaries and General	35.00%	R	1,670,788.84	

TOTAL COST	R	155,809,290.54

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		14,223		R 4.32	R 61,443.36	R 61,443.36
	Concrete demolitions	m3		0		R 1,545.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		4,855		R 44.00	R 213,620.00	R 461,962.30
	Trimming of sides	m2	2.22	2,189	4.16	R 10.58	R 23,153.41	
	Back fill and compact	m3	1.13	4,299	0.95	R 46.42	R 199,569.97	
	Overhaul	m3/km	1.65	2,937	11.36	R 3.87	R 11,376.30	
	Rip bed	m2	1.76	2,764	8.54	R 5.15	R 14,242.62	
PILING	Site establishment of rig	Item	0.00	1	194.56	R 272,776.12	R 272,776.12	R 1,933,591.78
	EO for raking equipment	Item	0.00	1	24.00	R 33,653.01	R 33,653.01	
	Number of piles	No	0.00	48	0.00		R -	
	Move rig to new position	No	1.47	33	0.19	R 266.38	R 8,672.84	
	Number of raking piles	No	18.91	3	0.00		R -	
	EO for setting up raking piles	No	0.96	3	0.26	R 369.53	R 976.19	
	EO for raking drilling	m	0.14	19	0.80	R 271.89	R 5,031.58	
	Auger quantity	m	0.05	988	0.00	R 342.00	R 337,976.47	
	EO for drilling in coarse gravel	m	0.54	89	0.22	R 305.44	R 27,113.98	
	EO for drilling in boulders	m	1.71	28	0.53	R 739.05	R 20,771.41	
	EO for drilling in soft rock	m	1.62	30	0.23	R 323.46	R 9,562.96	
	Temporary casings	m	0.37	132	0.32	R 447.64	R 58,867.54	
	EO casing to raking pile	m	0.16	16	0.56	R 982.40	R 15,242.83	
	Mild steel rod reinforcement	t	14.85	3.232	0.70	R 7,422.74	R 23,990.40	
	High tensile rod reinforcement	t	1.16	41.379	7.56	R 10,593.11	R 438,335.65	
	Concrete to piles and bases	m3	0.16	308	0.00	R 1,402.00	R 432,176.15	
	Concrete to raking piles	m3	0.08	33	1.08	R 1,512.16	R 49,292.69	
	Site establishment of test equipment	Item	0.00	1	109.82	R 153,963.63	R 153,963.63	
	Load test to pile	No	88.15	1	24.65	R 34,563.31	R 18,821.09	
	Site establishment of intergity testing	No	254.57	0	49.67	R 69,635.34	R 13,129.90	
	Integrity testing of piles	No	1.30	37	0.26	R 358.51	R 13,237.35	
ROAD WORKS	Red paving	m2	0.14	0	0.93	R 133.69	R -	R 1,104,643.02
	Grey paving	m2	0.00	0	0.00	R 144.20	R -	
	Kerbing	m	0.11	276	0.00	R 279.21	R 76,943.27	
	Total paving and asphalt	m2	0.00	2,555	0.00		R -	
	Remove top soil	m3	0.50	278	4.82	R 54.60	R 15,196.65	
	Asphalt	m2	0.22	557	0.00	R 157.52	R 87,680.05	
	Rip bed	m2	0.00	2,555	0.00	R 11.32	R 28,922.60	
	Reduce levels	m3	0.37	956	4.37	R 49.51	R 47,345.29	
	Selected fill	m3	1.49	643	0.44	R 111.43	R 71,623.12	
	Imported fill	m3	1.85	348	0.32	R 349.01	R 121,349.36	
	Wearing course	m3	3.89	246	0.20	R 253.89	R 62,484.36	
	Prime	m2	4.33	2,781	1.41	R 36.40	R 101,211.09	
	Three line road marking	m	0.82	2,270	0.10	R 29.12	R 66,105.30	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.01	278	3.94	R 8.97	R 2,492.61	
		1m Wide concrete V-drain	m	0.95	260	0.80	R 1,201.00	R 312,762.84	
		200mm Diameter PVC pipe	m	0.93	256	0.08	R 342.63	R 87,810.95	
		Road marking - STOP	No	0.15	42	0.03	R 416.42	R 17,459.21	
		Standard signage	No	0.01	3	4.30	R 517.34	R 1,425.65	
		100mm Painted line	m	1.70	468	1.23	R 8.18	R 3,830.68	
				0.00		1.49			
				0.00		1.85			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.91	155	0.74	R 1,402.00	R 217,310.00	R 856,260.85
		Concrete in plinths	m3	0.00	32	0.00	R 1,402.00	R 44,252.22	
		Total concrete	m3	0.00	302	0.00		R -	
		Rip and compact	m2	0.13	1,160	189.86	R 7.38	R 8,569.28	
		Formwork to plinth	m2	7.15	226	0.12	R 168.24	R 37,949.44	
		Formwork to slab	m2	0.80	125	0.15	R 210.30	R 26,193.62	
		High tensile steel	t	0.01	3.020	0.00	R 11,485.00	R 34,684.70	
		Mesh	m2	553.23	1,671	47.06	R 244.04	R 407,719.47	
		Construction joint	m	4.11	637	0.05	R 68.10	R 43,411.44	
		Expansion joint	m	2.14	331	0.08	R 109.16	R 36,170.70	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	11.88	3,715	0.00		R -	R 934,841.01
		Base excavation	m3	1.42	458	0.00	R 58.22	R 26,677.78	
		Backfill	m3	0.58	323	0.60	R 96.69	R 31,231.94	
		Working space	m2	0.43	797	1.36	R 71.13	R 56,685.45	
		Concrete in bases	m3	0.04	199	23.93	R 1,402.00	R 278,998.00	
		Blinding	m2	0.80	280	19.32	R 72.55	R 20,280.72	
		Concrete in sump walls	m3	0.11	21	29.87	R 1,402.00	R 29,494.07	
		Concrete in slabs	m3	0.02	3	0.84	R 1,402.00	R 4,184.97	
		Total concrete	m3	0.00	223	0.03		R -	
		Wood float	m2	0.63	355	127.13	R 11.03	R 3,917.19	
		Formwork to bases	m2	1.70	337	0.12	R 166.24	R 56,096.25	
		Formwork to sump walls	m2	11.31	238	0.12	R 168.24	R 40,029.36	
		Formwork to sides of slab	m2	5.69	17	0.18	R 251.36	R 4,269.77	
		Mild steel reinforcement	t	0.09	2.029	0.00	R 11,485.00	R 23,302.62	
		High tensile reinforcement	t	9.74	22.908	0.97	R 11,485.00	R 263,094.13	
		Cast in steel	kg	0.44	448	33.33	R 42.06	R 18,839.77	
		Waterstop	m	0.43	49	8.18	R 171.41	R 8,442.02	
		Manhole	No	0.07	6	2.71	R 4,090.90	R 25,334.37	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	85	0.13	R 517.21	R 43,962.58	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.72	215	0.05	R 58.22	R 12,538.09	R 821,100.37
	Working space	m2	0.33	654	0.69	R 40.05	R 26,191.29	
	Backfill	m3	4.18	52	1.26	R 73.44	R 3,782.42	
	Concrete bases	m3	0.91	125	0.00	R 1,402.00	R 175,250.00	
	Concrete plinth	m3	1.86	67	0.00	R 1,402.00	R 94,292.85	
	Total concrete	m3	0.00	192	0.00		R -	
	Wood float	m2	0.49	138	0.05	R 14.02	R 1,935.63	
	Blinding	m2	0.91	137	0.01	R 72.10	R 9,904.24	
	Formwork bases	m2	0.43	290	0.13	R 179.26	R 52,022.80	
	Formwork plinth	m2	0.55	122	0.12	R 166.24	R 20,249.18	
	High tensile reinforcement	t	9.68	19.857	6.55	R 11,485.00	R 228,054.85	
	Cast in steel	kg	0.10	1,856	0.03	R 40.06	R 74,356.65	
	HD Bolts	kg	0.08	2,515	0.03	R 42.06	R 105,801.87	
	Grout	m3	34.02	1.977	6.03	R 8,458.07	R 16,720.50	
TANK BASES AND BUNDING	Restricted excavation	m3	5.73	1,060	0.05	R 65.09	R 69,001.68	R 3,068,487.82
	Working space	m2	3.93	269	1.53	R 42.50	R 11,454.49	
	Backfill	m3	1.33	799	0.74	R 88.56	R 70,776.40	
	Concrete bases	m3	0.69	185	0.00	R 1,402.00	R 259,370.00	
	Concrete sump wall	m3	2.51	74	0.00	R 1,402.00	R 103,187.84	
	Concrete slab	m3	0.54	344	0.00	R 1,402.00	R 482,228.42	
	Concrete plinth	m3	3.54	52	19.77	R 1,402.00	R 73,268.36	
	Concrete column	m3	17.89	10	159.53	R 1,402.00	R 14,499.78	
	Total concrete	m3	0.00	665	0.99		R -	
	Blinding	m2	2.44	273	1.01	R 70.91	R 19,341.97	
	Wood float	m2	0.26	2,565	1.05	R 8.79	R 22,545.26	
	Formwork to bases	m2	0.39	478	1.10	R 175.77	R 83,992.40	
	Formwork to plinths	m2	0.34	154	7.98	R 192.43	R 29,640.04	
	Formwork to columns	m2	0.12	89	7.29	R 207.66	R 18,446.17	
	Formwork to sumps	m2	0.11	678	6.75	R 197.21	R 133,686.33	
	Formwork to slabs	m2	3.82	90	7.11	R 178.24	R 16,043.12	
	Formwork to slabs n/e 300mm	m	2.05	167	7.87	R 61.66	R 10,323.87	
	Mild steel reinforcement	t	0.21	6.334	22.74	R 11,485.00	R 72,741.75	
	High tensile reinforcement	t	22.13	30.058	0.89	R 11,485.00	R 345,215.08	
	Mesh	m2	0.15	2,271	53.39	R 215.12	R 488,616.40	
	Cast in items	kg	0.19	3,595	218.17	R 52.64	R 189,276.85	
	HD Bolts	kg	0.09	7,109	207.30	R 55.40	R 393,839.33	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	201.02	3.309	0.16	R 8,921.82	R 29,522.04	
		Construction joint	m	0.29	1,189	24.85	R 56.43	R 67,090.63	
		Expansion joint	m	0.45	761	16.57	R 84.63	R 64,379.59	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.30	648	0.05	R 64.09	R 41,499.20	R 1,528,580.32
		Working space	m2	0.30	2,169	1.46	R 93.48	R 202,730.54	
		Backfill	m3	2.30	282	0.76	R 84.57	R 23,837.70	
		Blinding	m2	0.39	503	22.60	R 62.05	R 31,238.91	
		Concrete bases	m3	5.70	196	0.00	R 1,402.00	R 274,792.00	
		Concrete plinth	m3	0.00	34	0.00	R 1,402.00	R 48,178.94	
		Total concrete	m3	0.00	230	1.25		R -	
		Wood float	m2	0.35	563	170.63	R 8.22	R 4,629.57	
		Formwork bases	m2	0.47	413	9.32	R 150.38	R 62,146.26	
		Formwork plinths	m2	0.09	382	6.95	R 201.60	R 76,977.21	
		High tensile reinforcement	t	9.11	25.281	0.00	R 11,485.00	R 290,352.73	
		HD Bolts	kg	0.03	7,840	199.40	R 57.60	R 451,573.17	
		Grout	m3	77.08	2.543	0.17	R 8,110.74	R 20,624.10	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.02	1,026	0.06	R 78.11	R 80,143.16	R 2,586,469.18
		Working space	m2	0.46	2,244	1.98	R 39.52	R 88,702.00	
		Backfill	m3	2.51	409	0.79	R 99.23	R 40,540.78	
		Blinding	m2	0.32	804	22.06	R 63.55	R 51,099.15	
		Concrete bases	m3	0.00	255	0.00	R 1,402.00	R 357,510.00	
		Concrete plinth	m3	2.30	87	0.00	R 1,402.00	R 121,720.33	
		Concrete slab	m3	2.94	111	0.00	R 1,402.00	R 155,198.14	
		Total concrete	m3	0.00	453	0.00		R -	
		Wood float	m2	0.52	864	148.51	R 9.44	R 8,159.50	
		Formwork bases	m2	0.43	590	7.78	R 180.29	R 106,385.07	
		Formwork plinths	m2	0.10	856	7.87	R 178.08	R 152,430.00	
		High tensile reinforcement	t	13.15	34.403	0.00	R 11,485.00	R 395,113.59	
		HD Bolts	kg	0.02	12,310	189.35	R 60.66	R 746,688.02	
		Cast in items	kg	0.05	5,100	233.51	R 49.18	R 250,842.43	
		Grout	m3	67.26	3.791	0.17	R 8,424.03	R 31,937.01	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.07	0	0.05	R 74.11	R -	R -
		Working space	m2	0.49	0	1.60	R 46.21	R -	
		Backfill	m3	2.15	0	0.78	R 94.83	R -	
		Blinding	m2	0.66	0	22.63	R 61.94	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,402.00	R -	
		Concrete column	m3	26.28	0	0.00	R 1,402.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.84	0	0.00	R 1,402.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.58	0	157.94	R 8.88	R -	
	Formwork bases	m2	0.49	0	7.87	R 178.11	R -	
	Formwork plinths	m2	0.30	0	7.46	R 188.03	R -	
	Formwork to columns	m2	0.29	0	7.78	R 180.21	R -	
	High tensile reinforcement	t	9.01	0.000	0.00	R 11,485.00	R -	
	HD bolts	kg	0.04	0	199.54	R 57.56	R -	
	Grout	m3	100.97	0.000	0.16	R 8,533.91	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.65	119	0.05	R 73.10	R 8,717.69	R 557,889.40
	Working space	m2	0.27	448	2.03	R 36.01	R 16,118.49	
	Backfill	m3	1.85	64	0.79	R 93.13	R 5,998.25	
	Blinding	m2	0.67	67	20.58	R 68.14	R 4,596.23	
	Concrete bases	m3	0.00	45	0.00	R 1,402.00	R 63,090.00	
	Concrete column	m3	1.06	41	150.71	R 1,402.00	R 57,567.19	
	Concrete beam	m3	2.53	16	0.90	R 1,402.00	R 22,740.99	
	Total concrete	m3	2.77	102	0.90		R -	
	Wood float	m2	0.46	98	7.37	R 9.30	R 915.72	
	Formwork bases	m2	0.47	96	6.38	R 190.23	R 18,353.04	
	Formwork to columns	m2	0.15	275	7.34	R 191.14	R 52,572.26	
	Formwork to sides beams	m2	0.33	50	5.83	R 219.70	R 10,917.00	
	Formwork to soffits beams	m2	0.67	24	6.38	R 240.66	R 5,813.80	
	Formwork corbels	m2	10.75	4	5.09	R 275.71	R 1,053.32	
	High tensile reinforcement	t	8.69	11.773	0.00	R 11,485.00	R 135,211.60	
	Cast in steel	kg	0.03	3,409	263.62	R 43.57	R 148,531.97	
	HD bolts	kg	1.42	72	213.45	R 53.81	R 3,873.71	
	Grout	m3	482.18	0.212	0.16	R 8,571.18	R 1,818.14	
	Restricted excavation	m3	3.74	834	0.05	R 69.10	R 57,640.60	R 3,223,994.71
	Working space	m2	0.60	1,385	1.72	R 40.16	R 55,631.42	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.14	731	0.77	R 89.57	R 65,461.21	
	Blinding	m2	0.60	371	19.91	R 70.43	R 26,147.05	
	Concrete bases	m3	0.00	223	0.96	R 1,402.00	R 312,646.00	
	Concrete column	m3	2.19	102	1.07	R 1,402.00	R 142,621.18	
	Concrete beam	m3	0.76	133	0.94	R 1,402.00	R 186,607.15	
	Concrete surface slab	m3	1.59	140	0.96	R 1,402.00	R 196,632.70	
	Concrete wall	m3	2.17	47	1.04	R 1,402.00	R 65,767.34	
	Concrete elevated slab	m3	0.99	102	0.00	R 1,402.00	R 143,440.84	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	747	0.00		R -	
		Wood float	m2	0.60	1,247	156.35	R 8.97	R 11,182.15	
		Formwork bases	m2	0.39	577	7.15	R 195.99	R 113,099.51	
		Formwork to columns	m2	0.15	678	6.39	R 219.41	R 148,796.22	
		Formwork to sides beams	m2	0.28	469	4.72	R 297.17	R 139,482.92	
		Formwork to soffits beams	m2	0.82	163	7.11	R 197.23	R 32,181.62	
		Formwork to soffts of slabs	m2	0.30	475	3.13	R 246.03	R 116,968.18	
		Formwork to pockets	m2	24.36	4	5.70	R 448.54	R 1,873.30	
		Formwork wall	m2	0.13	373	7.80	R 179.69	R 67,052.00	
		High tensile reinforcement	t	8.51	87.866	0.00	R 11,485.00	R 1,009,141.16	
		Cast in steel	kg	0.21	3,547	245.88	R 46.71	R 165,659.61	
		HD bolts	kg	0.37	2,020	203.69	R 56.39	R 113,883.92	
		Steel handrailing	m	2.42	36	8.94	R 1,284.06	R 46,594.49	
		Grout	m3	1,005.50	0.743	0.19	R 7,378.95	R 5,484.12	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.33	131	0.04	R 58.08	R 7,606.98	R 1,075,874.18
		Working space	m2	7.79	17	1.38	R 42.00	R 706.60	
		Backfill	m3	4.57	29	0.70	R 40.45	R 1,158.69	
		Blinding	m2	1.11	157	18.69	R 75.03	R 11,753.54	
		Concrete bases	m3	0.00	174	0.00	R 1,402.00	R 243,948.00	
		Concrete column	m3	25.61	7	0.00	R 1,402.00	R 9,524.97	
		Concrete beam	m3	1.36	5	0.00	R 1,402.00	R 6,985.31	
		Concrete wall	m3	11.06	16	0.00	R 1,402.00	R 22,048.24	
		Concrete elevated slabs	m3	11.15	1	0.00	R 1,402.00	R 854.37	
		Total concrete	m3	0.00	202	0.00		R -	
		Wood float	m2	0.83	244	155.65	R 9.01	R 2,195.21	
		Formwork bases	m2	7.89	22	6.82	R 205.46	R 4,531.15	
		Formwork to columns	m2	0.14	47	5.93	R 227.07	R 10,745.06	
		Formwork to sides beams	m2	0.17	29	4.84	R 236.37	R 6,841.28	
		Formwork to soffits beams	m2	0.49	10	6.17	R 289.71	R 2,967.46	
		Formwork to soffts of slabs	m2	0.14	4	3.23	R 284.05	R 1,275.47	
		Formwork to pockets	m2	426.90	0	4.94	R 433.86	R 176.84	
		Formwork wall	m2	0.11	150	6.42	R 218.28	R 32,693.12	
		High tensile reinforcement	t	4.18	48.369	0.00	R 11,485.00	R 555,514.05	
		Cast in steel	kg	0.16	1,304	209.52	R 54.82	R 71,478.12	
		HD bolts	kg	0.23	890	170.92	R 67.19	R 59,790.07	
		Galvanised grating	m2	18.24	11	0.16	R 1,905.32	R 21,108.97	
		Grout	m3	794.97	0.219	6.03	R 9,003.67	R 1,970.70	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.39	198	0.05	R 68.10	R 13,461.74	R 2,490,216.68
	Working space	m2	0.37	534	1.57	R 43.28	R 23,121.33	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.02	98	0.75	R 90.71	R 8,864.64	
	Blinding	m2	4.85	29	20.47	R 68.49	R 2,005.22	
	Concrete bases	m3	0.00	142	0.00	R 1,402.00	R 199,084.00	
	Concrete column	m3	6.08	23	0.00	R 1,402.00	R 32,740.23	
	Concrete beam	m3	1.78	13	0.00	R 1,402.00	R 18,437.78	
	Concrete wall	m3	36.25	4	0.00	R 1,402.00	R 5,492.08	
	Concrete elevated slabs	m3	24.29	1	0.00	R 1,402.00	R 1,348.13	
	Total concrete	m3	0.00	183	0.00		R -	
	Wood float	m2	4.65	31	154.88	R 9.05	R 276.26	
	Formwork bases	m2	1.40	102	7.51	R 186.58	R 18,963.03	
	Formwork to columns	m2	0.14	169	7.26	R 206.94	R 34,873.76	
	Formwork to sides beams	m2	0.23	58	5.98	R 193.21	R 11,151.24	
	Formwork to soffits beams	m2	0.75	18	6.78	R 234.45	R 4,107.08	
	Formwork to soffts of slabs	m2	0.23	4	3.54	R 238.70	R 1,020.11	
	Formwork to pockets	m2	3.01	47	5.87	R 396.45	R 18,720.50	
	Formwork wall	m2	0.28	14	7.26	R 193.19	R 2,702.80	
	High tensile reinforcement	t	7.18	25.538	0.00	R 11,485.00	R 293,306.15	
	Cast in steel	kg	0.02	9,874	188.77	R 60.84	R 600,789.08	
	HD bolts	kg	0.01	15,102	213.75	R 53.73	R 811,447.37	
	Galvanised grating	m2	3.90	47	0.17	R 8,110.74	R 381,726.03	
	Grout	m3	39.53	3.592	6.27	R 1,831.32	R 6,578.13	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.76	0	0.05	R 69.10	R -	R -
	Working space	m2	2.36	0	1.71	R 40.53	R -	
	Backfill	m3	1.25	0	0.78	R 89.00	R -	
	Blinding	m2	3.69	0	20.56	R 68.19	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Mesh reinforcement	m2	0.42	0	64.72	R 177.47	R -	
	Rough formwork	m2	2.78	0	8.16	R 171.90	R -	
	Smooth formwork	m2	0.57	0	7.04	R 199.21	R -	
	Finish to concrete	m2	0.23	0	101.84	R 13.77	R -	
	Construction joints	m	4.50	0	20.42	R 68.67	R -	
	Movement joints	m	15.35	0	16.73	R 83.79	R -	
	Cast in steel	kg	2.27	0	231.51	R 49.61	R -	
	Grout	m3	809.06	0.000	0.17	R 8,496.97	R -	
	Brick walls	m2	0.47	0	0.00	R 331.20	R -	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total building area	m2	4.40	0	0.00		R -	
		Waterproofing membrane	m2	2.11	0	11.65	R 120.39	R -	
		Roof construction	m2	2.05	0	36.28	R 316.53	R -	
		Ceiling	m2	0.97	0	0.00	R 233.32	R -	
		Doors and windows	No	459.23	0	0.15	R 2,166.73	R -	
		Floor finish	m2	1.02	0	0.76	R 433.35	R -	
		Wall finsih	m2	1.03	0	1.37	R 241.37	R -	
		Rod reinforcement	t	8.36	0	0.00	R 11,485.00	R -	
		Metalwork	Item	0.00	0	4.25	R 48,778.44	R -	
		Structural steel	Item	0.00	0	11.00	R 126,310.39	R -	
		Plumbing and drainage	Item	0.00	0	7.00	R 80,419.61	R -	
		Small power and lighting	Item	0.00	0	59.66	R 685,170.49	R -	
		External works	Item	0.00	0	183.22	R 256,875.44	R -	
	BUILDINGS - STEEL	Concrete	m3	0.00	72	0.17	R 1,402.00	R 100,944.00	R 2,060,931.37
		Earthworks	m3	2.24	161	8.49	R 165.09	R 26,600.85	
		Reinforcement	t	8.42	9	0.00	R 11,485.00	R 98,259.04	
		Mesh	m2	0.11	642	9.27	R 151.23	R 97,094.74	
		Formwork	m2	0.40	178	7.43	R 188.64	R 33,654.73	
		Brickwork	m2	5.99	93	5.76	R 243.58	R 22,693.84	
		Roof covering	m2	0.87	643	201.86	R 204.22	R 131,415.86	
		Structural steel	t	17.54	32	0.00	R 41,225.00	R 1,311,277.28	
		Side cladding	m2	1.48	378	0.97	R 198.53	R 75,069.97	
		Doors	No	378.75	1	0.50	R 20,759.73	R 30,584.64	
		Ridge ventilator	m	20.91	27	11.41	R 2,329.31	R 62,161.54	
		Aluminium insulation	m2	0.93	598	1.72	R 119.08	R 71,174.88	
		Total building area	m2	0.00	558	0.00		R -	
	CANOPIES - STEEL	Earthworks	m3	2.90	377	0.12	R 173.25	R 65,265.91	R 3,858,053.44
		Concrete	m3	0.00	130	0.00	R 1,402.00	R 182,260.00	
		Reinforcement	t	10.74	12	0.16	R 11,485.00	R 138,999.20	
		Mesh	m2	0.11	1,145	9.97	R 140.61	R 160,951.86	
		Formwork	m2	0.39	334	7.93	R 176.78	R 59,035.14	
		Brickwork	m2	5.67	154	5.40	R 259.87	R 40,098.38	
		Screed	m2	1.11	786	39.87	R 35.17	R 27,633.66	
		Structural steel	t	14.39	61	0.00	R 41,225.00	R 2,507,105.45	
		Cat ladders	m	2.54	24	9.62	R 4,283.43	R 102,500.55	
		Hand rail	m	0.74	83	26.30	R 1,567.36	R 129,560.40	
		Kick plates	m	0.74	82	2.55	R 615.86	R 50,661.89	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.85	1,025	195.44	R 210.94	R 216,232.89	
		Side cladding	m2	4.57	191	0.87	R 183.67	R 35,138.39	
		Floor grating	m2	1.08	56	16.24	R 2,539.27	R 142,609.72	
		Total buiding area	m2	0.00	875	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.57	0	8.02	R 174.78	R -	R -
		Blinding	m2	0.52	0	20.64	R 67.94	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	7.99	0	0.00	R 11,485.00	R -	
		Mesh	m2	0.52	0	52.57	R 218.46	R -	
		Formwork	m2	0.34	0	7.98	R 175.63	R -	
		Finish to concrete	m2	0.48	0	104.35	R 13.44	R -	
		Movement joints	m	2.61	0	15.53	R 90.25	R -	
		Cast in steel	kg	0.09	0	205.48	R 55.89	R -	
		Grout	m3	73.55	0.000	2.62	R 8,801.79	R -	
		Brickwork	m2	0.25	0	0.16	R 331.20	R -	
		Doors and windows	No	2.78	0	0.28	R 4,293.33	R -	
		Pipework	m	2.91	0	0.23	R 534.53	R -	
		Bolts	kg	0.11	0	0.08	R 55.89	R -	
		Structural steel	t	4.49	0	0.00	R 41,547.80	R -	
		Miscellaneous steel	t	149.51	0	0.00	R 50,090.34	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.84	0	6.88	R 203.67	R -	R -
		Blinding	m2	0.82	0	17.86	R 78.50	R -	
		Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
		Reinforcement	t	6.03	0	0.00	R 11,485.00	R -	
		Formwork	m2	0.07	0	6.04	R 231.95	R -	
		Finish to concrete	m2	0.35	0	89.38	R 15.69	R -	
		Movement joints	m	0.46	0	14.82	R 94.60	R -	
		Cast in steel	kg	27.41	0.000	171.35	R 67.03	R -	
		Grout	m3	25.76	0.000	0.70	R 9,087.04	R -	
		Bolts	kg	114.36	0.000	0.15	R 46.63	R -	
		Structural steel	t	40.50	0.000	0.24	R 48,430.72	R -	
		Miscellaneous steel	t	23.33	0.000	0.18	R 63,553.36	R -	
		Brickwork	m2	0.56	0	5.00	R 280.64	R -	
		Roof covering	m2	1.79	0	1.30	R 216.23	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.95	287	6.69	R 209.68	R 60,156.75	R 1,810,534.02
	Blinding	m2	1.26	240	18.97	R 73.93	R 17,718.69	
	Concrete	m3	0.00	302	0.00	R 1,402.00	R 423,404.00	
	Reinforcement	t	5.49	55.009	0.00	R 11,485.00	R 631,779.60	
	Formwork	m2	0.21	1,458	6.86	R 204.42	R 298,024.06	
	Movement joint	m	1.81	167	0.13	R 97.52	R 16,315.68	
	Cast in steel	kg	0.15	2,062	14.38	R 54.10	R 111,568.14	
	Bolts	kg	0.39	767	212.31	R 62.66	R 48,079.92	
	Chemical anchors	No	7.08	43	0.25	R 285.78	R 12,187.50	
	Miscellaneous steelwork	t	91.35	3.306	183.30	R 45,549.58	R 150,587.70	
	Pre-cast concrete	m3	33.71	9	40.19	R 3,925.60	R 35,169.28	
	Brickwork	m2	9.20	20	0.36	R 271.22	R 5,542.70	
	Total area	m2	0.00	188	5.17		R -	
EMERGENCY DAM	Earthworks	m3	0.62	0	1.82	R 121.78	R -	R -
	Lining	m2	0.81	0	1.46	R 67.10	R -	
	Paving	m2	0.75	0	0.57	R 117.56	R -	
	Pipework	m	30.31	0	0.29	R 427.29	R -	
	Manholes	No	17.28	0	0.12	R 3,603.68	R -	
	Concrete	m3	2.78	0	0.05	R 1,402.00	R -	
	Formwork	m2	0.09	0	5.54	R 253.10	R -	
	Mesh	m2	0.84	0	7.55	R 185.70	R -	
	Reinforcement	t	5.60	0.000	0.13	R 11,485.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	5.92	0	5.29	R 265.17	R -	R -
	Blinding	m2	0.78	0	11.80	R 118.83	R -	
	Concrete	m3	0.00	0	0.00	R 1,402.00	R -	
	Reinforcement	t	4.10	0.000	0.00	R 11,485.00	R -	
	Mesh	m2	0.95	0	36.63	R 313.58	R -	
	Formwork	m2	0.13	0	4.96	R 282.62	R -	
	Cast in steel	kg	0.03	0	136.75	R 83.98	R -	
	Miscellaneous steelwork	t	11.80	0.000	0.16	R 70,832.60	R -	
	Total tunnel length	m	0.00	0	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	142	0.00		R -	R 1,124,069.31
	Steel	t	8.22	17.275	0.00	R 41,225.00	R 712,159.37	
	Handrail	m	1.44	98	26.02	R 1,584.18	R 155,908.82	
	Grating	m2	1.76	81	16.75	R 2,461.19	R 198,412.56	
	Kick flats	m	1.63	87	78.80	R 523.13	R 45,633.41	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.73	25	85.40	R 482.72	R 11,955.15	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,945	0.00		R -	R 3,972,833.15
		Steel	t	25.14	77.376	0.00	R 41,225.00	R 3,189,806.63	
		Handrail	m	11.98	162	28.72	R 1,435.27	R 233,007.51	
		Grating	m2	12.19	160	17.35	R 2,376.57	R 379,065.13	
		Kick flats	m	12.59	155	82.26	R 501.15	R 77,434.09	
		Cat ladder	m	97.10	20	8.83	R 4,668.74	R 93,519.79	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	4,885	0.00		R -	R 6,799,267.04
		Steel	t	66.25	73.740	0.00	R 41,225.00	R 3,039,924.25	
		Handrail	m	30.37	161	29.37	R 1,403.71	R 225,770.39	
		Grating	m2	3.76	1,300	16.06	R 2,566.48	R 3,337,546.31	
		Kick flats	m	32.89	149	80.79	R 510.28	R 75,796.50	
		Stair treads	No	217.01	23	91.05	R 452.76	R 10,192.00	
		Cat ladder	m	225.84	22	8.10	R 5,087.26	R 110,037.58	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	645	0.00		R -	R 1,414,239.92
		Steel	t	22.05	29.251	0.00	R 41,225.00	R 1,205,862.30	
		Handrail	m	43.97	15	26.71	R 1,543.64	R 22,641.90	
		Grating	m2	57.74	11	16.83	R 2,449.60	R 27,362.20	
		Kick flats	m	42.48	15	74.57	R 552.82	R 8,392.97	
		Cat ladder	m	19.62	33	9.04	R 4,561.37	R 149,980.56	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 1,667,393.68
		Steel	t	13.89	19.148	0.00	R 41,225.00	R 789,356.27	
		Handrail	m	1.12	238	26.65	R 1,546.95	R 368,574.92	
		Grating	m2	1.92	138	16.06	R 2,567.62	R 355,326.02	
		Kick flats	m	1.07	250	76.94	R 535.82	R 133,740.03	
		Stair treads	No	5.55	48	96.82	R 425.78	R 20,396.44	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	455	0.00		R -	R 1,855,869.56
		Steel	t	12.11	37.588	0.00	R 41,225.00	R 1,549,555.97	
		Handrail	m	23.52	19	27.57	R 1,495.28	R 28,932.79	
		Grating	m2	7.25	63	16.63	R 2,479.27	R 155,503.84	
		Kick flats	m	22.45	20	81.87	R 503.57	R 10,205.31	
		Cat ladder	m	19.41	23	8.65	R 4,764.72	R 111,671.65	
	PIPING INSTALLATION	Pipe length	m	0.00	52,441	0.00		R -	R 57,469,606.10
		Total work units	WU	0.30	174,388	0.00	R 329.55	R 57,469,606.10	
		Pipe supports	kg	2.47	21,262	0.00		R -	
		WU for pipe supports	WU	0.15	25,785	0.00		R -	
		Number of welds	No	0.55	28,843	0.00		R -	
		Total fittings	No	0.37	19,590	0.00		R -	
		Stud bolts	No	0.34	6,675	0.00		R -	
		Support number	No	0.19	4,055	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	174,388	0.00	R 329.55		R 175,541.79

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	58.03	3,005	5.64	R 58.42	R 175,541.79	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	174,388	0.00	R 329.55		R 112,532.15
	Number of examinations	No	168.63	1,034	3.03	R 108.81	R 112,532.15	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	174,388	0.00	R 329.55		R 98,406.15
	Number of examinations	No	295.59	590	1.98	R 166.80	R 98,406.15	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	174,388	0.00	R 329.55		R 168,174.11
	Number of examinations	No	49.66	3,512	6.88	R 47.89	R 168,174.11	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	174,388	0.00	R 329.55		R 215,987.35
	Number of examinations	No	108.70	1,604	2.45	R 134.63	R 215,987.35	
MECHANICAL INSTALLATION	Total work units	WU	0.00	174,388	0.00	R 329.55		R 317,402.55
	Mechanical equipment	t	249.01	700	0.73	R 453.21	R 317,402.55	
	Structural steel	t	213.08	818	55.58			
PAINTING & INSULATION	Total work units	WU	0.00	174,388	0.00	R 329.55		R 4,022,139.01
	Painting to piping	m2	16.87	10,338	0.31	R 135.70	R 1,402,842.89	
	Insulation to piping	m2	51.26	3,402	2.43	R 431.76	R 1,469,015.78	
	Mechanical equipment received	t	0.00	700	0.81	R 453.21	R 317,402.55	
	Painting to mechanical equipment	m2	0.23	3,045	3.31	R 136.98	R 417,101.80	
	Insulation to mechanical equipment	m2	0.68	1,035	1.13	R 401.58	R 415,776.00	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.89	30,225	0.00	R 52.33	R 1,581,674.25	R 4,773,682.40
	Electrical cable terminations	No	280.99	1,320	0.38	R 139.28	R 183,901.99	
	Electrical equipment	No	8.83	108	0.09	R 567.92	R 61,089.68	
	DB's	No	5.98	12	0.31	R 1,832.01	R 22,317.49	
	Rack	m	0.58	5,054	1.57	R 162.08	R 819,131.43	
	Support steel	kg	1.37	8,671	1.96	R 26.64	R 230,992.14	
	Instrumentation cable	m	24.01	24,665	0.32	R 28.50	R 702,952.50	
	Instruments	No	0.50	1,027	0.16	R 181.36	R 186,278.04	
	Hook-ups	No	3.57	2,051	0.15	R 193.69	R 397,307.84	
	Light fittings	No	10.16	384	0.02	R 333.01	R 128,033.65	
	Conduit	m	4.05	2,976	0.11	R 33.24	R 98,935.82	
	Instrument stands	No	0.00	253		R 1,425.00	R 361,067.57	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project G				
Location:	South Africa				
Client:				Date of estimate:	2006

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	22,145	R	4.15
2	Concrete demolitions	m3	124	R	1,422.30
3	Bulk excavation	m3	11,542	R	40.00
4	Vertical piles	No	288		
5	Raking piles	No	12		
6	Concrete in piles	m3		R	1,289.00
7	Auger pile	m		R	322.45
8	Total paving and asphalt to road works	m2	6,552		
9	Grey paving to road works	m2	485	R	142.22
10	Asphalt to road surface	m2	6,067		
11	Rip bed of road works	m2	6,552	R	11.55
12	Total concrete in paving and bunding	m3	602	R	1,289.00
13	Concrete in paving	m3	401		
14	Rod reinforcement	t		R	11,425.00
15	Concrete in plinths and bases on area finishing	m3	415		
16	Stormwater pipe to drain surface run-off	m	345		
17	Machine excavation	m3		R	55.22
18	Concrete in pump and pipe support bases	m3	322	R	1,289.00
19	Concrete in tank bases	m3	345	R	1,289.00
20	Concrete in pipe and cable rack foundations	m3	422	R	1,289.00
21	Concrete to simple structural foundations	m3	503	R	1,289.00
22	Complex structural foundations - bases	m3	88	R	1,289.00
23	Concrete pipe racks - bases	m3	145	R	1,289.00
24	Concrete structure including concrete columns and beams - bases	m3	455	R	1,289.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,289.00
26	Major equipment bases and elevated concrete structure - bases	m3	95	R	1,289.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	388	R	1,289.00
28	One brick wall	m2		R	289.25
29	Concrete in structual steel buildings - all concrete	m3	205	R	1,289.00
30	Total building area - Structural steel buildings	m2	1,855		
31	Ceiling	m2		R	214.50
32	Structural steel	t		R	38,442.00
33	Steel canopy - concrete	m3	165	R	1,289.00
34	Steel canopy - area	m2	255		
35	Concrete in weighbridge - all concrete	m3	48	R	1,289.00
36	Total weighbridge area	m2	178		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	0	R	1,289.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	588	R	1,289.00
41	Total cooling tower area	m2	322		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	62	R	1,289.00
44	Total lengh of cable tunnel	m	55		
45	Total volume of basic steel platform	m3	365		
46	Total volume of steel pipe rack	m3	3,452		
47	Total volume of steel complex steel structure	m3	10,442		
48	Total volume of steel in stack	m3	458		
49	Total volume of steel in walkway	m3	95		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	299.00
52	Total process pipe length	m	118,452		
53	Total electrical cable - installation only	m	68,442	R	48.00
54	Total instrumentation cable - installation only	m	49,775	R	35.00

Ratio: Project Ratio Mean

Variables

Material	Simple	Mean
Labour	Complex	Mean
Engineering design	Simple	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Poor	Mean
Access	Normal	Mean
Project size	Large	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project G			
Location:	South Africa			
Client:	0	Date of estimate:	2006	

	CIVIL CONSTRUCTION COST				R 77,098,268.68
A	SITE CLEARANCE AND DEMOLITIONS		R	268,266.95	
B	BULK EARTHWORKS		R	976,021.24	
C	PILING		R	8,383,871.00	
D	ROAD WORKS		R	3,286,624.24	
E	GENERAL PAVING AND BUNDED AREAS		R	1,848,510.01	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,912,533.32	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,809,343.32	
H	TANK BASES AND BUNDING		R	4,928,701.13	
I	RACK FOUNDATIONS		R	2,973,023.89	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	4,526,779.07	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	509,314.56	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	1,669,377.72	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	5,437,729.65	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,605,826.27	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	4,507,011.45	
Q	BUILDINGS - STEEL		R	5,837,803.66	
R	CANOPIES - STEEL		R	1,545,549.57	
S	WEIGHBRIDGE		R	512,911.28	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	3,515,182.42	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	1,055,447.90	
	Preliminaries and General	35.00%	R	19,988,440.03	
	STRUCTURAL STEEL				R 32,193,778.11
A	STRUCTURAL STEEL - BASIC PLATFORM		R	2,362,766.44	
B	STRUCTURAL STEEL - PIPERACK		R	5,926,968.82	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	12,521,079.13	
D	STRUCTURAL STEEL - STACK		R	824,797.22	
E	STRUCTURAL STEEL - WALKWAY		R	480,051.15	
F	STRUCTURAL STEEL - CABLE GANTRY		R	879,893.03	
	Preliminaries and General	40.00%	R	9,198,222.32	
	MECHANICAL AND PIPING				R 152,555,035.89
A	PIPING INSTALLATION		R	107,324,690.91	
B	RADIOGRAPHIC EXAMINATION (RT)		R	301,743.89	
C	DYE PENETRATION TESTING (DP)		R	108,426.39	
D	MAGNETIC PARTICLE TESTING (MPI)		R	168,244.78	
E	POST WELD HEAT TREATMENT		R	292,482.88	
F	MATERIAL HARDNESS TEST (HT)		R	225,214.42	
H	MECHANICAL INSTALLATION		R	547,079.51	
	Preliminaries and General	40.00%	R	43,587,153.11	
	PAINTING AND INSULATION				R 8,729,692.81
A	PAINTING AND INSULATION		R	6,466,439.11	
	Preliminaries and General	35.00%	R	2,263,253.69	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 11,951,960.27
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	8,853,303.90	
	Preliminaries and General	35.00%	R	3,098,656.37	

TOTAL COST	R	282,528,735.75

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		22,145		R 4.15	R 91,901.75	R 268,266.95
	Concrete demolitions	m3		124		R 1,422.30	R 176,365.20	
BULK EARTHWORKS	Bulk excavation	m3		11,542		R 40.00	R 461,680.00	R 976,021.24
	Trimming of sides	m2	2.18	5,294	4.30	R 9.30	R 49,251.12	
	Back fill and compact	m3	1.15	10,037	0.98	R 40.82	R 409,653.95	
	Overhaul	m3/km	1.73	6,672	11.34	R 3.53	R 23,533.25	
	Rip bed	m2	1.78	6,484	8.13	R 4.92	R 31,902.93	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 247,874.70	R 247,874.70	R 8,383,871.00
	EO for raking equipment	Item	0.00	1	23.89	R 30,794.21	R 30,794.21	
	Number of piles	No	0.00	288	0.00		R -	
	Move rig to new position	No	1.50	192	0.18	R 232.02	R 44,547.84	
	Number of raking piles	No	18.41	16	0.00		R -	
	EO for setting up raking piles	No	0.93	17	0.28	R 360.92	R 6,071.09	
	EO for raking drilling	m	0.15	104	0.89	R 286.98	R 29,929.53	
	Auger quantity	m	0.05	5,760	0.00	R 322.45	R 1,857,312.00	
	EO for drilling in coarse gravel	m	0.53	543	0.22	R 283.58	R 154,096.30	
	EO for drilling in boulders	m	1.84	157	0.50	R 644.50	R 100,878.26	
	EO for drilling in soft rock	m	1.63	177	0.24	R 309.36	R 54,659.93	
	Temporary casings	m	0.36	800	0.36	R 464.04	R 371,232.00	
	EO casing to raking pile	m	0.18	87	0.51	R 1,198.77	R 104,184.25	
	Mild steel rod reinforcement	t	14.29	20.154	0.93	R 8,667.11	R 174,676.48	
	High tensile rod reinforcement	t	1.32	218.182	7.23	R 9,319.47	R 2,033,338.91	
	Concrete to piles and bases	m3	0.15	1,920	0.00	R 1,289.00	R 2,474,880.00	
	Concrete to raking piles	m3	0.07	223	1.06	R 1,366.34	R 305,351.07	
	Site establishment of test equipment	Item	0.00	1	110.73	R 142,730.97	R 142,730.97	
	Load test to pile	No	99.34	3	27.07	R 34,893.23	R 101,160.16	
	Site establishment of intergity testing	No	258.87	1	48.79	R 62,890.31	R 69,967.20	
	Integrity testing of piles	No	1.25	230	0.27	R 348.03	R 80,186.11	
ROAD WORKS	Red paving	m2	0.15	73	0.97	R 137.95	R 10,036.11	R 3,286,624.24
	Grey paving	m2	0.00	485	0.00	R 142.22	R 68,976.70	
	Kerbing	m	0.13	852	0.00	R 225.85	R 192,373.09	
	Total paving and asphalt	m2	0.00	6,552	0.00		R -	
	Remove top soil	m3	0.55	937	5.83	R 67.34	R 63,089.99	
	Asphalt	m2	0.26	1,704	0.00	R 159.85	R 272,314.79	
	Rip bed	m2	0.00	6,552	0.00	R 11.55	R 75,675.60	
	Reduce levels	m3	0.42	2,752	4.99	R 57.63	R 158,600.92	
	Selected fill	m3	1.65	1,668	0.53	R 108.74	R 181,361.83	
	Imported fill	m3	2.23	748	0.39	R 278.83	R 208,533.78	
	Wearing course	m3	3.86	713	0.29	R 198.74	R 141,683.87	
	Prime	m2	4.74	7,905	1.47	R 55.77	R 440,848.76	
	Three line road marking	m	0.83	6,561	0.20	R 45.17	R 296,382.62	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.02	869	4.19	R 11.29	R 9,811.03	
		1m Wide concrete V-drain	m	0.97	826	0.81	R 1,011.82	R 835,976.48	
		200mm Diameter PVC pipe	m	0.96	818	0.11	R 320.71	R 262,242.99	
		Road marking - STOP	No	0.15	128	0.05	R 343.30	R 43,861.06	
		Standard signage	No	0.01	9	4.48	R 438.16	R 3,732.04	
		100mm Painted line	m	1.83	1,559	1.42	R 13.55	R 21,122.56	
				0.00		1.52			
				0.00		1.94			
				0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	401	0.74	R 1,289.00	R 516,889.00	R 1,848,510.01
		Concrete in plinths	m3	0.00	80	0.00	R 1,289.00	R 102,965.94	
		Total concrete	m3	0.00	602	0.00		R -	
		Rip and compact	m2	0.13	3,085	187.19	R 6.89	R 21,240.82	
		Formwork to plinth	m2	7.26	580	0.12	R 154.68	R 89,703.92	
		Formwork to slab	m2	0.83	333	0.15	R 193.35	R 64,352.68	
		High tensile steel	t	0.01	6.020	0.00	R 11,425.00	R 68,778.50	
		Mesh	m2	585.35	3,524	51.00	R 224.02	R 789,401.86	
		Construction joint	m	4.00	1,604	0.05	R 64.45	R 103,377.80	
		Expansion joint	m	2.22	890	0.08	R 103.12	R 91,799.49	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	9,637	0.00		R -	R 1,912,533.32
		Base excavation	m3	1.50	922	0.00	R 55.22	R 50,925.11	
		Backfill	m3	0.59	615	0.64	R 86.28	R 53,046.99	
		Working space	m2	0.45	1,563	1.43	R 60.34	R 94,311.35	
		Concrete in bases	m3	0.04	415	25.24	R 1,289.00	R 534,935.00	
		Blinding	m2	0.83	560	20.88	R 61.73	R 34,570.88	
		Concrete in sump walls	m3	0.10	42	29.51	R 1,289.00	R 53,493.50	
		Concrete in slabs	m3	0.02	8	0.91	R 1,289.00	R 10,698.70	
		Total concrete	m3	0.00	465	0.04		R -	
		Wood float	m2	0.70	664	158.37	R 8.14	R 5,404.41	
		Formwork to bases	m2	1.69	701	0.12	R 154.68	R 108,484.82	
		Formwork to sump walls	m2	12.63	524	0.12	R 154.68	R 81,074.75	
		Formwork to sides of slab	m2	5.81	48	0.18	R 232.02	R 11,188.70	
		Mild steel reinforcement	t	0.12	5.222	0.00	R 11,425.00	R 59,666.74	
		High tensile reinforcement	t	10.68	43.521	1.19	R 11,425.00	R 497,222.85	
		Cast in steel	kg	0.46	902	34.10	R 37.80	R 34,102.70	
		Waterstop	m	0.43	97	8.10	R 159.14	R 15,358.46	
		Manhole	No	0.08	28	2.68	R 3,699.77	R 102,113.66	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	345	0.13	R 480.97	R 165,934.70	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS							R 1,809,343.32
	Restricted base excavation	m3	1.69	544	0.05	R 55.22	R 30,049.62	
	Working space	m2	0.38	1,432	0.67	R 37.00	R 52,982.22	
	Backfill	m3	4.42	123	1.32	R 72.89	R 8,974.09	
	Concrete bases	m3	1.01	322	0.00	R 1,289.00	R 415,058.00	
	Concrete plinth	m3	2.29	141	0.00	R 1,289.00	R 181,248.03	
	Total concrete	m3	0.00	463	0.00		R -	
	Wood float	m2	0.47	299	0.05	R 12.89	R 3,856.34	
	Blinding	m2	1.01	319	0.01	R 64.45	R 20,547.43	
	Formwork bases	m2	0.49	657	0.13	R 167.57	R 110,117.43	
	Formwork plinth	m2	0.58	242	0.12	R 154.68	R 37,499.59	
	High tensile reinforcement	t	10.00	46.261	7.15	R 11,425.00	R 528,533.47	
	Cast in steel	kg	0.11	4,206	0.03	R 38.67	R 162,628.92	
	HD Bolts	kg	0.08	5,783	0.03	R 38.67	R 223,614.76	
	Grout	m3	34.52	4.073	6.52	R 8,404.28	R 34,233.41	
	TANK BASES AND BUNDING							R 4,928,701.13
	Restricted excavation	m3	5.84	2,015	0.05	R 64.45	R 129,853.86	
	Working space	m2	4.36	462	1.63	R 39.54	R 18,271.78	
	Backfill	m3	1.38	1,460	0.72	R 89.51	R 130,690.28	
	Concrete bases	m3	0.75	345	0.00	R 1,289.00	R 444,705.00	
	Concrete sump wall	m3	2.86	121	0.00	R 1,289.00	R 155,491.26	
	Concrete slab	m3	0.57	605	0.00	R 1,289.00	R 780,184.21	
	Concrete plinth	m3	4.11	84	21.05	R 1,289.00	R 108,200.73	
	Concrete column	m3	19.22	18	164.76	R 1,289.00	R 23,137.62	
	Total concrete	m3	0.00	1,173	1.11		R -	
	Blinding	m2	2.67	439	1.05	R 61.24	R 26,897.24	
	Wood float	m2	0.25	4,691	1.12	R 7.82	R 36,701.11	
	Formwork to bases	m2	0.42	821	1.14	R 158.74	R 130,396.73	
	Formwork to plinths	m2	0.35	240	8.12	R 168.94	R 40,517.03	
	Formwork to columns	m2	0.12	150	7.63	R 181.55	R 27,156.83	
	Formwork to sumps	m2	0.11	1,097	7.10	R 176.09	R 193,108.87	
	Formwork to slabs	m2	4.07	149	7.32	R 157.00	R 23,348.53	
	Formwork to slabs n/e 300mm	m	2.17	279	8.21	R 54.71	R 15,260.27	
	Mild steel reinforcement	t	0.23	11.682	23.56	R 11,425.00	R 133,468.33	
	High tensile reinforcement	t	23.09	50.792	1.02	R 11,425.00	R 580,297.07	
	Mesh	m2	0.16	3,783	61.15	R 186.84	R 706,779.60	
	Cast in items	kg	0.19	6,173	214.69	R 53.22	R 328,479.97	
	HD Bolts	kg	0.10	11,728	207.02	R 55.19	R 647,235.02	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	204.15	5.745	0.17	R 7,582.35	R 43,558.48	
		Construction joint	m	0.30	2,018	24.89	R 51.79	R 104,484.29	
		Expansion joint	m	0.46	1,316	16.88	R 76.36	R 100,477.05	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	1,566	0.05	R 64.45	R 100,904.21	R 2,973,023.89
		Working space	m2	0.41	3,819	1.98	R 127.61	R 487,293.50	
		Backfill	m3	2.45	639	0.87	R 74.08	R 47,339.53	
		Blinding	m2	0.37	1,141	22.19	R 58.09	R 66,253.12	
		Concrete bases	m3	5.81	422	0.00	R 1,289.00	R 543,958.00	
		Concrete plinth	m3	0.00	73	0.00	R 1,289.00	R 93,624.44	
		Total concrete	m3	0.00	495	1.34		R -	
		Wood float	m2	0.35	1,206	173.00	R 7.45	R 8,983.62	
		Formwork bases	m2	0.47	898	9.63	R 133.85	R 120,182.50	
		Formwork plinths	m2	0.09	807	6.99	R 184.41	R 148,822.83	
		High tensile reinforcement	t	9.33	53.015	0.00	R 11,425.00	R 605,700.59	
		HD Bolts	kg	0.03	14,067	225.70	R 50.62	R 712,058.78	
		Grout	m3	79.73	5.293	0.18	R 7,161.11	R 37,902.78	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	2,158	0.06	R 77.34	R 166,889.67	R 4,526,779.07
		Working space	m2	0.50	4,316	1.90	R 40.71	R 175,673.33	
		Backfill	m3	2.66	811	0.80	R 96.68	R 78,425.59	
		Blinding	m2	0.33	1,524	21.39	R 60.26	R 91,853.60	
		Concrete bases	m3	0.00	503	0.00	R 1,289.00	R 648,367.00	
		Concrete plinth	m3	2.58	139	0.00	R 1,289.00	R 178,613.50	
		Concrete slab	m3	3.63	195	0.00	R 1,289.00	R 251,305.04	
		Total concrete	m3	0.00	837	0.00		R -	
		Wood float	m2	0.55	1,521	161.77	R 7.97	R 12,119.18	
		Formwork bases	m2	0.49	1,027	8.32	R 154.93	R 159,038.22	
		Formwork plinths	m2	0.11	1,260	8.34	R 154.56	R 194,695.33	
		High tensile reinforcement	t	13.32	62.802	0.00	R 11,425.00	R 717,518.08	
		HD Bolts	kg	0.02	25,150	217.74	R 52.47	R 1,319,641.54	
		Cast in items	kg	0.05	10,060	241.09	R 47.39	R 476,732.76	
		Grout	m3	68.22	7.373	0.17	R 7,582.35	R 55,906.24	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	183	0.05	R 64.45	R 11,796.93	R 509,314.56
		Working space	m2	0.56	327	1.66	R 38.83	R 12,690.33	
		Backfill	m3	2.15	85	0.79	R 81.58	R 6,945.50	
		Blinding	m2	0.65	135	20.36	R 63.31	R 8,571.26	
		Concrete bases	m3	0.00	88	0.00	R 1,289.00	R 113,432.00	
		Concrete column	m3	28.05	3	0.00	R 1,289.00	R 4,043.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	17	0.00	R 1,289.00	R 21,688.72	
	Total concrete	m3	0.00	108	0.00		R -	
	Wood float	m2	0.60	180	158.85	R 8.11	R 1,460.13	
	Formwork bases	m2	0.52	169	8.23	R 156.62	R 26,505.28	
	Formwork plinths	m2	0.33	51	7.44	R 173.25	R 8,833.79	
	Formwork to columns	m2	0.28	11	8.09	R 159.33	R 1,785.24	
	High tensile reinforcement	t	9.06	11.916	0.00	R 11,425.00	R 136,145.72	
	HD bolts	kg	0.04	2,699	209.18	R 54.62	R 147,418.52	
	Grout	m3	108.76	0.993	0.16	R 8,056.25	R 7,997.23	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	406	0.06	R 77.34	R 31,400.04	R 1,669,377.72
	Working space	m2	0.30	1,353	2.12	R 36.48	R 49,371.13	
	Backfill	m3	2.06	197	0.82	R 94.32	R 18,588.70	
	Blinding	m2	0.67	216	19.99	R 64.48	R 13,955.11	
	Concrete bases	m3	0.00	145	0.00	R 1,289.00	R 186,905.00	
	Concrete column	m3	1.19	131	151.33	R 1,289.00	R 168,655.02	
	Concrete beam	m3	2.68	49	0.95	R 1,289.00	R 62,930.98	
	Total concrete	m3	2.97	325	0.95		R -	
	Wood float	m2	0.47	309	7.50	R 8.52	R 2,627.83	
	Formwork bases	m2	0.48	302	6.55	R 171.87	R 51,918.06	
	Formwork to columns	m2	0.15	872	7.98	R 161.53	R 140,898.09	
	Formwork to sides beams	m2	0.33	148	6.11	R 196.79	R 29,114.49	
	Formwork to soffits beams	m2	0.69	71	6.55	R 210.97	R 14,927.06	
	Formwork corbels	m2	10.88	12	5.37	R 240.04	R 2,886.66	
	High tensile reinforcement	t	9.10	35.677	0.00	R 11,425.00	R 407,612.99	
	Cast in steel	kg	0.03	10,822	262.64	R 43.50	R 470,768.38	
	HD bolts	kg	1.48	219	215.28	R 53.07	R 11,641.90	
	Grout	m3	505.30	0.643	0.16	R 8,056.25	R 5,176.27	
	Restricted excavation	m3	3.84	1,747	0.05	R 64.45	R 112,607.04	R 5,437,729.65
	Working space	m2	0.61	2,864	1.79	R 36.01	R 103,129.44	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	1,519	0.79	R 81.58	R 123,948.31	
	Blinding	m2	0.61	746	20.06	R 64.26	R 47,929.57	
	Concrete bases	m3	0.00	455	0.97	R 1,289.00	R 586,495.00	
	Concrete column	m3	2.44	186	1.07	R 1,289.00	R 240,366.80	
	Concrete beam	m3	0.84	222	1.02	R 1,289.00	R 286,150.96	
	Concrete surface slab	m3	1.68	271	0.97	R 1,289.00	R 349,104.17	
	Concrete wall	m3	2.50	75	1.05	R 1,289.00	R 96,146.72	
	Concrete elevated slab	m3	1.10	170	0.00	R 1,289.00	R 218,515.28	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,378	0.00		R -	
		Wood float	m2	0.64	2,154	169.32	R 7.61	R 16,396.27	
		Formwork bases	m2	0.41	1,110	7.65	R 168.50	R 186,990.28	
		Formwork to columns	m2	0.17	1,097	6.34	R 203.31	R 223,016.15	
		Formwork to sides beams	m2	0.30	740	5.15	R 250.29	R 185,210.97	
		Formwork to soffits beams	m2	0.84	264	7.57	R 170.28	R 45,000.78	
		Formwork to soffts of slabs	m2	0.31	874	3.23	R 224.17	R 195,850.86	
		Formwork to pockets	m2	26.55	7	5.75	R 399.07	R 2,802.90	
		Formwork wall	m2	0.13	574	8.09	R 159.33	R 91,420.29	
		High tensile reinforcement	t	8.87	155.402	0.00	R 11,425.00	R 1,775,468.88	
		Cast in steel	kg	0.22	6,266	255.59	R 44.70	R 280,072.29	
		HD bolts	kg	0.41	3,362	201.38	R 56.73	R 190,737.68	
		Steel handrailing	m	2.58	60	9.71	R 1,176.62	R 70,871.91	
		Grout	m3	1,039.37	1.326	0.18	R 7,161.11	R 9,497.09	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	0	0.04	R 51.56	R -	R -
		Working space	m2	7.92	0	1.42	R 36.31	R -	
		Backfill	m3	4.13	0	0.63	R 32.48	R -	
		Blinding	m2	1.05	0	17.95	R 71.81	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,289.00	R -	
		Concrete column	m3	26.31	0	0.00	R 1,289.00	R -	
		Concrete beam	m3	1.43	0	0.00	R 1,289.00	R -	
		Concrete wall	m3	10.41	0	0.00	R 1,289.00	R -	
		Concrete elevated slabs	m3	10.92	0	0.00	R 1,289.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	138.41	R 9.31	R -	
		Formwork bases	m2	8.50	0	6.94	R 185.73	R -	
		Formwork to columns	m2	0.14	0	5.63	R 204.60	R -	
		Formwork to sides beams	m2	0.17	0	4.72	R 228.95	R -	
		Formwork to soffits beams	m2	0.50	0	6.30	R 273.09	R -	
		Formwork to soffts of slabs	m2	0.13	0	2.98	R 265.77	R -	
		Formwork to pockets	m2	418.49	0	4.85	R 432.55	R -	
		Formwork wall	m2	0.10	0	6.38	R 202.04	R -	
		High tensile reinforcement	t	4.05	0.000	0.00	R 11,425.00	R -	
		Cast in steel	kg	0.15	0	200.08	R 57.10	R -	
		HD bolts	kg	0.22	0	167.91	R 68.04	R -	
		Galvanised grating	m2	17.15	0	0.15	R 2,115.74	R -	
		Grout	m3	771.45	0.000	5.40	R 8,593.33	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	150	0.05	R 64.45	R 9,673.95	R 1,605,826.27
	Working space	m2	0.42	357	1.76	R 36.62	R 13,087.05	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	74	0.80	R 80.56	R 5,927.66	
	Blinding	m2	4.82	20	20.78	R 62.03	R 1,222.60	
	Concrete bases	m3	0.00	95	0.00	R 1,289.00	R 122,455.00	
	Concrete column	m3	6.67	14	0.00	R 1,289.00	R 18,359.07	
	Concrete beam	m3	1.99	7	0.00	R 1,289.00	R 9,225.66	
	Concrete wall	m3	35.85	3	0.00	R 1,289.00	R 3,415.76	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,289.00	R 742.08	
	Total concrete	m3	0.00	120	0.00		R -	
	Wood float	m2	4.82	20	162.71	R 7.92	R 156.14	
	Formwork bases	m2	1.44	66	8.18	R 157.58	R 10,395.87	
	Formwork to columns	m2	0.14	102	6.98	R 188.18	R 19,143.97	
	Formwork to sides beams	m2	0.23	31	6.34	R 184.67	R 5,746.64	
	Formwork to soffits beams	m2	0.75	10	6.85	R 203.31	R 1,940.20	
	Formwork to soffts of slabs	m2	0.22	3	3.87	R 208.91	R 546.69	
	Formwork to pockets	m2	3.09	31	6.17	R 333.07	R 10,240.17	
	Formwork wall	m2	0.29	9	7.54	R 170.95	R 1,562.13	
	High tensile reinforcement	t	7.31	16.365	0.00	R 11,425.00	R 186,966.35	
	Cast in steel	kg	0.02	5,981	212.67	R 53.72	R 321,325.07	
	HD bolts	kg	0.01	11,963	208.59	R 54.77	R 655,220.31	
	Galvanised grating	m2	3.97	30	0.19	R 6,784.21	R 204,424.73	
	Grout	m3	42.08	2.258	6.37	R 1,793.56	R 4,049.16	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	706	0.05	R 64.45	R 45,512.01	R 4,507,011.45
	Working space	m2	2.50	282	1.84	R 35.03	R 9,893.92	
	Backfill	m3	1.25	565	0.79	R 81.58	R 46,088.11	
	Blinding	m2	3.86	101	20.30	R 63.50	R 6,382.65	
	Concrete	m3	0.00	388	0.00	R 1,289.00	R 500,132.00	
	Mesh reinforcement	m2	0.51	761	65.77	R 173.71	R 132,156.92	
	Rough formwork	m2	3.09	126	8.61	R 149.71	R 18,798.49	
	Smooth formwork	m2	0.57	681	6.80	R 189.56	R 129,033.02	
	Finish to concrete	m2	0.23	1,687	105.40	R 12.23	R 20,630.81	
	Construction joints	m	4.97	78	21.29	R 60.54	R 4,726.64	
	Movement joints	m	15.36	25	17.11	R 75.34	R 1,903.02	
	Cast in steel	kg	2.35	165	232.74	R 49.09	R 8,104.93	
	Grout	m3	882.88	0.439	0.18	R 7,161.11	R 3,147.10	
	Brick walls	m2	0.50	776	0.00	R 289.25	R 224,458.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	1,734	0.00		R -	
	Waterproofing membrane	m2	2.22	781	12.03	R 107.15	R 83,709.27	
	Roof construction	m2	2.04	850	38.22	R 298.93	R 254,140.93	
	Ceiling	m2	0.98	1,770	0.00	R 214.50	R 379,612.47	
	Doors and windows	No	474.69	4	0.17	R 1,701.47	R 6,216.61	
	Floor finish	m2	1.03	1,684	0.79	R 366.14	R 616,521.61	
	Wall finsih	m2	1.04	1,668	1.47	R 196.77	R 328,142.09	
	Rod reinforcement	t	9.25	42	0.00	R 11,425.00	R 479,232.43	
	Metalwork	Item	0.00	1	4.44	R 50,727.00	R 50,727.00	
	Structural steel	Item	0.00	1	11.50	R 131,387.50	R 131,387.50	
	Plumbing and drainage	Item	0.00	1	7.32	R 83,631.00	R 83,631.00	
	Small power and lighting	Item	0.00	1	62.40	R 712,920.00	R 712,920.00	
	External works	Item	0.00	1	178.28	R 229,802.92	R 229,802.92	
BUILDINGS - STEEL	Concrete	m3	0.00	205	0.17	R 1,289.00	R 264,245.00	R 5,837,803.66
	Earthworks	m3	2.37	486	9.13	R 141.18	R 68,593.72	
	Reinforcement	t	8.82	23	0.00	R 11,425.00	R 265,547.05	
	Mesh	m2	0.12	1,708	10.27	R 125.51	R 214,414.96	
	Formwork	m2	0.40	513	8.06	R 159.93	R 81,961.85	
	Brickwork	m2	6.11	304	6.08	R 212.01	R 64,365.34	
	Roof covering	m2	0.87	2,132	208.48	R 184.39	R 393,157.20	
	Structural steel	t	18.83	99	0.00	R 38,442.00	R 3,787,037.17	
	Side cladding	m2	1.54	1,205	0.98	R 180.70	R 217,666.12	
	Doors	No	405.94	5	0.51	R 19,605.42	R 89,589.73	
	Ridge ventilator	m	21.95	85	11.48	R 2,116.82	R 178,892.80	
	Aluminium insulation	m2	0.89	2,084	1.81	R 101.87	R 212,332.71	
	Total building area	m2	0.00	1,855	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	515	0.13	R 167.57	R 86,265.04	R 1,545,549.57
	Concrete	m3	0.00	165	0.00	R 1,289.00	R 212,685.00	
	Reinforcement	t	11.42	14	0.18	R 11,425.00	R 165,072.24	
	Mesh	m2	0.12	1,375	10.21	R 126.25	R 173,592.07	
	Formwork	m2	0.45	367	8.51	R 151.47	R 55,538.58	
	Brickwork	m2	5.94	43	5.91	R 218.10	R 9,363.09	
	Screed	m2	1.12	228	43.13	R 29.89	R 6,804.49	
	Structural steel	t	14.72	17	0.00	R 38,442.00	R 665,944.97	
	Cat ladders	m	2.74	6	9.66	R 3,979.50	R 25,160.00	
	Hand rail	m	0.73	24	27.40	R 1,402.99	R 33,293.92	
	Kick plates	m	0.76	23	2.76	R 508.33	R 11,586.84	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	280	195.47	R 196.66	R 55,109.27	
		Side cladding	m2	4.76	54	0.93	R 182.90	R 9,798.10	
		Floor grating	m2	1.09	16	17.29	R 2,223.37	R 35,335.96	
		Total buiding area	m2	0.00	255	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	158	8.02	R 160.72	R 25,458.55	R 512,911.28
		Blinding	m2	0.47	102	18.72	R 68.86	R 7,032.19	
		Concrete	m3	0.00	48	0.00	R 1,289.00	R 61,872.00	
		Reinforcement	t	7.97	6	0.00	R 11,425.00	R 68,808.03	
		Mesh	m2	0.49	98	50.23	R 227.45	R 22,281.18	
		Formwork	m2	0.31	155	7.58	R 170.05	R 26,330.75	
		Finish to concrete	m2	0.44	109	103.65	R 12.44	R 1,356.66	
		Movement joints	m	2.46	20	15.35	R 83.97	R 1,638.52	
		Cast in steel	kg	0.09	533	179.47	R 63.66	R 33,951.82	
		Grout	m3	71.08	0.675	2.53	R 8,593.33	R 5,803.04	
		Brickwork	m2	0.24	38	0.15	R 289.25	R 10,846.88	
		Doors and windows	No	2.74	3	0.26	R 3,615.63	R 11,876.14	
		Pipework	m	2.59	69	0.21	R 509.49	R 35,014.88	
		Bolts	kg	0.11	436	0.08	R 63.66	R 27,778.76	
		Structural steel	t	3.99	2	0.00	R 43,942.31	R 99,117.99	
		Miscellaneous steel	t	131.32	1	0.00	R 54,404.76	R 73,743.89	
		Total bridge area	m2	0.00	178	0.00		R -	
		Total control room area	m2	0.00	9	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	0	6.07	R 212.36	R -	R -
		Blinding	m2	0.71	0	14.50	R 88.90	R -	
		Concrete	m3	0.00	0	0.00	R 1,289.00	R -	
		Reinforcement	t	5.75	0	0.00	R 11,425.00	R -	
		Formwork	m2	0.07	0	5.72	R 225.35	R -	
		Finish to concrete	m2	0.31	0	77.96	R 16.53	R -	
		Movement joints	m	0.42	0	12.46	R 103.45	R -	
		Cast in steel	kg	23.71	0.000	163.17	R 70.02	R -	
		Grout	m3	22.24	0.000	0.62	R 9,915.38	R -	
		Bolts	kg	109.85	0.000	0.13	R 43.41	R -	
		Structural steel	t	35.84	0.000	0.22	R 51,931.82	R -	
		Miscellaneous steel	t	20.04	0.000	0.18	R 63,472.22	R -	
		Brickwork	m2	0.49	0	4.24	R 304.01	R -	
		Roof covering	m2	1.46	0	1.22	R 249.19	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	465	6.10	R 211.31	R 98,158.41	R 3,515,182.42
	Blinding	m2	1.17	503	16.23	R 79.42	R 39,914.06	
	Concrete	m3	0.00	588	0.00	R 1,289.00	R 757,932.00	
	Reinforcement	t	5.89	99.830	0.00	R 11,425.00	R 1,140,560.27	
	Formwork	m2	0.21	2,800	6.04	R 213.41	R 597,549.67	
	Movement joint	m	1.61	365	0.12	R 100.08	R 36,550.09	
	Cast in steel	kg	0.13	4,523	12.88	R 58.24	R 263,438.79	
	Bolts	kg	0.37	1,589	196.16	R 70.34	R 111,787.26	
	Chemical anchors	No	6.13	96	0.22	R 317.54	R 30,458.74	
	Miscellaneous steelwork	t	88.98	6.608	162.42	R 51,931.82	R 343,177.22	
	Pre-cast concrete	m3	30.27	19	35.98	R 4,296.67	R 83,463.50	
	Brickwork	m2	7.79	41	0.30	R 294.97	R 12,192.42	
	Total area	m2	0.00	322	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.68	R 86.62	R -	R -
	Lining	m2	0.70	0	1.16	R 51.56	R -	
	Paving	m2	0.65	0	0.53	R 97.28	R -	
	Pipework	m	28.23	0	0.24	R 360.92	R -	
	Manholes	No	16.47	0	0.10	R 3,609.20	R -	
	Concrete	m3	2.43	0	0.04	R 1,289.00	R -	
	Formwork	m2	0.08	0	5.85	R 220.34	R -	
	Mesh	m2	0.70	0	6.64	R 194.13	R -	
	Reinforcement	t	4.69	0.000	0.12	R 11,425.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	374	5.56	R 231.83	R 86,817.40	R 1,055,447.90
	Blinding	m2	0.85	73	13.49	R 95.55	R 6,969.69	
	Concrete	m3	0.00	62	0.00	R 1,289.00	R 79,918.00	
	Reinforcement	t	4.52	13.717	0.00	R 11,425.00	R 156,714.60	
	Mesh	m2	0.90	69	38.60	R 295.98	R 20,390.04	
	Formwork	m2	0.15	413	5.36	R 240.49	R 99,400.50	
	Cast in steel	kg	0.02	3,100	140.16	R 81.51	R 252,693.35	
	Miscellaneous steelwork	t	11.14	4.937	0.16	R 71,406.25	R 352,544.32	
	Total tunnel length	m	0.00	55	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	365	0.00		R -	R 2,362,766.44
	Steel	t	9.58	38.100	0.00	R 38,442.00	R 1,464,648.23	
	Handrail	m	1.45	252	28.73	R 1,338.04	R 336,817.94	
	Grating	m2	1.91	191	16.97	R 2,265.29	R 432,896.06	
	Kick flats	m	1.71	213	76.94	R 499.64	R 106,647.47	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	54	95.97	R 400.56	R 21,756.75	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	3,452	0.00		R -	R 5,926,968.82
		Steel	t	27.86	123.905	0.00	R 38,442.00	R 4,763,165.25	
		Handrail	m	13.37	258	30.43	R 1,263.29	R 326,169.54	
		Grating	m2	12.47	277	18.55	R 2,072.35	R 573,675.62	
		Kick flats	m	13.35	259	84.90	R 452.79	R 117,081.37	
		Cat ladder	m	98.85	35	9.14	R 4,205.91	R 146,877.03	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	10,442	0.00		R -	R 12,521,079.13
		Steel	t	76.43	136.622	0.00	R 38,442.00	R 5,252,013.14	
		Handrail	m	31.26	334	30.84	R 1,246.50	R 416,376.61	
		Grating	m2	3.84	2,719	16.10	R 2,387.70	R 6,492,808.04	
		Kick flats	m	34.08	306	83.17	R 462.21	R 141,619.60	
		Stair treads	No	230.28	45	101.90	R 377.25	R 17,106.43	
		Cat ladder	m	238.13	44	8.38	R 4,587.35	R 201,155.32	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	458	0.00		R -	R 824,797.22
		Steel	t	25.51	17.954	0.00	R 38,442.00	R 690,177.81	
		Handrail	m	45.84	10	30.11	R 1,276.72	R 12,756.05	
		Grating	m2	60.74	8	17.06	R 2,253.34	R 16,990.95	
		Kick flats	m	46.49	10	79.97	R 480.71	R 4,735.71	
		Cat ladder	m	20.35	23	8.64	R 4,449.31	R 100,136.70	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	95	0.00		R -	R 480,051.15
		Steel	t	16.54	5.744	0.00	R 38,442.00	R 220,797.46	
		Handrail	m	1.10	86	31.41	R 1,223.88	R 105,698.53	
		Grating	m2	1.98	48	16.95	R 2,267.96	R 108,816.48	
		Kick flats	m	1.16	82	80.43	R 477.96	R 39,142.95	
		Stair treads	No	6.10	16	106.99	R 359.30	R 5,595.73	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 879,893.03
		Steel	t	12.73	19.246	0.00	R 38,442.00	R 739,849.96	
		Handrail	m	25.10	10	32.05	R 1,199.44	R 11,707.67	
		Grating	m2	7.46	33	17.66	R 2,176.78	R 71,489.54	
		Kick flats	m	22.84	11	84.46	R 455.15	R 4,882.30	
		Cat ladder	m	20.48	12	8.85	R 4,343.73	R 51,963.55	
	PIPING INSTALLATION	Pipe length	m	0.00	118,452	0.00		R -	R 107,324,690.91
		Total work units	WU	0.33	358,945	0.00	R 299.00	R 107,324,690.91	
		Pipe supports	kg	2.61	45,384	0.00		R -	
		WU for pipe supports	WU	0.16	57,431	0.00		R -	
		Number of welds	No	0.61	72,256	0.00		R -	
		Total fittings	No	0.38	45,012	0.00		R -	
		Stud bolts	No	0.34	15,304	0.00		R -	
		Support number	No	0.19	8,623	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	358,945	0.00	R 299.00		R 301,743.89

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	5,984	5.93	R 50.42	R 301,743.89	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	358,945	0.00	R 299.00		R 108,426.39
	Number of examinations	No	168.34	2,132	5.88	R 50.85	R 108,426.39	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	358,945	0.00	R 299.00		R 168,244.78
	Number of examinations	No	300.90	1,193	2.12	R 141.04	R 168,244.78	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	358,945	0.00	R 299.00		R 292,482.88
	Number of examinations	No	52.95	6,779	6.93	R 43.15	R 292,482.88	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	358,945	0.00	R 299.00		R 225,214.42
	Number of examinations	No	114.83	3,126	4.15	R 72.05	R 225,214.42	
MECHANICAL INSTALLATION	Total work units	WU	0.00	358,945	0.00	R 299.00		R 547,079.51
	Mechanical equipment	t	261.57	1,372	0.75	R 398.67	R 547,079.51	
	Structural steel	t	218.09	1,646	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	358,945	0.00	R 299.00		R 6,466,439.11
	Painting to piping	m2	17.88	20,075	0.34	R 115.00	R 2,308,653.65	
	Insulation to piping	m2	51.67	6,947	2.60	R 338.24	R 2,349,681.08	
	Mechanical equipment received	t	0.00	1,372	0.82	R 398.67	R 547,079.51	
	Painting to mechanical equipment	m2	0.25	5,489	3.69	R 108.04	R 593,040.12	
	Insulation to mechanical equipment	m2	0.70	1,960	1.17	R 340.74	R 667,984.75	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	68,442	0.00	R 48.00	R 3,285,216.00	R 8,853,303.90
	Electrical cable terminations	No	311.25	2,719	0.43	R 111.63	R 303,537.43	
	Electrical equipment	No	9.05	220	0.11	R 436.36	R 95,953.73	
	DB's	No	6.39	24	0.32	R 1,363.64	R 33,133.20	
	Rack	m	0.69	10,711	1.65	R 137.14	R 1,468,909.46	
	Support steel	kg	1.42	15,523	2.13	R 22.54	R 349,811.74	
	Instrumentation cable	m	27.43	49,775	0.35	R 28.50	R 1,418,587.50	
	Instruments	No	0.58	1,815	0.18	R 158.33	R 287,314.68	
	Hook-ups	No	3.98	3,129	0.16	R 178.13	R 557,291.40	
	Light fittings	No	10.26	875	0.02	R 266.67	R 233,380.81	
	Conduit	m	4.13	6,671	0.13	R 29.09	R 194,058.48	
	Instrument stands	No	0.00	439		R 1,425.00	R 626,109.47	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:			
Project name:	Project G		
Location:	South Africa		
Client:		Date of estimate:	2006

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	22,145	R	4.15
2	Concrete demolitions	m3	124	R	1,422.30
3	Bulk excavation	m3	11,542	R	40.00
4	Vertical piles	No	288		
5	Raking piles	No	12		
6	Concrete in piles	m3		R	1,289.00
7	Auger pile	m		R	322.45
8	Total paving and asphalt to road works	m2	6,552		
9	Grey paving to road works	m2	485	R	142.22
10	Asphalt to road surface	m2	6,067		
11	Rip bed of road works	m2	6,552	R	11.55
12	Total concrete in paving and bunding	m3	602	R	1,289.00
13	Concrete in paving	m3	401		
14	Rod reinforcement	t		R	11,425.00
15	Concrete in plinths and bases on area finishing	m3	415		
16	Stormwater pipe to drain surface run-off	m	345		
17	Machine excavation	m3		R	55.22
18	Concrete in pump and pipe support bases	m3	322	R	1,289.00
19	Concrete in tank bases	m3	345	R	1,289.00
20	Concrete in pipe and cable rack foundations	m3	422	R	1,289.00
21	Concrete to simple structural foundations	m3	503	R	1,289.00
22	Complex structural foundations - bases	m3	88	R	1,289.00
23	Concrete pipe racks - bases	m3	145	R	1,289.00
24	Concrete structure including concrete columns and beams - bases	m3	455	R	1,289.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,289.00
26	Major equipment bases and elevated concrete structure - bases	m3	95	R	1,289.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	388	R	1,289.00
28	One brick wall	m2		R	289.25
29	Concrete in structual steel buildings - all concrete	m3	205	R	1,289.00
30	Total building area - Structural steel buildings	m2	1,855		
31	Ceiling	m2		R	214.50
32	Structural steel	t		R	38,442.00
33	Steel canopy - concrete	m3	165	R	1,289.00
34	Steel canopy - area	m2	255		
35	Concrete in weighbridge - all concrete	m3	48	R	1,289.00
36	Total weighbridge area	m2	178		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	0	R	1,289.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	588	R	1,289.00
41	Total cooling tower area	m2	322		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	62	R	1,289.00
44	Total lengh of cable tunnel	m	55		
45	Total volume of basic steel platform	m3	365		
46	Total volume of steel pipe rack	m3	3,452		
47	Total volume of steel complex steel structure	m3	10,442		
48	Total volume of steel in stack	m3	458		
49	Total volume of steel in walkway	m3	95		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	299.00
52	Total process pipe length	m	118,452		
53	Total electrical cable - installation only	m	68,442	R	48.00
54	Total instrumentation cable - installation only	m	49,775	R	35.00

Ratio: Project Ratio Mean

Variables

Material	Simple	Mean
Labour	Complex	Mean
Engineering design	Simple	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Poor	Mean
Access	Normal	Mean
Project size	Large	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project G			
Location:	South Africa			
Client:	0	Date of estimate:	2006	

	CIVIL CONSTRUCTION COST				R 77,098,268.68
A	SITE CLEARANCE AND DEMOLITIONS		R	268,266.95	
B	BULK EARTHWORKS		R	976,021.24	
C	PILING		R	8,383,871.00	
D	ROAD WORKS		R	3,286,624.24	
E	GENERAL PAVING AND BUNDED AREAS		R	1,848,510.01	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,912,533.32	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,809,343.32	
H	TANK BASES AND BUNDING		R	4,928,701.13	
I	RACK FOUNDATIONS		R	2,973,023.89	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	4,526,779.07	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	509,314.56	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	1,669,377.72	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	5,437,729.65	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,605,826.27	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	4,507,011.45	
Q	BUILDINGS - STEEL		R	5,837,803.66	
R	CANOPIES - STEEL		R	1,545,549.57	
S	WEIGHBRIDGE		R	512,911.28	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	3,515,182.42	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	1,055,447.90	
	Preliminaries and General	35.00%	R	19,988,440.03	
	STRUCTURAL STEEL				R 32,193,778.11
A	STRUCTURAL STEEL - BASIC PLATFORM		R	2,362,766.44	
B	STRUCTURAL STEEL - PIPERACK		R	5,926,968.82	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	12,521,079.13	
D	STRUCTURAL STEEL - STACK		R	824,797.22	
E	STRUCTURAL STEEL - WALKWAY		R	480,051.15	
F	STRUCTURAL STEEL - CABLE GANTRY		R	879,893.03	
	Preliminaries and General	40.00%	R	9,198,222.32	
	MECHANICAL AND PIPING				R 152,555,035.89
A	PIPING INSTALLATION		R	107,324,690.91	
B	RADIOGRAPHIC EXAMINATION (RT)		R	301,743.89	
C	DYE PENETRATION TESTING (DP)		R	108,426.39	
D	MAGNETIC PARTICLE TESTING (MPI)		R	168,244.78	
E	POST WELD HEAT TREATMENT		R	292,482.88	
F	MATERIAL HARDNESS TEST (HT)		R	225,214.42	
H	MECHANICAL INSTALLATION		R	547,079.51	
	Preliminaries and General	40.00%	R	43,587,153.11	
	PAINTING AND INSULATION				R 8,729,692.81
A	PAINTING AND INSULATION		R	6,466,439.11	
	Preliminaries and General	35.00%	R	2,263,253.69	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 11,951,960.27
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	8,853,303.90	
	Preliminaries and General	35.00%	R	3,098,656.37	

TOTAL COST	R	282,528,735.75

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		22,145		R 4.15	R 91,901.75	R 268,266.95
	Concrete demolitions	m3		124		R 1,422.30	R 176,365.20	
BULK EARTHWORKS	Bulk excavation	m3		11,542		R 40.00	R 461,680.00	R 976,021.24
	Trimming of sides	m2	2.18	5,294	4.30	R 9.30	R 49,251.12	
	Back fill and compact	m3	1.15	10,037	0.98	R 40.82	R 409,653.95	
	Overhaul	m3/km	1.73	6,672	11.34	R 3.53	R 23,533.25	
	Rip bed	m2	1.78	6,484	8.13	R 4.92	R 31,902.93	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 247,874.70	R 247,874.70	R 8,383,871.00
	EO for raking equipment	Item	0.00	1	23.89	R 30,794.21	R 30,794.21	
	Number of piles	No	0.00	288	0.00		R -	
	Move rig to new position	No	1.50	192	0.18	R 232.02	R 44,547.84	
	Number of raking piles	No	18.41	16	0.00		R -	
	EO for setting up raking piles	No	0.93	17	0.28	R 360.92	R 6,071.09	
	EO for raking drilling	m	0.15	104	0.89	R 286.98	R 29,929.53	
	Auger quantity	m	0.05	5,760	0.00	R 322.45	R 1,857,312.00	
	EO for drilling in coarse gravel	m	0.53	543	0.22	R 283.58	R 154,096.30	
	EO for drilling in boulders	m	1.84	157	0.50	R 644.50	R 100,878.26	
	EO for drilling in soft rock	m	1.63	177	0.24	R 309.36	R 54,659.93	
	Temporary casings	m	0.36	800	0.36	R 464.04	R 371,232.00	
	EO casing to raking pile	m	0.18	87	0.51	R 1,198.77	R 104,184.25	
	Mild steel rod reinforcement	t	14.29	20.154	0.93	R 8,667.11	R 174,676.48	
	High tensile rod reinforcement	t	1.32	218.182	7.23	R 9,319.47	R 2,033,338.91	
	Concrete to piles and bases	m3	0.15	1,920	0.00	R 1,289.00	R 2,474,880.00	
	Concrete to raking piles	m3	0.07	223	1.06	R 1,366.34	R 305,351.07	
	Site establishment of test equipment	Item	0.00	1	110.73	R 142,730.97	R 142,730.97	
	Load test to pile	No	99.34	3	27.07	R 34,893.23	R 101,160.16	
	Site establishment of intergity testing	No	258.87	1	48.79	R 62,890.31	R 69,967.20	
	Integrity testing of piles	No	1.25	230	0.27	R 348.03	R 80,186.11	
ROAD WORKS	Red paving	m2	0.15	73	0.97	R 137.95	R 10,036.11	R 3,286,624.24
	Grey paving	m2	0.00	485	0.00	R 142.22	R 68,976.70	
	Kerbing	m	0.13	852	0.00	R 225.85	R 192,373.09	
	Total paving and asphalt	m2	0.00	6,552	0.00		R -	
	Remove top soil	m3	0.55	937	5.83	R 67.34	R 63,089.99	
	Asphalt	m2	0.26	1,704	0.00	R 159.85	R 272,314.79	
	Rip bed	m2	0.00	6,552	0.00	R 11.55	R 75,675.60	
	Reduce levels	m3	0.42	2,752	4.99	R 57.63	R 158,600.92	
	Selected fill	m3	1.65	1,668	0.53	R 108.74	R 181,361.83	
	Imported fill	m3	2.23	748	0.39	R 278.83	R 208,533.78	
	Wearing course	m3	3.86	713	0.29	R 198.74	R 141,683.87	
	Prime	m2	4.74	7,905	1.47	R 55.77	R 440,848.76	
	Three line road marking	m	0.83	6,561	0.20	R 45.17	R 296,382.62	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.02	869	4.19	R 11.29	R 9,811.03	
		1m Wide concrete V-drain	m	0.97	826	0.81	R 1,011.82	R 835,976.48	
		200mm Diameter PVC pipe	m	0.96	818	0.11	R 320.71	R 262,242.99	
		Road marking - STOP	No	0.15	128	0.05	R 343.30	R 43,861.06	
		Standard signage	No	0.01	9	4.48	R 438.16	R 3,732.04	
		100mm Painted line	m	1.83	1,559	1.42	R 13.55	R 21,122.56	
				0.00		1.52			
				0.00		1.94			
				0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	401	0.74	R 1,289.00	R 516,889.00	R 1,848,510.01
		Concrete in plinths	m3	0.00	80	0.00	R 1,289.00	R 102,965.94	
		Total concrete	m3	0.00	602	0.00		R -	
		Rip and compact	m2	0.13	3,085	187.19	R 6.89	R 21,240.82	
		Formwork to plinth	m2	7.26	580	0.12	R 154.68	R 89,703.92	
		Formwork to slab	m2	0.83	333	0.15	R 193.35	R 64,352.68	
		High tensile steel	t	0.01	6.020	0.00	R 11,425.00	R 68,778.50	
		Mesh	m2	585.35	3,524	51.00	R 224.02	R 789,401.86	
		Construction joint	m	4.00	1,604	0.05	R 64.45	R 103,377.80	
		Expansion joint	m	2.22	890	0.08	R 103.12	R 91,799.49	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	9,637	0.00		R -	R 1,912,533.32
		Base excavation	m3	1.50	922	0.00	R 55.22	R 50,925.11	
		Backfill	m3	0.59	615	0.64	R 86.28	R 53,046.99	
		Working space	m2	0.45	1,563	1.43	R 60.34	R 94,311.35	
		Concrete in bases	m3	0.04	415	25.24	R 1,289.00	R 534,935.00	
		Blinding	m2	0.83	560	20.88	R 61.73	R 34,570.88	
		Concrete in sump walls	m3	0.10	42	29.51	R 1,289.00	R 53,493.50	
		Concrete in slabs	m3	0.02	8	0.91	R 1,289.00	R 10,698.70	
		Total concrete	m3	0.00	465	0.04		R -	
		Wood float	m2	0.70	664	158.37	R 8.14	R 5,404.41	
		Formwork to bases	m2	1.69	701	0.12	R 154.68	R 108,484.82	
		Formwork to sump walls	m2	12.63	524	0.12	R 154.68	R 81,074.75	
		Formwork to sides of slab	m2	5.81	48	0.18	R 232.02	R 11,188.70	
		Mild steel reinforcement	t	0.12	5.222	0.00	R 11,425.00	R 59,666.74	
		High tensile reinforcement	t	10.68	43.521	1.19	R 11,425.00	R 497,222.85	
		Cast in steel	kg	0.46	902	34.10	R 37.80	R 34,102.70	
		Waterstop	m	0.43	97	8.10	R 159.14	R 15,358.46	
		Manhole	No	0.08	28	2.68	R 3,699.77	R 102,113.66	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	345	0.13	R 480.97	R 165,934.70	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	544	0.05	R 55.22	R 30,049.62	R 1,809,343.32
	Working space	m2	0.38	1,432	0.67	R 37.00	R 52,982.22	
	Backfill	m3	4.42	123	1.32	R 72.89	R 8,974.09	
	Concrete bases	m3	1.01	322	0.00	R 1,289.00	R 415,058.00	
	Concrete plinth	m3	2.29	141	0.00	R 1,289.00	R 181,248.03	
	Total concrete	m3	0.00	463	0.00		R -	
	Wood float	m2	0.47	299	0.05	R 12.89	R 3,856.34	
	Blinding	m2	1.01	319	0.01	R 64.45	R 20,547.43	
	Formwork bases	m2	0.49	657	0.13	R 167.57	R 110,117.43	
	Formwork plinth	m2	0.58	242	0.12	R 154.68	R 37,499.59	
	High tensile reinforcement	t	10.00	46.261	7.15	R 11,425.00	R 528,533.47	
	Cast in steel	kg	0.11	4,206	0.03	R 38.67	R 162,628.92	
	HD Bolts	kg	0.08	5,783	0.03	R 38.67	R 223,614.76	
	Grout	m3	34.52	4.073	6.52	R 8,404.28	R 34,233.41	
TANK BASES AND BUNDING	Restricted excavation	m3	5.84	2,015	0.05	R 64.45	R 129,853.86	R 4,928,701.13
	Working space	m2	4.36	462	1.63	R 39.54	R 18,271.78	
	Backfill	m3	1.38	1,460	0.72	R 89.51	R 130,690.28	
	Concrete bases	m3	0.75	345	0.00	R 1,289.00	R 444,705.00	
	Concrete sump wall	m3	2.86	121	0.00	R 1,289.00	R 155,491.26	
	Concrete slab	m3	0.57	605	0.00	R 1,289.00	R 780,184.21	
	Concrete plinth	m3	4.11	84	21.05	R 1,289.00	R 108,200.73	
	Concrete column	m3	19.22	18	164.76	R 1,289.00	R 23,137.62	
	Total concrete	m3	0.00	1,173	1.11		R -	
	Blinding	m2	2.67	439	1.05	R 61.24	R 26,897.24	
	Wood float	m2	0.25	4,691	1.12	R 7.82	R 36,701.11	
	Formwork to bases	m2	0.42	821	1.14	R 158.74	R 130,396.73	
	Formwork to plinths	m2	0.35	240	8.12	R 168.94	R 40,517.03	
	Formwork to columns	m2	0.12	150	7.63	R 181.55	R 27,156.83	
	Formwork to sumps	m2	0.11	1,097	7.10	R 176.09	R 193,108.87	
	Formwork to slabs	m2	4.07	149	7.32	R 157.00	R 23,348.53	
	Formwork to slabs n/e 300mm	m	2.17	279	8.21	R 54.71	R 15,260.27	
	Mild steel reinforcement	t	0.23	11.682	23.56	R 11,425.00	R 133,468.33	
	High tensile reinforcement	t	23.09	50.792	1.02	R 11,425.00	R 580,297.07	
	Mesh	m2	0.16	3,783	61.15	R 186.84	R 706,779.60	
	Cast in items	kg	0.19	6,173	214.69	R 53.22	R 328,479.97	
	HD Bolts	kg	0.10	11,728	207.02	R 55.19	R 647,235.02	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	204.15	5.745	0.17	R 7,582.35	R 43,558.48	
		Construction joint	m	0.30	2,018	24.89	R 51.79	R 104,484.29	
		Expansion joint	m	0.46	1,316	16.88	R 76.36	R 100,477.05	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	1,566	0.05	R 64.45	R 100,904.21	R 2,973,023.89
		Working space	m2	0.41	3,819	1.98	R 127.61	R 487,293.50	
		Backfill	m3	2.45	639	0.87	R 74.08	R 47,339.53	
		Blinding	m2	0.37	1,141	22.19	R 58.09	R 66,253.12	
		Concrete bases	m3	5.81	422	0.00	R 1,289.00	R 543,958.00	
		Concrete plinth	m3	0.00	73	0.00	R 1,289.00	R 93,624.44	
		Total concrete	m3	0.00	495	1.34		R -	
		Wood float	m2	0.35	1,206	173.00	R 7.45	R 8,983.62	
		Formwork bases	m2	0.47	898	9.63	R 133.85	R 120,182.50	
		Formwork plinths	m2	0.09	807	6.99	R 184.41	R 148,822.83	
		High tensile reinforcement	t	9.33	53.015	0.00	R 11,425.00	R 605,700.59	
		HD Bolts	kg	0.03	14,067	225.70	R 50.62	R 712,058.78	
		Grout	m3	79.73	5.293	0.18	R 7,161.11	R 37,902.78	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	2,158	0.06	R 77.34	R 166,889.67	R 4,526,779.07
		Working space	m2	0.50	4,316	1.90	R 40.71	R 175,673.33	
		Backfill	m3	2.66	811	0.80	R 96.68	R 78,425.59	
		Blinding	m2	0.33	1,524	21.39	R 60.26	R 91,853.60	
		Concrete bases	m3	0.00	503	0.00	R 1,289.00	R 648,367.00	
		Concrete plinth	m3	2.58	139	0.00	R 1,289.00	R 178,613.50	
		Concrete slab	m3	3.63	195	0.00	R 1,289.00	R 251,305.04	
		Total concrete	m3	0.00	837	0.00		R -	
		Wood float	m2	0.55	1,521	161.77	R 7.97	R 12,119.18	
		Formwork bases	m2	0.49	1,027	8.32	R 154.93	R 159,038.22	
		Formwork plinths	m2	0.11	1,260	8.34	R 154.56	R 194,695.33	
		High tensile reinforcement	t	13.32	62.802	0.00	R 11,425.00	R 717,518.08	
		HD Bolts	kg	0.02	25,150	217.74	R 52.47	R 1,319,641.54	
		Cast in items	kg	0.05	10,060	241.09	R 47.39	R 476,732.76	
		Grout	m3	68.22	7.373	0.17	R 7,582.35	R 55,906.24	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	183	0.05	R 64.45	R 11,796.93	R 509,314.56
		Working space	m2	0.56	327	1.66	R 38.83	R 12,690.33	
		Backfill	m3	2.15	85	0.79	R 81.58	R 6,945.50	
		Blinding	m2	0.65	135	20.36	R 63.31	R 8,571.26	
		Concrete bases	m3	0.00	88	0.00	R 1,289.00	R 113,432.00	
		Concrete column	m3	28.05	3	0.00	R 1,289.00	R 4,043.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	17	0.00	R 1,289.00	R 21,688.72	
	Total concrete	m3	0.00	108	0.00		R -	
	Wood float	m2	0.60	180	158.85	R 8.11	R 1,460.13	
	Formwork bases	m2	0.52	169	8.23	R 156.62	R 26,505.28	
	Formwork plinths	m2	0.33	51	7.44	R 173.25	R 8,833.79	
	Formwork to columns	m2	0.28	11	8.09	R 159.33	R 1,785.24	
	High tensile reinforcement	t	9.06	11.916	0.00	R 11,425.00	R 136,145.72	
	HD bolts	kg	0.04	2,699	209.18	R 54.62	R 147,418.52	
	Grout	m3	108.76	0.993	0.16	R 8,056.25	R 7,997.23	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	406	0.06	R 77.34	R 31,400.04	R 1,669,377.72
	Working space	m2	0.30	1,353	2.12	R 36.48	R 49,371.13	
	Backfill	m3	2.06	197	0.82	R 94.32	R 18,588.70	
	Blinding	m2	0.67	216	19.99	R 64.48	R 13,955.11	
	Concrete bases	m3	0.00	145	0.00	R 1,289.00	R 186,905.00	
	Concrete column	m3	1.19	131	151.33	R 1,289.00	R 168,655.02	
	Concrete beam	m3	2.68	49	0.95	R 1,289.00	R 62,930.98	
	Total concrete	m3	2.97	325	0.95		R -	
	Wood float	m2	0.47	309	7.50	R 8.52	R 2,627.83	
	Formwork bases	m2	0.48	302	6.55	R 171.87	R 51,918.06	
	Formwork to columns	m2	0.15	872	7.98	R 161.53	R 140,898.09	
	Formwork to sides beams	m2	0.33	148	6.11	R 196.79	R 29,114.49	
	Formwork to soffits beams	m2	0.69	71	6.55	R 210.97	R 14,927.06	
	Formwork corbels	m2	10.88	12	5.37	R 240.04	R 2,886.66	
	High tensile reinforcement	t	9.10	35.677	0.00	R 11,425.00	R 407,612.99	
	Cast in steel	kg	0.03	10,822	262.64	R 43.50	R 470,768.38	
	HD bolts	kg	1.48	219	215.28	R 53.07	R 11,641.90	
	Grout	m3	505.30	0.643	0.16	R 8,056.25	R 5,176.27	
	Restricted excavation	m3	3.84	1,747	0.05	R 64.45	R 112,607.04	R 5,437,729.65
	Working space	m2	0.61	2,864	1.79	R 36.01	R 103,129.44	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	1,519	0.79	R 81.58	R 123,948.31	
	Blinding	m2	0.61	746	20.06	R 64.26	R 47,929.57	
	Concrete bases	m3	0.00	455	0.97	R 1,289.00	R 586,495.00	
	Concrete column	m3	2.44	186	1.07	R 1,289.00	R 240,366.80	
	Concrete beam	m3	0.84	222	1.02	R 1,289.00	R 286,150.96	
	Concrete surface slab	m3	1.68	271	0.97	R 1,289.00	R 349,104.17	
	Concrete wall	m3	2.50	75	1.05	R 1,289.00	R 96,146.72	
	Concrete elevated slab	m3	1.10	170	0.00	R 1,289.00	R 218,515.28	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,378	0.00		R -	
		Wood float	m2	0.64	2,154	169.32	R 7.61	R 16,396.27	
		Formwork bases	m2	0.41	1,110	7.65	R 168.50	R 186,990.28	
		Formwork to columns	m2	0.17	1,097	6.34	R 203.31	R 223,016.15	
		Formwork to sides beams	m2	0.30	740	5.15	R 250.29	R 185,210.97	
		Formwork to soffits beams	m2	0.84	264	7.57	R 170.28	R 45,000.78	
		Formwork to soffts of slabs	m2	0.31	874	3.23	R 224.17	R 195,850.86	
		Formwork to pockets	m2	26.55	7	5.75	R 399.07	R 2,802.90	
		Formwork wall	m2	0.13	574	8.09	R 159.33	R 91,420.29	
		High tensile reinforcement	t	8.87	155.402	0.00	R 11,425.00	R 1,775,468.88	
		Cast in steel	kg	0.22	6,266	255.59	R 44.70	R 280,072.29	
		HD bolts	kg	0.41	3,362	201.38	R 56.73	R 190,737.68	
		Steel handrailing	m	2.58	60	9.71	R 1,176.62	R 70,871.91	
		Grout	m3	1,039.37	1.326	0.18	R 7,161.11	R 9,497.09	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	0	0.04	R 51.56	R -	R -
		Working space	m2	7.92	0	1.42	R 36.31	R -	
		Backfill	m3	4.13	0	0.63	R 32.48	R -	
		Blinding	m2	1.05	0	17.95	R 71.81	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,289.00	R -	
		Concrete column	m3	26.31	0	0.00	R 1,289.00	R -	
		Concrete beam	m3	1.43	0	0.00	R 1,289.00	R -	
		Concrete wall	m3	10.41	0	0.00	R 1,289.00	R -	
		Concrete elevated slabs	m3	10.92	0	0.00	R 1,289.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	138.41	R 9.31	R -	
		Formwork bases	m2	8.50	0	6.94	R 185.73	R -	
		Formwork to columns	m2	0.14	0	5.63	R 204.60	R -	
		Formwork to sides beams	m2	0.17	0	4.72	R 228.95	R -	
		Formwork to soffits beams	m2	0.50	0	6.30	R 273.09	R -	
		Formwork to soffts of slabs	m2	0.13	0	2.98	R 265.77	R -	
		Formwork to pockets	m2	418.49	0	4.85	R 432.55	R -	
		Formwork wall	m2	0.10	0	6.38	R 202.04	R -	
		High tensile reinforcement	t	4.05	0.000	0.00	R 11,425.00	R -	
		Cast in steel	kg	0.15	0	200.08	R 57.10	R -	
		HD bolts	kg	0.22	0	167.91	R 68.04	R -	
		Galvanised grating	m2	17.15	0	0.15	R 2,115.74	R -	
		Grout	m3	771.45	0.000	5.40	R 8,593.33	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.58	150	0.05	R 64.45	R 9,673.95	R 1,605,826.27
	Working space	m2	0.42	357	1.76	R 36.62	R 13,087.05	
	Backfill	m3	2.04	74	0.80	R 80.56	R 5,927.66	
	Blinding	m2	4.82	20	20.78	R 62.03	R 1,222.60	
	Concrete bases	m3	0.00	95	0.00	R 1,289.00	R 122,455.00	
	Concrete column	m3	6.67	14	0.00	R 1,289.00	R 18,359.07	
	Concrete beam	m3	1.99	7	0.00	R 1,289.00	R 9,225.66	
	Concrete wall	m3	35.85	3	0.00	R 1,289.00	R 3,415.76	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,289.00	R 742.08	
	Total concrete	m3	0.00	120	0.00		R -	
	Wood float	m2	4.82	20	162.71	R 7.92	R 156.14	
	Formwork bases	m2	1.44	66	8.18	R 157.58	R 10,395.87	
	Formwork to columns	m2	0.14	102	6.98	R 188.18	R 19,143.97	
	Formwork to sides beams	m2	0.23	31	6.34	R 184.67	R 5,746.64	
	Formwork to soffits beams	m2	0.75	10	6.85	R 203.31	R 1,940.20	
	Formwork to soffts of slabs	m2	0.22	3	3.87	R 208.91	R 546.69	
	Formwork to pockets	m2	3.09	31	6.17	R 333.07	R 10,240.17	
	Formwork wall	m2	0.29	9	7.54	R 170.95	R 1,562.13	
	High tensile reinforcement	t	7.31	16.365	0.00	R 11,425.00	R 186,966.35	
	Cast in steel	kg	0.02	5,981	212.67	R 53.72	R 321,325.07	
	HD bolts	kg	0.01	11,963	208.59	R 54.77	R 655,220.31	
	Galvanised grating	m2	3.97	30	0.19	R 6,784.21	R 204,424.73	
	Grout	m3	42.08	2.258	6.37	R 1,793.56	R 4,049.16	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	706	0.05	R 64.45	R 45,512.01	R 4,507,011.45
	Working space	m2	2.50	282	1.84	R 35.03	R 9,893.92	
	Backfill	m3	1.25	565	0.79	R 81.58	R 46,088.11	
	Blinding	m2	3.86	101	20.30	R 63.50	R 6,382.65	
	Concrete	m3	0.00	388	0.00	R 1,289.00	R 500,132.00	
	Mesh reinforcement	m2	0.51	761	65.77	R 173.71	R 132,156.92	
	Rough formwork	m2	3.09	126	8.61	R 149.71	R 18,798.49	
	Smooth formwork	m2	0.57	681	6.80	R 189.56	R 129,033.02	
	Finish to concrete	m2	0.23	1,687	105.40	R 12.23	R 20,630.81	
	Construction joints	m	4.97	78	21.29	R 60.54	R 4,726.64	
	Movement joints	m	15.36	25	17.11	R 75.34	R 1,903.02	
	Cast in steel	kg	2.35	165	232.74	R 49.09	R 8,104.93	
	Grout	m3	882.88	0.439	0.18	R 7,161.11	R 3,147.10	
	Brick walls	m2	0.50	776	0.00	R 289.25	R 224,458.00	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total building area	m2	4.47	1,734	0.00		R -	
		Waterproofing membrane	m2	2.22	781	12.03	R 107.15	R 83,709.27	
		Roof construction	m2	2.04	850	38.22	R 298.93	R 254,140.93	
		Ceiling	m2	0.98	1,770	0.00	R 214.50	R 379,612.47	
		Doors and windows	No	474.69	4	0.17	R 1,701.47	R 6,216.61	
		Floor finish	m2	1.03	1,684	0.79	R 366.14	R 616,521.61	
		Wall finsih	m2	1.04	1,668	1.47	R 196.77	R 328,142.09	
		Rod reinforcement	t	9.25	42	0.00	R 11,425.00	R 479,232.43	
		Metalwork	Item	0.00	1	4.44	R 50,727.00	R 50,727.00	
		Structural steel	Item	0.00	1	11.50	R 131,387.50	R 131,387.50	
		Plumbing and drainage	Item	0.00	1	7.32	R 83,631.00	R 83,631.00	
		Small power and lighting	Item	0.00	1	62.40	R 712,920.00	R 712,920.00	
		External works	Item	0.00	1	178.28	R 229,802.92	R 229,802.92	
	BUILDINGS - STEEL	Concrete	m3	0.00	205	0.17	R 1,289.00	R 264,245.00	R 5,837,803.66
		Earthworks	m3	2.37	486	9.13	R 141.18	R 68,593.72	
		Reinforcement	t	8.82	23	0.00	R 11,425.00	R 265,547.05	
		Mesh	m2	0.12	1,708	10.27	R 125.51	R 214,414.96	
		Formwork	m2	0.40	513	8.06	R 159.93	R 81,961.85	
		Brickwork	m2	6.11	304	6.08	R 212.01	R 64,365.34	
		Roof covering	m2	0.87	2,132	208.48	R 184.39	R 393,157.20	
		Structural steel	t	18.83	99	0.00	R 38,442.00	R 3,787,037.17	
		Side cladding	m2	1.54	1,205	0.98	R 180.70	R 217,666.12	
		Doors	No	405.94	5	0.51	R 19,605.42	R 89,589.73	
		Ridge ventilator	m	21.95	85	11.48	R 2,116.82	R 178,892.80	
		Aluminium insulation	m2	0.89	2,084	1.81	R 101.87	R 212,332.71	
		Total building area	m2	0.00	1,855	0.00		R -	
	CANOPIES - STEEL	Earthworks	m3	3.12	515	0.13	R 167.57	R 86,265.04	R 1,545,549.57
		Concrete	m3	0.00	165	0.00	R 1,289.00	R 212,685.00	
		Reinforcement	t	11.42	14	0.18	R 11,425.00	R 165,072.24	
		Mesh	m2	0.12	1,375	10.21	R 126.25	R 173,592.07	
		Formwork	m2	0.45	367	8.51	R 151.47	R 55,538.58	
		Brickwork	m2	5.94	43	5.91	R 218.10	R 9,363.09	
		Screed	m2	1.12	228	43.13	R 29.89	R 6,804.49	
		Structural steel	t	14.72	17	0.00	R 38,442.00	R 665,944.97	
		Cat ladders	m	2.74	6	9.66	R 3,979.50	R 25,160.00	
		Hand rail	m	0.73	24	27.40	R 1,402.99	R 33,293.92	
		Kick plates	m	0.76	23	2.76	R 508.33	R 11,586.84	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	280	195.47	R 196.66	R 55,109.27	
		Side cladding	m2	4.76	54	0.93	R 182.90	R 9,798.10	
		Floor grating	m2	1.09	16	17.29	R 2,223.37	R 35,335.96	
		Total buiding area	m2	0.00	255	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	158	8.02	R 160.72	R 25,458.55	R 512,911.28
		Blinding	m2	0.47	102	18.72	R 68.86	R 7,032.19	
		Concrete	m3	0.00	48	0.00	R 1,289.00	R 61,872.00	
		Reinforcement	t	7.97	6	0.00	R 11,425.00	R 68,808.03	
		Mesh	m2	0.49	98	50.23	R 227.45	R 22,281.18	
		Formwork	m2	0.31	155	7.58	R 170.05	R 26,330.75	
		Finish to concrete	m2	0.44	109	103.65	R 12.44	R 1,356.66	
		Movement joints	m	2.46	20	15.35	R 83.97	R 1,638.52	
		Cast in steel	kg	0.09	533	179.47	R 63.66	R 33,951.82	
		Grout	m3	71.08	0.675	2.53	R 8,593.33	R 5,803.04	
		Brickwork	m2	0.24	38	0.15	R 289.25	R 10,846.88	
		Doors and windows	No	2.74	3	0.26	R 3,615.63	R 11,876.14	
		Pipework	m	2.59	69	0.21	R 509.49	R 35,014.88	
		Bolts	kg	0.11	436	0.08	R 63.66	R 27,778.76	
		Structural steel	t	3.99	2	0.00	R 43,942.31	R 99,117.99	
		Miscellaneous steel	t	131.32	1	0.00	R 54,404.76	R 73,743.89	
		Total bridge area	m2	0.00	178	0.00		R -	
		Total control room area	m2	0.00	9	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	0	6.07	R 212.36	R -	R -
		Blinding	m2	0.71	0	14.50	R 88.90	R -	
		Concrete	m3	0.00	0	0.00	R 1,289.00	R -	
		Reinforcement	t	5.75	0	0.00	R 11,425.00	R -	
		Formwork	m2	0.07	0	5.72	R 225.35	R -	
		Finish to concrete	m2	0.31	0	77.96	R 16.53	R -	
		Movement joints	m	0.42	0	12.46	R 103.45	R -	
		Cast in steel	kg	23.71	0.000	163.17	R 70.02	R -	
		Grout	m3	22.24	0.000	0.62	R 9,915.38	R -	
		Bolts	kg	109.85	0.000	0.13	R 43.41	R -	
		Structural steel	t	35.84	0.000	0.22	R 51,931.82	R -	
		Miscellaneous steel	t	20.04	0.000	0.18	R 63,472.22	R -	
		Brickwork	m2	0.49	0	4.24	R 304.01	R -	
		Roof covering	m2	1.46	0	1.22	R 249.19	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	465	6.10	R 211.31	R 98,158.41	R 3,515,182.42
	Blinding	m2	1.17	503	16.23	R 79.42	R 39,914.06	
	Concrete	m3	0.00	588	0.00	R 1,289.00	R 757,932.00	
	Reinforcement	t	5.89	99.830	0.00	R 11,425.00	R 1,140,560.27	
	Formwork	m2	0.21	2,800	6.04	R 213.41	R 597,549.67	
	Movement joint	m	1.61	365	0.12	R 100.08	R 36,550.09	
	Cast in steel	kg	0.13	4,523	12.88	R 58.24	R 263,438.79	
	Bolts	kg	0.37	1,589	196.16	R 70.34	R 111,787.26	
	Chemical anchors	No	6.13	96	0.22	R 317.54	R 30,458.74	
	Miscellaneous steelwork	t	88.98	6.608	162.42	R 51,931.82	R 343,177.22	
	Pre-cast concrete	m3	30.27	19	35.98	R 4,296.67	R 83,463.50	
	Brickwork	m2	7.79	41	0.30	R 294.97	R 12,192.42	
	Total area	m2	0.00	322	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.68	R 86.62	R -	R -
	Lining	m2	0.70	0	1.16	R 51.56	R -	
	Paving	m2	0.65	0	0.53	R 97.28	R -	
	Pipework	m	28.23	0	0.24	R 360.92	R -	
	Manholes	No	16.47	0	0.10	R 3,609.20	R -	
	Concrete	m3	2.43	0	0.04	R 1,289.00	R -	
	Formwork	m2	0.08	0	5.85	R 220.34	R -	
	Mesh	m2	0.70	0	6.64	R 194.13	R -	
	Reinforcement	t	4.69	0.000	0.12	R 11,425.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	374	5.56	R 231.83	R 86,817.40	R 1,055,447.90
	Blinding	m2	0.85	73	13.49	R 95.55	R 6,969.69	
	Concrete	m3	0.00	62	0.00	R 1,289.00	R 79,918.00	
	Reinforcement	t	4.52	13.717	0.00	R 11,425.00	R 156,714.60	
	Mesh	m2	0.90	69	38.60	R 295.98	R 20,390.04	
	Formwork	m2	0.15	413	5.36	R 240.49	R 99,400.50	
	Cast in steel	kg	0.02	3,100	140.16	R 81.51	R 252,693.35	
	Miscellaneous steelwork	t	11.14	4.937	0.16	R 71,406.25	R 352,544.32	
	Total tunnel length	m	0.00	55	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	365	0.00		R -	R 2,362,766.44
	Steel	t	9.58	38.100	0.00	R 38,442.00	R 1,464,648.23	
	Handrail	m	1.45	252	28.73	R 1,338.04	R 336,817.94	
	Grating	m2	1.91	191	16.97	R 2,265.29	R 432,896.06	
	Kick flats	m	1.71	213	76.94	R 499.64	R 106,647.47	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	54	95.97	R 400.56	R 21,756.75	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	3,452	0.00		R -	R 5,926,968.82
		Steel	t	27.86	123.905	0.00	R 38,442.00	R 4,763,165.25	
		Handrail	m	13.37	258	30.43	R 1,263.29	R 326,169.54	
		Grating	m2	12.47	277	18.55	R 2,072.35	R 573,675.62	
		Kick flats	m	13.35	259	84.90	R 452.79	R 117,081.37	
		Cat ladder	m	98.85	35	9.14	R 4,205.91	R 146,877.03	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	10,442	0.00		R -	R 12,521,079.13
		Steel	t	76.43	136.622	0.00	R 38,442.00	R 5,252,013.14	
		Handrail	m	31.26	334	30.84	R 1,246.50	R 416,376.61	
		Grating	m2	3.84	2,719	16.10	R 2,387.70	R 6,492,808.04	
		Kick flats	m	34.08	306	83.17	R 462.21	R 141,619.60	
		Stair treads	No	230.28	45	101.90	R 377.25	R 17,106.43	
		Cat ladder	m	238.13	44	8.38	R 4,587.35	R 201,155.32	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	458	0.00		R -	R 824,797.22
		Steel	t	25.51	17.954	0.00	R 38,442.00	R 690,177.81	
		Handrail	m	45.84	10	30.11	R 1,276.72	R 12,756.05	
		Grating	m2	60.74	8	17.06	R 2,253.34	R 16,990.95	
		Kick flats	m	46.49	10	79.97	R 480.71	R 4,735.71	
		Cat ladder	m	20.35	23	8.64	R 4,449.31	R 100,136.70	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	95	0.00		R -	R 480,051.15
		Steel	t	16.54	5.744	0.00	R 38,442.00	R 220,797.46	
		Handrail	m	1.10	86	31.41	R 1,223.88	R 105,698.53	
		Grating	m2	1.98	48	16.95	R 2,267.96	R 108,816.48	
		Kick flats	m	1.16	82	80.43	R 477.96	R 39,142.95	
		Stair treads	No	6.10	16	106.99	R 359.30	R 5,595.73	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 879,893.03
		Steel	t	12.73	19.246	0.00	R 38,442.00	R 739,849.96	
		Handrail	m	25.10	10	32.05	R 1,199.44	R 11,707.67	
		Grating	m2	7.46	33	17.66	R 2,176.78	R 71,489.54	
		Kick flats	m	22.84	11	84.46	R 455.15	R 4,882.30	
		Cat ladder	m	20.48	12	8.85	R 4,343.73	R 51,963.55	
	PIPING INSTALLATION	Pipe length	m	0.00	118,452	0.00		R -	R 107,324,690.91
		Total work units	WU	0.33	358,945	0.00	R 299.00	R 107,324,690.91	
		Pipe supports	kg	2.61	45,384	0.00		R -	
		WU for pipe supports	WU	0.16	57,431	0.00		R -	
		Number of welds	No	0.61	72,256	0.00		R -	
		Total fittings	No	0.38	45,012	0.00		R -	
		Stud bolts	No	0.34	15,304	0.00		R -	
		Support number	No	0.19	8,623	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	358,945	0.00	R 299.00		R 301,743.89

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	5,984	5.93	R 50.42	R 301,743.89	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	358,945	0.00	R 299.00		R 108,426.39
	Number of examinations	No	168.34	2,132	5.88	R 50.85	R 108,426.39	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	358,945	0.00	R 299.00		R 168,244.78
	Number of examinations	No	300.90	1,193	2.12	R 141.04	R 168,244.78	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	358,945	0.00	R 299.00		R 292,482.88
	Number of examinations	No	52.95	6,779	6.93	R 43.15	R 292,482.88	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	358,945	0.00	R 299.00		R 225,214.42
	Number of examinations	No	114.83	3,126	4.15	R 72.05	R 225,214.42	
MECHANICAL INSTALLATION	Total work units	WU	0.00	358,945	0.00	R 299.00		R 547,079.51
	Mechanical equipment	t	261.57	1,372	0.75	R 398.67	R 547,079.51	
	Structural steel	t	218.09	1,646	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	358,945	0.00	R 299.00		R 6,466,439.11
	Painting to piping	m2	17.88	20,075	0.34	R 115.00	R 2,308,653.65	
	Insulation to piping	m2	51.67	6,947	2.60	R 338.24	R 2,349,681.08	
	Mechanical equipment received	t	0.00	1,372	0.82	R 398.67	R 547,079.51	
	Painting to mechanical equipment	m2	0.25	5,489	3.69	R 108.04	R 593,040.12	
	Insulation to mechanical equipment	m2	0.70	1,960	1.17	R 340.74	R 667,984.75	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	68,442	0.00	R 48.00	R 3,285,216.00	R 8,853,303.90
	Electrical cable terminations	No	311.25	2,719	0.43	R 111.63	R 303,537.43	
	Electrical equipment	No	9.05	220	0.11	R 436.36	R 95,953.73	
	DB's	No	6.39	24	0.32	R 1,363.64	R 33,133.20	
	Rack	m	0.69	10,711	1.65	R 137.14	R 1,468,909.46	
	Support steel	kg	1.42	15,523	2.13	R 22.54	R 349,811.74	
	Instrumentation cable	m	27.43	49,775	0.35	R 28.50	R 1,418,587.50	
	Instruments	No	0.58	1,815	0.18	R 158.33	R 287,314.68	
	Hook-ups	No	3.98	3,129	0.16	R 178.13	R 557,291.40	
	Light fittings	No	10.26	875	0.02	R 266.67	R 233,380.81	
	Conduit	m	4.13	6,671	0.13	R 29.09	R 194,058.48	
	Instrument stands	No	0.00	439		R 1,425.00	R 626,109.47	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project G				
Location:	South Africa				
Client:				Date of estimate:	2006

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	22,145	R	4.15
2	Concrete demolitions	m3	124	R	1,422.30
3	Bulk excavation	m3	11,542	R	40.00
4	Vertical piles	No	288		
5	Raking piles	No	12		
6	Concrete in piles	m3		R	1,289.00
7	Auger pile	m		R	322.45
8	Total paving and asphalt to road works	m2	6,552		
9	Grey paving to road works	m2	485	R	142.22
10	Asphalt to road surface	m2	6,067		
11	Rip bed of road works	m2	6,552	R	11.55
12	Total concrete in paving and bunding	m3	602	R	1,289.00
13	Concrete in paving	m3	401		
14	Rod reinforcement	t		R	11,425.00
15	Concrete in plinths and bases on area finishing	m3	415		
16	Stormwater pipe to drain surface run-off	m	345		
17	Machine excavation	m3		R	55.22
18	Concrete in pump and pipe support bases	m3	322	R	1,289.00
19	Concrete in tank bases	m3	345	R	1,289.00
20	Concrete in pipe and cable rack foundations	m3	422	R	1,289.00
21	Concrete to simple structural foundations	m3	503	R	1,289.00
22	Complex structural foundations - bases	m3	88	R	1,289.00
23	Concrete pipe racks - bases	m3	145	R	1,289.00
24	Concrete structure including concrete columns and beams - bases	m3	455	R	1,289.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,289.00
26	Major equipment bases and elevated concrete structure - bases	m3	95	R	1,289.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	388	R	1,289.00
28	One brick wall	m2		R	289.25
29	Concrete in structual steel buildings - all concrete	m3	205	R	1,289.00
30	Total building area - Structural steel buildings	m2	1,855		
31	Ceiling	m2		R	214.50
32	Structural steel	t		R	38,442.00
33	Steel canopy - concrete	m3	165	R	1,289.00
34	Steel canopy - area	m2	255		
35	Concrete in weighbridge - all concrete	m3	48	R	1,289.00
36	Total weighbridge area	m2	178		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	0	R	1,289.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	588	R	1,289.00
41	Total cooling tower area	m2	322		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	62	R	1,289.00
44	Total lengh of cable tunnel	m	55		
45	Total volume of basic steel platform	m3	365		
46	Total volume of steel pipe rack	m3	3,452		
47	Total volume of steel complex steel structure	m3	10,442		
48	Total volume of steel in stack	m3	458		
49	Total volume of steel in walkway	m3	95		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	299.00
52	Total process pipe length	m	118,452		
53	Total electrical cable - installation only	m	68,442	R	48.00
54	Total instrumentation cable - installation only	m	49,775	R	35.00

Ratio: Variable ratio

Variables

Material	Simple	Mean
Labour	Complex	Mean
Engineering design	Simple	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Poor	Mean
Access	Normal	Mean
Project size	Large	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

	Project name:	Project G			
	Location:	South Africa			
	Client:	0	Date of estimate:	2006	
	CIVIL CONSTRUCTION COST			R	76,590,369.69
A	SITE CLEARANCE AND DEMOLITIONS		R 268,266.95		
B	BULK EARTHWORKS		R 978,920.19		
C	PILING		R 8,329,266.90		
D	ROAD WORKS		R 3,422,012.56		
E	GENERAL PAVING AND BUNDED AREAS		R 1,854,866.06		
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R 1,911,213.73		
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R 1,808,819.63		
H	TANK BASES AND BUNDING		R 4,872,418.03		
I	RACK FOUNDATIONS		R 2,947,545.42		
J	SIMPLE STRUCTURAL FOUNDATIONS		R 4,259,037.01		
K	COMPLEX STRUCTURAL FOUNDATIONS		R 500,901.71		
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R 1,671,470.56		
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R 5,556,673.75		
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R -		
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R 1,509,152.21		
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R 4,467,492.98		
Q	BUILDINGS - STEEL		R 5,855,084.22		
R	CANOPIES - STEEL		R 1,553,069.20		
S	WEIGHBRIDGE		R 523,735.14		
T	PUMP HOUSE		R -		
U	COOLING TOWER		R 3,463,055.09		
V	EMERGENCY DAM		R -		
W	HEAVY DUTY CABLE TUNNEL		R 980,605.85		
	Preliminaries and General	35.00%	R 19,856,762.51		
	STRUCTURAL STEEL			R	31,792,325.10
A	STRUCTURAL STEEL - BASIC PLATFORM		R 2,368,934.07		
B	STRUCTURAL STEEL - PIPERACK		R 5,811,305.75		
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R 12,386,234.78		
D	STRUCTURAL STEEL - STACK		R 802,749.00		
E	STRUCTURAL STEEL - WALKWAY		R 472,132.41		
F	STRUCTURAL STEEL - CABLE GANTRY		R 867,447.63		
	Preliminaries and General	40.00%	R 9,083,521.46		
	MECHANICAL AND PIPING			R	149,120,579.40
A	PIPING INSTALLATION		R 104,828,767.86		
B	RADIOGRAPHIC EXAMINATION (RT)		R 294,739.27		
C	DYE PENETRATION TESTING (DP)		R 141,884.50		
D	MAGNETIC PARTICLE TESTING (MPI)		R 166,435.45		
E	POST WELD HEAT TREATMENT		R 296,424.99		
F	MATERIAL HARDNESS TEST (HT)		R 224,435.64		
H	MECHANICAL INSTALLATION		R 562,011.85		
	Preliminaries and General	40.00%	R 42,605,879.83		
	PAINTING AND INSULATION			R	8,883,656.55
A	PAINTING AND INSULATION		R 6,580,486.33		
	Preliminaries and General	35.00%	R 2,303,170.22		
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY			R	11,855,565.90
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R 8,781,900.67		
	Preliminaries and General	35.00%	R 3,073,665.23		
	TOTAL COST			R	278,242,496.63

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		22,145		R 4.15	R 91,901.75	R 268,266.95
	Concrete demolitions	m3		124		R 1,422.30	R 176,365.20	
BULK EARTHWORKS	Bulk excavation	m3		11,542		R 40.00	R 461,680.00	R 978,920.19
	Trimming of sides	m2	2.18	5,305	4.29	R 9.33	R 49,471.40	
	Back fill and compact	m3	1.15	10,018	0.97	R 41.06	R 411,290.23	
	Overhaul	m3/km	1.72	6,724	11.24	R 3.56	R 23,937.95	
	Rip bed	m2	1.77	6,521	8.02	R 4.99	R 32,540.60	
PILING	Site establishment of rig	Item	0.00	1	190.71	R 245,819.67	R 245,819.67	R 8,329,266.90
	EO for raking equipment	Item	0.00	1	23.91	R 30,815.39	R 30,815.39	
	Number of piles	No	0.00	288	0.00		R -	
	Move rig to new position	No	1.48	195	0.18	R 231.10	R 44,970.67	
	Number of raking piles	No	18.21	16	0.00		R -	
	EO for setting up raking piles	No	0.95	17	0.28	R 360.92	R 6,013.31	
	EO for raking drilling	m	0.15	104	0.90	R 289.74	R 30,120.56	
	Auger quantity	m	0.05	5,760	0.00	R 322.45	R 1,857,312.00	
	EO for drilling in coarse gravel	m	0.52	551	0.22	R 279.90	R 154,172.85	
	EO for drilling in boulders	m	1.83	157	0.50	R 648.18	R 101,810.41	
	EO for drilling in soft rock	m	1.61	178	0.23	R 300.15	R 53,549.39	
	Temporary casings	m	0.36	794	0.35	R 450.23	R 357,347.34	
	EO casing to raking pile	m	0.18	87	0.50	R 1,234.68	R 107,633.52	
	Mild steel rod reinforcement	t	14.08	20.448	0.96	R 8,878.22	R 181,544.61	
	High tensile rod reinforcement	t	1.33	216.193	7.19	R 9,268.83	R 2,003,856.59	
	Concrete to piles and bases	m3	0.15	1,902	0.00	R 1,289.00	R 2,451,532.08	
	Concrete to raking piles	m3	0.07	226	1.06	R 1,366.34	R 308,716.84	
	Site establishment of test equipment	Item	0.00	1	112.00	R 144,362.48	R 144,362.48	
	Load test to pile	No	101.01	3	26.68	R 34,391.44	R 98,061.13	
	Site establishment of intergity testing	No	260.38	1	48.81	R 62,912.41	R 69,586.65	
	Integrity testing of piles	No	1.23	234	0.27	R 350.79	R 82,041.41	
ROAD WORKS	Red paving	m2	0.15	72	0.96	R 136.33	R 9,870.64	R 3,422,012.56
	Grey paving	m2	0.00	485	0.00	R 142.22	R 68,976.70	
	Kerbing	m	0.13	861	0.00	R 235.81	R 203,064.33	
	Total paving and asphalt	m2	0.00	6,552	0.00		R -	
	Remove top soil	m3	0.55	945	5.94	R 68.58	R 64,807.40	
	Asphalt	m2	0.26	1,732	0.00	R 161.88	R 280,316.27	
	Rip bed	m2	0.00	6,552	0.00	R 11.55	R 75,675.60	
	Reduce levels	m3	0.43	2,813	5.03	R 58.07	R 163,337.25	
	Selected fill	m3	1.66	1,693	0.53	R 109.27	R 184,994.44	
	Imported fill	m3	2.18	775	0.38	R 284.36	R 220,463.66	
	Wearing course	m3	3.87	727	0.28	R 205.82	R 149,590.91	
	Prime	m2	4.73	7,999	1.48	R 55.65	R 445,172.95	
	Three line road marking	m	0.84	6,702	0.20	R 46.15	R 309,316.38	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	212.01	5.526	0.17	R 7,745.06	R 42,800.78	
	Construction joint	m	0.29	2,090	24.03	R 53.65	R 112,096.26	
	Expansion joint	m	0.46	1,308	16.84	R 76.56	R 100,167.95	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.64	1,537	0.05	R 63.53	R 97,643.51	R 2,947,545.42
	Working space	m2	0.40	3,829	1.92	R 121.93	R 466,847.19	
	Backfill	m3	2.45	627	0.89	R 71.38	R 44,728.17	
	Blinding	m2	0.37	1,130	22.90	R 56.28	R 63,577.30	
	Concrete bases	m3	5.97	422	0.00	R 1,289.00	R 543,958.00	
	Concrete plinth	m3	0.00	71	0.00	R 1,289.00	R 91,082.55	
	Total concrete	m3	0.00	493	1.39		R -	
	Wood float	m2	0.36	1,182	178.21	R 7.23	R 8,546.35	
	Formwork bases	m2	0.48	873	10.12	R 127.34	R 111,130.25	
	Formwork plinths	m2	0.09	791	6.82	R 189.02	R 149,594.05	
	High tensile reinforcement	t	9.59	51.376	0.00	R 11,425.00	R 586,973.49	
	HD Bolts	kg	0.03	15,149	231.34	R 49.39	R 748,130.45	
	Grout	m3	81.64	5.169	0.19	R 6,835.61	R 35,334.10	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.11	2,067	0.05	R 69.05	R 142,731.71	R 4,259,037.01
	Working space	m2	0.50	4,152	1.86	R 37.11	R 154,076.37	
	Backfill	m3	2.61	792	0.80	R 86.32	R 68,376.81	
	Blinding	m2	0.35	1,449	21.64	R 59.58	R 86,323.11	
	Concrete bases	m3	0.00	503	0.00	R 1,289.00	R 648,367.00	
	Concrete plinth	m3	2.68	129	0.00	R 1,289.00	R 165,641.20	
	Concrete slab	m3	3.91	188	0.00	R 1,289.00	R 241,799.09	
	Total concrete	m3	0.00	819	0.00		R -	
	Wood float	m2	0.57	1,437	165.33	R 7.80	R 11,203.90	
	Formwork bases	m2	0.50	1,012	8.37	R 154.08	R 155,896.61	
	Formwork plinths	m2	0.10	1,241	8.18	R 157.54	R 195,461.56	
	High tensile reinforcement	t	13.38	61.198	0.00	R 11,425.00	R 699,186.05	
	HD Bolts	kg	0.02	22,716	220.62	R 51.79	R 1,176,355.60	
	Cast in items	kg	0.05	9,647	241.15	R 47.38	R 457,023.20	
	Grout	m3	70.35	7.150	0.16	R 7,914.91	R 56,594.79	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.05	180	0.05	R 65.37	R 11,764.11	R 500,901.71
	Working space	m2	0.54	333	1.59	R 41.06	R 13,683.07	
	Backfill	m3	2.10	86	0.78	R 83.81	R 7,169.81	
	Blinding	m2	0.66	133	20.31	R 63.46	R 8,461.87	
	Concrete bases	m3	0.00	88	0.00	R 1,289.00	R 113,432.00	
	Concrete column	m3	28.20	3	0.00	R 1,289.00	R 4,022.82	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.17	17	0.00	R 1,289.00	R 21,961.67	
	Total concrete	m3	0.00	108	0.00		R -	
	Wood float	m2	0.60	182	158.74	R 8.12	R 1,474.34	
	Formwork bases	m2	0.53	168	8.21	R 157.02	R 26,319.09	
	Formwork plinths	m2	0.33	51	7.38	R 174.58	R 8,974.47	
	Formwork to columns	m2	0.28	11	8.09	R 159.43	R 1,786.13	
	High tensile reinforcement	t	9.04	11.961	0.00	R 11,425.00	R 136,650.66	
	HD bolts	kg	0.04	2,566	213.16	R 53.60	R 137,559.06	
	Grout	m3	108.68	0.995	0.17	R 7,679.15	R 7,642.61	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.88	417	0.06	R 72.74	R 30,367.20	R 1,671,470.56
	Working space	m2	0.31	1,353	2.09	R 34.73	R 46,990.83	
	Backfill	m3	2.08	200	0.81	R 89.33	R 17,892.49	
	Blinding	m2	0.66	221	19.60	R 65.78	R 14,546.58	
	Concrete bases	m3	0.00	145	0.00	R 1,289.00	R 186,905.00	
	Concrete column	m3	1.19	130	151.56	R 1,289.00	R 167,856.20	
	Concrete beam	m3	2.64	49	0.95	R 1,289.00	R 63,496.00	
	Total concrete	m3	2.94	324	0.95		R -	
	Wood float	m2	0.47	311	7.47	R 8.51	R 2,643.97	
	Formwork bases	m2	0.46	317	6.52	R 172.61	R 54,663.18	
	Formwork to columns	m2	0.15	844	7.89	R 163.28	R 137,815.74	
	Formwork to sides beams	m2	0.33	149	6.01	R 197.74	R 29,453.77	
	Formwork to soffits beams	m2	0.69	72	6.52	R 214.53	R 15,395.00	
	Formwork corbels	m2	10.78	12	5.33	R 241.97	R 2,922.00	
	High tensile reinforcement	t	9.10	35.649	0.00	R 11,425.00	R 407,289.36	
	Cast in steel	kg	0.03	10,816	259.18	R 44.08	R 476,794.41	
	HD bolts	kg	1.52	213	213.20	R 53.59	R 11,418.12	
	Grout	m3	513.79	0.632	0.16	R 7,949.78	R 5,020.69	
	Restricted excavation	m3	3.95	1,798	0.05	R 69.05	R 124,128.97	R 5,556,673.75
	Working space	m2	0.61	2,926	1.81	R 38.21	R 111,817.62	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.13	1,589	0.79	R 87.89	R 139,630.85	
	Blinding	m2	0.60	758	19.73	R 65.32	R 49,532.66	
	Concrete bases	m3	0.00	455	0.92	R 1,289.00	R 586,495.00	
	Concrete column	m3	2.34	194	1.05	R 1,289.00	R 250,180.68	
	Concrete beam	m3	0.84	230	1.03	R 1,289.00	R 296,573.21	
	Concrete surface slab	m3	1.65	276	0.94	R 1,289.00	R 355,144.03	
	Concrete wall	m3	2.54	76	1.01	R 1,289.00	R 98,358.03	
	Concrete elevated slab	m3	1.11	175	0.00	R 1,289.00	R 225,823.96	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,406	0.00		R -	
		Wood float	m2	0.63	2,242	163.87	R 7.87	R 17,637.29	
		Formwork bases	m2	0.42	1,095	7.79	R 165.47	R 181,105.61	
		Formwork to columns	m2	0.17	1,137	6.19	R 208.19	R 236,697.16	
		Formwork to sides beams	m2	0.30	767	5.01	R 257.29	R 197,320.83	
		Formwork to soffits beams	m2	0.81	283	7.92	R 162.74	R 46,103.63	
		Formwork to soffts of slabs	m2	0.30	918	3.25	R 222.68	R 204,508.74	
		Formwork to pockets	m2	26.93	7	5.79	R 396.27	R 2,856.19	
		Formwork wall	m2	0.13	571	8.15	R 158.17	R 90,360.10	
		High tensile reinforcement	t	9.02	155.823	0.00	R 11,425.00	R 1,780,272.23	
		Cast in steel	kg	0.22	6,351	254.99	R 44.81	R 284,535.44	
		HD bolts	kg	0.41	3,460	202.72	R 56.36	R 194,992.05	
		Steel handrailing	m	2.57	61	9.60	R 1,189.66	R 72,110.72	
		Grout	m3	1,020.83	1.377	0.17	R 7,614.35	R 10,488.75	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	0	0.04	R 54.32	R -	R -
		Working space	m2	8.43	0	1.48	R 36.69	R -	
		Backfill	m3	4.38	0	0.67	R 36.28	R -	
		Blinding	m2	1.07	0	18.93	R 68.10	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,289.00	R -	
		Concrete column	m3	26.84	0	0.00	R 1,289.00	R -	
		Concrete beam	m3	1.49	0	0.00	R 1,289.00	R -	
		Concrete wall	m3	10.68	0	0.00	R 1,289.00	R -	
		Concrete elevated slabs	m3	11.74	0	0.00	R 1,289.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	144.53	R 8.92	R -	
		Formwork bases	m2	8.74	0	7.12	R 180.93	R -	
		Formwork to columns	m2	0.14	0	6.02	R 195.73	R -	
		Formwork to sides beams	m2	0.18	0	4.80	R 214.04	R -	
		Formwork to soffits beams	m2	0.53	0	6.59	R 268.38	R -	
		Formwork to soffts of slabs	m2	0.13	0	3.14	R 256.63	R -	
		Formwork to pockets	m2	427.53	0	5.02	R 410.32	R -	
		Formwork wall	m2	0.11	0	6.44	R 200.22	R -	
		High tensile reinforcement	t	4.09	0.000	0.00	R 11,425.00	R -	
		Cast in steel	kg	0.15	0	203.93	R 56.02	R -	
		HD bolts	kg	0.22	0	170.33	R 67.07	R -	
		Galvanised grating	m2	17.96	0	0.16	R 2,050.90	R -	
		Grout	m3	799.53	0.000	5.57	R 8,202.73	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.61	153	0.05	R 64.45	R 9,848.88	R 1,509,152.21
	Working space	m2	0.42	364	1.77	R 36.50	R 13,303.21	
	Backfill	m3	2.02	76	0.81	R 79.29	R 5,996.08	
	Blinding	m2	4.74	20	20.83	R 61.87	R 1,239.52	
	Concrete bases	m3	0.00	95	0.00	R 1,289.00	R 122,455.00	
	Concrete column	m3	6.58	14	0.00	R 1,289.00	R 18,616.24	
	Concrete beam	m3	1.99	7	0.00	R 1,289.00	R 9,334.79	
	Concrete wall	m3	34.84	3	0.00	R 1,289.00	R 3,514.71	
	Concrete elevated slabs	m3	25.22	1	0.00	R 1,289.00	R 738.09	
	Total concrete	m3	0.00	120	0.00		R -	
	Wood float	m2	4.72	20	163.53	R 7.88	R 158.82	
	Formwork bases	m2	1.45	65	8.45	R 152.60	R 9,968.20	
	Formwork to columns	m2	0.14	102	7.03	R 190.96	R 19,402.75	
	Formwork to sides beams	m2	0.24	31	6.48	R 183.47	R 5,602.79	
	Formwork to soffits beams	m2	0.73	10	6.75	R 198.85	R 1,974.64	
	Formwork to soffts of slabs	m2	0.21	3	3.86	R 207.76	R 557.03	
	Formwork to pockets	m2	2.99	32	6.20	R 333.57	R 10,583.13	
	Formwork wall	m2	0.30	9	7.50	R 171.77	R 1,583.83	
	High tensile reinforcement	t	7.48	16.042	0.00	R 11,425.00	R 183,281.20	
	Cast in steel	kg	0.02	6,221	210.73	R 54.22	R 337,301.98	
	HD bolts	kg	0.01	9,881	207.90	R 54.95	R 542,994.22	
	Galvanised grating	m2	3.97	30	0.19	R 6,835.61	R 206,626.73	
	Grout	m3	42.36	2.243	6.30	R 1,814.93	R 4,070.38	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.78	692	0.05	R 65.37	R 45,238.22	R 4,467,492.98
	Working space	m2	2.50	277	1.85	R 35.40	R 9,811.37	
	Backfill	m3	1.24	558	0.77	R 84.98	R 47,451.11	
	Blinding	m2	3.97	98	20.39	R 63.23	R 6,183.05	
	Concrete	m3	0.00	388	0.00	R 1,289.00	R 500,132.00	
	Mesh reinforcement	m2	0.52	742	65.44	R 174.59	R 129,558.63	
	Rough formwork	m2	3.10	125	8.63	R 149.38	R 18,695.97	
	Smooth formwork	m2	0.58	665	6.80	R 189.52	R 126,005.78	
	Finish to concrete	m2	0.24	1,651	104.42	R 12.34	R 20,381.36	
	Construction joints	m	4.99	78	21.43	R 60.14	R 4,679.15	
	Movement joints	m	15.65	25	16.87	R 76.40	R 1,894.25	
	Cast in steel	kg	2.37	163	232.46	R 49.15	R 8,031.64	
	Grout	m3	904.94	0.429	0.18	R 7,276.61	R 3,119.91	
	Brick walls	m2	0.50	775	0.00	R 289.25	R 224,137.80	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.46	1,732	0.00		R -	
	Waterproofing membrane	m2	2.25	771	12.07	R 106.80	R 82,375.97	
	Roof construction	m2	2.09	831	39.96	R 285.92	R 237,532.97	
	Ceiling	m2	0.99	1,757	0.00	R 214.50	R 376,929.35	
	Doors and windows	No	489.28	4	0.16	R 1,760.65	R 6,232.99	
	Floor finish	m2	1.06	1,635	0.79	R 366.80	R 599,795.11	
	Wall finsih	m2	1.06	1,633	1.42	R 203.59	R 332,469.58	
	Rod reinforcement	t	9.16	42	0.00	R 11,425.00	R 483,865.59	
	Metalwork	Item	0.00	1	4.41	R 50,408.73	R 50,408.73	
	Structural steel	Item	0.00	1	11.42	R 130,497.98	R 130,497.98	
	Plumbing and drainage	Item	0.00	1	7.27	R 83,092.39	R 83,092.39	
	Small power and lighting	Item	0.00	1	61.97	R 707,950.13	R 707,950.13	
	External works	Item	0.00	1	179.23	R 231,021.95	R 231,021.95	
BUILDINGS - STEEL	Concrete	m3	0.00	205	0.17	R 1,289.00	R 264,245.00	R 5,855,084.22
	Earthworks	m3	2.34	481	9.05	R 142.41	R 68,438.45	
	Reinforcement	t	9.03	23	0.00	R 11,425.00	R 259,453.63	
	Mesh	m2	0.12	1,783	10.17	R 126.74	R 225,921.46	
	Formwork	m2	0.40	513	7.90	R 163.08	R 83,576.50	
	Brickwork	m2	6.06	306	6.03	R 213.64	R 65,411.20	
	Roof covering	m2	0.85	2,182	206.77	R 185.92	R 405,744.31	
	Structural steel	t	18.94	98	0.00	R 38,442.00	R 3,764,900.78	
	Side cladding	m2	1.50	1,234	0.98	R 182.47	R 225,222.80	
	Doors	No	402.59	5	0.51	R 19,605.42	R 90,336.02	
	Ridge ventilator	m	21.62	86	11.36	R 2,112.46	R 181,273.08	
	Aluminium insulation	m2	0.87	2,125	1.79	R 103.78	R 220,560.99	
	Total building area	m2	0.00	1,855	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.19	527	0.12	R 158.36	R 83,447.61	R 1,553,069.20
	Concrete	m3	0.00	165	0.00	R 1,289.00	R 212,685.00	
	Reinforcement	t	11.17	15	0.19	R 11,425.00	R 168,766.79	
	Mesh	m2	0.12	1,383	10.13	R 127.19	R 175,936.23	
	Formwork	m2	0.45	367	8.43	R 152.88	R 56,145.26	
	Brickwork	m2	5.88	43	6.18	R 208.60	R 9,046.44	
	Screed	m2	1.09	234	42.64	R 30.23	R 7,081.40	
	Structural steel	t	14.68	17	0.00	R 38,442.00	R 667,987.05	
	Cat ladders	m	2.68	6	9.54	R 4,027.75	R 26,114.99	
	Hand rail	m	0.74	24	27.65	R 1,390.27	R 32,772.53	
	Kick plates	m	0.76	23	2.75	R 505.55	R 11,591.55	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.89	287	194.42	R 197.73	R 56,835.28	
		Side cladding	m2	4.74	54	0.91	R 180.78	R 9,722.64	
		Floor grating	m2	1.09	16	17.55	R 2,190.07	R 34,936.42	
		Total buiding area	m2	0.00	255	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.34	160	7.71	R 167.25	R 26,784.44	R 523,735.14
		Blinding	m2	0.47	102	18.35	R 70.24	R 7,141.14	
		Concrete	m3	0.00	48	0.00	R 1,289.00	R 61,872.00	
		Reinforcement	t	7.71	6	0.00	R 11,425.00	R 71,141.59	
		Mesh	m2	0.49	99	50.25	R 227.35	R 22,401.35	
		Formwork	m2	0.31	155	7.31	R 176.30	R 27,297.96	
		Finish to concrete	m2	0.44	110	101.37	R 12.72	R 1,393.99	
		Movement joints	m	2.42	20	14.64	R 88.04	R 1,749.91	
		Cast in steel	kg	0.08	574	180.81	R 63.19	R 36,292.95	
		Grout	m3	69.58	0.690	2.44	R 8,393.49	R 5,790.40	
		Brickwork	m2	0.23	39	0.15	R 289.25	R 11,145.41	
		Doors and windows	No	2.75	3	0.26	R 3,292.28	R 10,780.32	
		Pipework	m	2.52	71	0.22	R 527.51	R 37,270.95	
		Bolts	kg	0.10	473	0.09	R 63.19	R 29,903.35	
		Structural steel	t	3.99	2	0.00	R 43,942.31	R 99,047.06	
		Miscellaneous steel	t	128.30	1	0.00	R 53,139.53	R 73,722.32	
		Total bridge area	m2	0.00	178	0.00		R -	
		Total control room area	m2	0.00	9	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.25	0	5.61	R 229.86	R -	R -
		Blinding	m2	0.67	0	13.38	R 96.36	R -	
		Concrete	m3	0.00	0	0.00	R 1,289.00	R -	
		Reinforcement	t	5.45	0	0.00	R 11,425.00	R -	
		Formwork	m2	0.06	0	5.12	R 251.65	R -	
		Finish to concrete	m2	0.29	0	74.37	R 17.33	R -	
		Movement joints	m	0.38	0	11.64	R 110.76	R -	
		Cast in steel	kg	22.49	0.000	152.95	R 74.70	R -	
		Grout	m3	19.78	0.000	0.59	R 11,003.66	R -	
		Bolts	kg	103.44	0.000	0.12	R 43.75	R -	
		Structural steel	t	33.11	0.000	0.21	R 54,590.44	R -	
		Miscellaneous steel	t	18.71	0.000	0.17	R 68,648.07	R -	
		Brickwork	m2	0.45	0	3.90	R 330.82	R -	
		Roof covering	m2	1.33	0	1.15	R 288.74	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.78	461	6.12	R 210.62	R 97,041.48	R 3,463,055.09
	Blinding	m2	1.19	496	16.06	R 80.27	R 39,827.74	
	Concrete	m3	0.00	588	0.00	R 1,289.00	R 757,932.00	
	Reinforcement	t	5.93	99.085	0.00	R 11,425.00	R 1,132,048.63	
	Formwork	m2	0.20	2,909	6.16	R 209.11	R 608,259.76	
	Movement joint	m	1.60	367	0.12	R 102.04	R 37,399.99	
	Cast in steel	kg	0.14	4,243	12.63	R 53.97	R 229,003.39	
	Bolts	kg	0.37	1,580	211.70	R 67.07	R 105,967.48	
	Chemical anchors	No	6.20	95	0.23	R 309.21	R 29,311.91	
	Miscellaneous steelwork	t	87.09	6.752	170.35	R 49,215.38	R 332,278.92	
	Pre-cast concrete	m3	30.22	19	36.95	R 4,236.15	R 82,428.00	
	Brickwork	m2	8.15	40	0.30	R 292.43	R 11,555.79	
	Total area	m2	0.00	322	4.41		R -	
EMERGENCY DAM	Earthworks	m3	0.54	0	1.53	R 87.38	R -	R -
	Lining	m2	0.67	0	1.05	R 57.08	R -	
	Paving	m2	0.60	0	0.49	R 116.16	R -	
	Pipework	m	26.82	0	0.22	R 389.59	R -	
	Manholes	No	15.43	0	0.09	R 4,195.60	R -	
	Concrete	m3	2.30	0	0.04	R 1,289.00	R -	
	Formwork	m2	0.08	0	5.31	R 242.55	R -	
	Mesh	m2	0.65	0	6.02	R 214.09	R -	
	Reinforcement	t	4.30	0.000	0.11	R 11,425.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	5.92	367	5.82	R 221.56	R 81,379.97	R 980,605.85
	Blinding	m2	0.88	70	13.70	R 94.06	R 6,621.80	
	Concrete	m3	0.00	62	0.00	R 1,289.00	R 79,918.00	
	Reinforcement	t	4.76	13.023	0.00	R 11,425.00	R 148,790.70	
	Mesh	m2	0.94	66	39.29	R 290.77	R 19,120.37	
	Formwork	m2	0.16	388	5.45	R 236.67	R 91,709.18	
	Cast in steel	kg	0.02	2,713	143.08	R 79.85	R 216,594.30	
	Miscellaneous steelwork	t	11.67	4.712	0.16	R 71,406.25	R 336,471.53	
	Total tunnel length	m	0.00	55	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	365	0.00		R -	R 2,368,934.07
	Steel	t	9.48	38.496	0.00	R 38,442.00	R 1,479,875.09	
	Handrail	m	1.47	248	29.02	R 1,324.74	R 328,931.51	
	Grating	m2	1.91	191	16.89	R 2,276.70	R 435,727.08	
	Kick flats	m	1.74	210	78.56	R 489.36	R 102,695.20	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.70	54	96.45	R 398.55	R 21,705.19	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	3,452	0.00		R -	R 5,811,305.75
		Steel	t	28.36	121.724	0.00	R 38,442.00	R 4,679,306.29	
		Handrail	m	13.61	254	31.53	R 1,219.41	R 309,190.97	
		Grating	m2	12.43	278	18.67	R 2,058.55	R 571,691.37	
		Kick flats	m	13.74	251	87.60	R 438.82	R 110,264.56	
		Cat ladder	m	100.31	34	9.39	R 4,093.00	R 140,852.56	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	10,442	0.00		R -	R 12,386,234.78
		Steel	t	78.27	133.419	0.00	R 38,442.00	R 5,128,874.52	
		Handrail	m	31.89	327	30.94	R 1,242.56	R 406,823.48	
		Grating	m2	3.86	2,705	16.03	R 2,398.45	R 6,488,239.85	
		Kick flats	m	34.27	305	82.78	R 464.38	R 141,498.45	
		Stair treads	No	229.64	45	100.92	R 380.92	R 17,320.84	
		Cat ladder	m	239.52	44	8.24	R 4,667.31	R 203,477.65	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	458	0.00		R -	R 802,749.00
		Steel	t	26.24	17.452	0.00	R 38,442.00	R 670,885.67	
		Handrail	m	45.97	10	30.29	R 1,269.16	R 12,644.49	
		Grating	m2	60.60	8	16.91	R 2,273.91	R 17,185.83	
		Kick flats	m	47.81	10	79.84	R 481.50	R 4,612.44	
		Cat ladder	m	20.80	22	8.69	R 4,424.80	R 97,420.58	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	95	0.00		R -	R 472,132.41
		Steel	t	16.36	5.807	0.00	R 38,442.00	R 223,236.52	
		Handrail	m	1.11	85	32.70	R 1,175.57	R 100,353.59	
		Grating	m2	1.99	48	17.40	R 2,209.13	R 105,234.30	
		Kick flats	m	1.17	81	82.45	R 466.25	R 37,927.72	
		Stair treads	No	6.19	15	109.66	R 350.57	R 5,380.28	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 867,447.63
		Steel	t	12.92	18.970	0.00	R 38,442.00	R 729,252.03	
		Handrail	m	24.98	10	32.90	R 1,168.30	R 11,457.17	
		Grating	m2	7.44	33	18.16	R 2,117.27	R 69,728.51	
		Kick flats	m	22.76	11	87.13	R 441.21	R 4,748.70	
		Cat ladder	m	20.17	12	8.93	R 4,303.09	R 52,261.22	
	PIPING INSTALLATION	Pipe length	m	0.00	118,452	0.00		R -	R 104,828,767.86
		Total work units	WU	0.34	350,598	0.00	R 299.00	R 104,828,767.86	
		Pipe supports	kg	2.69	44,011	0.00		R -	
		WU for pipe supports	WU	0.16	57,598	0.00		R -	
		Number of welds	No	0.61	72,171	0.00		R -	
		Total fittings	No	0.37	44,166	0.00		R -	
		Stud bolts	No	0.35	15,584	0.00		R -	
		Support number	No	0.19	8,268	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	350,598	0.00	R 299.00		R 294,739.27

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	60.12	5,832	5.92	R 50.54	R 294,739.27	
DYE PENETRATION	Total work units	WU	0.00	350,598	0.00	R 299.00		R 141,884.50
TESTING (DP)	Number of examinations	No	169.37	2,070	4.36	R 68.54	R 141,884.50	
MAGNETIC PARTICLE	Total work units	WU	0.00	350,598	0.00	R 299.00		R 166,435.45
TESTING (MPI)	Number of examinations	No	307.24	1,141	2.05	R 145.85	R 166,435.45	
POST WELD HEAT	Total work units	WU	0.00	350,598	0.00	R 299.00		R 296,424.99
TREATMENT	Number of examinations	No	52.33	6,700	6.76	R 44.24	R 296,424.99	
MATERIAL HARDNESS	Total work units	WU	0.00	350,598	0.00	R 299.00		R 224,435.64
TEST (HT)	Number of examinations	No	114.14	3,072	4.09	R 73.07	R 224,435.64	
MECHANICAL	Total work units	WU	0.00	350,598	0.00	R 299.00		R 562,011.85
INSTALLATION	Mechanical equipment	t	257.02	1,364	0.73	R 412.01	R 562,011.85	
	Structural steel	t	217.67	1,611	54.06			
	Total work units	WU	0.00	350,598	0.00	R 299.00		R 6,580,486.33
PAINTING & INSULATION	Painting to piping	m2	17.70	19,811	0.34	R 119.06	R 2,358,611.95	
	Insulation to piping	m2	51.95	6,749	2.51	R 353.88	R 2,388,225.09	
	Mechanical equipment received	t	0.00	1,364	0.80	R 412.01	R 562,011.85	
	Painting to mechanical equipment	m2	0.25	5,535	3.80	R 108.32	R 599,601.68	
	Insulation to mechanical equipment	m2	0.71	1,927	1.18	R 348.74	R 672,035.77	
ELECTRICAL &	Electrical cable	m	25.24	68,442	0.00	R 48.00	R 3,285,216.00	R 8,781,900.67
INSTRUMENTATION -	Electrical cable terminations	No	317.77	2,711	0.44	R 108.39	R 293,891.04	
INSTALLATION ONLY	Electrical equipment	No	9.08	215	0.12	R 409.76	R 88,254.37	
	DB's	No	6.37	24	0.32	R 1,300.81	R 30,841.46	
	Rack	m	0.71	10,746	1.71	R 134.40	R 1,444,212.93	
	Support steel	kg	1.46	15,211	2.11	R 22.76	R 346,154.14	
	Instrumentation cable	m	27.09	49,775	0.36	R 28.50	R 1,418,587.50	
	Instruments	No	0.57	1,837	0.18	R 157.09	R 288,629.98	
	Hook-ups	No	4.05	3,199	0.16	R 180.54	R 577,636.83	
	Light fittings	No	10.34	872	0.02	R 264.57	R 230,578.18	
	Conduit	m	4.13	6,622	0.12	R 28.02	R 185,580.48	
	Instrument stands	No	0.00	445		R 1,330.00	R 592,317.76	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project G				
Location:	South Africa				
Client:				Date of estimate:	2006

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	22,145	R	4.15
2	Concrete demolitions	m3	124	R	1,422.30
3	Bulk excavation	m3	11,542	R	40.00
4	Vertical piles	No	288		
5	Raking piles	No	12		
6	Concrete in piles	m3		R	1,289.00
7	Auger pile	m		R	322.45
8	Total paving and asphalt to road works	m2	6,552		
9	Grey paving to road works	m2	485	R	142.22
10	Asphalt to road surface	m2	6,067		
11	Rip bed of road works	m2	6,552	R	11.55
12	Total concrete in paving and bunding	m3	602	R	1,289.00
13	Concrete in paving	m3	401		
14	Rod reinforcement	t		R	11,425.00
15	Concrete in plinths and bases on area finishing	m3	415		
16	Stormwater pipe to drain surface run-off	m	345		
17	Machine excavation	m3		R	55.22
18	Concrete in pump and pipe support bases	m3	322	R	1,289.00
19	Concrete in tank bases	m3	345	R	1,289.00
20	Concrete in pipe and cable rack foundations	m3	422	R	1,289.00
21	Concrete to simple structural foundations	m3	503	R	1,289.00
22	Complex structural foundations - bases	m3	88	R	1,289.00
23	Concrete pipe racks - bases	m3	145	R	1,289.00
24	Concrete structure including concrete columns and beams - bases	m3	455	R	1,289.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,289.00
26	Major equipment bases and elevated concrete structure - bases	m3	95	R	1,289.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	388	R	1,289.00
28	One brick wall	m2		R	289.25
29	Concrete in structual steel buildings - all concrete	m3	205	R	1,289.00
30	Total building area - Structural steel buildings	m2	1,855		
31	Ceiling	m2		R	214.50
32	Structural steel	t		R	38,442.00
33	Steel canopy - concrete	m3	165	R	1,289.00
34	Steel canopy - area	m2	255		
35	Concrete in weighbridge - all concrete	m3	48	R	1,289.00
36	Total weighbridge area	m2	178		
37	Total control room area - weighbridge	m2	9		
38	Concrete in pump house - all concrete	m3	0	R	1,289.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	588	R	1,289.00
41	Total cooling tower area	m2	322		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	62	R	1,289.00
44	Total lengh of cable tunnel	m	55		
45	Total volume of basic steel platform	m3	365		
46	Total volume of steel pipe rack	m3	3,452		
47	Total volume of steel complex steel structure	m3	10,442		
48	Total volume of steel in stack	m3	458		
49	Total volume of steel in walkway	m3	95		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	299.00
52	Total process pipe length	m	118,452		
53	Total electrical cable - installation only	m	68,442	R	48.00
54	Total instrumentation cable - installation only	m	49,775	R	35.00

Ratio: Variable ratio

Variables

Material	Simple	Median
Labour	Complex	Median
Engineering design	Simple	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Normal	Median
Weather	Poor	Median
Access	Normal	Median
Project size	Large	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project G			
Location:	South Africa			
Client:	0	Date of estimate:	2006	

	CIVIL CONSTRUCTION COST				R 79,059,066.79
A	SITE CLEARANCE AND DEMOLITIONS		R	268,266.95	
B	BULK EARTHWORKS		R	995,473.07	
C	PILING		R	8,729,103.37	
D	ROAD WORKS		R	2,846,287.37	
E	GENERAL PAVING AND BUNDED AREAS		R	1,942,176.05	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	1,980,485.68	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	1,903,843.21	
H	TANK BASES AND BUNDING		R	5,263,947.93	
I	RACK FOUNDATIONS		R	2,990,129.14	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	4,572,419.11	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	532,680.02	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	1,701,119.61	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	6,195,378.76	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	1,726,217.10	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	4,690,624.45	
Q	BUILDINGS - STEEL		R	6,193,702.94	
R	CANOPIES - STEEL		R	1,588,075.99	
S	WEIGHBRIDGE		R	475,797.73	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	3,156,658.17	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	809,885.05	
	Preliminaries and General	35.00%	R	20,496,795.09	
	STRUCTURAL STEEL				R 34,477,476.97
A	STRUCTURAL STEEL - BASIC PLATFORM		R	2,589,128.95	
B	STRUCTURAL STEEL - PIPERACK		R	6,443,263.70	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	13,230,485.12	
D	STRUCTURAL STEEL - STACK		R	916,659.70	
E	STRUCTURAL STEEL - WALKWAY		R	542,435.73	
F	STRUCTURAL STEEL - CABLE GANTRY		R	904,796.07	
	Preliminaries and General	40.00%	R	9,850,707.71	
	MECHANICAL AND PIPING				R 162,888,191.26
A	PIPING INSTALLATION		R	113,986,223.45	
B	RADIOGRAPHIC EXAMINATION (RT)		R	383,358.18	
C	DYE PENETRATION TESTING (DP)		R	239,583.02	
D	MAGNETIC PARTICLE TESTING (MPI)		R	216,787.61	
E	POST WELD HEAT TREATMENT		R	388,696.43	
F	MATERIAL HARDNESS TEST (HT)		R	447,220.70	
H	MECHANICAL INSTALLATION		R	686,838.65	
	Preliminaries and General	40.00%	R	46,539,483.22	
	PAINTING AND INSULATION				R 11,788,564.38
A	PAINTING AND INSULATION		R	8,732,269.91	
	Preliminaries and General	35.00%	R	3,056,294.47	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 13,040,930.32
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	9,659,948.39	
	Preliminaries and General	35.00%	R	3,380,981.94	

TOTAL COST	R	301,254,229.72

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		22,145		R 4.15	R 91,901.75	R 268,266.95
	Concrete demolitions	m3		124		R 1,422.30	R 176,365.20	
BULK EARTHWORKS	Bulk excavation	m3		11,542		R 40.00	R 461,680.00	R 995,473.07
	Trimming of sides	m2	2.18	5,296	4.22	R 9.47	R 50,158.79	
	Back fill and compact	m3	1.13	10,208	0.96	R 41.70	R 425,637.82	
	Overhaul	m3/km	1.60	7,198	11.07	R 3.61	R 26,002.86	
	Rip bed	m2	1.72	6,727	8.41	R 4.76	R 31,993.61	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 247,990.71	R 247,990.71	R 8,729,103.37
	EO for raking equipment	Item	0.00	1	23.97	R 30,890.89	R 30,890.89	
	Number of piles	No	0.00	288	0.00		R -	
	Move rig to new position	No	1.47	196	0.19	R 244.91	R 48,029.04	
	Number of raking piles	No	18.91	15	0.00		R -	
	EO for setting up raking piles	No	0.94	16	0.26	R 337.90	R 5,503.19	
	EO for raking drilling	m	0.14	108	0.73	R 235.16	R 25,448.21	
	Auger quantity	m	0.05	6,300	0.00	R 322.45	R 2,031,435.00	
	EO for drilling in coarse gravel	m	0.54	534	0.22	R 283.58	R 151,442.99	
	EO for drilling in boulders	m	1.71	169	0.52	R 663.84	R 112,037.79	
	EO for drilling in soft rock	m	1.60	180	0.23	R 297.39	R 53,506.44	
	Temporary casings	m	0.36	794	0.32	R 406.04	R 322,270.30	
	EO casing to raking pile	m	0.17	88	0.55	R 906.90	R 80,224.58	
	Mild steel rod reinforcement	t	14.56	19.781	0.70	R 6,852.30	R 135,546.73	
	High tensile rod reinforcement	t	1.17	247.210	7.56	R 9,739.32	R 2,407,659.16	
	Concrete to piles and bases	m3	0.15	1,867	0.00	R 1,289.00	R 2,406,133.33	
	Concrete to raking piles	m3	0.07	207	1.07	R 1,380.15	R 285,662.13	
	Site establishment of test equipment	Item	0.00	1	112.59	R 145,122.99	R 145,122.99	
	Load test to pile	No	95.38	3	22.61	R 29,146.13	R 88,006.11	
	Site establishment of intergity testing	No	255.75	1	49.66	R 64,012.66	R 72,084.64	
	Integrity testing of piles	No	1.19	243	0.26	R 329.62	R 80,109.14	
ROAD WORKS	Red paving	m2	0.14	69	0.93	R 131.55	R 9,114.78	R 2,846,287.37
	Grey paving	m2	0.00	485	0.00	R 142.22	R 68,976.70	
	Kerbing	m	0.11	688	0.00	R 272.49	R 187,461.80	
	Total paving and asphalt	m2	0.00	6,552	0.00		R -	
	Remove top soil	m3	0.50	670	4.83	R 55.77	R 37,376.83	
	Asphalt	m2	0.20	1,338	0.00	R 160.70	R 215,090.73	
	Rip bed	m2	0.00	6,552	0.00	R 11.55	R 75,675.60	
	Reduce levels	m3	0.37	2,406	4.38	R 50.55	R 121,593.62	
	Selected fill	m3	1.49	1,617	0.46	R 110.23	R 178,214.31	
	Imported fill	m3	1.81	893	0.32	R 345.24	R 308,378.80	
	Wearing course	m3	3.93	612	0.20	R 258.27	R 158,086.84	
	Prime	m2	4.32	6,988	1.46	R 36.50	R 255,032.71	
	Three line road marking	m	0.80	5,570	0.11	R 28.81	R 160,459.81	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.01	691	4.15	R 9.15	R 6,324.83	
	1m Wide concrete V-drain	m	0.96	659	0.79	R 1,166.25	R 769,096.84	
	200mm Diameter PVC pipe	m	0.93	640	0.08	R 371.36	R 237,599.80	
	Road marking - STOP	No	0.16	110	0.03	R 409.71	R 44,896.62	
	Standard signage	No	0.01	7	4.28	R 505.08	R 3,474.74	
	100mm Painted line	m	1.68	1,154	1.36	R 8.17	R 9,432.01	
			0.00		1.50			
			0.00		1.85			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.03	401	0.74	R 1,289.00	R 516,889.00	R 1,942,176.05
		Concrete in plinths	m3	0.00	80	0.00	R 1,289.00	R 102,761.23	
		Total concrete	m3	0.00	602	0.00		R -	
		Rip and compact	m2	0.13	3,018	191.19	R 6.74	R 20,349.27	
		Formwork to plinth	m2	7.07	563	0.12	R 154.68	R 87,147.40	
		Formwork to slab	m2	0.81	325	0.15	R 191.51	R 62,313.61	
		High tensile steel	t	0.01	6.020	0.00	R 11,425.00	R 68,778.50	
		Mesh	m2	593.22	3,571	44.76	R 255.23	R 911,457.25	
		Construction joint	m	3.78	1,514	0.05	R 58.01	R 87,806.52	
		Expansion joint	m	2.16	868	0.08	R 97.60	R 84,673.27	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	11.98	9,570	0.00		R -	R 1,980,485.68
		Base excavation	m3	1.45	968	0.00	R 55.22	R 53,471.37	
		Backfill	m3	0.56	669	0.64	R 86.67	R 57,992.66	
		Working space	m2	0.43	1,729	1.36	R 63.59	R 109,962.88	
		Concrete in bases	m3	0.04	415	23.39	R 1,289.00	R 534,935.00	
		Blinding	m2	0.75	619	18.89	R 68.23	R 42,202.57	
		Concrete in sump walls	m3	0.11	44	29.94	R 1,289.00	R 56,168.18	
		Concrete in slabs	m3	0.02	7	0.87	R 1,289.00	R 9,170.31	
		Total concrete	m3	0.00	466	0.03		R -	
		Wood float	m2	0.62	749	127.56	R 10.11	R 7,563.96	
		Formwork to bases	m2	1.73	716	0.12	R 160.20	R 114,781.22	
		Formwork to sump walls	m2	11.49	501	0.12	R 148.24	R 74,245.50	
		Formwork to sides of slab	m2	5.76	41	0.18	R 225.58	R 9,243.68	
		Mild steel reinforcement	t	0.09	4.360	0.00	R 11,425.00	R 49,807.94	
		High tensile reinforcement	t	9.77	47.683	0.98	R 11,425.00	R 544,774.38	
		Cast in steel	kg	0.46	898	33.45	R 38.54	R 34,604.93	
		Waterstop	m	0.44	100	8.19	R 157.32	R 15,681.72	
		Manhole	No	0.08	26	2.74	R 3,923.38	R 103,451.25	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	345	0.12	R 470.81	R 162,428.12	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.60	515	0.05	R 55.22	R 28,462.04	R 1,903,843.21
		Working space	m2	0.33	1,565	0.68	R 37.39	R 58,529.32	
		Backfill	m3	4.13	125	1.24	R 68.32	R 8,533.19	
		Concrete bases	m3	0.97	322	0.00	R 1,289.00	R 415,058.00	
		Concrete plinth	m3	2.00	161	0.00	R 1,289.00	R 207,159.07	
		Total concrete	m3	0.00	483	0.00		R -	
		Wood float	m2	0.48	338	0.05	R 12.89	R 4,354.70	
		Blinding	m2	0.97	331	0.01	R 67.21	R 22,262.48	
		Formwork bases	m2	0.49	656	0.13	R 161.13	R 105,728.02	
		Formwork plinth	m2	0.54	296	0.12	R 157.44	R 46,672.20	
		High tensile reinforcement	t	10.03	48.117	6.56	R 11,425.00	R 549,732.62	
		Cast in steel	kg	0.10	4,726	0.03	R 36.83	R 174,046.73	
		HD Bolts	kg	0.07	6,498	0.03	R 37.75	R 245,297.12	
		Grout	m3	33.35	4.819	6.12	R 7,887.76	R 38,007.71	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.52	1,903	0.05	R 62.61	R 119,123.76	R 5,263,947.93
		Working space	m2	3.97	479	1.52	R 41.27	R 19,774.40	
		Backfill	m3	1.40	1,362	0.74	R 84.52	R 115,108.36	
		Concrete bases	m3	0.71	345	0.00	R 1,289.00	R 444,705.00	
		Concrete sump wall	m3	2.53	136	0.00	R 1,289.00	R 175,723.12	
		Concrete slab	m3	0.56	611	0.00	R 1,289.00	R 788,084.81	
		Concrete plinth	m3	3.68	94	19.62	R 1,289.00	R 120,726.59	
		Concrete column	m3	19.23	18	161.11	R 1,289.00	R 23,125.59	
		Total concrete	m3	0.00	1,204	0.95		R -	
		Blinding	m2	2.49	484	1.02	R 65.70	R 31,786.00	
		Wood float	m2	0.26	4,710	1.05	R 8.00	R 37,681.14	
		Formwork to bases	m2	0.39	891	1.02	R 174.34	R 155,362.60	
		Formwork to plinths	m2	0.36	262	7.39	R 178.99	R 46,939.91	
		Formwork to columns	m2	0.11	160	7.20	R 186.85	R 29,892.48	
		Formwork to sumps	m2	0.11	1,298	6.90	R 173.95	R 225,850.67	
		Formwork to slabs	m2	3.81	160	7.41	R 161.70	R 25,924.17	
		Formwork to slabs n/e 300mm	m	2.01	304	7.97	R 57.78	R 17,582.21	
		Mild steel reinforcement	t	0.22	11.795	22.31	R 11,425.00	R 134,756.51	
		High tensile reinforcement	t	22.90	52.589	0.96	R 11,425.00	R 600,825.19	
		Mesh	m2	0.15	4,115	56.07	R 203.77	R 838,546.19	
		Cast in items	kg	0.19	6,222	218.45	R 52.30	R 325,389.74	
		HD Bolts	kg	0.10	12,218	198.43	R 57.58	R 703,464.04	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	205.88	5.850	0.16	R 8,020.44	R 46,915.81	
	Construction joint	m	0.27	2,235	22.90	R 56.28	R 125,788.13	
	Expansion joint	m	0.44	1,387	16.13	R 79.92	R 110,871.50	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.30	1,393	0.05	R 59.85	R 83,342.14	R 2,990,129.14
	Working space	m2	0.33	4,193	1.63	R 97.42	R 408,466.08	
	Backfill	m3	2.35	592	0.83	R 71.80	R 42,493.87	
	Blinding	m2	0.40	1,044	24.56	R 52.48	R 54,775.39	
	Concrete bases	m3	5.74	422	0.00	R 1,289.00	R 543,958.00	
	Concrete plinth	m3	0.00	74	0.00	R 1,289.00	R 94,778.00	
	Total concrete	m3	0.00	496	1.36		R -	
	Wood float	m2	0.36	1,179	184.26	R 7.00	R 8,249.38	
	Formwork bases	m2	0.49	868	10.74	R 119.99	R 104,094.19	
	Formwork plinths	m2	0.09	830	6.74	R 191.12	R 158,663.82	
	High tensile reinforcement	t	9.30	53.258	0.00	R 11,425.00	R 608,473.47	
	HD Bolts	kg	0.03	15,547	210.33	R 54.32	R 844,523.77	
	Grout	m3	77.35	5.456	0.18	R 7,021.79	R 38,311.05	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.81	1,914	0.05	R 64.45	R 123,374.98	R 4,572,419.11
	Working space	m2	0.45	4,220	1.75	R 36.90	R 155,750.90	
	Backfill	m3	2.47	777	0.77	R 83.24	R 64,641.13	
	Blinding	m2	0.36	1,400	22.34	R 57.69	R 80,763.38	
	Concrete bases	m3	0.00	503	0.00	R 1,289.00	R 648,367.00	
	Concrete plinth	m3	2.52	144	0.00	R 1,289.00	R 185,854.59	
	Concrete slab	m3	3.49	200	0.00	R 1,289.00	R 257,434.43	
	Total concrete	m3	0.00	847	0.00		R -	
	Wood float	m2	0.54	1,562	153.53	R 8.40	R 13,115.68	
	Formwork bases	m2	0.48	1,042	8.03	R 160.45	R 167,145.07	
	Formwork plinths	m2	0.10	1,506	7.71	R 167.12	R 251,756.81	
	High tensile reinforcement	t	13.15	64.417	0.00	R 11,425.00	R 735,965.95	
	HD Bolts	kg	0.02	22,716	194.53	R 58.73	R 1,334,157.61	
	Cast in items	kg	0.05	9,918	227.73	R 50.17	R 497,587.60	
	Grout	m3	68.36	7.358	0.17	R 7,679.15	R 56,503.98	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	1.99	175	0.05	R 66.29	R 11,621.46	R 532,680.02
	Working space	m2	0.48	366	1.56	R 42.53	R 15,580.70	
	Backfill	m3	2.07	85	0.75	R 88.22	R 7,484.32	
	Blinding	m2	0.66	133	20.95	R 61.54	R 8,170.25	
	Concrete bases	m3	0.00	88	0.00	R 1,289.00	R 113,432.00	
	Concrete column	m3	27.67	3	0.00	R 1,289.00	R 4,099.78	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.65	19	0.00	R 1,289.00	R 24,412.73	
	Total concrete	m3	0.00	110	0.00		R -	
	Wood float	m2	0.60	184	152.56	R 8.45	R 1,558.16	
	Formwork bases	m2	0.50	176	7.78	R 165.73	R 29,126.32	
	Formwork plinths	m2	0.31	61	7.27	R 177.39	R 10,763.21	
	Formwork to columns	m2	0.27	12	7.72	R 166.91	R 1,955.81	
	High tensile reinforcement	t	8.84	12.457	0.00	R 11,425.00	R 142,321.20	
	HD bolts	kg	0.04	2,705	201.45	R 56.71	R 153,395.97	
	Grout	m3	99.52	1.107	0.16	R 7,914.91	R 8,758.12	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.65	384	0.05	R 68.13	R 26,158.88	R 1,701,119.61
	Working space	m2	0.28	1,351	2.02	R 33.74	R 45,568.67	
	Backfill	m3	2.00	192	0.79	R 85.93	R 16,473.06	
	Blinding	m2	0.65	223	19.55	R 65.95	R 14,712.01	
	Concrete bases	m3	0.00	145	0.00	R 1,289.00	R 186,905.00	
	Concrete column	m3	1.09	127	147.40	R 1,289.00	R 164,056.80	
	Concrete beam	m3	2.45	52	0.91	R 1,289.00	R 67,059.71	
	Total concrete	m3	2.79	324	0.91		R -	
	Wood float	m2	0.43	334	7.44	R 8.74	R 2,919.68	
	Formwork bases	m2	0.45	325	6.30	R 173.19	R 56,341.02	
	Formwork to columns	m2	0.15	873	7.46	R 172.74	R 150,878.91	
	Formwork to sides beams	m2	0.32	161	5.87	R 204.70	R 32,911.52	
	Formwork to soffits beams	m2	0.68	77	6.30	R 219.78	R 16,832.21	
	Formwork corbels	m2	10.45	12	4.94	R 260.82	R 3,176.38	
	High tensile reinforcement	t	8.85	36.653	0.00	R 11,425.00	R 418,758.68	
	Cast in steel	kg	0.03	10,319	245.42	R 46.55	R 480,363.34	
	HD bolts	kg	1.45	223	203.18	R 56.23	R 12,557.74	
	Grout	m3	484.06	0.670	0.16	R 8,128.83	R 5,445.99	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	1,686	0.05	R 65.37	R 110,242.81	R 6,195,378.76
	Working space	m2	0.58	2,933	1.71	R 38.21	R 112,074.02	
	Backfill	m3	1.14	1,486	0.77	R 85.29	R 126,730.96	
	Blinding	m2	0.61	744	19.17	R 67.24	R 50,039.46	
	Concrete bases	m3	0.00	455	0.86	R 1,289.00	R 586,495.00	
	Concrete column	m3	2.04	223	1.07	R 1,289.00	R 287,095.45	
	Concrete beam	m3	0.83	270	0.98	R 1,289.00	R 347,994.49	
	Concrete surface slab	m3	1.67	272	0.92	R 1,289.00	R 350,594.79	
	Concrete wall	m3	2.27	98	0.97	R 1,289.00	R 126,433.98	
	Concrete elevated slab	m3	1.03	217	0.00	R 1,289.00	R 279,120.58	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	1,534	0.00		R -	
		Wood float	m2	0.61	2,536	149.89	R 8.60	R 21,808.69	
		Formwork bases	m2	0.40	1,135	7.33	R 175.78	R 199,598.04	
		Formwork to columns	m2	0.16	1,411	5.95	R 216.56	R 305,554.53	
		Formwork to sides beams	m2	0.29	947	4.70	R 274.38	R 259,912.82	
		Formwork to soffits beams	m2	0.79	343	7.67	R 168.10	R 57,656.04	
		Formwork to soffts of slabs	m2	0.29	924	2.95	R 228.52	R 211,204.02	
		Formwork to pockets	m2	26.10	9	5.64	R 437.58	R 3,734.18	
		Formwork wall	m2	0.13	767	8.06	R 159.93	R 122,688.48	
		High tensile reinforcement	t	8.87	172.964	0.00	R 11,425.00	R 1,976,116.96	
		Cast in steel	kg	0.21	7,306	247.30	R 46.20	R 337,544.93	
		HD bolts	kg	0.38	4,045	205.47	R 55.60	R 224,930.72	
		Steel handrailing	m	2.52	69	9.16	R 1,246.78	R 85,502.38	
		Grout	m3	991.23	1.548	0.16	R 7,949.78	R 12,305.43	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.42	0	0.04	R 55.24	R -	R -
		Working space	m2	7.76	0	1.45	R 38.23	R -	
		Backfill	m3	4.66	0	0.71	R 39.42	R -	
		Blinding	m2	1.18	0	20.16	R 63.95	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,289.00	R -	
		Concrete column	m3	27.67	0	0.00	R 1,289.00	R -	
		Concrete beam	m3	1.38	0	0.00	R 1,289.00	R -	
		Concrete wall	m3	11.13	0	0.00	R 1,289.00	R -	
		Concrete elevated slabs	m3	11.79	0	0.00	R 1,289.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.86	0	163.84	R 7.87	R -	
		Formwork bases	m2	8.83	0	7.13	R 180.80	R -	
		Formwork to columns	m2	0.15	0	6.13	R 203.24	R -	
		Formwork to sides beams	m2	0.18	0	4.94	R 210.18	R -	
		Formwork to soffits beams	m2	0.57	0	6.34	R 260.86	R -	
		Formwork to soffts of slabs	m2	0.14	0	3.27	R 245.93	R -	
		Formwork to pockets	m2	449.39	0	5.24	R 394.02	R -	
		Formwork wall	m2	0.11	0	6.93	R 186.14	R -	
		High tensile reinforcement	t	4.11	0.000	0.00	R 11,425.00	R -	
		Cast in steel	kg	0.16	0	210.20	R 54.35	R -	
		HD bolts	kg	0.24	0	181.37	R 62.99	R -	
		Galvanised grating	m2	19.19	0	0.16	R 1,889.77	R -	
		Grout	m3	821.35	0.000	6.05	R 7,846.09	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.52	145	0.05	R 63.53	R 9,199.49	R 1,726,217.10
	Working space	m2	0.38	377	1.61	R 39.35	R 14,829.60	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.99	73	0.77	R 82.28	R 5,991.36	
	Blinding	m2	4.59	21	21.09	R 61.13	R 1,264.14	
	Concrete bases	m3	0.00	95	0.00	R 1,289.00	R 122,455.00	
	Concrete column	m3	6.01	16	0.00	R 1,289.00	R 20,387.32	
	Concrete beam	m3	1.77	9	0.00	R 1,289.00	R 11,504.33	
	Concrete wall	m3	33.08	3	0.00	R 1,289.00	R 3,701.70	
	Concrete elevated slabs	m3	24.29	1	0.00	R 1,289.00	R 839.48	
	Total concrete	m3	0.00	123	0.00		R -	
	Wood float	m2	4.60	21	158.11	R 8.15	R 168.34	
	Formwork bases	m2	1.41	68	7.74	R 166.45	R 11,237.17	
	Formwork to columns	m2	0.13	123	7.14	R 203.29	R 25,007.92	
	Formwork to sides beams	m2	0.23	38	6.22	R 180.51	R 6,940.08	
	Formwork to soffits beams	m2	0.68	13	6.34	R 207.14	R 2,701.68	
	Formwork to soffts of slabs	m2	0.21	3	3.75	R 224.56	R 689.40	
	Formwork to pockets	m2	2.86	33	5.74	R 343.86	R 11,424.92	
	Formwork wall	m2	0.29	10	7.21	R 178.71	R 1,761.01	
	High tensile reinforcement	t	7.26	16.977	0.00	R 11,425.00	R 193,961.08	
	Cast in steel	kg	0.02	6,637	185.95	R 61.44	R 407,804.91	
	HD bolts	kg	0.01	10,786	196.40	R 58.17	R 627,409.43	
	Galvanised grating	m2	3.73	33	0.18	R 7,335.77	R 242,562.87	
	Grout	m3	40.94	2.321	6.06	R 1,885.54	R 4,375.86	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.70	659	0.05	R 64.45	R 42,493.36	R 4,690,624.45
	Working space	m2	2.34	282	1.74	R 37.01	R 10,440.71	
	Backfill	m3	1.19	552	0.75	R 86.43	R 47,713.40	
	Blinding	m2	3.97	98	20.57	R 62.67	R 6,128.97	
	Concrete	m3	0.00	388	0.00	R 1,289.00	R 500,132.00	
	Mesh reinforcement	m2	0.45	869	63.06	R 181.18	R 157,464.26	
	Rough formwork	m2	2.85	136	8.09	R 159.40	R 21,668.58	
	Smooth formwork	m2	0.57	687	6.63	R 194.34	R 133,455.22	
	Finish to concrete	m2	0.23	1,714	104.72	R 12.31	R 21,093.30	
	Construction joints	m	4.77	81	20.04	R 64.32	R 5,230.26	
	Movement joints	m	15.00	26	15.85	R 81.33	R 2,103.89	
	Cast in steel	kg	2.35	165	223.90	R 51.03	R 8,424.98	
	Grout	m3	830.64	0.467	0.16	R 7,880.35	R 3,680.98	
	Brick walls	m2	0.47	828	0.00	R 289.25	R 239,513.11	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.46	1,729	0.00		R -	
	Waterproofing membrane	m2	2.03	853	11.41	R 112.96	R 96,401.50	
	Roof construction	m2	2.05	845	36.40	R 313.92	R 265,381.25	
	Ceiling	m2	0.98	1,769	0.00	R 214.50	R 379,505.69	
	Doors and windows	No	453.46	4	0.15	R 1,928.33	R 7,351.83	
	Floor finish	m2	1.03	1,687	0.77	R 377.40	R 636,541.72	
	Wall finsih	m2	1.06	1,634	1.36	R 212.02	R 346,489.50	
	Rod reinforcement	t	8.58	45	0.00	R 11,425.00	R 516,397.07	
	Metalwork	Item	0.00	1	4.54	R 51,812.38	R 51,812.38	
	Structural steel	Item	0.00	1	11.74	R 134,162.14	R 134,162.14	
	Plumbing and drainage	Item	0.00	1	7.48	R 85,434.52	R 85,434.52	
	Small power and lighting	Item	0.00	1	63.70	R 727,805.14	R 727,805.14	
	External works	Item	0.00	1	189.14	R 243,798.70	R 243,798.70	
BUILDINGS - STEEL	Concrete	m3	0.00	205	0.16	R 1,289.00	R 264,245.00	R 6,193,702.94
	Earthworks	m3	2.31	474	8.41	R 153.19	R 72,678.59	
	Reinforcement	t	8.39	24	0.00	R 11,425.00	R 279,275.62	
	Mesh	m2	0.11	1,876	9.15	R 140.81	R 264,130.72	
	Formwork	m2	0.38	544	7.36	R 175.20	R 95,233.93	
	Brickwork	m2	5.66	328	5.69	R 226.45	R 74,198.48	
	Roof covering	m2	0.82	2,254	194.06	R 198.09	R 446,560.01	
	Structural steel	t	18.17	102	0.00	R 38,442.00	R 3,924,904.62	
	Side cladding	m2	1.44	1,286	0.95	R 188.75	R 242,786.08	
	Doors	No	367.94	5	0.49	R 18,809.12	R 94,829.03	
	Ridge ventilator	m	20.62	90	10.73	R 2,125.35	R 191,219.23	
	Aluminium insulation	m2	0.86	2,146	1.75	R 113.52	R 243,641.63	
	Total building area	m2	0.00	1,855	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.90	479	0.11	R 147.31	R 70,541.97	R 1,588,075.99
	Concrete	m3	0.00	165	0.00	R 1,289.00	R 212,685.00	
	Reinforcement	t	10.50	16	0.17	R 11,425.00	R 179,572.36	
	Mesh	m2	0.11	1,520	9.93	R 129.86	R 197,360.18	
	Formwork	m2	0.43	388	7.75	R 166.32	R 64,463.95	
	Brickwork	m2	5.55	46	5.87	R 219.56	R 10,082.90	
	Screed	m2	1.06	241	40.04	R 32.19	R 7,770.82	
	Structural steel	t	14.73	17	0.00	R 38,442.00	R 665,492.87	
	Cat ladders	m	2.46	7	9.35	R 4,109.87	R 28,880.24	
	Hand rail	m	0.73	24	27.35	R 1,405.56	R 33,267.04	
	Kick plates	m	0.74	24	2.61	R 539.41	R 12,704.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.86	296	197.90	R 194.25	R 57,452.87	
	Side cladding	m2	4.59	56	0.89	R 171.91	R 9,548.91	
	Floor grating	m2	1.06	16	16.44	R 2,339.03	R 38,251.95	
	Total buiding area	m2	0.00	255	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.41	164	7.92	R 162.83	R 26,629.02	R 475,797.73
	Blinding	m2	0.51	94	20.53	R 62.79	R 5,877.18	
	Concrete	m3	0.00	48	0.00	R 1,289.00	R 61,872.00	
	Reinforcement	t	7.61	6	0.00	R 11,425.00	R 72,110.45	
	Mesh	m2	0.53	91	49.58	R 230.43	R 20,925.14	
	Formwork	m2	0.35	138	7.79	R 165.45	R 22,877.50	
	Finish to concrete	m2	0.46	105	108.50	R 11.88	R 1,241.65	
	Movement joints	m	2.58	19	15.18	R 84.90	R 1,582.65	
	Cast in steel	kg	0.09	546	205.15	R 55.69	R 30,426.39	
	Grout	m3	72.27	0.664	2.62	R 7,880.35	R 5,233.68	
	Brickwork	m2	0.25	36	0.16	R 289.25	R 10,533.38	
	Doors and windows	No	2.89	3	0.28	R 3,346.69	R 10,409.37	
	Pipework	m	2.83	63	0.23	R 491.72	R 30,927.76	
	Bolts	kg	0.11	448	0.09	R 55.69	R 24,949.64	
	Structural steel	t	4.35	2	0.00	R 41,012.82	R 84,951.76	
	Miscellaneous steel	t	135.93	1	0.00	R 49,828.66	R 65,250.17	
	Total bridge area	m2	0.00	178	0.00		R -	
	Total control room area	m2	0.00	9	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.32	0	5.71	R 225.58	R -	R -
	Blinding	m2	0.73	0	13.33	R 96.67	R -	
	Concrete	m3	0.00	0	0.00	R 1,289.00	R -	
	Reinforcement	t	5.69	0	0.00	R 11,425.00	R -	
	Formwork	m2	0.07	0	5.13	R 251.16	R -	
	Finish to concrete	m2	0.32	0	76.51	R 16.85	R -	
	Movement joints	m	0.40	0	12.81	R 100.64	R -	
	Cast in steel	kg	24.93	0.000	164.60	R 69.41	R -	
	Grout	m3	21.50	0.000	0.67	R 9,650.27	R -	
	Bolts	kg	116.25	0.000	0.13	R 46.31	R -	
	Structural steel	t	38.02	0.000	0.24	R 48,469.70	R -	
	Miscellaneous steel	t	22.33	0.000	0.17	R 68,063.83	R -	
	Brickwork	m2	0.52	0	4.33	R 297.49	R -	
	Roof covering	m2	1.53	0	1.20	R 248.21	R -	
	Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.84	493	7.15	R 180.28	R 88,816.61	R 3,156,658.17
	Blinding	m2	1.38	426	18.64	R 69.14	R 29,442.91	
	Concrete	m3	0.00	588	0.00	R 1,289.00	R 757,932.00	
	Reinforcement	t	6.18	95.190	0.00	R 11,425.00	R 1,087,541.63	
	Formwork	m2	0.22	2,690	6.98	R 184.71	R 496,901.52	
	Movement joint	m	1.82	322	0.13	R 91.52	R 29,510.23	
	Cast in steel	kg	0.15	3,883	14.08	R 49.68	R 192,918.89	
	Bolts	kg	0.41	1,442	229.96	R 61.36	R 88,459.09	
	Chemical anchors	No	7.21	82	0.25	R 268.41	R 21,905.18	
	Miscellaneous steelwork	t	89.96	6.536	186.20	R 45,183.62	R 295,319.16	
	Pre-cast concrete	m3	35.83	16	42.57	R 3,594.82	R 58,993.99	
	Brickwork	m2	9.29	35	0.36	R 257.32	R 8,916.97	
	Total area	m2	0.00	322	5.01		R -	
EMERGENCY DAM	Earthworks	m3	0.59	0	1.57	R 91.28	R -	R -
	Lining	m2	0.78	0	1.30	R 58.01	R -	
	Paving	m2	0.72	0	0.53	R 109.89	R -	
	Pipework	m	27.79	0	0.26	R 356.94	R -	
	Manholes	No	15.72	0	0.10	R 3,569.41	R -	
	Concrete	m3	2.56	0	0.05	R 1,289.00	R -	
	Formwork	m2	0.08	0	5.17	R 249.19	R -	
	Mesh	m2	0.69	0	6.41	R 201.09	R -	
	Reinforcement	t	5.13	0.000	0.12	R 11,425.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.45	400	6.12	R 210.74	R 84,257.82	R 809,885.05
	Blinding	m2	0.96	65	14.50	R 88.88	R 5,740.39	
	Concrete	m3	0.00	62	0.00	R 1,289.00	R 79,918.00	
	Reinforcement	t	4.83	12.846	0.00	R 11,425.00	R 146,764.84	
	Mesh	m2	1.10	56	41.46	R 275.54	R 15,500.15	
	Formwork	m2	0.17	371	5.88	R 219.22	R 81,316.65	
	Cast in steel	kg	0.03	2,117	163.20	R 70.01	R 148,211.34	
	Miscellaneous steelwork	t	13.79	3.988	0.18	R 62,237.35	R 248,175.88	
	Total tunnel length	m	0.00	55	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	365	0.00		R -	R 2,589,128.95
	Steel	t	8.74	41.752	0.00	R 38,442.00	R 1,605,021.82	
	Handrail	m	1.44	254	26.50	R 1,450.88	R 368,671.17	
	Grating	m2	1.84	199	16.00	R 2,402.95	R 477,412.84	
	Kick flats	m	1.68	218	75.02	R 512.40	R 111,657.09	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.99	61	88.87	R 432.59	R 26,366.04	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	3,452	0.00		R -	R 6,443,263.70
		Steel	t	25.41	135.852	0.00	R 38,442.00	R 5,222,423.61	
		Handrail	m	12.90	268	31.09	R 1,236.65	R 330,867.47	
		Grating	m2	12.10	285	17.47	R 2,200.28	R 627,530.45	
		Kick flats	m	12.98	266	84.00	R 457.67	R 121,748.73	
		Cat ladder	m	101.16	34	9.32	R 4,122.78	R 140,693.44	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	10,442	0.00		R -	R 13,230,485.12
		Steel	t	71.02	147.022	0.00	R 38,442.00	R 5,651,804.83	
		Handrail	m	31.31	334	28.13	R 1,366.44	R 455,735.20	
		Grating	m2	3.72	2,805	16.01	R 2,400.80	R 6,735,148.41	
		Kick flats	m	32.92	317	76.89	R 499.95	R 158,598.48	
		Stair treads	No	220.34	47	92.37	R 416.18	R 19,723.11	
		Cat ladder	m	238.55	44	8.03	R 4,785.59	R 209,475.10	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	458	0.00		R -	R 916,659.70
		Steel	t	22.76	20.127	0.00	R 38,442.00	R 773,714.94	
		Handrail	m	45.25	10	26.67	R 1,441.55	R 14,592.32	
		Grating	m2	57.58	8	16.51	R 2,328.21	R 18,518.67	
		Kick flats	m	45.45	10	76.64	R 501.56	R 5,054.50	
		Cat ladder	m	19.74	23	8.51	R 4,515.38	R 104,779.27	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	95	0.00		R -	R 542,435.73
		Steel	t	13.72	6.927	0.00	R 38,442.00	R 266,277.07	
		Handrail	m	1.11	86	29.52	R 1,302.30	R 111,601.64	
		Grating	m2	1.91	50	16.27	R 2,362.55	R 117,289.52	
		Kick flats	m	1.10	87	81.68	R 470.62	R 40,803.15	
		Stair treads	No	5.68	17	99.42	R 386.65	R 6,464.35	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 904,796.07
		Steel	t	12.58	19.480	0.00	R 38,442.00	R 748,841.78	
		Handrail	m	22.59	11	27.55	R 1,395.46	R 15,134.98	
		Grating	m2	7.19	34	17.04	R 2,256.46	R 76,896.71	
		Kick flats	m	22.25	11	82.69	R 464.89	R 5,119.37	
		Cat ladder	m	18.94	13	8.46	R 4,545.51	R 58,803.23	
	PIPING INSTALLATION	Pipe length	m	0.00	118,452	0.00		R -	R 113,986,223.45
		Total work units	WU	0.31	381,225	0.00	R 299.00	R 113,986,223.45	
		Pipe supports	kg	2.50	47,300	0.00		R -	
		WU for pipe supports	WU	0.16	61,268	0.00		R -	
		Number of welds	No	0.57	67,941	0.00		R -	
		Total fittings	No	0.37	43,573	0.00		R -	
		Stud bolts	No	0.36	15,811	0.00		R -	
		Support number	No	0.19	8,818	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	381,225	0.00	R 299.00		R 383,358.18

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	54.82	6,955	5.42	R 55.12	R 383,358.18	
DYE PENETRATION	Total work units	WU	0.00	381,225	0.00	R 299.00		R 239,583.02
TESTING (DP)	Number of examinations	No	162.62	2,344	2.93	R 102.20	R 239,583.02	
MAGNETIC PARTICLE	Total work units	WU	0.00	381,225	0.00	R 299.00		R 216,787.61
TESTING (MPI)	Number of examinations	No	282.25	1,351	1.86	R 160.51	R 216,787.61	
POST WELD HEAT	Total work units	WU	0.00	381,225	0.00	R 299.00		R 388,696.43
TREATMENT	Number of examinations	No	46.35	8,224	6.33	R 47.26	R 388,696.43	
MATERIAL HARDNESS	Total work units	WU	0.00	381,225	0.00	R 299.00		R 447,220.70
TEST (HT)	Number of examinations	No	107.61	3,543	2.37	R 126.24	R 447,220.70	
MECHANICAL	Total work units	WU	0.00	381,225	0.00	R 299.00		R 686,838.65
INSTALLATION	Mechanical equipment	t	235.16	1,621	0.71	R 423.68	R 686,838.65	
	Structural steel	t	198.81	1,918	54.77			
	Total work units	WU	0.00	381,225	0.00	R 299.00		R 8,732,269.91
PAINTING & INSULATION	Painting to piping	m2	16.80	22,693	0.31	R 127.78	R 2,899,650.74	
	Insulation to piping	m2	46.29	8,235	2.34	R 411.24	R 3,386,631.95	
	Mechanical equipment received	t	0.00	1,621	0.80	R 423.68	R 686,838.65	
	Painting to mechanical equipment	m2	0.23	7,182	3.44	R 123.16	R 884,580.25	
	Insulation to mechanical equipment	m2	0.68	2,392	1.16	R 365.70	R 874,568.31	
ELECTRICAL &	Electrical cable	m	22.65	68,442	0.00	R 48.00	R 3,285,216.00	R 9,659,948.39
INSTRUMENTATION -	Electrical cable terminations	No	284.20	3,021	0.41	R 116.06	R 350,641.27	
INSTALLATION ONLY	Electrical equipment	No	8.26	241	0.11	R 457.14	R 110,089.30	
	DB's	No	6.00	29	0.28	R 1,624.37	R 47,370.67	
	Rack	m	0.62	11,407	1.68	R 141.47	R 1,613,790.32	
	Support steel	kg	1.33	18,441	2.05	R 23.37	R 431,035.47	
	Instrumentation cable	m	23.68	49,775	0.34	R 28.50	R 1,418,587.50	
	Instruments	No	0.46	2,102	0.17	R 171.24	R 360,018.78	
	Hook-ups	No	3.77	4,570	0.15	R 184.72	R 844,246.93	
	Light fittings	No	10.16	908	0.02	R 288.41	R 261,847.16	
	Conduit	m	4.02	6,739	0.11	R 28.51	R 192,128.31	
	Instrument stands	No	0.00	523		R 1,425.00	R 744,976.69	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project H				
Location:	South Africa				
Client:				Date of estimate:	2005

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,442	R	3.77
2	Concrete demolitions	m3	23	R	1,313.25
3	Bulk excavation	m3	5,842	R	40.05
4	Vertical piles	No	65		
5	Raking piles	No	10		
6	Concrete in piles	m3		R	1,242.00
7	Auger pile	m		R	292.00
8	Total paving and asphalt to road works	m2	3,002		
9	Grey paving to road works	m2	115	R	124.00
10	Asphalt to road surface	m2	2,887		
11	Rip bed of road works	m2	3,002	R	10.20
12	Total concrete in paving and bunding	m3	274	R	1,242.00
13	Concrete in paving	m3	108		
14	Rod reinforcement	t		R	9,845.00
15	Concrete in plinths and bases on area finishing	m3	168		
16	Stormwater pipe to drain surface run-off	m	165		
17	Machine excavation	m3		R	49.20
18	Concrete in pump and pipe support bases	m3	89	R	1,242.00
19	Concrete in tank bases	m3	174	R	1,242.00
20	Concrete in pipe and cable rack foundations	m3	202	R	1,242.00
21	Concrete to simple structural foundations	m3	304	R	1,242.00
22	Complex structural foundations - bases	m3	0	R	1,242.00
23	Concrete pipe racks - bases	m3	66	R	1,242.00
24	Concrete structure including concrete columns and beams - bases	m3	285	R	1,242.00
25	Major equipment bases with blast proof walls - bases	m3	222	R	1,242.00
26	Major equipment bases and elevated concrete structure - bases	m3	164	R	1,242.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	64	R	1,242.00
28	One brick wall	m2		R	285.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,242.00
30	Total building area - Structural steel buildings	m2	665		
31	Ceiling	m2		R	185.00
32	Structural steel	t		R	34,225.00
33	Steel canopy - concrete	m3	177	R	1,242.00
34	Steel canopy - area	m2	955		
35	Concrete in weighbridge - all concrete	m3	55	R	1,242.00
36	Total weighbridge area	m2	185		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,242.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	189	R	1,242.00
41	Total cooling tower area	m2	95		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	36	R	1,242.00
44	Total lengh of cable tunnel	m	44		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	1,745		
47	Total volume of steel complex steel structure	m3	3,885		
48	Total volume of steel in stack	m3	345		
49	Total volume of steel in walkway	m3	199		
50	Total volume of steel in cable gantry	m3	322		
51	Piping work unit cost	WU		R	279.00
52	Total process pipe length	m	46,112		
53	Total electrical cable - installation only	m	29,421	R	44.50
54	Total instrumentation cable - installation only	m	27,442	R	32.55

Ratio: Project Ratio Mean

Variables

Material	Simple	Mean
Labour	Normal	Mean
Engineering design	Normal	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Poor	Mean
Project size	Medium	Mean
Project conditions	Poor	Mean
Complexity	Complex	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project H			
Location:	South Africa			
Client:	0	Date of estimate:	2005	

	CIVIL CONSTRUCTION COST				R 38,624,667.86
A	SITE CLEARANCE AND DEMOLITIONS		R	92,191.09	
B	BULK EARTHWORKS		R	494,632.08	
C	PILING		R	2,112,902.02	
D	ROAD WORKS		R	1,314,221.40	
E	GENERAL PAVING AND BUNDED AREAS		R	593,579.86	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	736,187.47	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	465,142.13	
H	TANK BASES AND BUNDING		R	2,272,074.76	
I	RACK FOUNDATIONS		R	1,306,983.96	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,481,395.58	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	690,895.47	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,134,060.26	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,231,877.64	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,465,835.50	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,572,214.88	
Q	BUILDINGS - STEEL		R	1,925,594.93	
R	CANOPIES - STEEL		R	3,544,974.29	
S	WEIGHBRIDGE		R	538,698.40	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	1,026,528.51	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	610,874.85	
	Preliminaries and General	35.00%	R	10,013,802.78	
	STRUCTURAL STEEL				R 14,639,942.01
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,164,171.01	
B	STRUCTURAL STEEL - PIPERACK		R	2,667,440.68	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	4,147,501.74	
D	STRUCTURAL STEEL - STACK		R	553,144.10	
E	STRUCTURAL STEEL - WALKWAY		R	895,270.90	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,029,573.00	
	Preliminaries and General	40.00%	R	4,182,840.57	
	MECHANICAL AND PIPING				R 55,415,483.21
A	PIPING INSTALLATION		R	38,985,600.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	109,608.21	
C	DYE PENETRATION TESTING (DP)		R	39,385.79	
D	MAGNETIC PARTICLE TESTING (MPI)		R	61,114.77	
E	POST WELD HEAT TREATMENT		R	106,244.15	
F	MATERIAL HARDNESS TEST (HT)		R	81,808.94	
H	MECHANICAL INSTALLATION		R	198,726.15	
	Preliminaries and General	40.00%	R	15,832,995.20	
	PAINTING AND INSULATION				R 3,171,053.27
A	PAINTING AND INSULATION		R	2,348,928.35	
	Preliminaries and General	35.00%	R	822,124.92	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 5,359,129.37
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	3,969,725.46	
	Preliminaries and General	35.00%	R	1,389,403.91	

TOTAL COST	R	117,210,275.72

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,442		R 3.77	R 61,986.34	R 92,191.09
	Concrete demolitions	m3		23		R 1,313.25	R 30,204.75	
BULK EARTHWORKS	Bulk excavation	m3		5,842		R 40.05	R 233,972.10	R 494,632.08
	Trimming of sides	m2	2.18	2,680	4.30	R 9.31	R 24,959.69	
	Back fill and compact	m3	1.15	5,080	0.98	R 40.87	R 207,606.12	
	Overhaul	m3/km	1.73	3,377	11.34	R 3.53	R 11,926.28	
	Rip bed	m2	1.78	3,282	8.13	R 4.93	R 16,167.90	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 238,836.60	R 238,836.60	R 2,112,902.02
	EO for raking equipment	Item	0.00	1	23.89	R 29,671.38	R 29,671.38	
	Number of piles	No	0.00	65	0.00		R -	
	Move rig to new position	No	1.50	43	0.18	R 223.56	R 9,687.60	
	Number of raking piles	No	18.41	4	0.00		R -	
	EO for setting up raking piles	No	0.93	4	0.28	R 347.76	R 1,320.25	
	EO for raking drilling	m	0.15	24	0.89	R 259.88	R 6,117.04	
	Auger quantity	m	0.05	1,300	0.00	R 292.00	R 379,600.00	
	EO for drilling in coarse gravel	m	0.53	123	0.22	R 273.24	R 33,510.57	
	EO for drilling in boulders	m	1.84	35	0.50	R 621.00	R 21,937.50	
	EO for drilling in soft rock	m	1.63	40	0.24	R 298.08	R 11,886.63	
	Temporary casings	m	0.36	181	0.36	R 447.12	R 80,730.00	
	EO casing to raking pile	m	0.18	20	0.51	R 1,155.06	R 22,656.44	
	Mild steel rod reinforcement	t	14.29	4.549	0.93	R 8,351.08	R 37,986.04	
	High tensile rod reinforcement	t	1.32	49.242	7.23	R 8,979.66	R 442,180.23	
	Concrete to piles and bases	m3	0.15	433	0.00	R 1,242.00	R 538,200.00	
	Concrete to raking piles	m3	0.07	50	1.06	R 1,316.52	R 66,403.20	
	Site establishment of test equipment	Item	0.00	1	110.73	R 137,526.66	R 137,526.66	
	Load test to pile	No	99.34	1	27.07	R 33,620.94	R 21,998.80	
	Site establishment of intergity testing	No	258.87	0	48.79	R 60,597.18	R 15,215.42	
	Integrity testing of piles	No	1.25	52	0.27	R 335.34	R 17,437.68	
ROAD WORKS	Red paving	m2	0.15	17	0.97	R 120.28	R 2,074.83	R 1,314,221.40
	Grey paving	m2	0.00	115	0.00	R 124.00	R 14,260.00	
	Kerbing	m	0.13	390	0.00	R 199.46	R 77,839.37	
	Total paving and asphalt	m2	0.00	3,002	0.00		R -	
	Remove top soil	m3	0.55	429	5.83	R 59.47	R 25,527.92	
	Asphalt	m2	0.26	781	0.00	R 141.17	R 110,185.95	
	Rip bed	m2	0.00	3,002	0.00	R 10.20	R 30,620.40	
	Reduce levels	m3	0.42	1,261	4.99	R 50.90	R 64,174.23	
	Selected fill	m3	1.65	764	0.53	R 96.03	R 73,383.92	
	Imported fill	m3	2.23	343	0.39	R 246.24	R 84,378.42	
	Wearing course	m3	3.86	327	0.29	R 175.51	R 57,329.14	
	Prime	m2	4.74	3,622	1.47	R 49.25	R 178,379.36	
	Three line road marking	m	0.83	3,006	0.20	R 39.89	R 119,924.45	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	398	4.19	R 9.97	R 3,969.81	
	1m Wide concrete V-drain	m	0.97	379	0.81	R 893.56	R 338,258.76	
	200mm Diameter PVC pipe	m	0.96	375	0.11	R 283.23	R 106,110.63	
	Road marking - STOP	No	0.15	59	0.05	R 303.17	R 17,747.38	
	Standard signage	No	0.01	4	4.48	R 386.94	R 1,510.08	
	100mm Painted line	m	1.83	714	1.42	R 11.97	R 8,546.76	
			0.00		1.52			
			0.00		1.94			
			0.00		0.06			
GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	108	0.74	R 1,242.00	R 134,136.00	R 593,579.86
	Concrete in plinths	m3	0.00	22	0.00	R 1,242.00	R 26,720.32	
	Total concrete	m3	0.00	274	0.00		R -	
	Rip and compact	m2	0.13	831	187.19	R 6.63	R 5,512.13	
	Formwork to plinth	m2	7.26	156	0.12	R 149.04	R 23,278.74	
	Formwork to slab	m2	0.83	90	0.15	R 186.30	R 16,699.93	
	High tensile steel	t	0.01	2.740	0.00	R 9,845.00	R 26,975.30	
	Mesh	m2	585.35	1,604	51.00	R 193.04	R 309,607.68	
	Construction joint	m	4.00	432	0.05	R 62.10	R 26,827.20	
	Expansion joint	m	2.22	240	0.08	R 99.36	R 23,822.55	
MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	3,833	0.00		R -	R 736,187.47
	Base excavation	m3	1.50	373	0.00	R 49.20	R 18,368.00	
	Backfill	m3	0.59	249	0.64	R 76.88	R 19,133.33	
	Working space	m2	0.45	633	1.43	R 53.76	R 34,016.83	
	Concrete in bases	m3	0.04	168	25.24	R 1,242.00	R 208,656.00	
	Blinding	m2	0.83	227	20.88	R 59.48	R 13,484.67	
	Concrete in sump walls	m3	0.10	17	29.51	R 1,242.00	R 20,865.60	
	Concrete in slabs	m3	0.02	3	0.91	R 1,242.00	R 4,173.12	
	Total concrete	m3	0.00	188	0.04		R -	
	Wood float	m2	0.70	269	158.37	R 7.84	R 2,108.04	
	Formwork to bases	m2	1.69	284	0.12	R 149.04	R 42,315.44	
	Formwork to sump walls	m2	12.63	212	0.12	R 149.04	R 31,623.90	
	Formwork to sides of slab	m2	5.81	20	0.18	R 223.56	R 4,364.25	
	Mild steel reinforcement	t	0.12	2.114	0.00	R 9,845.00	R 20,813.88	
	High tensile reinforcement	t	10.68	17.618	1.19	R 9,845.00	R 173,448.99	
	Cast in steel	kg	0.46	365	34.10	R 36.42	R 13,302.05	
	Waterstop	m	0.43	39	8.10	R 153.33	R 5,990.70	
	Manhole	No	0.08	13	2.68	R 3,564.87	R 47,056.26	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	165	0.13	R 463.43	R 76,466.42	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	150	0.05	R 49.20	R 7,400.17	R 465,142.13
		Working space	m2	0.38	396	0.67	R 32.96	R 13,047.67	
		Backfill	m3	4.42	34	1.32	R 64.94	R 2,210.01	
		Concrete bases	m3	1.01	89	0.00	R 1,242.00	R 110,538.00	
		Concrete plinth	m3	2.29	39	0.00	R 1,242.00	R 48,269.87	
		Total concrete	m3	0.00	128	0.00		R -	
		Wood float	m2	0.47	83	0.05	R 12.42	R 1,027.02	
		Blinding	m2	1.01	88	0.01	R 62.10	R 5,472.18	
		Formwork bases	m2	0.49	182	0.13	R 161.46	R 29,326.41	
		Formwork plinth	m2	0.58	67	0.12	R 149.04	R 9,986.87	
		High tensile reinforcement	t	10.00	12.786	7.15	R 9,845.00	R 125,882.73	
		Cast in steel	kg	0.11	1,162	0.03	R 37.26	R 43,311.24	
		HD Bolts	kg	0.08	1,598	0.03	R 37.26	R 59,552.95	
		Grout	m3	34.52	1.126	6.52	R 8,097.84	R 9,117.02	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.84	1,016	0.05	R 62.10	R 63,103.54	R 2,272,074.76
		Working space	m2	4.36	233	1.63	R 38.10	R 8,879.32	
		Backfill	m3	1.38	736	0.72	R 86.25	R 63,510.00	
		Concrete bases	m3	0.75	174	0.00	R 1,242.00	R 216,108.00	
		Concrete sump wall	m3	2.86	61	0.00	R 1,242.00	R 75,562.24	
		Concrete slab	m3	0.57	305	0.00	R 1,242.00	R 379,136.84	
		Concrete plinth	m3	4.11	42	21.05	R 1,242.00	R 52,581.02	
		Concrete column	m3	19.22	9	164.76	R 1,242.00	R 11,243.91	
		Total concrete	m3	0.00	591	1.11		R -	
		Blinding	m2	2.67	222	1.05	R 59.00	R 13,070.93	
		Wood float	m2	0.25	2,366	1.12	R 7.54	R 17,835.20	
		Formwork to bases	m2	0.42	414	1.14	R 152.96	R 63,367.35	
		Formwork to plinths	m2	0.35	121	8.12	R 162.78	R 19,689.58	
		Formwork to columns	m2	0.12	75	7.63	R 174.93	R 13,197.08	
		Formwork to sumps	m2	0.11	553	7.10	R 169.67	R 93,842.82	
		Formwork to slabs	m2	4.07	75	7.32	R 151.28	R 11,346.41	
		Formwork to slabs n/e 300mm	m	2.17	141	8.21	R 52.72	R 7,415.85	
		Mild steel reinforcement	t	0.23	5.892	23.56	R 9,845.00	R 58,005.33	
		High tensile reinforcement	t	23.09	25.617	1.02	R 9,845.00	R 252,197.07	
		Mesh	m2	0.16	1,908	61.15	R 161.00	R 307,166.37	
		Cast in items	kg	0.19	3,113	214.69	R 45.86	R 142,757.38	
		HD Bolts	kg	0.10	5,915	207.02	R 47.56	R 281,288.30	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	2.897	0.17	R 7,305.88	R 21,167.60	
	Construction joint	m	0.30	1,018	24.89	R 49.90	R 50,774.99	
	Expansion joint	m	0.46	664	16.88	R 73.58	R 48,827.64	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	749	0.05	R 62.10	R 46,538.98	R 1,306,983.96
	Working space	m2	0.41	1,828	1.98	R 122.96	R 224,749.23	
	Backfill	m3	2.45	306	0.87	R 71.38	R 21,833.91	
	Blinding	m2	0.37	546	22.19	R 55.97	R 30,557.23	
	Concrete bases	m3	5.81	202	0.00	R 1,242.00	R 250,884.00	
	Concrete plinth	m3	0.00	35	0.00	R 1,242.00	R 43,181.41	
	Total concrete	m3	0.00	237	1.34		R -	
	Wood float	m2	0.35	577	173.00	R 7.18	R 4,143.42	
	Formwork bases	m2	0.47	430	9.63	R 128.97	R 55,430.50	
	Formwork plinths	m2	0.09	386	6.99	R 177.68	R 68,639.98	
	High tensile reinforcement	t	9.33	25.377	0.00	R 9,845.00	R 249,836.81	
	HD Bolts	kg	0.03	6,733	225.70	R 43.62	R 293,706.99	
	Grout	m3	79.73	2.534	0.18	R 6,900.00	R 17,481.50	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	1,304	0.06	R 74.52	R 97,186.00	R 2,481,395.58
	Working space	m2	0.50	2,608	1.90	R 39.22	R 102,301.06	
	Backfill	m3	2.66	490	0.80	R 93.15	R 45,670.11	
	Blinding	m2	0.33	921	21.39	R 58.06	R 53,489.74	
	Concrete bases	m3	0.00	304	0.00	R 1,242.00	R 377,568.00	
	Concrete plinth	m3	2.58	84	0.00	R 1,242.00	R 104,013.22	
	Concrete slab	m3	3.63	118	0.00	R 1,242.00	R 146,344.19	
	Total concrete	m3	0.00	506	0.00		R -	
	Wood float	m2	0.55	919	161.77	R 7.68	R 7,057.44	
	Formwork bases	m2	0.49	620	8.32	R 149.28	R 92,613.81	
	Formwork plinths	m2	0.11	761	8.34	R 148.92	R 113,378.27	
	High tensile reinforcement	t	13.32	37.956	0.00	R 9,845.00	R 373,678.37	
	HD Bolts	kg	0.02	15,200	217.74	R 45.21	R 687,260.03	
	Cast in items	kg	0.05	6,080	241.09	R 40.84	R 248,279.07	
	Grout	m3	68.22	4.456	0.17	R 7,305.88	R 32,556.26	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	0	0.05	R 62.10	R -	R -
	Working space	m2	0.56	0	1.66	R 37.41	R -	
	Backfill	m3	2.15	0	0.79	R 78.61	R -	
	Blinding	m2	0.65	0	20.36	R 61.00	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,242.00	R -	
	Concrete column	m3	28.05	0	0.00	R 1,242.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	0	0.00	R 1,242.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.60	0	158.85	R 7.82	R -	
	Formwork bases	m2	0.52	0	8.23	R 150.91	R -	
	Formwork plinths	m2	0.33	0	7.44	R 166.94	R -	
	Formwork to columns	m2	0.28	0	8.09	R 153.52	R -	
	High tensile reinforcement	t	9.06	0.000	0.00	R 9,845.00	R -	
	HD bolts	kg	0.04	0	209.18	R 47.06	R -	
	Grout	m3	108.76	0.000	0.16	R 7,762.50	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	185	0.06	R 74.52	R 13,771.30	R 690,895.47
	Working space	m2	0.30	616	2.12	R 35.15	R 21,652.98	
	Backfill	m3	2.06	90	0.82	R 90.88	R 8,152.56	
	Blinding	m2	0.67	99	19.99	R 62.13	R 6,120.37	
	Concrete bases	m3	0.00	66	0.00	R 1,242.00	R 81,972.00	
	Concrete column	m3	1.19	60	151.33	R 1,242.00	R 73,968.00	
	Concrete beam	m3	2.68	22	0.95	R 1,242.00	R 27,600.00	
	Total concrete	m3	2.97	148	0.95		R -	
	Wood float	m2	0.47	140	7.50	R 8.21	R 1,152.50	
	Formwork bases	m2	0.48	138	6.55	R 165.60	R 22,770.00	
	Formwork to columns	m2	0.15	397	7.98	R 155.64	R 61,794.49	
	Formwork to sides beams	m2	0.33	67	6.11	R 189.62	R 12,768.91	
	Formwork to soffits beams	m2	0.69	32	6.55	R 203.27	R 6,546.64	
	Formwork corbels	m2	10.88	5	5.37	R 231.28	R 1,266.02	
	High tensile reinforcement	t	9.10	16.239	0.00	R 9,845.00	R 159,876.07	
	Cast in steel	kg	0.03	4,926	262.64	R 37.48	R 184,647.20	
	HD bolts	kg	1.48	100	215.28	R 45.73	R 4,566.25	
	Grout	m3	505.30	0.292	0.16	R 7,762.50	R 2,270.19	
	Restricted excavation	m3	3.84	1,094	0.05	R 62.10	R 67,962.24	R 3,134,060.26
	Working space	m2	0.61	1,794	1.79	R 34.69	R 62,242.18	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	952	0.79	R 78.61	R 74,807.09	
	Blinding	m2	0.61	467	20.06	R 61.91	R 28,927.15	
	Concrete bases	m3	0.00	285	0.97	R 1,242.00	R 353,970.00	
	Concrete column	m3	2.44	117	1.07	R 1,242.00	R 145,069.67	
	Concrete beam	m3	0.84	139	1.02	R 1,242.00	R 172,701.99	
	Concrete surface slab	m3	1.68	170	0.97	R 1,242.00	R 210,696.43	
	Concrete wall	m3	2.50	47	1.05	R 1,242.00	R 58,027.87	
	Concrete elevated slab	m3	1.10	106	0.00	R 1,242.00	R 131,881.52	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	863	0.00		R -	
		Wood float	m2	0.64	1,349	169.32	R 7.34	R 9,895.72	
		Formwork bases	m2	0.41	695	7.65	R 162.35	R 112,855.09	
		Formwork to columns	m2	0.17	687	6.34	R 195.90	R 134,597.95	
		Formwork to sides beams	m2	0.30	464	5.15	R 241.17	R 111,781.22	
		Formwork to soffits beams	m2	0.84	166	7.57	R 164.07	R 27,159.53	
		Formwork to soffts of slabs	m2	0.31	547	3.23	R 216.00	R 118,202.76	
		Formwork to pockets	m2	26.55	4	5.75	R 384.52	R 1,691.65	
		Formwork wall	m2	0.13	359	8.09	R 153.52	R 55,175.31	
		High tensile reinforcement	t	8.87	97.340	0.00	R 9,845.00	R 958,310.05	
		Cast in steel	kg	0.22	3,925	255.59	R 38.52	R 151,169.13	
		HD bolts	kg	0.41	2,106	201.38	R 48.89	R 102,950.74	
		Steel handrailing	m	2.58	38	9.71	R 1,013.90	R 38,253.14	
		Grout	m3	1,039.37	0.831	0.18	R 6,900.00	R 5,731.82	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	180	0.04	R 49.68	R 8,966.63	R 1,231,877.64
		Working space	m2	7.92	23	1.42	R 34.99	R 797.29	
		Backfill	m3	4.13	44	0.63	R 31.30	R 1,367.79	
		Blinding	m2	1.05	211	17.95	R 69.19	R 14,629.21	
		Concrete bases	m3	0.00	222	0.00	R 1,242.00	R 275,724.00	
		Concrete column	m3	26.31	8	0.00	R 1,242.00	R 10,479.82	
		Concrete beam	m3	1.43	6	0.00	R 1,242.00	R 7,328.54	
		Concrete wall	m3	10.41	21	0.00	R 1,242.00	R 26,486.46	
		Concrete elevated slabs	m3	10.92	1	0.00	R 1,242.00	R 959.69	
		Total concrete	m3	0.00	258	0.00		R -	
		Wood float	m2	0.82	315	138.41	R 8.97	R 2,828.10	
		Formwork bases	m2	8.50	26	6.94	R 178.96	R 4,674.08	
		Formwork to columns	m2	0.14	60	5.63	R 197.14	R 11,881.88	
		Formwork to sides beams	m2	0.17	35	4.72	R 220.60	R 7,657.03	
		Formwork to soffits beams	m2	0.50	12	6.30	R 263.14	R 3,105.32	
		Formwork to soffts of slabs	m2	0.13	6	2.98	R 256.08	R 1,522.11	
		Formwork to pockets	m2	418.49	1	4.85	R 416.78	R 221.09	
		Formwork wall	m2	0.10	213	6.38	R 194.67	R 41,514.82	
		High tensile reinforcement	t	4.05	63.812	0.00	R 9,845.00	R 628,224.77	
		Cast in steel	kg	0.15	1,723	200.08	R 49.21	R 84,776.43	
		HD bolts	kg	0.22	1,175	167.91	R 58.63	R 68,876.46	
		Galvanised grating	m2	17.15	15	0.15	R 1,823.15	R 27,473.39	
		Grout	m3	771.45	0.288	5.40	R 8,280.00	R 2,382.73	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	259	0.05	R 62.10	R 16,091.35	R 2,465,835.50
	Working space	m2	0.42	617	1.76	R 35.28	R 21,768.60	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	127	0.80	R 77.63	R 9,859.90	
	Blinding	m2	4.82	34	20.78	R 59.77	R 2,033.63	
	Concrete bases	m3	0.00	164	0.00	R 1,242.00	R 203,688.00	
	Concrete column	m3	6.67	25	0.00	R 1,242.00	R 30,537.93	
	Concrete beam	m3	1.99	12	0.00	R 1,242.00	R 15,345.69	
	Concrete wall	m3	35.85	5	0.00	R 1,242.00	R 5,681.67	
	Concrete elevated slabs	m3	24.74	1	0.00	R 1,242.00	R 1,234.35	
	Total concrete	m3	0.00	207	0.00		R -	
	Wood float	m2	4.82	34	162.71	R 7.63	R 259.72	
	Formwork bases	m2	1.44	114	8.18	R 151.83	R 17,292.18	
	Formwork to columns	m2	0.14	176	6.98	R 181.31	R 31,843.52	
	Formwork to sides beams	m2	0.23	54	6.34	R 177.94	R 9,558.80	
	Formwork to soffits beams	m2	0.75	16	6.85	R 195.90	R 3,227.28	
	Formwork to soffts of slabs	m2	0.22	5	3.87	R 201.30	R 909.35	
	Formwork to pockets	m2	3.09	53	6.17	R 320.93	R 17,033.19	
	Formwork wall	m2	0.29	16	7.54	R 164.72	R 2,598.41	
	High tensile reinforcement	t	7.31	28.251	0.00	R 9,845.00	R 278,127.04	
	Cast in steel	kg	0.02	10,326	212.67	R 46.29	R 477,996.11	
	HD bolts	kg	0.01	20,651	208.59	R 47.20	R 974,691.33	
	Galvanised grating	m2	3.97	52	0.19	R 6,536.84	R 340,034.01	
	Grout	m3	42.08	3.897	6.37	R 1,545.53	R 6,023.44	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	116	0.05	R 62.10	R 7,233.41	R 1,572,214.88
	Working space	m2	2.50	47	1.84	R 33.75	R 1,572.48	
	Backfill	m3	1.25	93	0.79	R 78.61	R 7,324.97	
	Blinding	m2	3.86	17	20.30	R 61.18	R 1,014.42	
	Concrete	m3	0.00	64	0.00	R 1,242.00	R 79,488.00	
	Mesh reinforcement	m2	0.51	125	65.77	R 149.69	R 18,784.42	
	Rough formwork	m2	3.09	21	8.61	R 144.25	R 2,987.72	
	Smooth formwork	m2	0.57	112	6.80	R 182.65	R 20,507.74	
	Finish to concrete	m2	0.23	278	105.40	R 11.78	R 3,278.94	
	Construction joints	m	4.97	13	21.29	R 58.34	R 751.22	
	Movement joints	m	15.36	4	17.11	R 72.59	R 302.45	
	Cast in steel	kg	2.35	27	232.74	R 42.30	R 1,152.01	
	Grout	m3	882.88	0.072	0.18	R 6,900.00	R 500.18	
	Brick walls	m2	0.50	128	0.00	R 285.00	R 36,480.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	286	0.00		R -	
	Waterproofing membrane	m2	2.22	129	12.03	R 103.24	R 13,304.25	
	Roof construction	m2	2.04	140	38.22	R 257.59	R 36,122.88	
	Ceiling	m2	0.98	292	0.00	R 185.00	R 54,004.90	
	Doors and windows	No	474.69	1	0.17	R 1,676.47	R 1,010.35	
	Floor finish	m2	1.03	278	0.79	R 360.76	R 100,200.07	
	Wall finsih	m2	1.04	275	1.47	R 193.88	R 53,331.24	
	Rod reinforcement	t	9.25	7	0.00	R 9,845.00	R 68,116.76	
	Metalwork	Item	0.00	1	4.44	R 43,711.80	R 43,711.80	
	Structural steel	Item	0.00	1	11.50	R 113,217.50	R 113,217.50	
	Plumbing and drainage	Item	0.00	1	7.32	R 72,065.40	R 72,065.40	
	Small power and lighting	Item	0.00	1	62.40	R 614,328.00	R 614,328.00	
	External works	Item	0.00	1	178.28	R 221,423.76	R 221,423.76	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.17	R 1,242.00	R 105,570.00	R 1,925,594.93
	Earthworks	m3	2.37	201	9.13	R 136.04	R 27,404.26	
	Reinforcement	t	8.82	10	0.00	R 9,845.00	R 94,878.12	
	Mesh	m2	0.12	708	10.27	R 120.93	R 85,662.12	
	Formwork	m2	0.40	213	8.06	R 154.09	R 32,745.04	
	Brickwork	m2	6.11	109	6.08	R 204.28	R 22,233.02	
	Roof covering	m2	0.87	764	208.48	R 164.16	R 125,482.01	
	Structural steel	t	18.83	35	0.00	R 34,225.00	R 1,208,689.59	
	Side cladding	m2	1.54	432	0.98	R 160.88	R 69,471.40	
	Doors	No	405.94	2	0.51	R 17,454.75	R 28,593.90	
	Ridge ventilator	m	21.95	30	11.48	R 1,884.61	R 57,096.31	
	Aluminium insulation	m2	0.89	747	1.81	R 90.70	R 67,769.16	
	Total building area	m2	0.00	665	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	552	0.13	R 161.46	R 89,164.67	R 3,544,974.29
	Concrete	m3	0.00	177	0.00	R 1,242.00	R 219,834.00	
	Reinforcement	t	11.42	15	0.18	R 9,845.00	R 152,588.88	
	Mesh	m2	0.12	1,475	10.21	R 121.65	R 179,427.03	
	Formwork	m2	0.45	393	8.51	R 145.95	R 57,405.41	
	Brickwork	m2	5.94	161	5.91	R 210.15	R 33,787.11	
	Screed	m2	1.12	853	43.13	R 28.80	R 24,554.30	
	Structural steel	t	14.72	65	0.00	R 34,225.00	R 2,220,439.88	
	Cat ladders	m	2.74	24	9.66	R 3,542.96	R 83,890.22	
	Hand rail	m	0.73	89	27.40	R 1,249.09	R 111,010.89	
	Kick plates	m	0.76	85	2.76	R 452.57	R 38,633.65	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	1,049	195.47	R 175.09	R 183,749.14	
		Side cladding	m2	4.76	201	0.93	R 162.83	R 32,669.52	
		Floor grating	m2	1.09	60	17.29	R 1,979.47	R 117,819.60	
		Total buiding area	m2	0.00	955	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	182	8.02	R 154.86	R 28,107.61	R 538,698.40
		Blinding	m2	0.47	117	18.72	R 66.35	R 7,763.91	
		Concrete	m3	0.00	55	0.00	R 1,242.00	R 68,310.00	
		Reinforcement	t	7.97	7	0.00	R 9,845.00	R 67,939.15	
		Mesh	m2	0.49	112	50.23	R 196.00	R 21,999.82	
		Formwork	m2	0.31	177	7.58	R 163.85	R 29,070.56	
		Finish to concrete	m2	0.44	125	103.65	R 11.98	R 1,497.83	
		Movement joints	m	2.46	22	15.35	R 80.91	R 1,809.01	
		Cast in steel	kg	0.09	611	179.47	R 54.86	R 33,523.09	
		Grout	m3	71.08	0.774	2.53	R 8,280.00	R 6,406.87	
		Brickwork	m2	0.24	50	0.15	R 285.00	R 14,250.00	
		Doors and windows	No	2.74	4	0.26	R 3,562.50	R 15,602.19	
		Pipework	m	2.59	71	0.21	R 490.91	R 35,064.94	
		Bolts	kg	0.11	500	0.08	R 54.86	R 27,427.98	
		Structural steel	t	3.99	3	0.00	R 37,865.38	R 113,880.86	
		Miscellaneous steel	t	131.32	1	0.00	R 46,880.95	R 66,044.59	
		Total bridge area	m2	0.00	185	0.00		R -	
		Total control room area	m2	0.00	12	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	0	6.07	R 204.61	R -	R -
		Blinding	m2	0.71	0	14.50	R 85.66	R -	
		Concrete	m3	0.00	0	0.00	R 1,242.00	R -	
		Reinforcement	t	5.75	0	0.00	R 9,845.00	R -	
		Formwork	m2	0.07	0	5.72	R 217.13	R -	
		Finish to concrete	m2	0.31	0	77.96	R 15.93	R -	
		Movement joints	m	0.42	0	12.46	R 99.68	R -	
		Cast in steel	kg	23.71	0.000	163.17	R 60.34	R -	
		Grout	m3	22.24	0.000	0.62	R 9,553.85	R -	
		Bolts	kg	109.85	0.000	0.13	R 37.41	R -	
		Structural steel	t	35.84	0.000	0.22	R 44,750.00	R -	
		Miscellaneous steel	t	20.04	0.000	0.18	R 54,694.44	R -	
		Brickwork	m2	0.49	0	4.24	R 292.92	R -	
		Roof covering	m2	1.46	0	1.22	R 240.10	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	149	6.10	R 203.61	R 30,400.50	R 1,026,528.51
	Blinding	m2	1.17	162	16.23	R 76.52	R 12,361.72	
	Concrete	m3	0.00	189	0.00	R 1,242.00	R 234,738.00	
	Reinforcement	t	5.89	32.088	0.00	R 9,845.00	R 315,909.17	
	Formwork	m2	0.21	900	6.04	R 205.63	R 185,066.23	
	Movement joint	m	1.61	117	0.12	R 96.43	R 11,319.88	
	Cast in steel	kg	0.13	1,454	12.88	R 50.19	R 72,966.53	
	Bolts	kg	0.37	511	196.16	R 60.61	R 30,962.52	
	Chemical anchors	No	6.13	31	0.22	R 273.62	R 8,436.38	
	Miscellaneous steelwork	t	88.98	2.124	162.42	R 44,750.00	R 95,052.26	
	Pre-cast concrete	m3	30.27	6	35.98	R 4,140.00	R 25,849.36	
	Brickwork	m2	7.79	12	0.30	R 284.21	R 3,465.98	
	Total area	m2	0.00	95	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	0	1.68	R 83.46	R -	R -
	Lining	m2	0.70	0	1.16	R 49.68	R -	
	Paving	m2	0.65	0	0.53	R 93.74	R -	
	Pipework	m	28.23	0	0.24	R 347.76	R -	
	Manholes	No	16.47	0	0.10	R 3,477.60	R -	
	Concrete	m3	2.43	0	0.04	R 1,242.00	R -	
	Formwork	m2	0.08	0	5.85	R 212.31	R -	
	Mesh	m2	0.70	0	6.64	R 187.05	R -	
	Reinforcement	t	4.69	0.000	0.12	R 9,845.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	217	5.56	R 223.38	R 48,572.03	R 610,874.85
	Blinding	m2	0.85	42	13.49	R 92.07	R 3,899.36	
	Concrete	m3	0.00	36	0.00	R 1,242.00	R 44,712.00	
	Reinforcement	t	4.52	7.965	0.00	R 9,845.00	R 78,411.50	
	Mesh	m2	0.90	40	38.60	R 255.05	R 10,202.07	
	Formwork	m2	0.15	240	5.36	R 231.72	R 55,611.94	
	Cast in steel	kg	0.02	1,800	140.16	R 70.24	R 126,434.08	
	Miscellaneous steelwork	t	11.14	3.950	0.16	R 61,531.25	R 243,031.87	
	Total tunnel length	m	0.00	44	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,164,171.01
	Steel	t	9.58	21.086	0.00	R 34,225.00	R 721,654.49	
	Handrail	m	1.45	139	28.73	R 1,191.26	R 165,955.33	
	Grating	m2	1.91	106	16.97	R 2,016.79	R 213,294.48	
	Kick flats	m	1.71	118	76.94	R 444.83	R 52,546.83	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	30	95.97	R 356.62	R 10,719.88	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,745	0.00		R -	R 2,667,440.68
	Steel	t	27.86	62.635	0.00	R 34,225.00	R 2,143,669.24	
	Handrail	m	13.37	131	30.43	R 1,124.71	R 146,793.06	
	Grating	m2	12.47	140	18.55	R 1,845.01	R 258,183.52	
	Kick flats	m	13.35	131	84.90	R 403.12	R 52,692.64	
	Cat ladder	m	98.85	18	9.14	R 3,744.53	R 66,102.22	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,885	0.00		R -	R 4,147,501.74
	Steel	t	76.43	50.831	0.00	R 34,225.00	R 1,739,685.01	
	Handrail	m	31.26	124	30.84	R 1,109.76	R 137,921.23	
	Grating	m2	3.84	1,012	16.10	R 2,125.78	R 2,150,687.84	
	Kick flats	m	34.08	114	83.17	R 411.51	R 46,910.30	
	Stair treads	No	230.28	17	101.90	R 335.87	R 5,666.36	
	Cat ladder	m	238.13	16	8.38	R 4,084.13	R 66,631.00	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	345	0.00		R -	R 553,144.10
	Steel	t	25.51	13.524	0.00	R 34,225.00	R 462,862.60	
	Handrail	m	45.84	8	30.11	R 1,136.67	R 8,554.75	
	Grating	m2	60.74	6	17.06	R 2,006.15	R 11,394.85	
	Kick flats	m	46.49	7	79.97	R 427.97	R 3,175.97	
	Cat ladder	m	20.35	17	8.64	R 3,961.23	R 67,155.93	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	199	0.00		R -	R 895,270.90
	Steel	t	16.54	12.031	0.00	R 34,225.00	R 411,776.00	
	Handrail	m	1.10	181	31.41	R 1,089.62	R 197,122.37	
	Grating	m2	1.98	101	16.95	R 2,019.17	R 202,937.19	
	Kick flats	m	1.16	172	80.43	R 425.53	R 72,999.60	
	Stair treads	No	6.10	33	106.99	R 319.89	R 10,435.75	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	322	0.00		R -	R 1,029,573.00
	Steel	t	12.73	25.295	0.00	R 34,225.00	R 865,706.99	
	Handrail	m	25.10	13	32.05	R 1,067.86	R 13,699.27	
	Grating	m2	7.46	43	17.66	R 1,938.00	R 83,650.74	
	Kick flats	m	22.84	14	84.46	R 405.22	R 5,712.84	
	Cat ladder	m	20.48	16	8.85	R 3,867.23	R 60,803.15	
PIPING INSTALLATION	Pipe length	m	0.00	46,112	0.00		R -	R 38,985,600.00
	Total work units	WU	0.33	139,733	0.00	R 279.00	R 38,985,600.00	
	Pipe supports	kg	2.61	17,667	0.00		R -	
	WU for pipe supports	WU	0.16	22,357	0.00		R -	
	Number of welds	No	0.61	28,128	0.00		R -	
	Total fittings	No	0.38	17,523	0.00		R -	
	Stud bolts	No	0.34	5,958	0.00		R -	
	Support number	No	0.19	3,357	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	139,733	0.00	R 279.00		R 109,608.21

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	2,330	5.93	R 47.05	R 109,608.21	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	139,733	0.00	R 279.00		R 39,385.79
	Number of examinations	No	168.34	830	5.88	R 47.45	R 39,385.79	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	139,733	0.00	R 279.00		R 61,114.77
	Number of examinations	No	300.90	464	2.12	R 131.60	R 61,114.77	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	139,733	0.00	R 279.00		R 106,244.15
	Number of examinations	No	52.95	2,639	6.93	R 40.26	R 106,244.15	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	139,733	0.00	R 279.00		R 81,808.94
	Number of examinations	No	114.83	1,217	4.15	R 67.23	R 81,808.94	
MECHANICAL INSTALLATION	Total work units	WU	0.00	139,733	0.00	R 279.00		R 198,726.15
	Mechanical equipment	t	261.57	534	0.75	R 372.00	R 198,726.15	
	Structural steel	t	218.09	641	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	139,733	0.00	R 279.00		R 2,348,928.35
	Painting to piping	m2	17.88	7,815	0.34	R 107.31	R 838,616.42	
	Insulation to piping	m2	51.67	2,704	2.60	R 315.61	R 853,519.59	
	Mechanical equipment received	t	0.00	534	0.82	R 372.00	R 198,726.15	
	Painting to mechanical equipment	m2	0.25	2,137	3.69	R 100.81	R 215,421.30	
	Insulation to mechanical equipment	m2	0.70	763	1.17	R 317.95	R 242,644.88	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	29,421	0.00	R 44.50	R 1,309,234.50	R 3,969,725.46
	Electrical cable terminations	No	311.25	1,169	0.43	R 103.49	R 120,966.68	
	Electrical equipment	No	9.05	95	0.11	R 404.55	R 38,239.78	
	DB's	No	6.39	10	0.32	R 1,264.20	R 13,204.34	
	Rack	m	0.69	4,604	1.65	R 127.14	R 585,394.37	
	Support steel	kg	1.42	6,673	2.13	R 20.89	R 139,408.06	
	Instrumentation cable	m	27.43	27,442	0.35	R 28.50	R 782,097.00	
	Instruments	No	0.58	1,000	0.18	R 158.33	R 158,402.60	
	Hook-ups	No	3.98	1,725	0.16	R 178.13	R 307,246.42	
	Light fittings	No	10.26	376	0.02	R 247.22	R 93,007.64	
	Conduit	m	4.13	2,868	0.13	R 26.97	R 77,336.79	
	Instrument stands	No	0.00	242		R 1,425.00	R 345,187.27	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project H				
Location:	South Africa				
Client:				Date of estimate:	2005

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,442	R	3.77
2	Concrete demolitions	m3	23	R	1,313.25
3	Bulk excavation	m3	5,842	R	40.05
4	Vertical piles	No	65		
5	Raking piles	No	10		
6	Concrete in piles	m3		R	1,242.00
7	Auger pile	m		R	292.00
8	Total paving and asphalt to road works	m2	3,002		
9	Grey paving to road works	m2	115	R	124.00
10	Asphalt to road surface	m2	2,887		
11	Rip bed of road works	m2	3,002	R	10.20
12	Total concrete in paving and bunding	m3	274	R	1,242.00
13	Concrete in paving	m3	108		
14	Rod reinforcement	t		R	9,845.00
15	Concrete in plinths and bases on area finishing	m3	168		
16	Stormwater pipe to drain surface run-off	m	165		
17	Machine excavation	m3		R	49.20
18	Concrete in pump and pipe support bases	m3	89	R	1,242.00
19	Concrete in tank bases	m3	174	R	1,242.00
20	Concrete in pipe and cable rack foundations	m3	202	R	1,242.00
21	Concrete to simple structural foundations	m3	304	R	1,242.00
22	Complex structural foundations - bases	m3	0	R	1,242.00
23	Concrete pipe racks - bases	m3	66	R	1,242.00
24	Concrete structure including concrete columns and beams - bases	m3	285	R	1,242.00
25	Major equipment bases with blast proof walls - bases	m3	222	R	1,242.00
26	Major equipment bases and elevated concrete structure - bases	m3	164	R	1,242.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	64	R	1,242.00
28	One brick wall	m2		R	285.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,242.00
30	Total building area - Structural steel buildings	m2	665		
31	Ceiling	m2		R	185.00
32	Structural steel	t		R	34,225.00
33	Steel canopy - concrete	m3	177	R	1,242.00
34	Steel canopy - area	m2	955		
35	Concrete in weighbridge - all concrete	m3	55	R	1,242.00
36	Total weighbridge area	m2	185		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,242.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	189	R	1,242.00
41	Total cooling tower area	m2	95		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	36	R	1,242.00
44	Total lengh of cable tunnel	m	44		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	1,745		
47	Total volume of steel complex steel structure	m3	3,885		
48	Total volume of steel in stack	m3	345		
49	Total volume of steel in walkway	m3	199		
50	Total volume of steel in cable gantry	m3	322		
51	Piping work unit cost	WU		R	279.00
52	Total process pipe length	m	46,112		
53	Total electrical cable - installation only	m	29,421	R	44.50
54	Total instrumentation cable - installation only	m	27,442	R	32.55

Ratio: Project Ratio Median

Variables

Material	Simple	Median
Labour	Normal	Median
Engineering design	Normal	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Normal	Median
Weather	Normal	Median
Access	Poor	Median
Project size	Medium	Median
Project conditions	Poor	Median
Complexity	Complex	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project H			
Location:	South Africa			
Client:	0	Date of estimate:	2005	

	CIVIL CONSTRUCTION COST				R 40,051,508.12
A	SITE CLEARANCE AND DEMOLITIONS		R	92,191.09	
B	BULK EARTHWORKS		R	508,116.60	
C	PILING		R	2,106,652.92	
D	ROAD WORKS		R	991,544.13	
E	GENERAL PAVING AND BUNDED AREAS		R	652,625.29	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	776,468.40	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	487,916.91	
H	TANK BASES AND BUNDING		R	2,484,627.33	
I	RACK FOUNDATIONS		R	1,330,667.22	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,682,766.20	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	715,490.21	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,676,227.14	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,170,505.34	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,764,317.93	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,640,124.47	
Q	BUILDINGS - STEEL		R	2,038,954.55	
R	CANOPIES - STEEL		R	3,597,343.08	
S	WEIGHBRIDGE		R	489,247.48	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	965,595.46	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	496,402.04	
	Preliminaries and General	35.00%	R	10,383,724.33	
	STRUCTURAL STEEL				R 16,583,167.04
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,288,526.56	
B	STRUCTURAL STEEL - PIPERACK		R	3,132,613.50	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	4,614,923.92	
D	STRUCTURAL STEEL - STACK		R	634,154.91	
E	STRUCTURAL STEEL - WALKWAY		R	1,064,231.73	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,110,668.69	
	Preliminaries and General	40.00%	R	4,738,047.73	
	MECHANICAL AND PIPING				R 61,252,351.47
A	PIPING INSTALLATION		R	42,884,160.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	139,727.87	
C	DYE PENETRATION TESTING (DP)		R	86,210.56	
D	MAGNETIC PARTICLE TESTING (MPI)		R	82,855.69	
E	POST WELD HEAT TREATMENT		R	141,913.60	
F	MATERIAL HARDNESS TEST (HT)		R	168,227.67	
H	MECHANICAL INSTALLATION		R	248,584.23	
	Preliminaries and General	40.00%	R	17,500,671.85	
	PAINTING AND INSULATION				R 4,263,638.71
A	PAINTING AND INSULATION		R	3,158,250.90	
	Preliminaries and General	35.00%	R	1,105,387.81	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 6,061,201.20
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	4,489,778.67	
	Preliminaries and General	35.00%	R	1,571,422.53	

TOTAL COST	R	128,211,866.55

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,442		R 3.77	R 61,986.34	R 92,191.09
	Concrete demolitions	m3		23		R 1,313.25	R 30,204.75	
BULK EARTHWORKS	Bulk excavation	m3		5,842		R 40.05	R 233,972.10	R 508,116.60
	Trimming of sides	m2	2.20	2,655	4.18	R 9.58	R 25,442.81	
	Back fill and compact	m3	1.12	5,216	0.95	R 42.16	R 219,898.59	
	Overhaul	m3/km	1.62	3,606	11.35	R 3.53	R 12,724.87	
	Rip bed	m2	1.71	3,416	8.51	R 4.71	R 16,078.24	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 238,948.38	R 238,948.38	R 2,106,652.92
	EO for raking equipment	Item	0.00	1	24.25	R 30,118.50	R 30,118.50	
	Number of piles	No	0.00	65	0.00		R -	
	Move rig to new position	No	1.48	44	0.19	R 235.98	R 10,363.99	
	Number of raking piles	No	19.43	3	0.00		R -	
	EO for setting up raking piles	No	0.93	4	0.24	R 298.08	R 1,072.24	
	EO for raking drilling	m	0.14	24	0.61	R 178.12	R 4,256.23	
	Auger quantity	m	0.05	1,300	0.00	R 292.00	R 379,600.00	
	EO for drilling in coarse gravel	m	0.55	118	0.22	R 273.24	R 32,292.00	
	EO for drilling in boulders	m	1.65	39	0.51	R 633.42	R 24,952.91	
	EO for drilling in soft rock	m	1.57	41	0.23	R 285.66	R 11,826.69	
	Temporary casings	m	0.38	171	0.31	R 385.02	R 65,858.68	
	EO casing to raking pile	m	0.17	20	0.57	R 869.40	R 17,108.47	
	Mild steel rod reinforcement	t	14.65	4.437	0.70	R 6,311.84	R 28,004.77	
	High tensile rod reinforcement	t	1.16	56.034	7.26	R 9,016.92	R 505,258.45	
	Concrete to piles and bases	m3	0.16	406	0.00	R 1,242.00	R 504,562.50	
	Concrete to raking piles	m3	0.08	42	1.08	R 1,341.36	R 56,091.35	
	Site establishment of test equipment	Item	0.00	1	115.74	R 143,749.08	R 143,749.08	
	Load test to pile	No	93.50	1	22.16	R 27,522.72	R 19,133.44	
	Site establishment of intergity testing	No	255.00	0	49.96	R 62,050.32	R 15,816.75	
	Integrity testing of piles	No	1.19	55	0.26	R 322.92	R 17,638.49	
ROAD WORKS	Red paving	m2	0.14	16	0.93	R 115.32	R 1,856.65	R 991,544.13
	Grey paving	m2	0.00	115	0.00	R 124.00	R 14,260.00	
	Kerbing	m	0.09	270	0.00	R 225.37	R 60,889.82	
	Total paving and asphalt	m2	0.00	3,002	0.00		R -	
	Remove top soil	m3	0.49	294	4.45	R 45.39	R 13,353.56	
	Asphalt	m2	0.20	600	0.00	R 140.16	R 84,152.85	
	Rip bed	m2	0.00	3,002	0.00	R 10.20	R 30,620.40	
	Reduce levels	m3	0.36	1,081	4.30	R 43.86	R 47,400.38	
	Selected fill	m3	1.50	720	0.46	R 95.35	R 68,696.20	
	Imported fill	m3	1.94	371	0.33	R 288.93	R 107,304.28	
	Wearing course	m3	3.89	278	0.20	R 219.30	R 60,925.94	
	Prime	m2	4.34	3,127	1.47	R 28.89	R 90,345.91	
	Three line road marking	m	0.78	2,439	0.10	R 22.54	R 54,966.45	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.99	267	4.06	R 6.76	R 1,808.43	
	1m Wide concrete V-drain	m	1.00	270	0.78	R 964.57	R 260,608.41	
	200mm Diameter PVC pipe	m	0.93	251	0.09	R 299.74	R 75,314.61	
	Road marking - STOP	No	0.15	41	0.03	R 369.60	R 14,978.89	
	Standard signage	No	0.01	3	4.28	R 414.68	R 1,120.37	
	100mm Painted line	m	1.61	435	1.33	R 6.76	R 2,940.98	
			0.00		1.64			
			0.00		1.84			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	108	0.75	R 1,242.00	R 134,136.00	R 652,625.29
		Concrete in plinths	m3	0.00	22	0.00	R 1,242.00	R 27,486.89	
		Total concrete	m3	0.00	274	0.00		R -	
		Rip and compact	m2	0.13	831	193.57	R 6.42	R 5,330.45	
		Formwork to plinth	m2	6.92	153	0.12	R 149.04	R 22,825.11	
		Formwork to slab	m2	0.80	86	0.15	R 186.30	R 16,096.32	
		High tensile steel	t	0.01	2.740	0.00	R 9,845.00	R 26,975.30	
		Mesh	m2	607.27	1,664	43.37	R 227.00	R 377,710.18	
		Construction joint	m	3.64	393	0.04	R 49.68	R 19,530.20	
		Expansion joint	m	2.10	227	0.08	R 99.36	R 22,534.85	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	3,833	0.00		R -	R 776,468.40
		Base excavation	m3	1.42	391	0.00	R 49.20	R 19,222.33	
		Backfill	m3	0.56	275	0.63	R 78.10	R 21,487.06	
		Working space	m2	0.43	698	1.35	R 57.85	R 40,359.30	
		Concrete in bases	m3	0.04	168	23.71	R 1,242.00	R 208,656.00	
		Blinding	m2	0.71	267	19.17	R 64.79	R 17,323.23	
		Concrete in sump walls	m3	0.11	18	31.87	R 1,242.00	R 22,952.16	
		Concrete in slabs	m3	0.02	3	0.81	R 1,242.00	R 4,173.12	
		Total concrete	m3	0.00	190	0.03		R -	
		Wood float	m2	0.61	311	123.90	R 10.02	R 3,119.67	
		Formwork to bases	m2	1.73	291	0.12	R 149.04	R 43,316.99	
		Formwork to sump walls	m2	11.18	207	0.12	R 149.04	R 30,792.62	
		Formwork to sides of slab	m2	5.67	19	0.17	R 211.14	R 4,022.47	
		Mild steel reinforcement	t	0.08	1.621	0.00	R 9,845.00	R 15,957.10	
		High tensile reinforcement	t	9.37	20.260	0.92	R 9,845.00	R 199,463.69	
		Cast in steel	kg	0.45	373	33.55	R 37.02	R 13,820.57	
		Waterstop	m	0.44	42	8.37	R 148.39	R 6,232.26	
		Manhole	No	0.08	13	2.72	R 3,805.15	R 50,227.94	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	165	0.12	R 456.62	R 75,341.91	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	143	0.05	R 49.20	R 7,049.87	R 487,916.91
	Working space	m2	0.33	434	0.68	R 33.46	R 14,527.00	
	Backfill	m3	3.97	36	1.27	R 62.48	R 2,255.25	
	Concrete bases	m3	0.93	89	0.00	R 1,242.00	R 110,538.00	
	Concrete plinth	m3	2.01	44	0.00	R 1,242.00	R 54,994.03	
	Total concrete	m3	0.00	133	0.00		R -	
	Wood float	m2	0.46	96	0.05	R 12.42	R 1,195.52	
	Blinding	m2	0.93	96	0.01	R 62.10	R 5,942.90	
	Formwork bases	m2	0.47	189	0.12	R 149.04	R 28,222.47	
	Formwork plinth	m2	0.53	84	0.12	R 149.04	R 12,451.48	
	High tensile reinforcement	t	10.15	13.131	6.60	R 9,845.00	R 129,273.68	
	Cast in steel	kg	0.10	1,333	0.03	R 37.26	R 49,659.61	
	HD Bolts	kg	0.08	1,666	0.03	R 37.26	R 62,074.51	
	Grout	m3	33.79	1.310	5.98	R 7,427.16	R 9,732.59	
TANK BASES AND BUNDING	Restricted excavation	m3	5.54	964	0.05	R 62.10	R 59,861.92	R 2,484,627.33
	Working space	m2	3.95	244	1.56	R 39.81	R 9,714.69	
	Backfill	m3	1.34	719	0.75	R 82.80	R 59,564.10	
	Concrete bases	m3	0.70	174	0.00	R 1,242.00	R 216,108.00	
	Concrete sump wall	m3	2.55	68	0.00	R 1,242.00	R 84,748.24	
	Concrete slab	m3	0.56	311	0.00	R 1,242.00	R 385,907.14	
	Concrete plinth	m3	3.73	47	19.74	R 1,242.00	R 57,937.80	
	Concrete column	m3	19.00	9	160.09	R 1,242.00	R 11,374.11	
	Total concrete	m3	0.00	609	0.99		R -	
	Blinding	m2	2.44	249	1.05	R 62.92	R 15,697.41	
	Wood float	m2	0.25	2,435	1.05	R 7.76	R 18,891.26	
	Formwork to bases	m2	0.39	446	1.05	R 164.29	R 73,296.70	
	Formwork to plinths	m2	0.34	137	7.56	R 172.02	R 23,601.84	
	Formwork to columns	m2	0.11	83	7.22	R 181.31	R 15,095.03	
	Formwork to sumps	m2	0.10	682	6.85	R 169.67	R 115,776.28	
	Formwork to slabs	m2	3.83	81	7.32	R 154.29	R 12,516.65	
	Formwork to slabs n/e 300mm	m	2.05	152	8.05	R 56.45	R 8,556.70	
	Mild steel reinforcement	t	0.22	6.055	22.00	R 9,845.00	R 59,606.93	
	High tensile reinforcement	t	22.12	27.521	0.90	R 9,845.00	R 270,940.57	
	Mesh	m2	0.15	2,071	54.97	R 179.10	R 370,988.07	
	Cast in items	kg	0.19	3,204	218.75	R 45.01	R 144,197.42	
	HD Bolts	kg	0.09	6,764	198.48	R 49.60	R 335,505.70	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	200.00	3.044	0.16	R 7,762.50	R 23,627.35	
	Construction joint	m	0.29	1,071	24.07	R 51.60	R 55,285.18	
	Expansion joint	m	0.44	706	15.71	R 79.06	R 55,828.24	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	663	0.05	R 62.10	R 41,144.98	R 1,330,667.22
	Working space	m2	0.30	2,209	1.58	R 98.12	R 216,696.87	
	Backfill	m3	2.36	281	0.78	R 79.62	R 22,351.68	
	Blinding	m2	0.40	505	24.38	R 50.94	R 25,726.42	
	Concrete bases	m3	5.73	202	0.00	R 1,242.00	R 250,884.00	
	Concrete plinth	m3	0.00	35	0.00	R 1,242.00	R 43,784.29	
	Total concrete	m3	0.00	237	1.35		R -	
	Wood float	m2	0.35	577	182.61	R 6.80	R 3,925.37	
	Formwork bases	m2	0.49	412	11.01	R 112.81	R 46,503.92	
	Formwork plinths	m2	0.09	392	6.94	R 178.96	R 70,099.73	
	High tensile reinforcement	t	9.11	26.043	0.00	R 9,845.00	R 256,394.77	
	HD Bolts	kg	0.03	6,733	198.55	R 49.58	R 333,868.88	
	Grout	m3	76.52	2.640	0.17	R 7,305.88	R 19,286.31	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	1,183	0.05	R 62.10	R 73,436.98	R 2,682,766.20
	Working space	m2	0.45	2,628	1.88	R 33.03	R 86,804.94	
	Backfill	m3	2.48	477	0.78	R 79.62	R 37,963.70	
	Blinding	m2	0.35	869	21.52	R 57.71	R 50,128.52	
	Concrete bases	m3	0.00	304	0.00	R 1,242.00	R 377,568.00	
	Concrete plinth	m3	2.36	103	0.00	R 1,242.00	R 127,556.76	
	Concrete slab	m3	2.96	129	0.00	R 1,242.00	R 159,986.44	
	Total concrete	m3	0.00	536	0.00		R -	
	Wood float	m2	0.51	1,050	155.50	R 7.99	R 8,386.75	
	Formwork bases	m2	0.45	676	8.00	R 155.25	R 104,880.00	
	Formwork plinths	m2	0.10	1,027	7.78	R 159.64	R 163,954.70	
	High tensile reinforcement	t	12.87	41.610	0.00	R 9,845.00	R 409,647.06	
	HD Bolts	kg	0.02	15,200	190.91	R 51.57	R 783,845.79	
	Cast in items	kg	0.05	6,080	225.21	R 43.71	R 265,785.71	
	Grout	m3	67.67	4.492	0.17	R 7,305.88	R 32,820.87	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	0	0.05	R 62.10	R -	R -
	Working space	m2	0.50	0	1.64	R 37.87	R -	
	Backfill	m3	2.15	0	0.76	R 81.71	R -	
	Blinding	m2	0.66	0	20.25	R 61.33	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,242.00	R -	
	Concrete column	m3	27.56	0	0.00	R 1,242.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	0	0.00	R 1,242.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.59	0	157.14	R 7.90	R -	
	Formwork bases	m2	0.49	0	7.78	R 159.64	R -	
	Formwork plinths	m2	0.31	0	7.42	R 167.39	R -	
	Formwork to columns	m2	0.29	0	7.75	R 160.26	R -	
	High tensile reinforcement	t	8.97	0.000	0.00	R 9,845.00	R -	
	HD bolts	kg	0.04	0	200.18	R 49.18	R -	
	Grout	m3	96.76	0.000	0.16	R 7,762.50	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	173	0.05	R 62.10	R 10,738.33	R 715,490.21
	Working space	m2	0.25	692	2.02	R 30.74	R 21,264.02	
	Backfill	m3	1.91	91	0.79	R 78.61	R 7,116.66	
	Blinding	m2	0.68	97	20.00	R 62.10	R 6,027.35	
	Concrete bases	m3	0.00	66	0.00	R 1,242.00	R 81,972.00	
	Concrete column	m3	1.08	60	145.46	R 1,242.00	R 74,250.00	
	Concrete beam	m3	2.50	24	0.88	R 1,242.00	R 29,700.00	
	Total concrete	m3	2.76	150	0.88		R -	
	Wood float	m2	0.44	150	7.44	R 8.54	R 1,280.76	
	Formwork bases	m2	0.45	147	6.41	R 166.94	R 24,483.87	
	Formwork to columns	m2	0.14	427	7.35	R 168.98	R 72,157.43	
	Formwork to sides beams	m2	0.32	75	5.90	R 193.76	R 14,479.33	
	Formwork to soffits beams	m2	0.68	35	6.41	R 210.51	R 7,402.79	
	Formwork corbels	m2	10.42	6	4.87	R 255.03	R 1,463.19	
	High tensile reinforcement	t	8.81	16.992	0.00	R 9,845.00	R 167,281.92	
	Cast in steel	kg	0.03	4,990	260.94	R 37.73	R 188,262.14	
	HD bolts	kg	1.43	105	199.28	R 49.40	R 5,171.60	
	Grout	m3	476.47	0.314	0.16	R 7,762.50	R 2,438.79	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	1,057	0.05	R 62.10	R 65,661.44	R 3,676,227.14
	Working space	m2	0.58	1,823	1.69	R 36.75	R 66,987.79	
	Backfill	m3	1.15	919	0.78	R 79.62	R 73,201.15	
	Blinding	m2	0.62	460	19.41	R 63.99	R 29,413.67	
	Concrete bases	m3	0.00	285	0.88	R 1,242.00	R 353,970.00	
	Concrete column	m3	2.01	142	1.07	R 1,242.00	R 176,104.48	
	Concrete beam	m3	0.83	171	1.00	R 1,242.00	R 212,174.07	
	Concrete surface slab	m3	1.64	174	0.92	R 1,242.00	R 215,835.37	
	Concrete wall	m3	2.14	66	1.00	R 1,242.00	R 82,291.81	
	Concrete elevated slab	m3	0.97	146	0.00	R 1,242.00	R 181,551.01	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	984	0.00		R -	
		Wood float	m2	0.60	1,640	152.05	R 8.17	R 13,393.91	
		Formwork bases	m2	0.39	731	7.60	R 163.42	R 119,423.08	
		Formwork to columns	m2	0.15	945	6.20	R 200.32	R 189,359.65	
		Formwork to sides beams	m2	0.29	589	4.91	R 252.95	R 149,009.11	
		Formwork to soffits beams	m2	0.79	216	7.19	R 172.74	R 37,353.93	
		Formwork to soffts of slabs	m2	0.30	579	3.11	R 219.82	R 127,336.50	
		Formwork to pockets	m2	25.00	6	5.65	R 399.36	R 2,265.01	
		Formwork wall	m2	0.12	552	7.88	R 157.61	R 87,026.03	
		High tensile reinforcement	t	8.60	114.400	0.00	R 9,845.00	R 1,126,265.65	
		Cast in steel	kg	0.21	4,685	251.20	R 39.19	R 183,611.70	
		HD bolts	kg	0.39	2,523	193.52	R 50.87	R 128,336.10	
		Steel handrailing	m	2.48	46	9.30	R 1,058.60	R 48,832.19	
		Grout	m3	994.87	0.989	0.18	R 6,900.00	R 6,823.49	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	169	0.04	R 49.68	R 8,419.05	R 1,170,505.34
		Working space	m2	7.47	23	1.41	R 35.23	R 799.33	
		Backfill	m3	4.63	37	0.74	R 36.76	R 1,345.59	
		Blinding	m2	1.22	182	19.45	R 63.86	R 11,619.71	
		Concrete bases	m3	0.00	222	0.00	R 1,242.00	R 275,724.00	
		Concrete column	m3	28.46	8	0.00	R 1,242.00	R 9,688.12	
		Concrete beam	m3	1.44	5	0.00	R 1,242.00	R 6,727.86	
		Concrete wall	m3	11.19	20	0.00	R 1,242.00	R 24,640.21	
		Concrete elevated slabs	m3	11.80	1	0.00	R 1,242.00	R 821.03	
		Total concrete	m3	0.00	256	0.00		R -	
		Wood float	m2	0.88	291	160.92	R 7.72	R 2,242.79	
		Formwork bases	m2	8.70	26	6.92	R 179.48	R 4,579.83	
		Formwork to columns	m2	0.15	52	5.95	R 195.28	R 10,155.27	
		Formwork to sides beams	m2	0.17	32	5.05	R 208.74	R 6,651.37	
		Formwork to soffits beams	m2	0.51	11	6.36	R 245.94	R 2,612.26	
		Formwork to soffts of slabs	m2	0.14	5	3.22	R 232.15	R 1,096.16	
		Formwork to pockets	m2	450.00	0	5.35	R 385.71	R 190.29	
		Formwork wall	m2	0.11	180	6.97	R 178.19	R 32,138.01	
		High tensile reinforcement	t	4.12	62.067	0.00	R 9,845.00	R 611,053.29	
		Cast in steel	kg	0.16	1,598	209.64	R 46.96	R 75,055.44	
		HD bolts	kg	0.24	1,065	171.78	R 57.31	R 61,065.01	
		Galvanised grating	m2	18.82	14	0.16	R 1,603.42	R 21,786.54	
		Grout	m3	822.89	0.270	6.14	R 7,762.50	R 2,094.17	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.48	243	0.05	R 62.10	R 15,072.91	R 2,764,317.93
	Working space	m2	0.38	639	1.56	R 39.81	R 25,426.64	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.98	123	0.78	R 79.62	R 9,759.72	
	Blinding	m2	4.71	35	21.03	R 59.06	R 2,056.39	
	Concrete bases	m3	0.00	164	0.00	R 1,242.00	R 203,688.00	
	Concrete column	m3	6.03	27	0.00	R 1,242.00	R 33,779.10	
	Concrete beam	m3	1.73	16	0.00	R 1,242.00	R 19,525.49	
	Concrete wall	m3	33.33	5	0.00	R 1,242.00	R 6,111.25	
	Concrete elevated slabs	m3	24.00	1	0.00	R 1,242.00	R 1,407.46	
	Total concrete	m3	0.00	213	0.00		R -	
	Wood float	m2	4.62	35	151.91	R 8.18	R 290.23	
	Formwork bases	m2	1.43	115	7.62	R 162.99	R 18,692.80	
	Formwork to columns	m2	0.13	209	6.99	R 198.40	R 41,507.87	
	Formwork to sides beams	m2	0.23	68	5.94	R 177.68	R 12,144.99	
	Formwork to soffits beams	m2	0.69	23	6.26	R 209.09	R 4,763.94	
	Formwork to soffts of slabs	m2	0.20	6	3.67	R 217.13	R 1,230.30	
	Formwork to pockets	m2	2.86	57	5.72	R 338.42	R 19,405.88	
	Formwork wall	m2	0.29	17	7.33	R 169.44	R 2,874.94	
	High tensile reinforcement	t	7.10	29.996	0.00	R 9,845.00	R 295,311.27	
	Cast in steel	kg	0.02	10,649	188.96	R 52.10	R 554,802.61	
	HD bolts	kg	0.01	21,297	197.35	R 49.89	R 1,062,432.25	
	Galvanised grating	m2	3.64	59	0.17	R 7,305.88	R 427,458.49	
	Grout	m3	40.32	4.067	6.09	R 1,616.58	R 6,575.39	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	111	0.05	R 62.10	R 6,875.71	R 1,640,124.47
	Working space	m2	2.26	49	1.69	R 36.75	R 1,800.21	
	Backfill	m3	1.23	90	0.76	R 81.71	R 7,355.28	
	Blinding	m2	3.82	17	19.66	R 63.17	R 1,058.41	
	Concrete	m3	0.00	64	0.00	R 1,242.00	R 79,488.00	
	Mesh reinforcement	m2	0.40	160	61.78	R 159.36	R 25,496.92	
	Rough formwork	m2	2.73	23	7.94	R 156.42	R 3,667.06	
	Smooth formwork	m2	0.56	114	6.78	R 183.19	R 20,935.52	
	Finish to concrete	m2	0.22	291	108.86	R 11.41	R 3,319.03	
	Construction joints	m	4.61	14	19.60	R 63.37	R 879.72	
	Movement joints	m	14.81	4	15.71	R 79.06	R 341.64	
	Cast in steel	kg	2.30	28	221.43	R 44.46	R 1,237.18	
	Grout	m3	803.00	0.080	0.16	R 7,762.50	R 618.68	
	Brick walls	m2	0.46	139	0.00	R 285.00	R 39,652.17	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	282	0.00		R -	
	Waterproofing membrane	m2	2.00	141	11.21	R 110.79	R 15,599.79	
	Roof construction	m2	1.99	142	34.10	R 288.71	R 40,854.60	
	Ceiling	m2	0.97	290	0.00	R 185.00	R 53,707.22	
	Doors and windows	No	434.63	1	0.15	R 1,900.00	R 1,231.02	
	Floor finish	m2	1.00	282	0.77	R 370.13	R 104,228.57	
	Wall finsih	m2	1.01	279	1.37	R 208.03	R 58,001.01	
	Rod reinforcement	t	8.63	7	0.00	R 9,845.00	R 73,010.43	
	Metalwork	Item	0.00	1	4.56	R 44,893.20	R 44,893.20	
	Structural steel	Item	0.00	1	11.81	R 116,269.45	R 116,269.45	
	Plumbing and drainage	Item	0.00	1	7.52	R 74,034.40	R 74,034.40	
	Small power and lighting	Item	0.00	1	64.07	R 630,769.15	R 630,769.15	
	External works	Item	0.00	1	189.05	R 234,800.10	R 234,800.10	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.16	R 1,242.00	R 105,570.00	R 2,038,954.55
	Earthworks	m3	2.30	196	8.34	R 148.92	R 29,114.03	
	Reinforcement	t	8.29	10	0.00	R 9,845.00	R 100,943.91	
	Mesh	m2	0.11	773	9.20	R 135.00	R 104,318.18	
	Formwork	m2	0.40	213	7.44	R 166.94	R 35,473.79	
	Brickwork	m2	5.73	116	5.65	R 219.82	R 25,511.75	
	Roof covering	m2	0.83	801	202.02	R 169.41	R 135,735.25	
	Structural steel	t	17.93	37	0.00	R 34,225.00	R 1,269,360.01	
	Side cladding	m2	1.49	446	0.95	R 160.94	R 71,830.36	
	Doors	No	371.00	2	0.49	R 16,770.25	R 30,059.88	
	Ridge ventilator	m	20.62	32	10.67	R 1,807.65	R 58,297.04	
	Aluminium insulation	m2	0.88	756	1.76	R 96.26	R 72,740.35	
	Total building area	m2	0.00	665	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	489	0.12	R 149.04	R 72,809.02	R 3,597,343.08
	Concrete	m3	0.00	177	0.00	R 1,242.00	R 219,834.00	
	Reinforcement	t	10.55	17	0.16	R 9,845.00	R 165,172.04	
	Mesh	m2	0.11	1,609	9.84	R 126.22	R 203,098.67	
	Formwork	m2	0.41	432	8.08	R 153.71	R 66,358.97	
	Brickwork	m2	5.78	165	5.59	R 222.18	R 36,710.08	
	Screed	m2	1.10	868	39.96	R 31.08	R 26,984.03	
	Structural steel	t	14.85	64	0.00	R 34,225.00	R 2,201,001.68	
	Cat ladders	m	2.52	26	9.58	R 3,572.55	R 91,170.50	
	Hand rail	m	0.72	89	26.40	R 1,296.40	R 115,793.44	
	Kick plates	m	0.73	88	2.64	R 491.06	R 43,260.31	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.87	1,098	193.17	R 177.18	R 194,485.80	
	Side cladding	m2	4.70	203	0.92	R 163.00	R 33,120.52	
	Floor grating	m2	1.06	61	16.28	R 2,102.27	R 127,544.02	
	Total buiding area	m2	0.00	955	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.39	186	7.88	R 157.61	R 29,387.17	R 489,247.48
	Blinding	m2	0.48	115	20.45	R 60.73	R 6,959.05	
	Concrete	m3	0.00	55	0.00	R 1,242.00	R 68,310.00	
	Reinforcement	t	8.00	7	0.00	R 9,845.00	R 67,684.38	
	Mesh	m2	0.50	110	48.38	R 203.49	R 22,384.25	
	Formwork	m2	0.35	157	7.78	R 159.64	R 25,086.30	
	Finish to concrete	m2	0.46	120	108.02	R 11.50	R 1,374.75	
	Movement joints	m	2.57	21	15.71	R 79.06	R 1,691.90	
	Cast in steel	kg	0.09	611	204.99	R 48.03	R 29,349.67	
	Grout	m3	72.28	0.761	2.62	R 7,305.88	R 5,559.26	
	Brickwork	m2	0.25	48	0.17	R 285.00	R 13,680.00	
	Doors and windows	No	3.00	4	0.28	R 3,166.67	R 12,666.67	
	Pipework	m	2.93	63	0.22	R 474.05	R 29,931.22	
	Bolts	kg	0.11	500	0.09	R 48.03	R 24,013.37	
	Structural steel	t	4.50	3	0.00	R 35,160.71	R 93,761.90	
	Miscellaneous steel	t	144.21	1	0.00	R 44,750.00	R 57,407.60	
	Total bridge area	m2	0.00	185	0.00		R -	
	Total control room area	m2	0.00	12	0.00		R -	
PUMP HOUSE	Earthworks	m3	7.76	0	6.28	R 197.77	R -	R -
	Blinding	m2	0.82	0	15.92	R 78.02	R -	
	Concrete	m3	0.00	0	0.00	R 1,242.00	R -	
	Reinforcement	t	5.77	0	0.00	R 9,845.00	R -	
	Formwork	m2	0.07	0	5.92	R 209.80	R -	
	Finish to concrete	m2	0.34	0	81.15	R 15.30	R -	
	Movement joints	m	0.46	0	15.43	R 80.49	R -	
	Cast in steel	kg	28.85	0.000	181.80	R 54.15	R -	
	Grout	m3	24.19	0.000	0.79	R 7,762.50	R -	
	Bolts	kg	121.43	0.000	0.16	R 42.78	R -	
	Structural steel	t	43.33	0.000	0.26	R 37,865.38	R -	
	Miscellaneous steel	t	24.14	0.000	0.18	R 54,694.44	R -	
	Brickwork	m2	0.60	0	4.81	R 258.21	R -	
	Roof covering	m2	1.79	0	1.32	R 195.62	R -	
	Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	172	7.10	R 174.93	R 30,086.14	R 965,595.46
	Blinding	m2	1.40	135	19.02	R 65.30	R 8,815.46	
	Concrete	m3	0.00	189	0.00	R 1,242.00	R 234,738.00	
	Reinforcement	t	5.77	32.756	0.00	R 9,845.00	R 322,479.20	
	Formwork	m2	0.20	945	7.01	R 177.18	R 167,430.81	
	Movement joint	m	1.86	102	0.13	R 84.66	R 8,602.81	
	Cast in steel	kg	0.15	1,260	14.67	R 45.96	R 57,914.47	
	Bolts	kg	0.39	485	214.19	R 57.18	R 27,709.60	
	Chemical anchors	No	7.24	26	0.25	R 239.83	R 6,260.74	
	Miscellaneous steelwork	t	91.86	2.057	172.18	R 39,380.00	R 81,023.51	
	Pre-cast concrete	m3	36.75	5	41.05	R 3,450.00	R 17,742.86	
	Brickwork	m2	8.86	11	0.36	R 260.38	R 2,791.86	
	Total area	m2	0.00	95	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	0	1.69	R 104.95	R -	R -
	Lining	m2	0.82	0	1.50	R 62.10	R -	
	Paving	m2	0.84	0	0.59	R 105.25	R -	
	Pipework	m	28.97	0	0.26	R 403.65	R -	
	Manholes	No	17.25	0	0.11	R 3,669.55	R -	
	Concrete	m3	2.90	0	0.05	R 1,242.00	R -	
	Formwork	m2	0.10	0	5.83	R 213.04	R -	
	Mesh	m2	0.78	0	7.36	R 168.75	R -	
	Reinforcement	t	5.63	0.000	0.14	R 9,845.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	247	5.85	R 212.31	R 52,431.51	R 496,402.04
	Blinding	m2	0.92	39	13.72	R 90.52	R 3,542.27	
	Concrete	m3	0.00	36	0.00	R 1,242.00	R 44,712.00	
	Reinforcement	t	4.44	8.108	0.00	R 9,845.00	R 79,824.32	
	Mesh	m2	1.14	32	41.22	R 238.84	R 7,542.33	
	Formwork	m2	0.15	240	5.63	R 220.60	R 52,944.94	
	Cast in steel	kg	0.03	1,200	157.23	R 62.62	R 75,138.33	
	Miscellaneous steelwork	t	13.35	3.296	0.18	R 54,694.44	R 180,266.33	
	Total tunnel length	m	0.00	44	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,288,526.56
	Steel	t	8.75	23.086	0.00	R 34,225.00	R 790,108.57	
	Handrail	m	1.45	139	25.58	R 1,337.96	R 186,391.58	
	Grating	m2	1.79	113	15.88	R 2,155.23	R 243,215.53	
	Kick flats	m	1.64	123	75.83	R 451.34	R 55,591.70	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	35	90.17	R 379.56	R 13,219.19	
	STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,745	0.00		R -	R 3,132,613.50
		Steel	t	23.48	74.319	0.00	R 34,225.00	R 2,543,553.02	
		Handrail	m	12.68	138	29.85	R 1,146.57	R 157,788.48	
		Grating	m2	12.33	142	16.37	R 2,090.71	R 295,887.85	
		Kick flats	m	12.52	139	77.41	R 442.13	R 61,622.24	
		Cat ladder	m	94.92	18	8.53	R 4,012.31	R 73,761.91	
	STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,885	0.00		R -	R 4,614,923.92
		Steel	t	64.24	60.476	0.00	R 34,225.00	R 2,069,802.69	
		Handrail	m	29.15	133	28.17	R 1,214.94	R 161,923.20	
		Grating	m2	3.70	1,050	15.96	R 2,144.42	R 2,251,644.74	
		Kick flats	m	32.29	120	77.41	R 442.13	R 53,194.82	
		Stair treads	No	217.41	18	91.87	R 372.54	R 6,657.04	
		Cat ladder	m	228.94	17	8.10	R 4,225.31	R 71,701.42	
	STRUCTURAL STEEL - STACK	Total volume	m3	0.00	345	0.00		R -	R 634,154.91
		Steel	t	22.16	15.569	0.00	R 34,225.00	R 532,835.06	
		Handrail	m	45.11	8	26.08	R 1,312.31	R 10,036.50	
		Grating	m2	58.13	6	15.86	R 2,157.94	R 12,807.34	
		Kick flats	m	42.58	8	77.41	R 442.13	R 3,582.28	
		Cat ladder	m	19.44	18	8.11	R 4,220.10	R 74,893.73	
	STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	199	0.00		R -	R 1,064,231.73
		Steel	t	13.69	14.536	0.00	R 34,225.00	R 497,500.00	
		Handrail	m	1.04	191	26.86	R 1,274.20	R 243,813.18	
		Grating	m2	1.91	104	15.68	R 2,182.72	R 227,413.95	
		Kick flats	m	1.08	184	76.30	R 448.56	R 82,651.02	
		Stair treads	No	5.57	36	95.13	R 359.77	R 12,853.57	
	STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	322	0.00		R -	R 1,110,668.69
		Steel	t	11.98	26.878	0.00	R 34,225.00	R 919,904.01	
		Handrail	m	22.00	15	26.10	R 1,311.30	R 19,192.70	
		Grating	m2	7.32	44	15.97	R 2,143.08	R 94,272.13	
		Kick flats	m	22.59	14	78.04	R 438.56	R 6,251.24	
		Cat ladder	m	18.87	17	8.22	R 4,163.63	R 71,048.61	
	PIPING INSTALLATION	Pipe length	m	0.00	46,112	0.00		R -	R 42,884,160.00
		Total work units	WU	0.30	153,707	0.00	R 279.00	R 42,884,160.00	
		Pipe supports	kg	2.49	18,519	0.00		R -	
		WU for pipe supports	WU	0.16	24,593	0.00		R -	
		Number of welds	No	0.56	25,823	0.00		R -	
		Total fittings	No	0.39	17,984	0.00		R -	
		Stud bolts	No	0.35	6,294	0.00		R -	
		Support number	No	0.19	3,519	0.00		R -	
	RADIOGRAPHIC	Total work units	WU	0.00	153,707	0.00	R 279.00		R 139,727.87

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	2,765	5.52	R 50.54	R 139,727.87	
DYE PENETRATION	Total work units	WU	0.00	153,707	0.00	R 279.00		R 86,210.56
TESTING (DP)	Number of examinations	No	164.17	936	3.03	R 92.08	R 86,210.56	
MAGNETIC PARTICLE	Total work units	WU	0.00	153,707	0.00	R 279.00		R 82,855.69
TESTING (MPI)	Number of examinations	No	273.85	561	1.89	R 147.62	R 82,855.69	
POST WELD HEAT	Total work units	WU	0.00	153,707	0.00	R 279.00		R 141,913.60
TREATMENT	Number of examinations	No	46.49	3,306	6.50	R 42.92	R 141,913.60	
MATERIAL HARDNESS	Total work units	WU	0.00	153,707	0.00	R 279.00		R 168,227.67
TEST (HT)	Number of examinations	No	106.66	1,441	2.39	R 116.74	R 168,227.67	
MECHANICAL	Total work units	WU	0.00	153,707	0.00	R 279.00		R 248,584.23
INSTALLATION	Mechanical equipment	t	236.32	650	0.73	R 382.19	R 248,584.23	
	Structural steel	t	192.98	796	54.54			
	Total work units	WU	0.00	153,707	0.00	R 279.00		R 3,158,250.90
PAINTING & INSULATION	Painting to piping	m2	16.80	9,149	0.32	R 118.72	R 1,086,224.92	
	Insulation to piping	m2	48.21	3,188	2.35	R 371.01	R 1,182,883.40	
	Mechanical equipment received	t	0.00	650	0.81	R 382.19	R 248,584.23	
	Painting to mechanical equipment	m2	0.23	2,828	3.37	R 113.41	R 320,712.46	
	Insulation to mechanical equipment	m2	0.67	971	1.16	R 329.48	R 319,845.89	
ELECTRICAL &	Electrical cable	m	22.74	29,421	0.00	R 44.50	R 1,309,234.50	R 4,489,778.67
INSTRUMENTATION -	Electrical cable terminations	No	276.76	1,294	0.38	R 117.11	R 151,510.73	
INSTALLATION ONLY	Electrical equipment	No	8.25	106	0.10	R 445.00	R 47,305.77	
	DB's	No	5.97	13	0.28	R 1,589.29	R 20,478.69	
	Rack	m	0.59	4,928	1.65	R 139.06	R 685,319.57	
	Support steel	kg	1.34	8,353	1.99	R 22.36	R 186,783.29	
	Instrumentation cable	m	23.73	27,442	0.32	R 28.50	R 782,097.00	
	Instruments	No	0.44	1,156	0.16	R 178.13	R 205,988.46	
	Hook-ups	No	3.69	2,628	0.15	R 190.00	R 499,365.97	
	Light fittings	No	9.97	392	0.02	R 278.13	R 109,098.93	
	Conduit	m	3.99	2,951	0.11	R 26.97	R 79,586.30	
	Instrument stands	No	0.00	290		R 1,425.00	R 413,009.45	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project H				
Location:	South Africa				
Client:			Date of estimate:	2005	

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,442	R	3.77
2	Concrete demolitions	m3	23	R	1,313.25
3	Bulk excavation	m3	5,842	R	40.05
4	Vertical piles	No	65		
5	Raking piles	No	10		
6	Concrete in piles	m3		R	1,242.00
7	Auger pile	m		R	292.00
8	Total paving and asphalt to road works	m2	3,002		
9	Grey paving to road works	m2	115	R	124.00
10	Asphalt to road surface	m2	2,887		
11	Rip bed of road works	m2	3,002	R	10.20
12	Total concrete in paving and bunding	m3	274	R	1,242.00
13	Concrete in paving	m3	108		
14	Rod reinforcement	t		R	9,845.00
15	Concrete in plinths and bases on area finishing	m3	168		
16	Stormwater pipe to drain surface run-off	m	165		
17	Machine excavation	m3		R	49.20
18	Concrete in pump and pipe support bases	m3	89	R	1,242.00
19	Concrete in tank bases	m3	174	R	1,242.00
20	Concrete in pipe and cable rack foundations	m3	202	R	1,242.00
21	Concrete to simple structural foundations	m3	304	R	1,242.00
22	Complex structural foundations - bases	m3	0	R	1,242.00
23	Concrete pipe racks - bases	m3	66	R	1,242.00
24	Concrete structure including concrete columns and beams - bases	m3	285	R	1,242.00
25	Major equipment bases with blast proof walls - bases	m3	222	R	1,242.00
26	Major equipment bases and elevated concrete structure - bases	m3	164	R	1,242.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	64	R	1,242.00
28	One brick wall	m2		R	285.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,242.00
30	Total building area - Structural steel buildings	m2	665		
31	Ceiling	m2		R	185.00
32	Structural steel	t		R	34,225.00
33	Steel canopy - concrete	m3	177	R	1,242.00
34	Steel canopy - area	m2	955		
35	Concrete in weighbridge - all concrete	m3	55	R	1,242.00
36	Total weighbridge area	m2	185		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,242.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	189	R	1,242.00
41	Total cooling tower area	m2	95		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	36	R	1,242.00
44	Total lengh of cable tunnel	m	44		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	1,745		
47	Total volume of steel complex steel structure	m3	3,885		
48	Total volume of steel in stack	m3	345		
49	Total volume of steel in walkway	m3	199		
50	Total volume of steel in cable gantry	m3	322		
51	Piping work unit cost	WU		R	279.00
52	Total process pipe length	m	46,112		
53	Total electrical cable - installation only	m	29,421	R	44.50
54	Total instrumentation cable - installation only	m	27,442	R	32.55

Ratio: Variable ratio

Variables

Material	Simple	Mean
Labour	Normal	Mean
Engineering design	Normal	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Normal	Mean
Weather	Normal	Mean
Access	Poor	Mean
Project size	Medium	Mean
Project conditions	Poor	Mean
Complexity	Complex	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project H			
Location:	South Africa			
Client:	0	Date of estimate:	2005	

	CIVIL CONSTRUCTION COST				R 38,463,598.25
A	SITE CLEARANCE AND DEMOLITIONS		R	92,191.09	
B	BULK EARTHWORKS		R	493,457.21	
C	PILING		R	2,103,867.46	
D	ROAD WORKS		R	1,313,737.00	
E	GENERAL PAVING AND BUNDED AREAS		R	591,520.81	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	747,997.67	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	473,037.35	
H	TANK BASES AND BUNDING		R	2,276,271.41	
I	RACK FOUNDATIONS		R	1,319,246.89	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,397,768.51	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	687,413.15	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,110,514.20	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,259,034.95	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,361,954.94	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,570,180.09	
Q	BUILDINGS - STEEL		R	1,935,511.98	
R	CANOPIES - STEEL		R	3,534,390.02	
S	WEIGHBRIDGE		R	545,929.22	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	1,058,320.07	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	619,210.24	
	Preliminaries and General	35.00%	R	9,972,043.99	
	STRUCTURAL STEEL				R 14,653,534.30
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,154,766.12	
B	STRUCTURAL STEEL - PIPERACK		R	2,630,561.73	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	4,200,521.46	
D	STRUCTURAL STEEL - STACK		R	559,721.59	
E	STRUCTURAL STEEL - WALKWAY		R	896,036.81	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,025,202.50	
	Preliminaries and General	40.00%	R	4,186,724.09	
	MECHANICAL AND PIPING				R 54,035,118.85
A	PIPING INSTALLATION		R	37,998,622.78	
B	RADIOGRAPHIC EXAMINATION (RT)		R	107,260.30	
C	DYE PENETRATION TESTING (DP)		R	40,384.56	
D	MAGNETIC PARTICLE TESTING (MPI)		R	61,446.78	
E	POST WELD HEAT TREATMENT		R	106,955.64	
F	MATERIAL HARDNESS TEST (HT)		R	85,076.17	
H	MECHANICAL INSTALLATION		R	196,767.24	
	Preliminaries and General	40.00%	R	15,438,605.39	
	PAINTING AND INSULATION				R 3,201,305.71
A	PAINTING AND INSULATION		R	2,371,337.56	
	Preliminaries and General	35.00%	R	829,968.15	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 5,352,213.57
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	3,964,602.64	
	Preliminaries and General	35.00%	R	1,387,610.93	

TOTAL COST	R	115,705,770.68

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,442		R 3.77	R 61,986.34	R 92,191.09
	Concrete demolitions	m3		23		R 1,313.25	R 30,204.75	
BULK EARTHWORKS	Bulk excavation	m3		5,842		R 40.05	R 233,972.10	R 493,457.21
	Trimming of sides	m2	2.17	2,690	4.28	R 9.35	R 25,146.04	
	Back fill and compact	m3	1.14	5,115	0.99	R 40.37	R 206,475.93	
	Overhaul	m3/km	1.74	3,355	11.32	R 3.54	R 11,871.19	
	Rip bed	m2	1.79	3,273	8.20	R 4.89	R 15,991.94	
PILING	Site establishment of rig	Item	0.00	1	191.65	R 238,034.62	R 238,034.62	R 2,103,867.46
	EO for raking equipment	Item	0.00	1	23.82	R 29,581.78	R 29,581.78	
	Number of piles	No	0.00	65	0.00		R -	
	Move rig to new position	No	1.49	44	0.18	R 225.33	R 9,863.12	
	Number of raking piles	No	18.48	4	0.00		R -	
	EO for setting up raking piles	No	0.93	4	0.28	R 345.10	R 1,308.40	
	EO for raking drilling	m	0.15	23	0.87	R 255.08	R 5,953.95	
	Auger quantity	m	0.05	1,300	0.00	R 292.00	R 379,600.00	
	EO for drilling in coarse gravel	m	0.53	123	0.22	R 270.58	R 33,318.88	
	EO for drilling in boulders	m	1.82	36	0.50	R 620.11	R 22,164.29	
	EO for drilling in soft rock	m	1.65	40	0.23	R 289.21	R 11,427.69	
	Temporary casings	m	0.37	178	0.35	R 440.02	R 78,360.23	
	EO casing to raking pile	m	0.18	20	0.51	R 1,119.57	R 22,144.21	
	Mild steel rod reinforcement	t	14.33	4.537	0.90	R 8,147.30	R 36,963.03	
	High tensile rod reinforcement	t	1.30	50.000	7.28	R 9,038.21	R 451,910.57	
	Concrete to piles and bases	m3	0.15	423	0.00	R 1,242.00	R 525,683.72	
	Concrete to raking piles	m3	0.07	50	1.06	R 1,320.96	R 65,714.26	
	Site establishment of test equipment	Item	0.00	1	110.19	R 136,856.87	R 136,856.87	
	Load test to pile	No	98.13	1	27.02	R 33,559.73	R 22,228.87	
	Site establishment of intergity testing	No	257.86	0	48.69	R 60,470.32	R 15,243.04	
	Integrity testing of piles	No	1.25	52	0.27	R 337.11	R 17,509.93	
ROAD WORKS	Red paving	m2	0.15	17	0.97	R 120.19	R 2,102.92	R 1,313,737.00
	Grey paving	m2	0.00	115	0.00	R 124.00	R 14,260.00	
	Kerbing	m	0.13	392	0.00	R 198.17	R 77,763.32	
	Total paving and asphalt	m2	0.00	3,002	0.00		R -	
	Remove top soil	m3	0.54	422	5.84	R 59.60	R 25,182.38	
	Asphalt	m2	0.26	776	0.00	R 141.30	R 109,684.61	
	Rip bed	m2	0.00	3,002	0.00	R 10.20	R 30,620.40	
	Reduce levels	m3	0.42	1,265	4.98	R 50.80	R 64,263.47	
	Selected fill	m3	1.67	759	0.53	R 95.20	R 72,274.47	
	Imported fill	m3	2.21	343	0.39	R 247.27	R 84,861.56	
	Wearing course	m3	3.86	328	0.29	R 174.73	R 57,225.44	
	Prime	m2	4.78	3,632	1.48	R 50.34	R 182,834.48	
	Three line road marking	m	0.83	3,022	0.20	R 40.34	R 121,932.88	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	400	4.23	R 10.62	R 4,246.23	
	1m Wide concrete V-drain	m	0.95	374	0.80	R 895.31	R 334,761.16	
	200mm Diameter PVC pipe	m	0.96	377	0.11	R 276.31	R 104,087.31	
	Road marking - STOP	No	0.15	59	0.05	R 306.03	R 18,013.32	
	Standard signage	No	0.01	4	4.52	R 383.60	R 1,505.28	
	100mm Painted line	m	1.80	708	1.39	R 11.47	R 8,117.78	
			0.00		1.54			
			0.00		1.94			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.04	108	0.74	R 1,242.00	R 134,136.00	R 591,520.81
		Concrete in plinths	m3	0.00	21	0.00	R 1,242.00	R 26,621.83	
		Total concrete	m3	0.00	274	0.00		R -	
		Rip and compact	m2	0.13	835	187.60	R 6.62	R 5,530.53	
		Formwork to plinth	m2	7.47	160	0.13	R 157.02	R 25,156.65	
		Formwork to slab	m2	0.84	91	0.15	R 185.41	R 16,863.56	
		High tensile steel	t	0.01	2.740	0.00	R 9,845.00	R 26,975.30	
		Mesh	m2	581.69	1,594	51.32	R 191.85	R 305,783.52	
		Construction joint	m	4.07	440	0.05	R 62.10	R 27,306.26	
		Expansion joint	m	2.26	244	0.08	R 94.92	R 23,147.15	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.74	3,837	0.00		R -	R 747,997.67
		Base excavation	m3	1.47	370	0.00	R 49.20	R 18,194.72	
		Backfill	m3	0.60	252	0.62	R 79.17	R 19,956.38	
		Working space	m2	0.45	621	1.42	R 55.84	R 34,664.39	
		Concrete in bases	m3	0.04	168	25.37	R 1,242.00	R 208,656.00	
		Blinding	m2	0.82	228	20.61	R 60.25	R 13,718.09	
		Concrete in sump walls	m3	0.10	16	29.40	R 1,242.00	R 20,418.48	
		Concrete in slabs	m3	0.02	3	0.91	R 1,242.00	R 4,024.08	
		Total concrete	m3	0.00	188	0.04		R -	
		Wood float	m2	0.69	273	157.44	R 7.89	R 2,150.24	
		Formwork to bases	m2	1.68	283	0.12	R 150.81	R 42,620.12	
		Formwork to sump walls	m2	12.75	210	0.13	R 156.14	R 32,722.41	
		Formwork to sides of slab	m2	5.97	19	0.19	R 229.77	R 4,444.93	
		Mild steel reinforcement	t	0.11	2.023	0.00	R 9,845.00	R 19,916.20	
		High tensile reinforcement	t	10.27	18.272	1.13	R 9,845.00	R 179,888.28	
		Cast in steel	kg	0.46	368	33.67	R 36.89	R 13,555.27	
		Waterstop	m	0.42	39	8.00	R 155.21	R 6,044.46	
		Manhole	No	0.08	13	2.66	R 3,729.33	R 50,106.21	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	165	0.13	R 466.17	R 76,917.43	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.71	152	0.05	R 49.20	R 7,478.36	R 473,037.35
	Working space	m2	0.39	395	0.67	R 32.75	R 12,931.05	
	Backfill	m3	4.47	34	1.31	R 64.52	R 2,192.98	
	Concrete bases	m3	1.03	89	0.00	R 1,242.00	R 110,538.00	
	Concrete plinth	m3	2.24	40	0.00	R 1,242.00	R 49,394.57	
	Total concrete	m3	0.00	129	0.00		R -	
	Wood float	m2	0.48	83	0.05	R 12.42	R 1,033.67	
	Blinding	m2	1.03	86	0.01	R 67.42	R 5,829.90	
	Formwork bases	m2	0.49	183	0.13	R 164.12	R 30,072.84	
	Formwork plinth	m2	0.59	67	0.12	R 149.04	R 10,058.53	
	High tensile reinforcement	t	10.01	12.868	7.28	R 9,845.00	R 126,683.76	
	Cast in steel	kg	0.11	1,186	0.03	R 37.26	R 44,191.90	
	HD Bolts	kg	0.08	1,624	0.03	R 39.03	R 63,396.70	
	Grout	m3	35.25	1.128	6.59	R 8,184.78	R 9,235.08	
TANK BASES AND BUNDING	Restricted excavation	m3	5.92	1,029	0.05	R 61.21	R 63,000.88	R 2,276,271.41
	Working space	m2	4.40	234	1.62	R 37.74	R 8,831.13	
	Backfill	m3	1.38	744	0.72	R 85.02	R 63,243.02	
	Concrete bases	m3	0.75	174	0.00	R 1,242.00	R 216,108.00	
	Concrete sump wall	m3	2.86	61	0.00	R 1,242.00	R 75,449.18	
	Concrete slab	m3	0.56	309	0.00	R 1,242.00	R 383,948.22	
	Concrete plinth	m3	4.19	42	20.69	R 1,242.00	R 51,568.30	
	Concrete column	m3	19.48	9	165.17	R 1,242.00	R 11,094.65	
	Total concrete	m3	0.00	594	1.11		R -	
	Blinding	m2	2.65	225	1.04	R 60.04	R 13,481.01	
	Wood float	m2	0.26	2,331	1.13	R 7.52	R 17,525.75	
	Formwork to bases	m2	0.42	419	1.15	R 152.62	R 63,880.14	
	Formwork to plinths	m2	0.34	121	8.14	R 163.02	R 19,783.44	
	Formwork to columns	m2	0.12	75	7.62	R 175.42	R 13,136.87	
	Formwork to sumps	m2	0.12	525	7.08	R 167.37	R 87,866.19	
	Formwork to slabs	m2	4.08	76	7.42	R 150.05	R 11,371.25	
	Formwork to slabs n/e 300mm	m	2.20	140	8.28	R 52.59	R 7,380.27	
	Mild steel reinforcement	t	0.23	5.928	23.62	R 9,845.00	R 58,365.36	
	High tensile reinforcement	t	23.27	25.538	1.00	R 9,845.00	R 251,420.01	
	Mesh	m2	0.16	1,890	61.15	R 160.99	R 304,261.96	
	Cast in items	kg	0.19	3,093	213.99	R 46.01	R 142,308.35	
	HD Bolts	kg	0.10	6,164	209.25	R 47.05	R 289,990.84	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.65	2.904	0.17	R 7,275.31	R 21,128.38	
	Construction joint	m	0.30	1,033	24.51	R 50.67	R 52,333.54	
	Expansion joint	m	0.47	663	16.87	R 73.62	R 48,794.68	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.66	739	0.05	R 61.21	R 45,211.73	R 1,319,246.89
	Working space	m2	0.40	1,866	1.91	R 116.65	R 217,734.46	
	Backfill	m3	2.40	308	0.86	R 71.47	R 22,029.04	
	Blinding	m2	0.37	546	22.35	R 55.56	R 30,332.66	
	Concrete bases	m3	5.70	202	0.00	R 1,242.00	R 250,884.00	
	Concrete plinth	m3	0.00	35	0.00	R 1,242.00	R 44,053.38	
	Total concrete	m3	0.00	237	1.33		R -	
	Wood float	m2	0.36	563	175.17	R 7.09	R 3,994.25	
	Formwork bases	m2	0.47	431	9.56	R 129.96	R 56,023.35	
	Formwork plinths	m2	0.09	382	7.11	R 174.75	R 66,752.71	
	High tensile reinforcement	t	9.42	25.201	0.00	R 9,845.00	R 248,108.32	
	HD Bolts	kg	0.03	7,251	225.39	R 43.68	R 316,736.88	
	Grout	m3	79.22	2.550	0.18	R 6,818.82	R 17,386.11	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.30	1,307	0.06	R 70.97	R 92,727.62	R 2,397,768.51
	Working space	m2	0.50	2,598	1.96	R 36.17	R 93,979.66	
	Backfill	m3	2.62	498	0.79	R 89.35	R 44,510.01	
	Blinding	m2	0.33	921	21.27	R 58.38	R 53,780.68	
	Concrete bases	m3	0.00	304	0.00	R 1,242.00	R 377,568.00	
	Concrete plinth	m3	2.60	82	0.00	R 1,242.00	R 102,242.79	
	Concrete slab	m3	3.69	117	0.00	R 1,242.00	R 145,218.46	
	Total concrete	m3	0.00	503	0.00		R -	
	Wood float	m2	0.55	915	162.83	R 7.63	R 6,979.01	
	Formwork bases	m2	0.49	619	8.34	R 148.93	R 92,131.03	
	Formwork plinths	m2	0.11	768	8.31	R 149.54	R 114,892.71	
	High tensile reinforcement	t	13.21	38.087	0.00	R 9,845.00	R 374,971.04	
	HD Bolts	kg	0.02	13,729	216.56	R 45.46	R 624,123.08	
	Cast in items	kg	0.05	5,911	240.73	R 40.90	R 241,741.97	
	Grout	m3	68.95	4.409	0.17	R 7,462.66	R 32,902.47	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.10	0	0.05	R 65.65	R -	R -
	Working space	m2	0.56	0	1.72	R 38.15	R -	
	Backfill	m3	2.14	0	0.79	R 83.33	R -	
	Blinding	m2	0.64	0	20.41	R 60.86	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,242.00	R -	
	Concrete column	m3	27.56	0	0.00	R 1,242.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.15	0	0.00	R 1,242.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.60	0	158.92	R 7.82	R -	
	Formwork bases	m2	0.51	0	8.08	R 153.67	R -	
	Formwork plinths	m2	0.33	0	7.32	R 169.59	R -	
	Formwork to columns	m2	0.28	0	7.97	R 155.78	R -	
	High tensile reinforcement	t	9.23	0.000	0.00	R 9,845.00	R -	
	HD bolts	kg	0.04	0	209.15	R 47.07	R -	
	Grout	m3	108.09	0.000	0.16	R 7,560.00	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.83	187	0.06	R 70.97	R 13,269.43	R 687,413.15
	Working space	m2	0.30	622	2.10	R 33.84	R 21,041.18	
	Backfill	m3	2.04	92	0.82	R 86.70	R 7,954.66	
	Blinding	m2	0.68	98	20.24	R 61.38	R 5,988.60	
	Concrete bases	m3	0.00	66	0.00	R 1,242.00	R 81,972.00	
	Concrete column	m3	1.19	60	152.96	R 1,242.00	R 73,907.24	
	Concrete beam	m3	2.67	22	0.94	R 1,242.00	R 27,673.21	
	Total concrete	m3	2.96	148	0.94		R -	
	Wood float	m2	0.47	141	7.45	R 8.12	R 1,142.00	
	Formwork bases	m2	0.48	138	6.66	R 166.63	R 22,980.23	
	Formwork to columns	m2	0.16	377	8.03	R 154.74	R 58,331.13	
	Formwork to sides beams	m2	0.33	67	6.10	R 186.49	R 12,564.13	
	Formwork to soffits beams	m2	0.69	32	6.66	R 203.51	R 6,592.17	
	Formwork corbels	m2	10.81	6	5.39	R 230.27	R 1,267.36	
	High tensile reinforcement	t	9.19	16.080	0.00	R 9,845.00	R 158,308.79	
	Cast in steel	kg	0.03	4,926	258.51	R 38.08	R 187,612.99	
	HD bolts	kg	1.49	99	215.22	R 45.74	R 4,537.22	
	Grout	m3	500.72	0.295	0.16	R 7,693.81	R 2,270.83	
	Restricted excavation	m3	3.81	1,087	0.05	R 62.99	R 68,471.52	R 3,110,514.20
	Working space	m2	0.61	1,770	1.79	R 35.26	R 62,395.59	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Backfill	m3	1.15	942	0.78	R 80.46	R 75,772.94	
	Blinding	m2	0.62	458	20.46	R 60.69	R 27,770.35	
	Concrete bases	m3	0.00	285	0.98	R 1,242.00	R 353,970.00	
	Concrete column	m3	2.47	115	1.10	R 1,242.00	R 143,307.69	
	Concrete beam	m3	0.85	135	1.03	R 1,242.00	R 168,173.32	
	Concrete surface slab	m3	1.67	171	0.98	R 1,242.00	R 212,139.55	
	Concrete wall	m3	2.52	46	1.04	R 1,242.00	R 56,771.58	
	Concrete elevated slab	m3	1.10	105	0.00	R 1,242.00	R 130,110.75	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	857	0.00		R -	
		Wood float	m2	0.64	1,341	170.05	R 7.30	R 9,791.81	
		Formwork bases	m2	0.41	702	7.67	R 161.85	R 113,696.90	
		Formwork to columns	m2	0.17	670	6.28	R 197.79	R 132,577.63	
		Formwork to sides beams	m2	0.29	462	5.06	R 245.35	R 113,440.17	
		Formwork to soffits beams	m2	0.83	163	7.57	R 164.13	R 26,753.06	
		Formwork to soffts of slabs	m2	0.31	548	3.12	R 210.92	R 115,678.66	
		Formwork to pockets	m2	26.36	4	5.89	R 397.62	R 1,740.54	
		Formwork wall	m2	0.13	352	8.21	R 151.28	R 53,191.78	
		High tensile reinforcement	t	8.90	96.268	0.00	R 9,845.00	R 947,762.08	
		Cast in steel	kg	0.22	3,846	252.11	R 39.05	R 150,180.00	
		HD bolts	kg	0.41	2,076	200.21	R 49.17	R 102,079.86	
		Steel handrailing	m	2.56	38	9.50	R 1,036.55	R 39,033.73	
		Grout	m3	1,028.48	0.833	0.18	R 6,845.67	R 5,704.69	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.22	182	0.04	R 49.68	R 9,056.04	R 1,259,034.95
		Working space	m2	7.77	23	1.46	R 34.13	R 800.79	
		Backfill	m3	4.04	45	0.63	R 31.30	R 1,413.95	
		Blinding	m2	1.04	214	17.58	R 70.63	R 15,149.89	
		Concrete bases	m3	0.00	222	0.00	R 1,242.00	R 275,724.00	
		Concrete column	m3	25.49	9	0.00	R 1,242.00	R 10,818.77	
		Concrete beam	m3	1.47	6	0.00	R 1,242.00	R 7,370.45	
		Concrete wall	m3	10.29	22	0.00	R 1,242.00	R 26,787.90	
		Concrete elevated slabs	m3	11.10	1	0.00	R 1,242.00	R 974.60	
		Total concrete	m3	0.00	259	0.00		R -	
		Wood float	m2	0.80	325	138.65	R 8.96	R 2,912.98	
		Formwork bases	m2	8.49	26	7.04	R 176.33	R 4,609.22	
		Formwork to columns	m2	0.14	63	5.44	R 201.67	R 12,677.22	
		Formwork to sides beams	m2	0.16	36	4.70	R 228.46	R 8,252.40	
		Formwork to soffits beams	m2	0.48	12	6.16	R 264.38	R 3,249.19	
		Formwork to soffts of slabs	m2	0.13	6	2.89	R 263.18	R 1,624.27	
		Formwork to pockets	m2	405.53	1	4.72	R 429.97	R 235.38	
		Formwork wall	m2	0.10	216	6.38	R 194.65	R 41,982.60	
		High tensile reinforcement	t	3.95	65.522	0.00	R 9,845.00	R 645,061.73	
		Cast in steel	kg	0.15	1,769	197.64	R 49.81	R 88,108.54	
		HD bolts	kg	0.21	1,221	168.72	R 58.35	R 71,237.73	
		Galvanised grating	m2	16.80	15	0.15	R 1,858.30	R 28,644.91	
		Grout	m3	773.69	0.287	5.30	R 8,163.38	R 2,342.36	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	259	0.05	R 64.76	R 16,758.22	R 2,361,954.94
	Working space	m2	0.41	634	1.77	R 36.62	R 23,232.57	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.01	129	0.80	R 80.59	R 10,379.15	
	Blinding	m2	4.78	34	20.36	R 61.02	R 2,091.59	
	Concrete bases	m3	0.00	164	0.00	R 1,242.00	R 203,688.00	
	Concrete column	m3	6.57	25	0.00	R 1,242.00	R 30,992.63	
	Concrete beam	m3	2.01	12	0.00	R 1,242.00	R 15,430.19	
	Concrete wall	m3	35.56	5	0.00	R 1,242.00	R 5,727.89	
	Concrete elevated slabs	m3	24.78	1	0.00	R 1,242.00	R 1,250.68	
	Total concrete	m3	0.00	207	0.00		R -	
	Wood float	m2	4.76	34	160.10	R 7.76	R 267.52	
	Formwork bases	m2	1.41	116	8.00	R 155.18	R 18,031.12	
	Formwork to columns	m2	0.15	170	6.95	R 182.17	R 31,044.50	
	Formwork to sides beams	m2	0.23	53	6.40	R 178.67	R 9,503.36	
	Formwork to soffits beams	m2	0.75	17	6.82	R 194.00	R 3,228.92	
	Formwork to soffts of slabs	m2	0.22	5	3.89	R 199.08	R 923.24	
	Formwork to pockets	m2	3.00	55	6.24	R 319.51	R 17,454.35	
	Formwork wall	m2	0.29	16	7.60	R 163.53	R 2,575.20	
	High tensile reinforcement	t	7.30	28.353	0.00	R 9,845.00	R 279,134.12	
	Cast in steel	kg	0.02	10,350	212.51	R 46.33	R 479,476.63	
	HD bolts	kg	0.01	18,112	209.96	R 46.89	R 849,263.33	
	Galvanised grating	m2	3.99	52	0.18	R 6,845.67	R 355,463.06	
	Grout	m3	41.04	3.996	6.51	R 1,511.29	R 6,038.65	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.85	118	0.05	R 62.99	R 7,437.52	R 1,570,180.09
	Working space	m2	2.55	46	1.86	R 33.93	R 1,572.00	
	Backfill	m3	1.25	94	0.78	R 80.68	R 7,595.21	
	Blinding	m2	3.79	17	20.67	R 60.09	R 1,014.12	
	Concrete	m3	0.00	64	0.00	R 1,242.00	R 79,488.00	
	Mesh reinforcement	m2	0.50	129	66.66	R 147.70	R 19,041.31	
	Rough formwork	m2	3.05	21	8.77	R 141.70	R 2,976.86	
	Smooth formwork	m2	0.57	113	6.81	R 182.38	R 20,606.74	
	Finish to concrete	m2	0.23	280	106.37	R 11.68	R 3,269.32	
	Construction joints	m	4.87	13	21.19	R 58.62	R 769.67	
	Movement joints	m	15.05	4	17.26	R 71.97	R 305.98	
	Cast in steel	kg	2.31	28	235.64	R 41.78	R 1,156.81	
	Grout	m3	867.92	0.074	0.18	R 7,039.68	R 519.10	
	Brick walls	m2	0.48	132	0.00	R 285.00	R 37,719.35	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.53	290	0.00		R -	
	Waterproofing membrane	m2	2.21	131	11.77	R 105.52	R 13,830.96	
	Roof construction	m2	1.99	146	38.82	R 253.60	R 36,965.93	
	Ceiling	m2	0.99	294	0.00	R 185.00	R 54,460.57	
	Doors and windows	No	468.59	1	0.17	R 1,683.54	R 1,041.78	
	Floor finish	m2	1.01	287	0.79	R 358.81	R 103,086.22	
	Wall finsih	m2	1.03	281	1.47	R 194.35	R 54,675.44	
	Rod reinforcement	t	9.10	7	0.00	R 9,845.00	R 69,228.69	
	Metalwork	Item	0.00	1	4.39	R 43,212.52	R 43,212.52	
	Structural steel	Item	0.00	1	11.36	R 111,860.30	R 111,860.30	
	Plumbing and drainage	Item	0.00	1	7.24	R 71,228.58	R 71,228.58	
	Small power and lighting	Item	0.00	1	61.64	R 606,852.83	R 606,852.83	
	External works	Item	0.00	1	177.35	R 220,264.26	R 220,264.26	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.18	R 1,242.00	R 105,570.00	R 1,935,511.98
	Earthworks	m3	2.35	200	9.05	R 137.28	R 27,388.52	
	Reinforcement	t	8.89	10	0.00	R 9,845.00	R 94,184.02	
	Mesh	m2	0.12	735	10.31	R 120.46	R 88,484.01	
	Formwork	m2	0.40	212	7.96	R 156.00	R 33,032.48	
	Brickwork	m2	6.10	109	6.09	R 203.96	R 22,243.32	
	Roof covering	m2	0.87	767	214.05	R 159.89	R 122,620.23	
	Structural steel	t	18.63	36	0.00	R 34,225.00	R 1,221,805.86	
	Side cladding	m2	1.55	428	0.99	R 157.50	R 67,446.20	
	Doors	No	409.70	2	0.50	R 17,185.84	R 27,894.86	
	Ridge ventilator	m	21.58	31	11.69	R 1,869.04	R 57,586.07	
	Aluminium insulation	m2	0.90	743	1.77	R 90.52	R 67,256.41	
	Total building area	m2	0.00	665	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.25	575	0.13	R 157.91	R 90,738.73	R 3,534,390.02
	Concrete	m3	0.00	177	0.00	R 1,242.00	R 219,834.00	
	Reinforcement	t	10.82	16	0.18	R 9,845.00	R 160,997.23	
	Mesh	m2	0.12	1,484	10.17	R 122.12	R 181,198.66	
	Formwork	m2	0.43	408	8.34	R 148.91	R 60,789.83	
	Brickwork	m2	6.01	159	5.76	R 215.54	R 34,230.12	
	Screed	m2	1.13	849	41.93	R 29.62	R 25,146.91	
	Structural steel	t	14.89	64	0.00	R 34,225.00	R 2,194,457.37	
	Cat ladders	m	2.74	23	9.62	R 3,559.01	R 83,392.93	
	Hand rail	m	0.73	88	27.12	R 1,262.02	R 111,283.09	
	Kick plates	m	0.76	85	2.82	R 448.09	R 37,875.09	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.92	1,037	193.79	R 176.61	R 183,189.34	
		Side cladding	m2	4.83	198	0.94	R 165.26	R 32,685.09	
		Floor grating	m2	1.08	59	17.15	R 1,995.88	R 118,571.65	
		Total buiding area	m2	0.00	955	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.29	181	8.15	R 152.31	R 27,554.97	R 545,929.22
		Blinding	m2	0.47	117	18.88	R 65.77	R 7,673.34	
		Concrete	m3	0.00	55	0.00	R 1,242.00	R 68,310.00	
		Reinforcement	t	8.12	7	0.00	R 9,845.00	R 66,707.59	
		Mesh	m2	0.49	112	49.26	R 199.87	R 22,467.41	
		Formwork	m2	0.31	178	7.54	R 164.71	R 29,289.50	
		Finish to concrete	m2	0.45	123	103.79	R 11.97	R 1,471.90	
		Movement joints	m	2.48	22	15.44	R 80.46	R 1,787.55	
		Cast in steel	kg	0.09	647	174.95	R 56.27	R 36,412.98	
		Grout	m3	70.99	0.775	2.54	R 7,797.31	R 6,040.66	
		Brickwork	m2	0.23	51	0.16	R 285.00	R 14,597.56	
		Doors and windows	No	2.69	4	0.26	R 3,352.94	R 14,969.28	
		Pipework	m	2.54	73	0.21	R 488.43	R 35,514.48	
		Bolts	kg	0.11	510	0.09	R 56.27	R 28,696.32	
		Structural steel	t	3.94	3	0.00	R 38,392.76	R 116,826.36	
		Miscellaneous steel	t	128.72	1	0.00	R 47,040.96	R 67,609.33	
		Total bridge area	m2	0.00	185	0.00		R -	
		Total control room area	m2	0.00	12	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.48	0	6.18	R 200.88	R -	R -
		Blinding	m2	0.71	0	14.66	R 84.73	R -	
		Concrete	m3	0.00	0	0.00	R 1,242.00	R -	
		Reinforcement	t	5.66	0	0.00	R 9,845.00	R -	
		Formwork	m2	0.06	0	5.82	R 213.45	R -	
		Finish to concrete	m2	0.30	0	77.87	R 15.95	R -	
		Movement joints	m	0.40	0	12.50	R 99.38	R -	
		Cast in steel	kg	23.28	0.000	157.68	R 62.43	R -	
		Grout	m3	21.71	0.000	0.61	R 9,768.54	R -	
		Bolts	kg	106.94	0.000	0.13	R 38.09	R -	
		Structural steel	t	34.84	0.000	0.21	R 45,943.33	R -	
		Miscellaneous steel	t	19.40	0.000	0.17	R 57,429.17	R -	
		Brickwork	m2	0.48	0	4.27	R 290.62	R -	
		Roof covering	m2	1.45	0	1.20	R 241.90	R -	
		Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.83	157	6.04	R 205.68	R 32,209.14	R 1,058,320.07
	Blinding	m2	1.15	165	16.07	R 77.29	R 12,733.57	
	Concrete	m3	0.00	189	0.00	R 1,242.00	R 234,738.00	
	Reinforcement	t	5.61	33.664	0.00	R 9,845.00	R 331,423.28	
	Formwork	m2	0.20	938	5.98	R 207.57	R 194,760.93	
	Movement joint	m	1.56	121	0.12	R 96.52	R 11,661.68	
	Cast in steel	kg	0.13	1,407	12.87	R 50.85	R 71,573.72	
	Bolts	kg	0.35	535	193.60	R 61.31	R 32,774.20	
	Chemical anchors	No	5.91	32	0.22	R 276.68	R 8,851.47	
	Miscellaneous steelwork	t	86.70	2.180	160.57	R 44,461.29	R 96,920.94	
	Pre-cast concrete	m3	29.15	6	35.58	R 4,179.81	R 27,099.31	
	Brickwork	m2	7.64	12	0.30	R 287.36	R 3,573.83	
	Total area	m2	0.00	95	4.32		R -	
EMERGENCY DAM	Earthworks	m3	0.53	0	1.67	R 94.90	R -	R -
	Lining	m2	0.68	0	1.16	R 56.78	R -	
	Paving	m2	0.62	0	0.52	R 108.59	R -	
	Pipework	m	27.85	0	0.24	R 401.39	R -	
	Manholes	No	16.39	0	0.10	R 3,902.36	R -	
	Concrete	m3	2.34	0	0.05	R 1,242.00	R -	
	Formwork	m2	0.09	0	5.81	R 213.61	R -	
	Mesh	m2	0.70	0	6.56	R 189.33	R -	
	Reinforcement	t	4.57	0.000	0.12	R 9,845.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	5.85	211	5.22	R 238.06	R 50,117.35	R 619,210.24
	Blinding	m2	0.83	43	12.63	R 98.30	R 4,274.82	
	Concrete	m3	0.00	36	0.00	R 1,242.00	R 44,712.00	
	Reinforcement	t	4.58	7.863	0.00	R 9,845.00	R 77,408.42	
	Mesh	m2	0.87	41	36.99	R 266.16	R 10,959.45	
	Formwork	m2	0.15	246	4.99	R 249.04	R 61,227.49	
	Cast in steel	kg	0.02	1,680	135.34	R 72.74	R 122,206.48	
	Miscellaneous steelwork	t	10.86	4.053	0.16	R 61,257.78	R 248,304.21	
	Total tunnel length	m	0.00	44	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,154,766.12
	Steel	t	9.73	20.765	0.00	R 34,225.00	R 710,685.81	
	Handrail	m	1.43	141	28.77	R 1,189.78	R 168,067.46	
	Grating	m2	1.90	106	17.15	R 1,995.38	R 212,459.62	
	Kick flats	m	1.70	119	77.54	R 441.39	R 52,381.87	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.57	31	94.24	R 363.19	R 11,171.36	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,745	0.00		R -	R 2,630,561.73
	Steel	t	28.43	61.390	0.00	R 34,225.00	R 2,101,059.81	
	Handrail	m	13.28	131	29.77	R 1,149.67	R 151,035.48	
	Grating	m2	12.50	140	18.37	R 1,863.02	R 260,003.24	
	Kick flats	m	13.44	130	84.90	R 403.10	R 52,345.49	
	Cat ladder	m	99.24	18	9.10	R 3,760.10	R 66,117.72	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,885	0.00		R -	R 4,200,521.46
	Steel	t	75.31	51.587	0.00	R 34,225.00	R 1,765,574.11	
	Handrail	m	31.43	124	31.69	R 1,080.16	R 133,498.74	
	Grating	m2	3.71	1,047	16.40	R 2,087.07	R 2,184,677.61	
	Kick flats	m	34.61	112	84.33	R 405.83	R 45,552.74	
	Stair treads	No	226.45	17	102.36	R 334.36	R 5,736.23	
	Cat ladder	m	237.04	16	8.57	R 3,995.25	R 65,482.04	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	345	0.00		R -	R 559,721.59
	Steel	t	25.26	13.658	0.00	R 34,225.00	R 467,456.81	
	Handrail	m	44.83	8	29.40	R 1,164.17	R 8,959.74	
	Grating	m2	60.52	6	16.89	R 2,026.60	R 11,553.39	
	Kick flats	m	45.22	8	77.81	R 439.83	R 3,355.88	
	Cat ladder	m	20.06	17	8.61	R 3,977.01	R 68,395.77	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	199	0.00		R -	R 896,036.81
	Steel	t	16.68	11.931	0.00	R 34,225.00	R 408,354.82	
	Handrail	m	1.10	181	31.40	R 1,089.89	R 197,428.09	
	Grating	m2	1.96	102	16.94	R 2,020.88	R 205,705.67	
	Kick flats	m	1.15	173	79.85	R 428.64	R 74,035.92	
	Stair treads	No	6.10	33	106.30	R 321.97	R 10,512.31	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	322	0.00		R -	R 1,025,202.50
	Steel	t	12.80	25.155	0.00	R 34,225.00	R 860,924.61	
	Handrail	m	24.64	13	32.13	R 1,065.09	R 13,918.33	
	Grating	m2	7.52	43	17.40	R 1,966.95	R 84,271.32	
	Kick flats	m	23.13	14	84.37	R 405.64	R 5,646.99	
	Cat ladder	m	20.42	16	8.93	R 3,832.28	R 60,441.24	
PIPING INSTALLATION	Pipe length	m	0.00	46,112	0.00		R -	R 37,998,622.78
	Total work units	WU	0.34	136,196	0.00	R 279.00	R 37,998,622.78	
	Pipe supports	kg	2.57	17,927	0.00		R -	
	WU for pipe supports	WU	0.16	22,180	0.00		R -	
	Number of welds	No	0.61	27,964	0.00		R -	
	Total fittings	No	0.38	17,555	0.00		R -	
	Stud bolts	No	0.34	5,956	0.00		R -	
	Support number	No	0.19	3,419	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	136,196	0.00	R 279.00		R 107,260.30

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	60.05	2,268	5.90	R 47.29	R 107,260.30	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	136,196	0.00	R 279.00		R 40,384.56
	Number of examinations	No	166.81	816	5.64	R 49.46	R 40,384.56	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	136,196	0.00	R 279.00		R 61,446.78
	Number of examinations	No	293.98	463	2.10	R 132.63	R 61,446.78	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	136,196	0.00	R 279.00		R 106,955.64
	Number of examinations	No	52.08	2,615	6.82	R 40.90	R 106,955.64	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	136,196	0.00	R 279.00		R 85,076.17
	Number of examinations	No	111.38	1,223	4.01	R 69.58	R 85,076.17	
MECHANICAL INSTALLATION	Total work units	WU	0.00	136,196	0.00	R 279.00		R 196,767.24
	Mechanical equipment	t	260.21	523	0.74	R 375.94	R 196,767.24	
	Structural steel	t	214.21	636	54.04			
PAINTING & INSULATION	Total work units	WU	0.00	136,196	0.00	R 279.00		R 2,371,337.56
	Painting to piping	m2	17.44	7,808	0.33	R 106.75	R 833,485.55	
	Insulation to piping	m2	50.63	2,690	2.61	R 325.60	R 875,946.68	
	Mechanical equipment received	t	0.00	523	0.81	R 375.94	R 196,767.24	
	Painting to mechanical equipment	m2	0.25	2,124	3.60	R 104.37	R 221,666.87	
	Insulation to mechanical equipment	m2	0.70	748	1.16	R 325.29	R 243,471.23	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	24.83	29,421	0.00	R 44.50	R 1,309,234.50	R 3,964,602.64
	Electrical cable terminations	No	303.71	1,185	0.43	R 103.66	R 122,805.93	
	Electrical equipment	No	9.29	97	0.11	R 404.55	R 39,189.69	
	DB's	No	6.29	10	0.33	R 1,236.60	R 12,899.88	
	Rack	m	0.69	4,681	1.62	R 128.99	R 603,731.32	
	Support steel	kg	1.40	6,819	2.12	R 20.99	R 143,130.30	
	Instrumentation cable	m	27.43	27,442	0.35	R 28.50	R 782,097.00	
	Instruments	No	0.58	1,000	0.18	R 160.24	R 160,315.24	
	Hook-ups	No	3.94	1,725	0.16	R 177.33	R 305,888.85	
	Light fittings	No	10.11	381	0.02	R 250.20	R 95,427.67	
	Conduit	m	4.15	2,911	0.13	R 27.42	R 79,808.17	
	Instrument stands	No	0.00	241		R 1,287.10	R 310,074.09	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project H				
Location:	South Africa				
Client:				Date of estimate:	2005

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	16,442	R	3.77
2	Concrete demolitions	m3	23	R	1,313.25
3	Bulk excavation	m3	5,842	R	40.05
4	Vertical piles	No	65		
5	Raking piles	No	10		
6	Concrete in piles	m3		R	1,242.00
7	Auger pile	m		R	292.00
8	Total paving and asphalt to road works	m2	3,002		
9	Grey paving to road works	m2	115	R	124.00
10	Asphalt to road surface	m2	2,887		
11	Rip bed of road works	m2	3,002	R	10.20
12	Total concrete in paving and bunding	m3	274	R	1,242.00
13	Concrete in paving	m3	108		
14	Rod reinforcement	t		R	9,845.00
15	Concrete in plinths and bases on area finishing	m3	168		
16	Stormwater pipe to drain surface run-off	m	165		
17	Machine excavation	m3		R	49.20
18	Concrete in pump and pipe support bases	m3	89	R	1,242.00
19	Concrete in tank bases	m3	174	R	1,242.00
20	Concrete in pipe and cable rack foundations	m3	202	R	1,242.00
21	Concrete to simple structural foundations	m3	304	R	1,242.00
22	Complex structural foundations - bases	m3	0	R	1,242.00
23	Concrete pipe racks - bases	m3	66	R	1,242.00
24	Concrete structure including concrete columns and beams - bases	m3	285	R	1,242.00
25	Major equipment bases with blast proof walls - bases	m3	222	R	1,242.00
26	Major equipment bases and elevated concrete structure - bases	m3	164	R	1,242.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	64	R	1,242.00
28	One brick wall	m2		R	285.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	1,242.00
30	Total building area - Structural steel buildings	m2	665		
31	Ceiling	m2		R	185.00
32	Structural steel	t		R	34,225.00
33	Steel canopy - concrete	m3	177	R	1,242.00
34	Steel canopy - area	m2	955		
35	Concrete in weighbridge - all concrete	m3	55	R	1,242.00
36	Total weighbridge area	m2	185		
37	Total control room area - weighbridge	m2	12		
38	Concrete in pump house - all concrete	m3	0	R	1,242.00
39	Total pump house area	m2	0		
40	Concrete in cooling tower	m3	189	R	1,242.00
41	Total cooling tower area	m2	95		
42	Emergency earth dam area - top of berm	m2	0		
43	Concrete in cable tunnel	m3	36	R	1,242.00
44	Total lengh of cable tunnel	m	44		
45	Total volume of basic steel platform	m3	202		
46	Total volume of steel pipe rack	m3	1,745		
47	Total volume of steel complex steel structure	m3	3,885		
48	Total volume of steel in stack	m3	345		
49	Total volume of steel in walkway	m3	199		
50	Total volume of steel in cable gantry	m3	322		
51	Piping work unit cost	WU		R	279.00
52	Total process pipe length	m	46,112		
53	Total electrical cable - installation only	m	29,421	R	44.50
54	Total instrumentation cable - installation only	m	27,442	R	32.55

Ratio: Variable ratio

Variables

Material	Simple	Median
Labour	Normal	Median
Engineering design	Normal	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Normal	Median
Weather	Normal	Median
Access	Poor	Median
Project size	Medium	Median
Project conditions	Poor	Median
Complexity	Complex	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

Project name:	Project H				
Location:	South Africa				
Client:	0	Date of estimate:	2005		

	CIVIL CONSTRUCTION COST				R 39,966,162.42
A	SITE CLEARANCE AND DEMOLITIONS		R	92,191.09	
B	BULK EARTHWORKS		R	505,137.85	
C	PILING		R	2,164,463.08	
D	ROAD WORKS		R	1,100,626.38	
E	GENERAL PAVING AND BUNDED AREAS		R	624,748.80	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	775,147.68	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	509,379.70	
H	TANK BASES AND BUNDING		R	2,466,396.83	
I	RACK FOUNDATIONS		R	1,347,117.18	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	2,640,980.19	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	710,668.56	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	3,527,101.03	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	1,165,866.29	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	2,777,974.00	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,627,970.29	
Q	BUILDINGS - STEEL		R	2,059,205.98	
R	CANOPIES - STEEL		R	3,559,893.37	
S	WEIGHBRIDGE		R	494,295.68	
T	PUMP HOUSE		R	-	
U	COOLING TOWER		R	974,526.06	
V	EMERGENCY DAM		R	-	
W	HEAVY DUTY CABLE TUNNEL		R	480,874.73	
	Preliminaries and General	35.00%	R	10,361,597.66	
	STRUCTURAL STEEL				R 16,261,200.12
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,284,308.29	
B	STRUCTURAL STEEL - PIPERACK		R	3,005,097.68	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	4,564,877.77	
D	STRUCTURAL STEEL - STACK		R	629,460.74	
E	STRUCTURAL STEEL - WALKWAY		R	1,045,739.75	
F	STRUCTURAL STEEL - CABLE GANTRY		R	1,085,658.70	
	Preliminaries and General	40.00%	R	4,646,057.18	
	MECHANICAL AND PIPING				R 59,982,990.47
A	PIPING INSTALLATION		R	41,984,492.31	
B	RADIOGRAPHIC EXAMINATION (RT)		R	139,185.68	
C	DYE PENETRATION TESTING (DP)		R	85,336.21	
D	MAGNETIC PARTICLE TESTING (MPI)		R	79,998.95	
E	POST WELD HEAT TREATMENT		R	140,719.55	
F	MATERIAL HARDNESS TEST (HT)		R	166,039.18	
H	MECHANICAL INSTALLATION		R	249,221.32	
	Preliminaries and General	40.00%	R	17,137,997.28	
	PAINTING AND INSULATION				R 4,264,889.16
A	PAINTING AND INSULATION		R	3,159,177.15	
	Preliminaries and General	35.00%	R	1,105,712.00	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 5,957,354.71
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	4,412,855.34	
	Preliminaries and General	35.00%	R	1,544,499.37	

TOTAL COST R 126,432,596.88

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		16,442		R 3.77	R 61,986.34	R 92,191.09
	Concrete demolitions	m3		23		R 1,313.25	R 30,204.75	
BULK EARTHWORKS	Bulk excavation	m3		5,842		R 40.05	R 233,972.10	R 505,137.85
	Trimming of sides	m2	2.18	2,681	4.21	R 9.51	R 25,501.62	
	Back fill and compact	m3	1.13	5,193	0.96	R 41.87	R 217,449.80	
	Overhaul	m3/km	1.64	3,567	11.22	R 3.57	R 12,737.63	
	Rip bed	m2	1.76	3,325	8.60	R 4.66	R 15,476.70	
PILING	Site establishment of rig	Item	0.00	1	192.83	R 239,491.31	R 239,491.31	R 2,164,463.08
	EO for raking equipment	Item	0.00	1	23.94	R 29,736.14	R 29,736.14	
	Number of piles	No	0.00	65	0.00		R -	
	Move rig to new position	No	1.50	43	0.19	R 235.98	R 10,220.93	
	Number of raking piles	No	19.31	3	0.00		R -	
	EO for setting up raking piles	No	0.93	4	0.25	R 310.50	R 1,128.89	
	EO for raking drilling	m	0.14	25	0.73	R 213.99	R 5,279.15	
	Auger quantity	m	0.05	1,379	0.00	R 292.00	R 402,606.06	
	EO for drilling in coarse gravel	m	0.55	119	0.22	R 274.13	R 32,523.56	
	EO for drilling in boulders	m	1.67	39	0.52	R 641.40	R 25,007.62	
	EO for drilling in soft rock	m	1.60	41	0.23	R 286.55	R 11,609.88	
	Temporary casings	m	0.37	175	0.31	R 383.25	R 67,068.00	
	EO casing to raking pile	m	0.17	20	0.56	R 867.63	R 17,545.73	
	Mild steel rod reinforcement	t	14.72	4.417	0.70	R 6,520.83	R 28,802.80	
	High tensile rod reinforcement	t	1.17	55.794	7.52	R 9,334.52	R 520,809.97	
	Concrete to piles and bases	m3	0.16	419	0.00	R 1,242.00	R 520,838.71	
	Concrete to raking piles	m3	0.07	45	1.07	R 1,328.94	R 60,209.76	
	Site establishment of test equipment	Item	0.00	1	110.75	R 137,545.29	R 137,545.29	
	Load test to pile	No	88.82	1	23.33	R 28,974.97	R 21,204.21	
	Site establishment of intergity testing	No	254.21	0	49.77	R 61,811.68	R 15,804.62	
	Integrity testing of piles	No	1.23	53	0.26	R 321.15	R 17,030.45	
ROAD WORKS	Red paving	m2	0.14	17	0.95	R 117.62	R 1,951.70	R 1,100,626.38
	Grey paving	m2	0.00	115	0.00	R 124.00	R 14,260.00	
	Kerbing	m	0.11	317	0.00	R 229.21	R 72,740.21	
	Total paving and asphalt	m2	0.00	3,002	0.00		R -	
	Remove top soil	m3	0.49	294	4.78	R 48.73	R 14,315.84	
	Asphalt	m2	0.20	596	0.00	R 138.67	R 82,665.26	
	Rip bed	m2	0.00	3,002	0.00	R 10.20	R 30,620.40	
	Reduce levels	m3	0.37	1,104	4.27	R 43.50	R 48,040.67	
	Selected fill	m3	1.49	742	0.46	R 93.70	R 69,477.75	
	Imported fill	m3	1.80	412	0.31	R 300.18	R 123,804.71	
	Wearing course	m3	3.93	281	0.20	R 222.28	R 62,458.85	
	Prime	m2	4.39	3,256	1.48	R 31.52	R 102,633.10	
	Three line road marking	m	0.81	2,633	0.11	R 24.07	R 63,365.89	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	314	4.12	R 7.69	R 2,412.34	
		1m Wide concrete V-drain	m	0.95	302	0.76	R 981.01	R 295,984.05	
		200mm Diameter PVC pipe	m	0.93	295	0.09	R 314.02	R 92,678.30	
		Road marking - STOP	No	0.16	49	0.03	R 365.91	R 17,999.30	
		Standard signage	No	0.01	3	4.28	R 430.91	R 1,367.52	
		100mm Painted line	m	1.68	535	1.37	R 7.20	R 3,850.48	
				0.00		1.60			
				0.00		1.88			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.95	108	0.74	R 1,242.00	R 134,136.00	R 624,748.80
		Concrete in plinths	m3	0.00	22	0.00	R 1,242.00	R 27,082.55	
		Total concrete	m3	0.00	274	0.00		R -	
		Rip and compact	m2	0.13	831	195.00	R 6.37	R 5,291.44	
		Formwork to plinth	m2	7.26	158	0.12	R 146.38	R 23,186.67	
		Formwork to slab	m2	0.83	89	0.15	R 183.64	R 16,362.20	
		High tensile steel	t	0.01	2.740	0.00	R 9,845.00	R 26,975.30	
		Mesh	m2	584.41	1,601	45.51	R 216.31	R 346,378.04	
		Construction joint	m	3.83	413	0.04	R 55.00	R 22,738.65	
		Expansion joint	m	2.20	238	0.08	R 94.92	R 22,597.95	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.19	3,833	0.00		R -	R 775,147.68
		Base excavation	m3	1.40	390	0.00	R 49.20	R 19,190.45	
		Backfill	m3	0.55	278	0.62	R 78.81	R 21,934.65	
		Working space	m2	0.43	704	1.37	R 57.62	R 40,544.06	
		Concrete in bases	m3	0.04	168	24.10	R 1,242.00	R 208,656.00	
		Blinding	m2	0.72	263	18.63	R 66.67	R 17,554.41	
		Concrete in sump walls	m3	0.11	18	30.84	R 1,242.00	R 22,505.04	
		Concrete in slabs	m3	0.02	3	0.88	R 1,242.00	R 3,129.84	
		Total concrete	m3	0.00	189	0.03		R -	
		Wood float	m2	0.59	318	126.32	R 9.83	R 3,124.73	
		Formwork to bases	m2	1.72	289	0.12	R 150.81	R 43,543.10	
		Formwork to sump walls	m2	11.15	202	0.12	R 145.49	R 29,404.21	
		Formwork to sides of slab	m2	5.92	15	0.18	R 219.12	R 3,270.56	
		Mild steel reinforcement	t	0.08	1.731	0.00	R 9,845.00	R 17,046.19	
		High tensile reinforcement	t	9.11	20.718	0.89	R 9,845.00	R 203,971.53	
		Cast in steel	kg	0.45	370	33.07	R 37.56	R 13,890.99	
		Waterstop	m	0.43	42	8.27	R 150.22	R 6,340.75	
		Manhole	No	0.07	12	2.71	R 3,748.23	R 45,500.87	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	165	0.12	R 457.82	R 75,540.28	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.62	144	0.05	R 49.20	R 7,106.17	R 509,379.70
	Working space	m2	0.32	447	0.68	R 33.53	R 14,998.41	
	Backfill	m3	4.04	36	1.24	R 60.97	R 2,180.23	
	Concrete bases	m3	0.95	89	0.00	R 1,242.00	R 110,538.00	
	Concrete plinth	m3	1.90	47	0.00	R 1,242.00	R 58,309.42	
	Total concrete	m3	0.00	136	0.00		R -	
	Wood float	m2	0.47	99	0.05	R 12.42	R 1,229.42	
	Blinding	m2	0.95	94	0.01	R 63.87	R 6,006.59	
	Formwork bases	m2	0.47	189	0.13	R 157.91	R 29,857.00	
	Formwork plinth	m2	0.54	88	0.12	R 149.93	R 13,121.56	
	High tensile reinforcement	t	9.62	14.128	6.76	R 9,845.00	R 139,086.35	
	Cast in steel	kg	0.10	1,313	0.03	R 36.37	R 47,743.06	
	HD Bolts	kg	0.07	1,848	0.03	R 37.26	R 68,850.40	
	Grout	m3	34.20	1.373	6.07	R 7,542.49	R 10,353.08	
TANK BASES AND BUNDING	Restricted excavation	m3	5.50	957	0.05	R 57.66	R 55,184.72	R 2,466,396.83
	Working space	m2	3.96	242	1.51	R 38.13	R 9,219.08	
	Backfill	m3	1.34	715	0.73	R 78.53	R 56,115.20	
	Concrete bases	m3	0.70	174	0.00	R 1,242.00	R 216,108.00	
	Concrete sump wall	m3	2.59	67	0.00	R 1,242.00	R 83,301.54	
	Concrete slab	m3	0.55	315	0.00	R 1,242.00	R 391,398.71	
	Concrete plinth	m3	3.91	45	19.70	R 1,242.00	R 55,280.69	
	Concrete column	m3	19.16	9	162.19	R 1,242.00	R 11,277.86	
	Total concrete	m3	0.00	610	1.00		R -	
	Blinding	m2	2.43	251	1.03	R 63.06	R 15,838.98	
	Wood float	m2	0.26	2,385	1.07	R 7.66	R 18,261.51	
	Formwork to bases	m2	0.40	440	1.07	R 163.88	R 72,061.25	
	Formwork to plinths	m2	0.34	132	7.58	R 171.31	R 22,568.48	
	Formwork to columns	m2	0.11	82	7.25	R 185.04	R 15,176.16	
	Formwork to sumps	m2	0.11	626	6.71	R 168.85	R 105,697.56	
	Formwork to slabs	m2	3.91	81	7.36	R 157.94	R 12,739.14	
	Formwork to slabs n/e 300mm	m	2.05	154	7.86	R 55.42	R 8,516.99	
	Mild steel reinforcement	t	0.22	6.087	22.41	R 9,845.00	R 59,930.04	
	High tensile reinforcement	t	22.18	27.491	0.89	R 9,845.00	R 270,651.77	
	Mesh	m2	0.15	2,121	54.96	R 179.14	R 379,969.22	
	Cast in items	kg	0.19	3,246	215.97	R 45.58	R 147,971.41	
	HD Bolts	kg	0.09	6,618	202.06	R 48.72	R 322,448.16	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	198.07	3.079	0.16	R 7,762.50	R 23,898.25	
	Construction joint	m	0.29	1,103	24.03	R 51.69	R 57,017.89	
	Expansion joint	m	0.45	706	15.72	R 79.00	R 55,764.22	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.29	664	0.05	R 56.78	R 37,700.19	R 1,347,117.18
	Working space	m2	0.32	2,057	1.58	R 89.42	R 183,913.51	
	Backfill	m3	2.36	281	0.78	R 72.59	R 20,418.04	
	Blinding	m2	0.40	502	24.40	R 50.90	R 25,566.86	
	Concrete bases	m3	5.63	202	0.00	R 1,242.00	R 250,884.00	
	Concrete plinth	m3	0.00	36	0.00	R 1,242.00	R 44,578.96	
	Total concrete	m3	0.00	238	1.30		R -	
	Wood float	m2	0.36	569	178.65	R 6.95	R 3,955.96	
	Formwork bases	m2	0.48	425	9.83	R 126.41	R 53,758.46	
	Formwork plinths	m2	0.09	390	7.04	R 176.40	R 68,714.99	
	High tensile reinforcement	t	9.11	26.113	0.00	R 9,845.00	R 257,086.21	
	HD Bolts	kg	0.03	7,856	202.65	R 48.58	R 381,634.43	
	Grout	m3	76.77	2.631	0.17	R 7,185.12	R 18,905.58	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.99	1,212	0.05	R 65.65	R 79,543.56	R 2,640,980.19
	Working space	m2	0.47	2,590	1.93	R 33.95	R 87,928.88	
	Backfill	m3	2.49	487	0.76	R 86.06	R 41,947.94	
	Blinding	m2	0.33	909	22.20	R 55.94	R 50,869.16	
	Concrete bases	m3	0.00	304	0.00	R 1,242.00	R 377,568.00	
	Concrete plinth	m3	2.39	96	0.00	R 1,242.00	R 119,808.52	
	Concrete slab	m3	3.15	127	0.00	R 1,242.00	R 157,789.61	
	Total concrete	m3	0.00	528	0.00		R -	
	Wood float	m2	0.53	1,005	152.46	R 8.15	R 8,185.56	
	Formwork bases	m2	0.47	642	7.96	R 156.07	R 100,187.50	
	Formwork plinths	m2	0.10	986	7.89	R 157.43	R 155,187.77	
	High tensile reinforcement	t	12.81	41.196	0.00	R 9,845.00	R 405,570.15	
	HD Bolts	kg	0.02	14,676	189.70	R 51.90	R 761,641.11	
	Cast in items	kg	0.05	6,080	228.54	R 43.08	R 261,913.01	
	Grout	m3	67.92	4.476	0.17	R 7,336.71	R 32,839.42	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.04	0	0.05	R 66.54	R -	R -
	Working space	m2	0.50	0	1.63	R 40.87	R -	
	Backfill	m3	2.12	0	0.76	R 87.88	R -	
	Blinding	m2	0.65	0	21.26	R 58.43	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,242.00	R -	
	Concrete column	m3	26.72	0	0.00	R 1,242.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.64	0	0.00	R 1,242.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.59	0	156.77	R 7.92	R -	
	Formwork bases	m2	0.48	0	7.63	R 162.78	R -	
	Formwork plinths	m2	0.32	0	7.20	R 172.41	R -	
	Formwork to columns	m2	0.28	0	7.68	R 161.73	R -	
	High tensile reinforcement	t	9.03	0.000	0.00	R 9,845.00	R -	
	HD bolts	kg	0.04	0	194.45	R 50.63	R -	
	Grout	m3	98.98	0.000	0.16	R 7,867.87	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.66	176	0.05	R 62.99	R 11,072.87	R 710,668.56
	Working space	m2	0.29	606	2.01	R 31.30	R 18,975.94	
	Backfill	m3	1.88	93	0.80	R 78.80	R 7,366.06	
	Blinding	m2	0.68	98	20.64	R 60.18	R 5,878.32	
	Concrete bases	m3	0.00	66	0.00	R 1,242.00	R 81,972.00	
	Concrete column	m3	1.08	58	151.32	R 1,242.00	R 72,196.70	
	Concrete beam	m3	2.42	24	0.90	R 1,242.00	R 29,815.74	
	Total concrete	m3	2.75	148	0.90		R -	
	Wood float	m2	0.44	150	7.35	R 8.21	R 1,233.19	
	Formwork bases	m2	0.46	144	6.45	R 168.96	R 24,356.00	
	Formwork to columns	m2	0.15	395	7.43	R 167.08	R 66,005.57	
	Formwork to sides beams	m2	0.32	76	5.96	R 192.60	R 14,578.98	
	Formwork to soffits beams	m2	0.68	36	6.45	R 208.36	R 7,410.43	
	Formwork corbels	m2	10.49	6	4.98	R 249.58	R 1,383.10	
	High tensile reinforcement	t	8.78	16.876	0.00	R 9,845.00	R 166,144.78	
	Cast in steel	kg	0.03	4,938	249.47	R 39.46	R 194,868.04	
	HD bolts	kg	1.45	103	203.26	R 48.43	R 4,965.33	
	Grout	m3	472.32	0.314	0.16	R 7,797.31	R 2,445.50	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.65	1,040	0.05	R 62.10	R 64,599.53	R 3,527,101.03
	Working space	m2	0.59	1,767	1.66	R 37.39	R 66,089.92	
	Backfill	m3	1.15	907	0.77	R 80.50	R 73,044.35	
	Blinding	m2	0.62	457	19.98	R 62.17	R 28,380.41	
	Concrete bases	m3	0.00	285	0.91	R 1,242.00	R 353,970.00	
	Concrete column	m3	2.11	135	1.10	R 1,242.00	R 167,758.29	
	Concrete beam	m3	0.82	166	0.98	R 1,242.00	R 205,658.15	
	Concrete surface slab	m3	1.64	174	0.94	R 1,242.00	R 215,835.37	
	Concrete wall	m3	2.19	62	0.97	R 1,242.00	R 76,452.35	
	Concrete elevated slab	m3	1.03	132	0.00	R 1,242.00	R 163,666.63	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total concrete	m3	0.00	953	0.00		R -	
	Wood float	m2	0.62	1,549	156.65	R 7.93	R 12,283.11	
	Formwork bases	m2	0.39	725	7.50	R 165.57	R 120,112.39	
	Formwork to columns	m2	0.16	837	6.02	R 206.36	R 172,667.33	
	Formwork to sides beams	m2	0.28	596	4.78	R 260.03	R 154,960.53	
	Formwork to soffits beams	m2	0.81	206	7.35	R 168.98	R 34,727.82	
	Formwork to soffts of slabs	m2	0.30	575	2.99	R 213.77	R 122,951.59	
	Formwork to pockets	m2	25.37	5	5.81	R 415.78	R 2,213.89	
	Formwork wall	m2	0.12	504	8.10	R 153.43	R 77,322.50	
	High tensile reinforcement	t	8.86	107.545	0.00	R 9,845.00	R 1,058,778.84	
	Cast in steel	kg	0.21	4,461	241.75	R 40.72	R 181,677.87	
	HD bolts	kg	0.39	2,430	199.86	R 49.26	R 119,681.65	
	Steel handrailing	m	2.49	43	8.96	R 1,099.39	R 47,442.41	
	Grout	m3	966.92	0.985	0.18	R 6,927.49	R 6,826.13	
MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.34	165	0.04	R 52.34	R 8,648.44	R 1,165,866.29
	Working space	m2	7.57	22	1.49	R 35.20	R 767.94	
	Backfill	m3	4.57	36	0.72	R 37.61	R 1,361.34	
	Blinding	m2	1.19	187	19.19	R 64.71	R 12,094.02	
	Concrete bases	m3	0.00	222	0.00	R 1,242.00	R 275,724.00	
	Concrete column	m3	26.73	8	0.00	R 1,242.00	R 10,315.15	
	Concrete beam	m3	1.42	6	0.00	R 1,242.00	R 7,245.97	
	Concrete wall	m3	10.95	20	0.00	R 1,242.00	R 25,180.27	
	Concrete elevated slabs	m3	11.55	1	0.00	R 1,242.00	R 893.03	
	Total concrete	m3	0.00	257	0.00		R -	
	Wood float	m2	0.85	304	160.78	R 7.72	R 2,344.66	
	Formwork bases	m2	8.34	27	7.23	R 171.85	R 4,572.13	
	Formwork to columns	m2	0.15	54	5.84	R 202.59	R 11,007.25	
	Formwork to sides beams	m2	0.18	33	4.88	R 212.54	R 7,056.85	
	Formwork to soffits beams	m2	0.50	12	6.13	R 254.58	R 2,979.04	
	Formwork to soffts of slabs	m2	0.14	5	3.07	R 242.58	R 1,258.70	
	Formwork to pockets	m2	441.97	1	5.12	R 404.09	R 202.97	
	Formwork wall	m2	0.11	180	7.12	R 174.46	R 31,339.71	
	High tensile reinforcement	t	4.22	60.973	0.00	R 9,845.00	R 600,280.43	
	Cast in steel	kg	0.16	1,629	204.45	R 48.15	R 78,436.21	
	HD bolts	kg	0.24	1,091	179.33	R 54.90	R 59,887.15	
	Galvanised grating	m2	18.87	14	0.16	R 1,626.89	R 22,165.47	
	Grout	m3	797.10	0.279	6.05	R 7,560.00	R 2,105.54	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.45	238	0.05	R 62.99	R 15,015.24	R 2,777,974.00
	Working space	m2	0.37	647	1.60	R 39.38	R 25,473.25	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	1.97	121	0.78	R 80.83	R 9,802.01	
	Blinding	m2	4.65	35	20.49	R 60.61	R 2,139.82	
	Concrete bases	m3	0.00	164	0.00	R 1,242.00	R 203,688.00	
	Concrete column	m3	5.92	28	0.00	R 1,242.00	R 34,398.46	
	Concrete beam	m3	1.76	16	0.00	R 1,242.00	R 19,592.29	
	Concrete wall	m3	34.02	5	0.00	R 1,242.00	R 5,987.18	
	Concrete elevated slabs	m3	24.11	1	0.00	R 1,242.00	R 1,426.90	
	Total concrete	m3	0.00	213	0.00		R -	
	Wood float	m2	4.59	36	152.96	R 8.12	R 289.84	
	Formwork bases	m2	1.39	118	7.27	R 170.87	R 20,212.45	
	Formwork to columns	m2	0.13	211	7.10	R 197.79	R 41,681.08	
	Formwork to sides beams	m2	0.23	69	6.15	R 175.04	R 12,004.97	
	Formwork to soffits beams	m2	0.73	22	6.28	R 202.05	R 4,374.61	
	Formwork to soffts of slabs	m2	0.22	5	3.63	R 209.97	R 1,092.97	
	Formwork to pockets	m2	2.84	58	5.92	R 341.88	R 19,742.35	
	Formwork wall	m2	0.29	17	7.30	R 170.17	R 2,814.83	
	High tensile reinforcement	t	7.05	30.297	0.00	R 9,845.00	R 298,271.04	
	Cast in steel	kg	0.02	11,067	190.78	R 51.60	R 571,117.06	
	HD bolts	kg	0.01	21,344	200.08	R 49.21	R 1,050,254.64	
	Galvanised grating	m2	3.67	58	0.17	R 7,430.77	R 432,075.41	
	Grout	m3	39.38	4.165	6.29	R 1,565.36	R 6,519.61	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	110	0.05	R 62.99	R 6,959.54	R 1,627,970.29
	Working space	m2	2.30	48	1.72	R 36.70	R 1,761.26	
	Backfill	m3	1.21	91	0.76	R 82.64	R 7,551.19	
	Blinding	m2	3.78	17	20.76	R 59.83	R 1,014.12	
	Concrete	m3	0.00	64	0.00	R 1,242.00	R 79,488.00	
	Mesh reinforcement	m2	0.41	158	63.78	R 154.36	R 24,392.22	
	Rough formwork	m2	2.74	23	8.01	R 155.01	R 3,624.56	
	Smooth formwork	m2	0.57	113	6.72	R 184.70	R 20,922.18	
	Finish to concrete	m2	0.22	286	106.01	R 11.72	R 3,353.79	
	Construction joints	m	4.55	14	20.18	R 61.55	R 865.12	
	Movement joints	m	14.70	4	16.06	R 77.35	R 336.79	
	Cast in steel	kg	2.29	28	228.21	R 43.14	R 1,205.30	
	Grout	m3	793.28	0.081	0.16	R 7,626.32	R 615.28	
	Brick walls	m2	0.46	140	0.00	R 285.00	R 39,775.70	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total building area	m2	4.43	284	0.00		R -	
		Waterproofing membrane	m2	2.00	142	11.10	R 111.86	R 15,844.76	
		Roof construction	m2	1.97	144	35.96	R 273.80	R 39,543.97	
		Ceiling	m2	0.97	293	0.00	R 185.00	R 54,285.61	
		Doors and windows	No	439.79	1	0.16	R 1,821.92	R 1,175.69	
		Floor finish	m2	0.98	290	0.77	R 371.85	R 107,683.89	
		Wall finsih	m2	1.01	281	1.39	R 205.14	R 57,641.54	
		Rod reinforcement	t	8.47	8	0.00	R 9,845.00	R 74,370.80	
		Metalwork	Item	0.00	1	4.49	R 44,197.02	R 44,197.02	
		Structural steel	Item	0.00	1	11.63	R 114,448.13	R 114,448.13	
		Plumbing and drainage	Item	0.00	1	7.40	R 72,881.13	R 72,881.13	
		Small power and lighting	Item	0.00	1	63.07	R 620,896.02	R 620,896.02	
		External works	Item	0.00	1	187.71	R 233,136.71	R 233,136.71	
	BUILDINGS - STEEL	Concrete	m3	0.00	85	0.16	R 1,242.00	R 105,570.00	R 2,059,205.98
		Earthworks	m3	2.31	196	8.41	R 147.72	R 28,950.81	
		Reinforcement	t	8.29	10	0.00	R 9,845.00	R 100,891.75	
		Mesh	m2	0.11	768	9.29	R 133.65	R 102,609.51	
		Formwork	m2	0.39	219	7.28	R 170.59	R 37,384.77	
		Brickwork	m2	5.75	116	5.79	R 214.40	R 24,802.22	
		Roof covering	m2	0.86	775	206.48	R 165.76	R 128,384.38	
		Structural steel	t	17.50	38	0.00	R 34,225.00	R 1,300,868.58	
		Side cladding	m2	1.51	441	0.96	R 158.77	R 69,987.98	
		Doors	No	363.70	2	0.49	R 16,696.91	R 30,529.43	
		Ridge ventilator	m	20.77	32	11.14	R 1,846.04	R 59,101.16	
		Aluminium insulation	m2	0.90	740	1.75	R 94.76	R 70,125.38	
		Total building area	m2	0.00	665	0.00		R -	
	CANOPIES - STEEL	Earthworks	m3	2.88	509	0.12	R 152.59	R 77,706.38	R 3,559,893.37
		Concrete	m3	0.00	177	0.00	R 1,242.00	R 219,834.00	
		Reinforcement	t	10.36	17	0.16	R 9,845.00	R 168,201.25	
		Mesh	m2	0.11	1,620	9.89	R 125.62	R 203,451.39	
		Formwork	m2	0.40	446	7.92	R 156.75	R 69,859.77	
		Brickwork	m2	5.82	164	5.38	R 231.01	R 37,887.41	
		Screed	m2	1.08	884	39.98	R 31.07	R 27,472.93	
		Structural steel	t	15.19	63	0.00	R 34,225.00	R 2,151,331.69	
		Cat ladders	m	2.50	25	9.56	R 3,578.95	R 89,986.98	
		Hand rail	m	0.71	89	26.33	R 1,299.64	R 115,060.82	
		Kick plates	m	0.73	86	2.72	R 478.31	R 41,025.51	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.86	1,111	193.56	R 176.82	R 196,519.13	
	Side cladding	m2	4.67	204	0.90	R 158.51	R 32,414.64	
	Floor grating	m2	1.04	61	16.08	R 2,127.85	R 129,141.44	
	Total buiding area	m2	0.00	955	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.36	185	8.66	R 143.44	R 26,491.12	R 494,295.68
	Blinding	m2	0.50	109	21.01	R 59.10	R 6,464.57	
	Concrete	m3	0.00	55	0.00	R 1,242.00	R 68,310.00	
	Reinforcement	t	8.22	7	0.00	R 9,845.00	R 65,872.87	
	Mesh	m2	0.51	107	49.01	R 200.86	R 21,481.15	
	Formwork	m2	0.34	163	8.07	R 154.00	R 25,069.57	
	Finish to concrete	m2	0.47	118	111.11	R 11.18	R 1,320.08	
	Movement joints	m	2.57	21	15.94	R 77.92	R 1,669.42	
	Cast in steel	kg	0.09	616	201.02	R 48.97	R 30,168.20	
	Grout	m3	70.95	0.775	2.71	R 7,214.94	R 5,592.69	
	Brickwork	m2	0.25	48	0.17	R 285.00	R 13,798.27	
	Doors and windows	No	2.91	4	0.27	R 3,439.66	R 14,177.19	
	Pipework	m	2.88	64	0.22	R 458.18	R 29,483.00	
	Bolts	kg	0.11	484	0.08	R 48.97	R 23,717.14	
	Structural steel	t	4.42	3	0.00	R 36,754.67	R 99,850.97	
	Miscellaneous steel	t	137.44	1	0.00	R 45,190.16	R 60,829.44	
	Total bridge area	m2	0.00	185	0.00		R -	
	Total control room area	m2	0.00	12	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.11	0	6.27	R 198.11	R -	R -
	Blinding	m2	0.79	0	15.69	R 79.18	R -	
	Concrete	m3	0.00	0	0.00	R 1,242.00	R -	
	Reinforcement	t	5.75	0	0.00	R 9,845.00	R -	
	Formwork	m2	0.07	0	5.81	R 213.93	R -	
	Finish to concrete	m2	0.34	0	80.59	R 15.41	R -	
	Movement joints	m	0.42	0	14.29	R 86.93	R -	
	Cast in steel	kg	26.41	0.000	169.70	R 58.02	R -	
	Grout	m3	24.06	0.000	0.73	R 8,163.38	R -	
	Bolts	kg	116.42	0.000	0.15	R 42.39	R -	
	Structural steel	t	41.76	0.000	0.24	R 40,899.11	R -	
	Miscellaneous steel	t	23.24	0.000	0.17	R 58,156.12	R -	
	Brickwork	m2	0.55	0	4.87	R 255.14	R -	
	Roof covering	m2	1.71	0	1.27	R 201.69	R -	
	Total pump house area	m2	0.00	0	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.93	176	7.00	R 177.46	R 31,216.94	R 974,526.06
	Blinding	m2	1.24	152	18.94	R 65.58	R 9,984.23	
	Concrete	m3	0.00	189	0.00	R 1,242.00	R 234,738.00	
	Reinforcement	t	5.65	33.434	0.00	R 9,845.00	R 329,161.87	
	Formwork	m2	0.22	879	6.81	R 182.38	R 160,323.74	
	Movement joint	m	1.80	105	0.13	R 86.45	R 9,063.03	
	Cast in steel	kg	0.15	1,278	14.37	R 47.07	R 60,165.52	
	Bolts	kg	0.39	491	209.16	R 55.57	R 27,279.65	
	Chemical anchors	No	7.20	26	0.25	R 239.99	R 6,299.69	
	Miscellaneous steelwork	t	89.03	2.123	177.17	R 39,835.26	R 84,569.55	
	Pre-cast concrete	m3	35.09	5	41.02	R 3,505.65	R 18,883.08	
	Brickwork	m2	8.60	11	0.35	R 257.14	R 2,840.77	
	Total area	m2	0.00	95	4.83		R -	
EMERGENCY DAM	Earthworks	m3	0.61	0	1.69	R 95.67	R -	R -
	Lining	m2	0.80	0	1.48	R 56.78	R -	
	Paving	m2	0.73	0	0.58	R 97.77	R -	
	Pipework	m	28.63	0	0.27	R 354.33	R -	
	Manholes	No	16.67	0	0.11	R 3,374.59	R -	
	Concrete	m3	2.70	0	0.05	R 1,242.00	R -	
	Formwork	m2	0.09	0	5.67	R 219.13	R -	
	Mesh	m2	0.77	0	7.25	R 171.28	R -	
	Reinforcement	t	5.31	0.000	0.13	R 9,845.00	R -	
	Dam area (to top of berm)	m2	0.00	0	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.90	248	5.53	R 224.62	R 55,778.81	R 480,874.73
	Blinding	m2	0.90	40	13.32	R 93.22	R 3,746.57	
	Concrete	m3	0.00	36	0.00	R 1,242.00	R 44,712.00	
	Reinforcement	t	4.84	7.445	0.00	R 9,845.00	R 73,292.17	
	Mesh	m2	1.07	34	41.78	R 235.66	R 7,933.88	
	Formwork	m2	0.16	231	5.41	R 229.48	R 53,055.01	
	Cast in steel	kg	0.03	1,200	158.08	R 62.28	R 74,734.31	
	Miscellaneous steelwork	t	13.20	3.332	0.20	R 50,302.92	R 167,621.98	
	Total tunnel length	m	0.00	44	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	202	0.00		R -	R 1,284,308.29
	Steel	t	8.80	22.964	0.00	R 34,225.00	R 785,938.29	
	Handrail	m	1.41	143	25.29	R 1,353.30	R 193,779.10	
	Grating	m2	1.86	109	15.85	R 2,158.72	R 234,983.32	
	Kick flats	m	1.65	123	74.53	R 459.21	R 56,266.74	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.88	34	88.10	R 388.48	R 13,340.85	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,745	0.00		R -	R 3,005,097.68
	Steel	t	24.72	70.589	0.00	R 34,225.00	R 2,415,893.99	
	Handrail	m	12.56	139	28.17	R 1,214.88	R 168,777.94	
	Grating	m2	12.32	142	16.67	R 2,053.27	R 290,823.70	
	Kick flats	m	12.57	139	80.69	R 424.13	R 58,872.36	
	Cat ladder	m	99.10	18	8.52	R 4,016.68	R 70,729.69	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,885	0.00		R -	R 4,564,877.77
	Steel	t	65.08	59.692	0.00	R 34,225.00	R 2,042,952.82	
	Handrail	m	30.39	128	29.19	R 1,172.66	R 149,910.98	
	Grating	m2	3.58	1,086	16.56	R 2,067.35	R 2,244,824.01	
	Kick flats	m	32.66	119	78.46	R 436.20	R 51,881.75	
	Stair treads	No	219.14	18	94.20	R 363.32	R 6,441.06	
	Cat ladder	m	233.60	17	8.27	R 4,140.96	R 68,867.16	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	345	0.00		R -	R 629,460.74
	Steel	t	22.24	15.511	0.00	R 34,225.00	R 530,867.24	
	Handrail	m	43.91	8	25.20	R 1,358.02	R 10,669.24	
	Grating	m2	58.02	6	16.24	R 2,107.73	R 12,533.96	
	Kick flats	m	42.95	8	75.89	R 451.00	R 3,622.39	
	Cat ladder	m	19.43	18	8.47	R 4,042.78	R 71,767.92	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	199	0.00		R -	R 1,045,739.75
	Steel	t	13.65	14.582	0.00	R 34,225.00	R 499,062.34	
	Handrail	m	1.08	184	27.56	R 1,241.80	R 228,210.12	
	Grating	m2	1.92	104	16.01	R 2,137.63	R 222,135.03	
	Kick flats	m	1.05	189	77.66	R 440.69	R 83,294.00	
	Stair treads	No	5.44	37	96.10	R 356.14	R 13,038.26	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	322	0.00		R -	R 1,085,658.70
	Steel	t	12.25	26.293	0.00	R 34,225.00	R 899,890.93	
	Handrail	m	22.42	14	26.19	R 1,306.58	R 18,762.98	
	Grating	m2	7.22	45	16.32	R 2,097.03	R 93,561.00	
	Kick flats	m	22.66	14	79.20	R 432.13	R 6,141.95	
	Cat ladder	m	19.58	16	8.36	R 4,093.20	R 67,301.84	
PIPING INSTALLATION	Pipe length	m	0.00	46,112	0.00		R -	R 41,984,492.31
	Total work units	WU	0.31	150,482	0.00	R 279.00	R 41,984,492.31	
	Pipe supports	kg	2.40	19,179	0.00		R -	
	WU for pipe supports	WU	0.16	24,185	0.00		R -	
	Number of welds	No	0.56	25,987	0.00		R -	
	Total fittings	No	0.38	17,720	0.00		R -	
	Stud bolts	No	0.34	5,974	0.00		R -	
	Support number	No	0.18	3,521	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	150,482	0.00	R 279.00		R 139,185.68

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	54.86	2,743	5.50	R 50.74	R 139,185.68	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	150,482	0.00	R 279.00		R 85,336.21
	Number of examinations	No	161.35	933	3.05	R 91.50	R 85,336.21	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	150,482	0.00	R 279.00		R 79,998.95
	Number of examinations	No	275.18	547	1.91	R 146.29	R 79,998.95	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	150,482	0.00	R 279.00		R 140,719.55
	Number of examinations	No	46.18	3,259	6.46	R 43.18	R 140,719.55	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	150,482	0.00	R 279.00		R 166,039.18
	Number of examinations	No	103.69	1,451	2.44	R 114.41	R 166,039.18	
MECHANICAL INSTALLATION	Total work units	WU	0.00	150,482	0.00	R 279.00		R 249,221.32
	Mechanical equipment	t	235.61	639	0.72	R 390.21	R 249,221.32	
	Structural steel	t	198.50	758	54.30			
PAINTING & INSULATION	Total work units	WU	0.00	150,482	0.00	R 279.00		R 3,159,177.15
	Painting to piping	m2	16.75	8,987	0.31	R 115.63	R 1,039,135.41	
	Insulation to piping	m2	46.09	3,265	2.41	R 370.44	R 1,209,419.58	
	Mechanical equipment received	t	0.00	639	0.80	R 390.21	R 249,221.32	
	Painting to mechanical equipment	m2	0.23	2,794	3.23	R 120.89	R 337,791.68	
	Insulation to mechanical equipment	m2	0.67	947	1.14	R 341.65	R 323,609.16	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.95	29,421	0.00	R 44.50	R 1,309,234.50	R 4,412,855.34
	Electrical cable terminations	No	273.67	1,282	0.39	R 114.94	R 147,359.12	
	Electrical equipment	No	8.48	108	0.10	R 448.20	R 48,184.20	
	DB's	No	5.86	13	0.29	R 1,557.03	R 19,750.95	
	Rack	m	0.61	5,022	1.59	R 140.00	R 703,062.18	
	Support steel	kg	1.34	8,271	2.02	R 22.04	R 182,279.17	
	Instrumentation cable	m	24.10	27,442	0.32	R 28.50	R 782,097.00	
	Instruments	No	0.47	1,139	0.16	R 178.13	R 202,832.00	
	Hook-ups	No	3.64	2,405	0.16	R 183.87	R 442,119.08	
	Light fittings	No	10.06	392	0.02	R 278.13	R 108,900.12	
	Conduit	m	4.07	2,924	0.12	R 27.96	R 81,759.80	
	Instrument stands	No	0.00	280		R 1,375.86	R 385,277.23	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project I				
Location:	South Africa				
Client:				Date of estimate:	2002

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	8,554	R	3.22
2	Concrete demolitions	m3	0	R	1,005.00
3	Bulk excavation	m3	2,441	R	32.11
4	Vertical piles	No	16		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,052.00
7	Auger pile	m		R	185.00
8	Total paving and asphalt to road works	m2	1,742		
9	Grey paving to road works	m2	0	R	85.00
10	Asphalt to road surface	m2	1,742		
11	Rip bed of road works	m2	1,742	R	7.55
12	Total concrete in paving and bunding	m3	88	R	1,052.00
13	Concrete in paving	m3	65		
14	Rod reinforcement	t		R	7,554.00
15	Concrete in plinths and bases on area finishing	m3	78		
16	Stormwater pipe to drain surface run-off	m	75		
17	Machine excavation	m3		R	34.22
18	Concrete in pump and pipe support bases	m3	85	R	1,052.00
19	Concrete in tank bases	m3	25	R	1,052.00
20	Concrete in pipe and cable rack foundations	m3	0	R	1,052.00
21	Concrete to simple structural foundations	m3	222	R	1,052.00
22	Complex structural foundations - bases	m3	0	R	1,052.00
23	Concrete pipe racks - bases	m3	0	R	1,052.00
24	Concrete structure including concrete columns and beams - bases	m3	125	R	1,052.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,052.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,052.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	122	R	1,052.00
28	One brick wall	m2		R	167.00
29	Concrete in structual steel buildings - all concrete	m3	70	R	1,052.00
30	Total building area - Structural steel buildings	m2	555		
31	Ceiling	m2		R	112.00
32	Structural steel	t		R	25,546.00
33	Steel canopy - concrete	m3	65	R	1,052.00
34	Steel canopy - area	m2	444		
35	Concrete in weighbridge - all concrete	m3	0	R	1,052.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	12	R	1,052.00
39	Total pump house area	m2	9		
40	Concrete in cooling tower	m3	0	R	1,052.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	885		
43	Concrete in cable tunnel	m3	28	R	1,052.00
44	Total lengh of cable tunnel	m	36		
45	Total volume of basic steel platform	m3	235		
46	Total volume of steel pipe rack	m3	1,655		
47	Total volume of steel complex steel structure	m3	2,445		
48	Total volume of steel in stack	m3	331		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	177.55
52	Total process pipe length	m	22,452		
53	Total electrical cable - installation only	m	15,223	R	29.55
54	Total instrumentation cable - installation only	m	17,224	R	22.44

Ratio: Project Ratio Mean

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Normal	Mean
Current economic conditions	Volatile	Mean
Current economic factors	Volatile	Mean
Level of scope definition	Poor	Mean
Rework	Extensive	Mean
Scope change	Extensive	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Small	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project I			
Location:	South Africa			
Client:	0	Date of estimate:	2002	

	CIVIL CONSTRUCTION COST				R 13,398,160.67
A	SITE CLEARANCE AND DEMOLITIONS		R	27,543.88	
B	BULK EARTHWORKS		R	165,701.44	
C	PILING		R	679,530.31	
D	ROAD WORKS		R	557,469.33	
E	GENERAL PAVING AND BUNDED AREAS		R	213,956.26	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	276,272.57	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	363,414.41	
H	TANK BASES AND BUNDING		R	264,578.32	
I	RACK FOUNDATIONS		R	-	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,458,637.01	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	1,120,570.32	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,515,196.15	
Q	BUILDINGS - STEEL		R	1,221,011.00	
R	CANOPIES - STEEL		R	1,203,328.47	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	119,616.62	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	356,168.01	
W	HEAVY DUTY CABLE TUNNEL		R	381,569.35	
	Preliminaries and General	35.00%	R	3,473,597.21	
	STRUCTURAL STEEL				R 9,410,231.02
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,010,910.54	
B	STRUCTURAL STEEL - PIPERACK		R	1,888,325.19	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	1,948,291.20	
D	STRUCTURAL STEEL - STACK		R	396,119.88	
E	STRUCTURAL STEEL - WALKWAY		R	893,228.31	
F	STRUCTURAL STEEL - CABLE GANTRY		R	584,718.47	
	Preliminaries and General	40.00%	R	2,688,637.44	
	MECHANICAL AND PIPING				R 17,170,726.56
A	PIPING INSTALLATION		R	12,079,856.36	
B	RADIOGRAPHIC EXAMINATION (RT)		R	33,962.58	
C	DYE PENETRATION TESTING (DP)		R	12,203.86	
D	MAGNETIC PARTICLE TESTING (MPI)		R	18,936.67	
E	POST WELD HEAT TREATMENT		R	32,920.21	
F	MATERIAL HARDNESS TEST (HT)		R	25,348.85	
H	MECHANICAL INSTALLATION		R	61,576.16	
	Preliminaries and General	40.00%	R	4,905,921.88	
	PAINTING AND INSULATION				R 982,564.54
A	PAINTING AND INSULATION		R	727,825.58	
	Preliminaries and General	35.00%	R	254,738.95	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 2,452,204.59
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	1,816,447.85	
	Preliminaries and General	35.00%	R	635,756.75	

TOTAL COST	R	43,413,887.39

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		8,554		R 3.22	R 27,543.88	R 27,543.88
	Concrete demolitions	m3		0		R 1,005.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		2,441		R 32.11	R 78,380.51	R 165,701.44
	Trimming of sides	m2	2.18	1,120	4.30	R 7.47	R 8,361.48	
	Back fill and compact	m3	1.15	2,123	0.98	R 32.77	R 69,547.92	
	Overhaul	m3/km	1.73	1,411	11.34	R 2.83	R 3,995.30	
	Rip bed	m2	1.78	1,371	8.13	R 3.95	R 5,416.24	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 202,299.60	R 202,299.60	R 679,530.31
	EO for raking equipment	Item	0.00	1	23.89	R 25,132.28	R 25,132.28	
	Number of piles	No	0.00	16	0.00		R -	
	Move rig to new position	No	1.50	11	0.18	R 189.36	R 2,019.84	
	Number of raking piles	No	18.41	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.28	R 294.56	R 275.27	
	EO for raking drilling	m	0.15	6	0.89	R 164.65	R 953.97	
	Auger quantity	m	0.05	320	0.00	R 185.00	R 59,200.00	
	EO for drilling in coarse gravel	m	0.53	30	0.22	R 231.44	R 6,986.87	
	EO for drilling in boulders	m	1.84	9	0.50	R 526.00	R 4,573.91	
	EO for drilling in soft rock	m	1.63	10	0.24	R 252.48	R 2,478.33	
	Temporary casings	m	0.36	44	0.36	R 378.72	R 16,832.00	
	EO casing to raking pile	m	0.18	5	0.51	R 978.36	R 4,723.81	
	Mild steel rod reinforcement	t	14.29	1.120	0.93	R 7,073.54	R 7,919.99	
	High tensile rod reinforcement	t	1.32	12.121	7.23	R 7,605.96	R 92,193.45	
	Concrete to piles and bases	m3	0.15	107	0.00	R 1,052.00	R 112,213.33	
	Concrete to raking piles	m3	0.07	12	1.06	R 1,115.12	R 13,844.90	
	Site establishment of test equipment	Item	0.00	1	110.73	R 116,487.96	R 116,487.96	
	Load test to pile	No	99.34	0	27.07	R 28,477.64	R 4,586.69	
	Site establishment of intergity testing	No	258.87	0	48.79	R 51,327.08	R 3,172.38	
	Integrity testing of piles	No	1.25	13	0.27	R 284.04	R 3,635.71	
ROAD WORKS	Red paving	m2	0.15	0	0.97	R 82.45	R -	R 557,469.33
	Grey paving	m2	0.00	0	0.00	R 85.00	R -	
	Kerbing	m	0.13	226	0.00	R 147.64	R 33,433.63	
	Total paving and asphalt	m2	0.00	1,742	0.00		R -	
	Remove top soil	m3	0.55	249	5.83	R 44.02	R 10,964.77	
	Asphalt	m2	0.26	453	0.00	R 104.49	R 47,327.16	
	Rip bed	m2	0.00	1,742	0.00	R 7.55	R 13,152.10	
	Reduce levels	m3	0.42	732	4.99	R 37.67	R 27,564.17	
	Selected fill	m3	1.65	443	0.53	R 71.08	R 31,519.92	
	Imported fill	m3	2.23	199	0.39	R 182.27	R 36,242.29	
	Wearing course	m3	3.86	190	0.29	R 129.91	R 24,624.06	
	Prime	m2	4.74	2,102	1.47	R 36.45	R 76,617.65	
	Three line road marking	m	0.83	1,744	0.20	R 29.53	R 51,510.05	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	231	4.19	R 7.38	R 1,705.12	
	1m Wide concrete V-drain	m	0.97	220	0.81	R 661.41	R 145,289.19	
	200mm Diameter PVC pipe	m	0.96	217	0.11	R 209.64	R 45,576.73	
	Road marking - STOP	No	0.15	34	0.05	R 224.41	R 7,622.87	
	Standard signage	No	0.01	2	4.48	R 286.41	R 648.61	
	100mm Painted line	m	1.83	414	1.42	R 8.86	R 3,671.01	
			0.00		1.52			
			0.00		1.94			
			0.00		0.06			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	65	0.74	R 1,052.00	R 68,380.00	R 213,956.26
		Concrete in plinths	m3	0.00	13	0.00	R 1,052.00	R 13,621.51	
		Total concrete	m3	0.00	88	0.00		R -	
		Rip and compact	m2	0.13	500	187.19	R 5.62	R 2,809.98	
		Formwork to plinth	m2	7.26	94	0.12	R 126.24	R 11,867.06	
		Formwork to slab	m2	0.83	54	0.15	R 157.80	R 8,513.31	
		High tensile steel	t	0.01	0.880	0.00	R 7,554.00	R 6,647.52	
		Mesh	m2	585.35	515	51.00	R 148.12	R 76,296.58	
		Construction joint	m	4.00	260	0.05	R 52.60	R 13,676.00	
		Expansion joint	m	2.22	144	0.08	R 84.16	R 12,144.29	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	2,242	0.00		R -	R 276,272.57
		Base excavation	m3	1.50	173	0.00	R 34.22	R 5,931.47	
		Backfill	m3	0.59	116	0.64	R 53.47	R 6,178.61	
		Working space	m2	0.45	294	1.43	R 37.39	R 10,984.85	
		Concrete in bases	m3	0.04	78	25.24	R 1,052.00	R 82,056.00	
		Blinding	m2	0.83	105	20.88	R 50.38	R 5,302.98	
		Concrete in sump walls	m3	0.10	8	29.51	R 1,052.00	R 8,205.60	
		Concrete in slabs	m3	0.02	2	0.91	R 1,052.00	R 1,641.12	
		Total concrete	m3	0.00	87	0.04		R -	
		Wood float	m2	0.70	125	158.37	R 6.64	R 829.01	
		Formwork to bases	m2	1.69	132	0.12	R 126.24	R 16,640.96	
		Formwork to sump walls	m2	12.63	99	0.12	R 126.24	R 12,436.41	
		Formwork to sides of slab	m2	5.81	9	0.18	R 189.36	R 1,716.28	
		Mild steel reinforcement	t	0.12	0.982	0.00	R 7,554.00	R 7,414.80	
		High tensile reinforcement	t	10.68	8.180	1.19	R 7,554.00	R 61,790.02	
		Cast in steel	kg	0.46	170	34.10	R 30.85	R 5,231.16	
		Waterstop	m	0.43	18	8.10	R 129.88	R 2,355.90	
		Manhole	No	0.08	6	2.68	R 3,019.52	R 18,117.11	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	75	0.13	R 392.54	R 29,440.30	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	144	0.05	R 34.22	R 4,915.70	R 363,414.41
		Working space	m2	0.38	378	0.67	R 22.93	R 8,667.16	
		Backfill	m3	4.42	33	1.32	R 45.17	R 1,468.04	
		Concrete bases	m3	1.01	85	0.00	R 1,052.00	R 89,420.00	
		Concrete plinth	m3	2.29	37	0.00	R 1,052.00	R 39,048.03	
		Total concrete	m3	0.00	122	0.00		R -	
		Wood float	m2	0.47	79	0.05	R 10.52	R 830.81	
		Blinding	m2	1.01	84	0.01	R 52.60	R 4,426.73	
		Formwork bases	m2	0.49	173	0.13	R 136.76	R 23,723.67	
		Formwork plinth	m2	0.58	64	0.12	R 126.24	R 8,078.90	
		High tensile reinforcement	t	10.00	12.212	7.15	R 7,554.00	R 92,247.86	
		Cast in steel	kg	0.11	1,110	0.03	R 31.56	R 35,036.74	
		HD Bolts	kg	0.08	1,526	0.03	R 31.56	R 48,175.51	
		Grout	m3	34.52	1.075	6.52	R 6,859.04	R 7,375.24	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.84	146	0.05	R 52.60	R 7,679.60	R 264,578.32
		Working space	m2	4.36	33	1.63	R 32.27	R 1,080.60	
		Backfill	m3	1.38	106	0.72	R 73.06	R 7,729.07	
		Concrete bases	m3	0.75	25	0.00	R 1,052.00	R 26,300.00	
		Concrete sump wall	m3	2.86	9	0.00	R 1,052.00	R 9,195.80	
		Concrete slab	m3	0.57	44	0.00	R 1,052.00	R 46,140.35	
		Concrete plinth	m3	4.11	6	21.05	R 1,052.00	R 6,399.03	
		Concrete column	m3	19.22	1	164.76	R 1,052.00	R 1,368.37	
		Total concrete	m3	0.00	85	1.11		R -	
		Blinding	m2	2.67	32	1.05	R 49.98	R 1,590.71	
		Wood float	m2	0.25	340	1.12	R 6.39	R 2,170.52	
		Formwork to bases	m2	0.42	60	1.14	R 129.56	R 7,711.71	
		Formwork to plinths	m2	0.35	17	8.12	R 137.88	R 2,396.19	
		Formwork to columns	m2	0.12	11	7.63	R 148.17	R 1,606.06	
		Formwork to sumps	m2	0.11	79	7.10	R 143.72	R 11,420.52	
		Formwork to slabs	m2	4.07	11	7.32	R 128.14	R 1,380.84	
		Formwork to slabs n/e 300mm	m	2.17	20	8.21	R 44.65	R 902.50	
		Mild steel reinforcement	t	0.23	0.847	23.56	R 7,554.00	R 6,394.70	
		High tensile reinforcement	t	23.09	3.681	1.02	R 7,554.00	R 27,803.03	
		Mesh	m2	0.16	274	61.15	R 123.53	R 33,863.02	
		Cast in items	kg	0.19	447	214.69	R 35.19	R 15,738.04	
		HD Bolts	kg	0.10	850	207.02	R 36.49	R 31,010.14	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	0.416	0.17	R 6,188.24	R 2,576.06	
	Construction joint	m	0.30	146	24.89	R 42.27	R 6,179.24	
	Expansion joint	m	0.46	95	16.88	R 62.32	R 5,942.25	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	0	0.05	R 52.60	R -	R -
	Working space	m2	0.41	0	1.98	R 104.15	R -	
	Backfill	m3	2.45	0	0.87	R 60.46	R -	
	Blinding	m2	0.37	0	22.19	R 47.41	R -	
	Concrete bases	m3	5.81	0	0.00	R 1,052.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	1.34		R -	
	Wood float	m2	0.35	0	173.00	R 6.08	R -	
	Formwork bases	m2	0.47	0	9.63	R 109.24	R -	
	Formwork plinths	m2	0.09	0	6.99	R 150.50	R -	
	High tensile reinforcement	t	9.33	0.000	0.00	R 7,554.00	R -	
	HD Bolts	kg	0.03	0	225.70	R 33.47	R -	
	Grout	m3	79.73	0.000	0.18	R 5,844.44	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	952	0.06	R 63.12	R 60,114.23	R 1,458,637.01
	Working space	m2	0.50	1,905	1.90	R 33.22	R 63,278.13	
	Backfill	m3	2.66	358	0.80	R 78.90	R 28,249.17	
	Blinding	m2	0.33	673	21.39	R 49.18	R 33,085.98	
	Concrete bases	m3	0.00	222	0.00	R 1,052.00	R 233,544.00	
	Concrete plinth	m3	2.58	61	0.00	R 1,052.00	R 64,337.19	
	Concrete slab	m3	3.63	86	0.00	R 1,052.00	R 90,520.93	
	Total concrete	m3	0.00	369	0.00		R -	
	Wood float	m2	0.55	671	161.77	R 6.50	R 4,365.37	
	Formwork bases	m2	0.49	453	8.32	R 126.44	R 57,286.11	
	Formwork plinths	m2	0.11	556	8.34	R 126.14	R 70,129.92	
	High tensile reinforcement	t	13.32	27.718	0.00	R 7,554.00	R 209,381.65	
	HD Bolts	kg	0.02	11,100	217.74	R 34.69	R 385,089.56	
	Cast in items	kg	0.05	4,440	241.09	R 31.33	R 139,117.18	
	Grout	m3	68.22	3.254	0.17	R 6,188.24	R 20,137.62	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	0	0.05	R 52.60	R -	R -
	Working space	m2	0.56	0	1.66	R 31.69	R -	
	Backfill	m3	2.15	0	0.79	R 66.58	R -	
	Blinding	m2	0.65	0	20.36	R 51.67	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	28.05	0	0.00	R 1,052.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.60	0	158.85	R 6.62	R -	
	Formwork bases	m2	0.52	0	8.23	R 127.83	R -	
	Formwork plinths	m2	0.33	0	7.44	R 141.40	R -	
	Formwork to columns	m2	0.28	0	8.09	R 130.04	R -	
	High tensile reinforcement	t	9.06	0.000	0.00	R 7,554.00	R -	
	HD bolts	kg	0.04	0	209.18	R 36.11	R -	
	Grout	m3	108.76	0.000	0.16	R 6,575.00	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	0	0.06	R 63.12	R -	R -
	Working space	m2	0.30	0	2.12	R 29.77	R -	
	Backfill	m3	2.06	0	0.82	R 76.98	R -	
	Blinding	m2	0.67	0	19.99	R 52.63	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	1.19	0	151.33	R 1,052.00	R -	
	Concrete beam	m3	2.68	0	0.95	R 1,052.00	R -	
	Total concrete	m3	2.97	0	0.95		R -	
	Wood float	m2	0.47	0	7.50	R 6.95	R -	
	Formwork bases	m2	0.48	0	6.55	R 140.27	R -	
	Formwork to columns	m2	0.15	0	7.98	R 131.83	R -	
	Formwork to sides beams	m2	0.33	0	6.11	R 160.61	R -	
	Formwork to soffits beams	m2	0.69	0	6.55	R 172.18	R -	
	Formwork corbels	m2	10.88	0	5.37	R 195.90	R -	
	High tensile reinforcement	t	9.10	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.03	0	262.64	R 28.76	R -	
	HD bolts	kg	1.48	0	215.28	R 35.09	R -	
	Grout	m3	505.30	0.000	0.16	R 6,575.00	R -	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.84	480	0.05	R 52.60	R 25,248.00	R 1,120,570.32
	Working space	m2	0.61	787	1.79	R 29.39	R 23,123.00	
	Backfill	m3	1.15	417	0.79	R 66.58	R 27,790.86	
	Blinding	m2	0.61	205	20.06	R 52.44	R 10,746.45	
	Concrete bases	m3	0.00	125	0.97	R 1,052.00	R 131,500.00	
	Concrete column	m3	2.44	51	1.07	R 1,052.00	R 53,893.44	
	Concrete beam	m3	0.84	61	1.02	R 1,052.00	R 64,158.86	
	Concrete surface slab	m3	1.68	74	0.97	R 1,052.00	R 78,273.81	
	Concrete wall	m3	2.50	20	1.05	R 1,052.00	R 21,557.38	
	Concrete elevated slab	m3	1.10	47	0.00	R 1,052.00	R 48,994.04	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	379	0.00		R -	
		Wood float	m2	0.64	592	169.32	R 6.21	R 3,676.26	
		Formwork bases	m2	0.41	305	7.65	R 137.52	R 41,925.71	
		Formwork to columns	m2	0.17	301	6.34	R 165.93	R 50,003.19	
		Formwork to sides beams	m2	0.30	203	5.15	R 204.27	R 41,526.77	
		Formwork to soffits beams	m2	0.84	73	7.57	R 138.97	R 10,089.77	
		Formwork to soffts of slabs	m2	0.31	240	3.23	R 182.96	R 43,912.38	
		Formwork to pockets	m2	26.55	2	5.75	R 325.70	R 628.45	
		Formwork wall	m2	0.13	158	8.09	R 130.04	R 20,497.65	
		High tensile reinforcement	t	8.87	42.693	0.00	R 7,554.00	R 322,502.03	
		Cast in steel	kg	0.22	1,721	255.59	R 29.56	R 50,873.26	
		HD bolts	kg	0.41	924	201.38	R 37.51	R 34,646.22	
		Steel handrailing	m	2.58	17	9.71	R 777.96	R 12,873.41	
		Grout	m3	1,039.37	0.364	0.18	R 5,844.44	R 2,129.37	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	0	0.04	R 42.08	R -	R -
		Working space	m2	7.92	0	1.42	R 29.63	R -	
		Backfill	m3	4.13	0	0.63	R 26.51	R -	
		Blinding	m2	1.05	0	17.95	R 58.61	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
		Concrete column	m3	26.31	0	0.00	R 1,052.00	R -	
		Concrete beam	m3	1.43	0	0.00	R 1,052.00	R -	
		Concrete wall	m3	10.41	0	0.00	R 1,052.00	R -	
		Concrete elevated slabs	m3	10.92	0	0.00	R 1,052.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	138.41	R 7.60	R -	
		Formwork bases	m2	8.50	0	6.94	R 151.59	R -	
		Formwork to columns	m2	0.14	0	5.63	R 166.98	R -	
		Formwork to sides beams	m2	0.17	0	4.72	R 186.86	R -	
		Formwork to soffits beams	m2	0.50	0	6.30	R 222.88	R -	
		Formwork to soffts of slabs	m2	0.13	0	2.98	R 216.91	R -	
		Formwork to pockets	m2	418.49	0	4.85	R 353.02	R -	
		Formwork wall	m2	0.10	0	6.38	R 164.89	R -	
		High tensile reinforcement	t	4.05	0.000	0.00	R 7,554.00	R -	
		Cast in steel	kg	0.15	0	200.08	R 37.75	R -	
		HD bolts	kg	0.22	0	167.91	R 44.99	R -	
		Galvanised grating	m2	17.15	0	0.15	R 1,398.89	R -	
		Grout	m3	771.45	0.000	5.40	R 7,013.33	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.58	0	0.05	R 52.60	R -	R -
	Working space	m2	0.42	0	1.76	R 29.89	R -	
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Backfill	m3	2.04	0	0.80	R 65.75	R -	
	Blinding	m2	4.82	0	20.78	R 50.63	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	6.67	0	0.00	R 1,052.00	R -	
	Concrete beam	m3	1.99	0	0.00	R 1,052.00	R -	
	Concrete wall	m3	35.85	0	0.00	R 1,052.00	R -	
	Concrete elevated slabs	m3	24.74	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.82	0	162.71	R 6.47	R -	
	Formwork bases	m2	1.44	0	8.18	R 128.61	R -	
	Formwork to columns	m2	0.14	0	6.98	R 153.58	R -	
	Formwork to sides beams	m2	0.23	0	6.34	R 150.72	R -	
	Formwork to soffits beams	m2	0.75	0	6.85	R 165.93	R -	
	Formwork to soffts of slabs	m2	0.22	0	3.87	R 170.50	R -	
	Formwork to pockets	m2	3.09	0	6.17	R 271.83	R -	
	Formwork wall	m2	0.29	0	7.54	R 139.52	R -	
	High tensile reinforcement	t	7.31	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.02	0	212.67	R 35.52	R -	
	HD bolts	kg	0.01	0	208.59	R 36.21	R -	
	Galvanised grating	m2	3.97	0	0.19	R 5,536.84	R -	
	Grout	m3	42.08	0.000	6.37	R 1,185.87	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	222	0.05	R 52.60	R 11,679.30	R 1,515,196.15
	Working space	m2	2.50	89	1.84	R 28.59	R 2,538.98	
	Backfill	m3	1.25	178	0.79	R 66.58	R 11,827.14	
	Blinding	m2	3.86	32	20.30	R 51.82	R 1,637.92	
	Concrete	m3	0.00	122	0.00	R 1,052.00	R 128,344.00	
	Mesh reinforcement	m2	0.51	239	65.77	R 114.85	R 27,475.07	
	Rough formwork	m2	3.09	39	8.61	R 122.18	R 4,824.07	
	Smooth formwork	m2	0.57	214	6.80	R 154.71	R 33,112.49	
	Finish to concrete	m2	0.23	530	105.40	R 9.98	R 5,294.28	
	Construction joints	m	4.97	25	21.29	R 49.41	R 1,212.95	
	Movement joints	m	15.36	8	17.11	R 61.48	R 488.35	
	Cast in steel	kg	2.35	52	232.74	R 32.46	R 1,684.99	
	Grout	m3	882.88	0.138	0.18	R 5,844.44	R 807.61	
	Brick walls	m2	0.50	244	0.00	R 167.00	R 40,748.00	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	545	0.00		R -	
	Waterproofing membrane	m2	2.22	246	12.03	R 87.45	R 21,481.49	
	Roof construction	m2	2.04	267	38.22	R 197.65	R 52,835.22	
	Ceiling	m2	0.98	556	0.00	R 112.00	R 62,324.57	
	Doors and windows	No	474.69	1	0.17	R 982.35	R 1,128.56	
	Floor finish	m2	1.03	529	0.79	R 211.39	R 111,923.04	
	Wall finsih	m2	1.04	524	1.47	R 113.61	R 59,570.76	
	Rod reinforcement	t	9.25	13	0.00	R 7,554.00	R 99,631.14	
	Metalwork	Item	0.00	1	4.44	R 33,539.76	R 33,539.76	
	Structural steel	Item	0.00	1	11.50	R 86,871.00	R 86,871.00	
	Plumbing and drainage	Item	0.00	1	7.32	R 55,295.28	R 55,295.28	
	Small power and lighting	Item	0.00	1	62.40	R 471,369.60	R 471,369.60	
	External works	Item	0.00	1	178.28	R 187,550.56	R 187,550.56	
BUILDINGS - STEEL	Concrete	m3	0.00	70	0.17	R 1,052.00	R 73,640.00	R 1,221,011.00
	Earthworks	m3	2.37	166	9.13	R 115.22	R 19,115.75	
	Reinforcement	t	8.82	8	0.00	R 7,554.00	R 59,952.38	
	Mesh	m2	0.12	583	10.27	R 102.43	R 59,753.33	
	Formwork	m2	0.40	175	8.06	R 130.52	R 22,841.19	
	Brickwork	m2	6.11	91	6.08	R 173.03	R 15,716.79	
	Roof covering	m2	0.87	638	208.48	R 122.53	R 78,168.58	
	Structural steel	t	18.83	29	0.00	R 25,546.00	R 752,949.02	
	Side cladding	m2	1.54	360	0.98	R 120.08	R 43,276.97	
	Doors	No	405.94	1	0.51	R 13,028.46	R 17,812.47	
	Ridge ventilator	m	21.95	25	11.48	R 1,406.70	R 35,567.95	
	Aluminium insulation	m2	0.89	624	1.81	R 67.70	R 42,216.57	
	Total building area	m2	0.00	555	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	203	0.13	R 136.76	R 27,734.93	R 1,203,328.47
	Concrete	m3	0.00	65	0.00	R 1,052.00	R 68,380.00	
	Reinforcement	t	11.42	6	0.18	R 7,554.00	R 42,995.62	
	Mesh	m2	0.12	542	10.21	R 103.04	R 55,811.30	
	Formwork	m2	0.45	144	8.51	R 123.62	R 17,856.12	
	Brickwork	m2	5.94	75	5.91	R 178.00	R 13,305.30	
	Screed	m2	1.12	396	43.13	R 24.39	R 9,669.44	
	Structural steel	t	14.72	30	0.00	R 25,546.00	R 770,545.11	
	Cat ladders	m	2.74	11	9.66	R 2,644.51	R 29,111.89	
	Hand rail	m	0.73	41	27.40	R 932.34	R 38,523.40	
	Kick plates	m	0.76	40	2.76	R 337.80	R 13,406.79	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	488	195.47	R 130.69	R 63,765.29	
		Side cladding	m2	4.76	93	0.93	R 121.54	R 11,337.09	
		Floor grating	m2	1.09	28	17.29	R 1,477.50	R 40,886.18	
		Total buiding area	m2	0.00	444	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	0	8.02	R 131.17	R -	R -
		Blinding	m2	0.47	0	18.72	R 56.20	R -	
		Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
		Reinforcement	t	7.97	0	0.00	R 7,554.00	R -	
		Mesh	m2	0.49	0	50.23	R 150.39	R -	
		Formwork	m2	0.31	0	7.58	R 138.79	R -	
		Finish to concrete	m2	0.44	0	103.65	R 10.15	R -	
		Movement joints	m	2.46	0	15.35	R 68.53	R -	
		Cast in steel	kg	0.09	0	179.47	R 42.09	R -	
		Grout	m3	71.08	0.000	2.53	R 7,013.33	R -	
		Brickwork	m2	0.24	0	0.15	R 167.00	R -	
		Doors and windows	No	2.74	0	0.26	R 2,087.50	R -	
		Pipework	m	2.59	0	0.21	R 415.81	R -	
		Bolts	kg	0.11	0	0.08	R 42.09	R -	
		Structural steel	t	3.99	0	0.00	R 29,053.85	R -	
		Miscellaneous steel	t	131.32	0	0.00	R 35,971.43	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	103	6.07	R 173.31	R 17,864.94	R 119,616.62
		Blinding	m2	0.71	17	14.50	R 72.55	R 1,226.23	
		Concrete	m3	0.00	12	0.00	R 1,052.00	R 12,624.00	
		Reinforcement	t	5.75	2	0.00	R 7,554.00	R 15,764.87	
		Formwork	m2	0.07	171	5.72	R 183.92	R 31,528.47	
		Finish to concrete	m2	0.31	39	77.96	R 13.49	R 522.35	
		Movement joints	m	0.42	29	12.46	R 84.43	R 2,412.29	
		Cast in steel	kg	23.71	0.506	163.17	R 46.30	R 23.43	
		Grout	m3	22.24	0.540	0.62	R 8,092.31	R 4,366.35	
		Bolts	kg	109.85	0.109	0.13	R 28.70	R 3.14	
		Structural steel	t	35.84	0.251	0.22	R 34,336.36	R 8,622.41	
		Miscellaneous steel	t	20.04	0.449	0.18	R 41,966.67	R 18,847.31	
		Brickwork	m2	0.49	18	4.24	R 248.11	R 4,557.18	
		Roof covering	m2	1.46	6	1.22	R 203.37	R 1,253.66	
		Total pump house area	m2	0.00	9	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	6.10	R 172.46	R -	R -
	Blinding	m2	1.17	0	16.23	R 64.82	R -	
	Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
	Reinforcement	t	5.89	0.000	0.00	R 7,554.00	R -	
	Formwork	m2	0.21	0	6.04	R 174.17	R -	
	Movement joint	m	1.61	0	0.12	R 81.68	R -	
	Cast in steel	kg	0.13	0	12.88	R 38.51	R -	
	Bolts	kg	0.37	0	196.16	R 46.51	R -	
	Chemical anchors	No	6.13	0	0.22	R 209.95	R -	
	Miscellaneous steelwork	t	88.98	0.000	162.42	R 34,336.36	R -	
	Pre-cast concrete	m3	30.27	0	35.98	R 3,506.67	R -	
	Brickwork	m2	7.79	0	0.30	R 240.73	R -	
	Total area	m2	0.00	0	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	1,609	1.68	R 70.69	R 113,753.72	R 356,168.01
	Lining	m2	0.70	1,264	1.16	R 42.08	R 53,201.14	
	Paving	m2	0.65	1,362	0.53	R 79.40	R 108,101.02	
	Pipework	m	28.23	31	0.24	R 294.56	R 9,234.35	
	Manholes	No	16.47	2	0.10	R 2,945.60	R 5,606.77	
	Concrete	m3	2.43	13	0.04	R 1,052.00	R 13,571.94	
	Formwork	m2	0.08	161	5.85	R 179.83	R 28,999.87	
	Mesh	m2	0.70	18	6.64	R 158.43	R 2,919.95	
	Reinforcement	t	4.69	2.751	0.12	R 7,554.00	R 20,779.27	
	Dam area (to top of berm)	m2	0.00	885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	169	5.56	R 189.21	R 31,998.96	R 381,569.35
	Blinding	m2	0.85	33	13.49	R 77.98	R 2,568.87	
	Concrete	m3	0.00	28	0.00	R 1,052.00	R 29,456.00	
	Reinforcement	t	4.52	6.195	0.00	R 7,554.00	R 46,794.69	
	Mesh	m2	0.90	31	38.60	R 195.70	R 6,088.43	
	Formwork	m2	0.15	187	5.36	R 196.27	R 36,636.82	
	Cast in steel	kg	0.02	1,400	140.16	R 53.90	R 75,453.77	
	Miscellaneous steelwork	t	11.14	3.232	0.16	R 47,212.50	R 152,571.81	
	Total tunnel length	m	0.00	36	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	235	0.00		R -	R 1,010,910.54
	Steel	t	9.58	24.530	0.00	R 25,546.00	R 626,650.31	
	Handrail	m	1.45	162	28.73	R 889.18	R 144,107.69	
	Grating	m2	1.91	123	16.97	R 1,505.36	R 185,214.75	
	Kick flats	m	1.71	137	76.94	R 332.02	R 45,629.16	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	35	95.97	R 266.19	R 9,308.64	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,655	0.00		R -	R 1,888,325.19
	Steel	t	27.86	59.404	0.00	R 25,546.00	R 1,517,538.77	
	Handrail	m	13.37	124	30.43	R 839.50	R 103,917.23	
	Grating	m2	12.47	133	18.55	R 1,377.14	R 182,772.37	
	Kick flats	m	13.35	124	84.90	R 300.90	R 37,301.99	
	Cat ladder	m	98.85	17	9.14	R 2,794.97	R 46,794.85	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	2,445	0.00		R -	R 1,948,291.20
	Steel	t	76.43	31.990	0.00	R 25,546.00	R 817,217.98	
	Handrail	m	31.26	78	30.84	R 828.34	R 64,788.58	
	Grating	m2	3.84	637	16.10	R 1,586.71	R 1,010,286.78	
	Kick flats	m	34.08	72	83.17	R 307.15	R 22,036.14	
	Stair treads	No	230.28	11	101.90	R 250.70	R 2,661.78	
	Cat ladder	m	238.13	10	8.38	R 3,048.45	R 31,299.95	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	331	0.00		R -	R 396,119.88
	Steel	t	25.51	12.975	0.00	R 25,546.00	R 331,467.11	
	Handrail	m	45.84	7	30.11	R 848.42	R 6,126.26	
	Grating	m2	60.74	5	17.06	R 1,497.42	R 8,160.13	
	Kick flats	m	46.49	7	79.97	R 319.44	R 2,274.39	
	Cat ladder	m	20.35	16	8.64	R 2,956.71	R 48,091.99	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 893,228.31
	Steel	t	16.54	16.082	0.00	R 25,546.00	R 410,836.52	
	Handrail	m	1.10	242	31.41	R 813.31	R 196,672.63	
	Grating	m2	1.98	134	16.95	R 1,507.14	R 202,474.18	
	Kick flats	m	1.16	229	80.43	R 317.62	R 72,833.05	
	Stair treads	No	6.10	44	106.99	R 238.77	R 10,411.94	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 584,718.47
	Steel	t	12.73	19.246	0.00	R 25,546.00	R 491,655.15	
	Handrail	m	25.10	10	32.05	R 797.07	R 7,780.14	
	Grating	m2	7.46	33	17.66	R 1,446.55	R 47,507.20	
	Kick flats	m	22.84	11	84.46	R 302.46	R 3,244.46	
	Cat ladder	m	20.48	12	8.85	R 2,886.55	R 34,531.53	
PIPING INSTALLATION	Pipe length	m	0.00	22,452	0.00		R -	R 12,079,856.36
	Total work units	WU	0.33	68,036	0.00	R 177.55	R 12,079,856.36	
	Pipe supports	kg	2.61	8,602	0.00		R -	
	WU for pipe supports	WU	0.16	10,886	0.00		R -	
	Number of welds	No	0.61	13,696	0.00		R -	
	Total fittings	No	0.38	8,532	0.00		R -	
	Stud bolts	No	0.34	2,901	0.00		R -	
	Support number	No	0.19	1,634	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	68,036	0.00	R 177.55		R 33,962.58

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	59.98	1,134	5.93	R 29.94	R 33,962.58	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	68,036	0.00	R 177.55		R 12,203.86
	Number of examinations	No	168.34	404	5.88	R 30.20	R 12,203.86	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	68,036	0.00	R 177.55		R 18,936.67
	Number of examinations	No	300.90	226	2.12	R 83.75	R 18,936.67	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	68,036	0.00	R 177.55		R 32,920.21
	Number of examinations	No	52.95	1,285	6.93	R 25.62	R 32,920.21	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	68,036	0.00	R 177.55		R 25,348.85
	Number of examinations	No	114.83	592	4.15	R 42.78	R 25,348.85	
MECHANICAL INSTALLATION	Total work units	WU	0.00	68,036	0.00	R 177.55		R 61,576.16
	Mechanical equipment	t	261.57	260	0.75	R 236.73	R 61,576.16	
	Structural steel	t	218.09	312	53.95			
PAINTING & INSULATION	Total work units	WU	0.00	68,036	0.00	R 177.55		R 727,825.58
	Painting to piping	m2	17.88	3,805	0.34	R 68.29	R 259,848.92	
	Insulation to piping	m2	51.67	1,317	2.60	R 200.85	R 264,466.73	
	Mechanical equipment received	t	0.00	260	0.82	R 236.73	R 61,576.16	
	Painting to mechanical equipment	m2	0.25	1,040	3.69	R 64.16	R 66,749.22	
	Insulation to mechanical equipment	m2	0.70	372	1.17	R 202.34	R 75,184.56	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	15,223	0.00	R 29.55	R 449,839.65	R 1,816,447.85
	Electrical cable terminations	No	311.25	605	0.43	R 68.72	R 41,562.92	
	Electrical equipment	No	9.05	49	0.11	R 268.64	R 13,138.80	
	DB's	No	6.39	5	0.32	R 839.49	R 4,536.88	
	Rack	m	0.69	2,382	1.65	R 84.43	R 201,135.55	
	Support steel	kg	1.42	3,453	2.13	R 13.87	R 47,899.19	
	Instrumentation cable	m	27.43	17,224	0.35	R 28.50	R 490,884.00	
	Instruments	No	0.58	628	0.18	R 158.33	R 99,421.56	
	Hook-ups	No	3.98	1,083	0.16	R 178.13	R 192,843.54	
	Light fittings	No	10.26	195	0.02	R 164.17	R 31,956.48	
	Conduit	m	4.13	1,484	0.13	R 17.91	R 26,572.13	
	Instrument stands	No	0.00	152		R 1,425.00	R 216,657.15	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project I				
Location:	South Africa				
Client:				Date of estimate:	2002

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	8,554	R	3.22
2	Concrete demolitions	m3	0	R	1,005.00
3	Bulk excavation	m3	2,441	R	32.11
4	Vertical piles	No	16		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,052.00
7	Auger pile	m		R	185.00
8	Total paving and asphalt to road works	m2	1,742		
9	Grey paving to road works	m2	0	R	85.00
10	Asphalt to road surface	m2	1,742		
11	Rip bed of road works	m2	1,742	R	7.55
12	Total concrete in paving and bunding	m3	88	R	1,052.00
13	Concrete in paving	m3	65		
14	Rod reinforcement	t		R	7,554.00
15	Concrete in plinths and bases on area finishing	m3	78		
16	Stormwater pipe to drain surface run-off	m	75		
17	Machine excavation	m3		R	34.22
18	Concrete in pump and pipe support bases	m3	85	R	1,052.00
19	Concrete in tank bases	m3	25	R	1,052.00
20	Concrete in pipe and cable rack foundations	m3	0	R	1,052.00
21	Concrete to simple structural foundations	m3	222	R	1,052.00
22	Complex structural foundations - bases	m3	0	R	1,052.00
23	Concrete pipe racks - bases	m3	0	R	1,052.00
24	Concrete structure including concrete columns and beams - bases	m3	125	R	1,052.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,052.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,052.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	122	R	1,052.00
28	One brick wall	m2		R	167.00
29	Concrete in structual steel buildings - all concrete	m3	70	R	1,052.00
30	Total building area - Structural steel buildings	m2	555		
31	Ceiling	m2		R	112.00
32	Structural steel	t		R	25,546.00
33	Steel canopy - concrete	m3	65	R	1,052.00
34	Steel canopy - area	m2	444		
35	Concrete in weighbridge - all concrete	m3	0	R	1,052.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	12	R	1,052.00
39	Total pump house area	m2	9		
40	Concrete in cooling tower	m3	0	R	1,052.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	885		
43	Concrete in cable tunnel	m3	28	R	1,052.00
44	Total lengh of cable tunnel	m	36		
45	Total volume of basic steel platform	m3	235		
46	Total volume of steel pipe rack	m3	1,655		
47	Total volume of steel complex steel structure	m3	2,445		
48	Total volume of steel in stack	m3	331		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	177.55
52	Total process pipe length	m	22,452		
53	Total electrical cable - installation only	m	15,223	R	29.55
54	Total instrumentation cable - installation only	m	17,224	R	22.44

Ratio: Project Ratio Median

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Normal	Median
Current economic conditions	Volatile	Median
Current economic factors	Volatile	Median
Level of scope definition	Poor	Median
Rework	Extensive	Median
Scope change	Extensive	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Small	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Repitition	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

Project name:	Project I				
Location:	South Africa				
Client:	0	Date of estimate:	2002		

	CIVIL CONSTRUCTION COST				R 13,807,112.94
A	SITE CLEARANCE AND DEMOLITIONS		R	27,543.88	
B	BULK EARTHWORKS		R	170,218.75	
C	PILING		R	682,655.19	
D	ROAD WORKS		R	418,966.43	
E	GENERAL PAVING AND BUNDED AREAS		R	226,121.63	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	290,641.61	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	381,410.03	
H	TANK BASES AND BUNDING		R	288,843.92	
I	RACK FOUNDATIONS		R	-	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,574,457.54	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	1,313,720.32	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,587,014.76	
Q	BUILDINGS - STEEL		R	1,293,680.38	
R	CANOPIES - STEEL		R	1,220,345.78	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	106,676.68	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	333,834.32	
W	HEAVY DUTY CABLE TUNNEL		R	311,359.83	
	Preliminaries and General	35.00%	R	3,579,621.87	
	STRUCTURAL STEEL				R 10,711,538.05
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,118,894.96	
B	STRUCTURAL STEEL - PIPERACK		R	2,217,628.70	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	2,167,863.02	
D	STRUCTURAL STEEL - STACK		R	454,133.68	
E	STRUCTURAL STEEL - WALKWAY		R	1,061,803.65	
F	STRUCTURAL STEEL - CABLE GANTRY		R	630,774.59	
	Preliminaries and General	40.00%	R	3,060,439.44	
	MECHANICAL AND PIPING				R 18,979,305.38
A	PIPING INSTALLATION		R	13,287,842.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	43,295.28	
C	DYE PENETRATION TESTING (DP)		R	26,712.71	
D	MAGNETIC PARTICLE TESTING (MPI)		R	25,673.19	
E	POST WELD HEAT TREATMENT		R	43,972.54	
F	MATERIAL HARDNESS TEST (HT)		R	52,126.07	
H	MECHANICAL INSTALLATION		R	77,024.90	
	Preliminaries and General	40.00%	R	5,422,658.68	
	PAINTING AND INSULATION				R 1,321,106.85
A	PAINTING AND INSULATION		R	978,597.67	
	Preliminaries and General	35.00%	R	342,509.18	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 2,811,360.83
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	2,082,489.50	
	Preliminaries and General	35.00%	R	728,871.33	

TOTAL COST	R	47,630,424.05

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		8,554		R 3.22	R 27,543.88	R 27,543.88
	Concrete demolitions	m3		0		R 1,005.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		2,441		R 32.11	R 78,380.51	R 170,218.75
	Trimming of sides	m2	2.20	1,110	4.18	R 7.68	R 8,523.33	
	Back fill and compact	m3	1.12	2,179	0.95	R 33.80	R 73,665.89	
	Overhaul	m3/km	1.62	1,507	11.35	R 2.83	R 4,262.82	
	Rip bed	m2	1.71	1,427	8.51	R 3.77	R 5,386.20	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 202,394.28	R 202,394.28	R 682,655.19
	EO for raking equipment	Item	0.00	1	24.25	R 25,511.00	R 25,511.00	
	Number of piles	No	0.00	16	0.00		R -	
	Move rig to new position	No	1.48	11	0.19	R 199.88	R 2,160.86	
	Number of raking piles	No	19.43	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.24	R 252.48	R 223.56	
	EO for raking drilling	m	0.14	6	0.61	R 112.85	R 663.77	
	Auger quantity	m	0.05	320	0.00	R 185.00	R 59,200.00	
	EO for drilling in coarse gravel	m	0.55	29	0.22	R 231.44	R 6,732.80	
	EO for drilling in boulders	m	1.65	10	0.51	R 536.52	R 5,202.62	
	EO for drilling in soft rock	m	1.57	10	0.23	R 241.96	R 2,465.83	
	Temporary casings	m	0.38	42	0.31	R 326.12	R 13,731.37	
	EO casing to raking pile	m	0.17	5	0.57	R 736.40	R 3,567.07	
	Mild steel rod reinforcement	t	14.65	1.092	0.70	R 5,346.26	R 5,838.92	
	High tensile rod reinforcement	t	1.16	13.793	7.26	R 7,637.52	R 105,345.10	
	Concrete to piles and bases	m3	0.16	100	0.00	R 1,052.00	R 105,200.00	
	Concrete to raking piles	m3	0.08	10	1.08	R 1,136.16	R 11,694.90	
	Site establishment of test equipment	Item	0.00	1	115.74	R 121,758.48	R 121,758.48	
	Load test to pile	No	93.50	0	22.16	R 23,312.32	R 3,989.27	
	Site establishment of intergity testing	No	255.00	0	49.96	R 52,557.92	R 3,297.75	
	Integrity testing of piles	No	1.19	13	0.26	R 273.52	R 3,677.58	
ROAD WORKS	Red paving	m2	0.14	0	0.93	R 79.05	R -	R 418,966.43
	Grey paving	m2	0.00	0	0.00	R 85.00	R -	
	Kerbing	m	0.09	157	0.00	R 166.82	R 26,153.44	
	Total paving and asphalt	m2	0.00	1,742	0.00		R -	
	Remove top soil	m3	0.49	171	4.45	R 33.60	R 5,735.63	
	Asphalt	m2	0.20	348	0.00	R 103.75	R 36,145.40	
	Rip bed	m2	0.00	1,742	0.00	R 7.55	R 13,152.10	
	Reduce levels	m3	0.36	627	4.30	R 32.47	R 20,359.45	
	Selected fill	m3	1.50	418	0.46	R 70.58	R 29,506.45	
	Imported fill	m3	1.94	216	0.33	R 213.87	R 46,089.43	
	Wearing course	m3	3.89	161	0.20	R 162.33	R 26,168.96	
	Prime	m2	4.34	1,814	1.47	R 21.39	R 38,805.45	
	Three line road marking	m	0.78	1,415	0.10	R 16.68	R 23,609.24	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	155	4.06	R 5.00	R 776.76	
		1m Wide concrete V-drain	m	1.00	157	0.78	R 713.97	R 111,936.74	
		200mm Diameter PVC pipe	m	0.93	146	0.09	R 221.87	R 32,349.20	
		Road marking - STOP	No	0.15	24	0.03	R 273.58	R 6,433.75	
		Standard signage	No	0.01	2	4.28	R 306.94	R 481.22	
		100mm Painted line	m	1.61	252	1.33	R 5.00	R 1,263.21	
				0.00		1.64			
				0.00		1.84			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	65	0.75	R 1,052.00	R 68,380.00	R 226,121.63
		Concrete in plinths	m3	0.00	13	0.00	R 1,052.00	R 14,012.30	
		Total concrete	m3	0.00	88	0.00		R -	
		Rip and compact	m2	0.13	500	193.57	R 5.43	R 2,717.36	
		Formwork to plinth	m2	6.92	92	0.12	R 126.24	R 11,635.81	
		Formwork to slab	m2	0.80	52	0.15	R 157.80	R 8,205.60	
		High tensile steel	t	0.01	0.880	0.00	R 7,554.00	R 6,647.52	
		Mesh	m2	607.27	534	43.37	R 174.18	R 93,079.07	
		Construction joint	m	3.64	237	0.04	R 42.08	R 9,956.13	
		Expansion joint	m	2.10	137	0.08	R 84.16	R 11,487.84	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	2,242	0.00		R -	R 290,641.61
		Base excavation	m3	1.42	181	0.00	R 34.22	R 6,207.35	
		Backfill	m3	0.56	128	0.63	R 54.32	R 6,938.69	
		Working space	m2	0.43	324	1.35	R 40.24	R 13,032.98	
		Concrete in bases	m3	0.04	78	23.71	R 1,052.00	R 82,056.00	
		Blinding	m2	0.71	124	19.17	R 54.88	R 6,812.53	
		Concrete in sump walls	m3	0.11	9	31.87	R 1,052.00	R 9,026.16	
		Concrete in slabs	m3	0.02	2	0.81	R 1,052.00	R 1,641.12	
		Total concrete	m3	0.00	88	0.03		R -	
		Wood float	m2	0.61	144	123.90	R 8.49	R 1,226.84	
		Formwork to bases	m2	1.73	135	0.12	R 126.24	R 17,034.83	
		Formwork to sump walls	m2	11.18	96	0.12	R 126.24	R 12,109.50	
		Formwork to sides of slab	m2	5.67	9	0.17	R 178.84	R 1,581.88	
		Mild steel reinforcement	t	0.08	0.753	0.00	R 7,554.00	R 5,684.61	
		High tensile reinforcement	t	9.37	9.407	0.92	R 7,554.00	R 71,057.58	
		Cast in steel	kg	0.45	173	33.55	R 31.36	R 5,435.07	
		Waterstop	m	0.44	20	8.37	R 125.69	R 2,450.90	
		Manhole	No	0.08	6	2.72	R 3,223.04	R 19,338.24	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Stormwater pipe	m	0.00	75	0.12	R 386.76	R 29,007.35	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	137	0.05	R 34.22	R 4,683.01	R 381,410.03
		Working space	m2	0.33	415	0.68	R 23.27	R 9,649.83	
		Backfill	m3	3.97	34	1.27	R 43.46	R 1,498.09	
		Concrete bases	m3	0.93	85	0.00	R 1,052.00	R 89,420.00	
		Concrete plinth	m3	2.01	42	0.00	R 1,052.00	R 44,487.56	
		Total concrete	m3	0.00	127	0.00		R -	
		Wood float	m2	0.46	92	0.05	R 10.52	R 967.12	
		Blinding	m2	0.93	91	0.01	R 52.60	R 4,807.53	
		Formwork bases	m2	0.47	181	0.12	R 126.24	R 22,830.64	
		Formwork plinth	m2	0.53	80	0.12	R 126.24	R 10,072.66	
		High tensile reinforcement	t	10.15	12.541	6.60	R 7,554.00	R 94,732.78	
		Cast in steel	kg	0.10	1,273	0.03	R 31.56	R 40,172.27	
		HD Bolts	kg	0.08	1,591	0.03	R 31.56	R 50,215.34	
		Grout	m3	33.79	1.252	5.98	R 6,290.96	R 7,873.21	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.54	139	0.05	R 52.60	R 7,285.10	R 288,843.92
		Working space	m2	3.95	35	1.56	R 33.72	R 1,182.26	
		Backfill	m3	1.34	103	0.75	R 70.13	R 7,248.86	
		Concrete bases	m3	0.70	25	0.00	R 1,052.00	R 26,300.00	
		Concrete sump wall	m3	2.55	10	0.00	R 1,052.00	R 10,313.73	
		Concrete slab	m3	0.56	45	0.00	R 1,052.00	R 46,964.29	
		Concrete plinth	m3	3.73	7	19.74	R 1,052.00	R 7,050.94	
		Concrete column	m3	19.00	1	160.09	R 1,052.00	R 1,384.21	
		Total concrete	m3	0.00	87	0.99		R -	
		Blinding	m2	2.44	36	1.05	R 53.29	R 1,910.35	
		Wood float	m2	0.25	350	1.05	R 6.57	R 2,299.04	
		Formwork to bases	m2	0.39	64	1.05	R 139.15	R 8,920.09	
		Formwork to plinths	m2	0.34	20	7.56	R 145.71	R 2,872.31	
		Formwork to columns	m2	0.11	12	7.22	R 153.58	R 1,837.04	
		Formwork to sumps	m2	0.10	98	6.85	R 143.72	R 14,089.79	
		Formwork to slabs	m2	3.83	12	7.32	R 130.68	R 1,523.26	
		Formwork to slabs n/e 300mm	m	2.05	22	8.05	R 47.82	R 1,041.34	
		Mild steel reinforcement	t	0.22	0.870	22.00	R 7,554.00	R 6,571.26	
		High tensile reinforcement	t	22.12	3.954	0.90	R 7,554.00	R 29,869.37	
		Mesh	m2	0.15	298	54.97	R 137.42	R 40,898.93	
		Cast in items	kg	0.19	460	218.75	R 34.53	R 15,896.79	
		HD Bolts	kg	0.09	972	198.48	R 38.06	R 36,987.24	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	200.00	0.437	0.16	R 6,575.00	R 2,875.41	
	Construction joint	m	0.29	154	24.07	R 43.71	R 6,728.12	
	Expansion joint	m	0.44	101	15.71	R 66.96	R 6,794.21	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	0	0.05	R 52.60	R -	R -
	Working space	m2	0.30	0	1.58	R 83.11	R -	
	Backfill	m3	2.36	0	0.78	R 67.44	R -	
	Blinding	m2	0.40	0	24.38	R 43.15	R -	
	Concrete bases	m3	5.73	0	0.00	R 1,052.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	1.35		R -	
	Wood float	m2	0.35	0	182.61	R 5.76	R -	
	Formwork bases	m2	0.49	0	11.01	R 95.55	R -	
	Formwork plinths	m2	0.09	0	6.94	R 151.59	R -	
	High tensile reinforcement	t	9.11	0.000	0.00	R 7,554.00	R -	
	HD Bolts	kg	0.03	0	198.55	R 38.05	R -	
	Grout	m3	76.52	0.000	0.17	R 6,188.24	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	864	0.05	R 52.60	R 45,424.31	R 1,574,457.54
	Working space	m2	0.45	1,919	1.88	R 27.98	R 53,693.04	
	Backfill	m3	2.48	348	0.78	R 67.44	R 23,482.38	
	Blinding	m2	0.35	634	21.52	R 48.88	R 31,006.90	
	Concrete bases	m3	0.00	222	0.00	R 1,052.00	R 233,544.00	
	Concrete plinth	m3	2.36	75	0.00	R 1,052.00	R 78,900.00	
	Concrete slab	m3	2.96	94	0.00	R 1,052.00	R 98,959.32	
	Total concrete	m3	0.00	391	0.00		R -	
	Wood float	m2	0.51	767	155.50	R 6.77	R 5,187.61	
	Formwork bases	m2	0.45	493	8.00	R 131.50	R 64,873.33	
	Formwork plinths	m2	0.10	750	7.78	R 135.22	R 101,413.88	
	High tensile reinforcement	t	12.87	30.386	0.00	R 7,554.00	R 229,535.83	
	HD Bolts	kg	0.02	11,100	190.91	R 39.57	R 439,209.05	
	Cast in items	kg	0.05	4,440	225.21	R 33.54	R 148,926.60	
	Grout	m3	67.67	3.281	0.17	R 6,188.24	R 20,301.29	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	0	0.05	R 52.60	R -	R -
	Working space	m2	0.50	0	1.64	R 32.07	R -	
	Backfill	m3	2.15	0	0.76	R 69.21	R -	
	Blinding	m2	0.66	0	20.25	R 51.95	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	27.56	0	0.00	R 1,052.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.59	0	157.14	R 6.69	R -	
	Formwork bases	m2	0.49	0	7.78	R 135.22	R -	
	Formwork plinths	m2	0.31	0	7.42	R 141.78	R -	
	Formwork to columns	m2	0.29	0	7.75	R 135.74	R -	
	High tensile reinforcement	t	8.97	0.000	0.00	R 7,554.00	R -	
	HD bolts	kg	0.04	0	200.18	R 37.74	R -	
	Grout	m3	96.76	0.000	0.16	R 6,575.00	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	0	0.05	R 52.60	R -	R -
	Working space	m2	0.25	0	2.02	R 26.04	R -	
	Backfill	m3	1.91	0	0.79	R 66.58	R -	
	Blinding	m2	0.68	0	20.00	R 52.60	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	1.08	0	145.46	R 1,052.00	R -	
	Concrete beam	m3	2.50	0	0.88	R 1,052.00	R -	
	Total concrete	m3	2.76	0	0.88		R -	
	Wood float	m2	0.44	0	7.44	R 7.23	R -	
	Formwork bases	m2	0.45	0	6.41	R 141.40	R -	
	Formwork to columns	m2	0.14	0	7.35	R 143.13	R -	
	Formwork to sides beams	m2	0.32	0	5.90	R 164.12	R -	
	Formwork to soffits beams	m2	0.68	0	6.41	R 178.31	R -	
	Formwork corbels	m2	10.42	0	4.87	R 216.02	R -	
	High tensile reinforcement	t	8.81	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.03	0	260.94	R 28.95	R -	
	HD bolts	kg	1.43	0	199.28	R 37.91	R -	
	Grout	m3	476.47	0.000	0.16	R 6,575.00	R -	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	464	0.05	R 52.60	R 24,393.25	R 1,313,720.32
	Working space	m2	0.58	800	1.69	R 31.12	R 24,885.99	
	Backfill	m3	1.15	403	0.78	R 67.44	R 27,194.26	
	Blinding	m2	0.62	202	19.41	R 54.20	R 10,927.19	
	Concrete bases	m3	0.00	125	0.88	R 1,052.00	R 131,500.00	
	Concrete column	m3	2.01	62	1.07	R 1,052.00	R 65,422.89	
	Concrete beam	m3	0.83	75	1.00	R 1,052.00	R 78,822.75	
	Concrete surface slab	m3	1.64	76	0.92	R 1,052.00	R 80,182.93	
	Concrete wall	m3	2.14	29	1.00	R 1,052.00	R 30,571.44	
	Concrete elevated slab	m3	0.97	64	0.00	R 1,052.00	R 67,446.27	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	432	0.00		R -	
		Wood float	m2	0.60	719	152.05	R 6.92	R 4,975.84	
		Formwork bases	m2	0.39	321	7.60	R 138.42	R 44,365.72	
		Formwork to columns	m2	0.15	415	6.20	R 169.68	R 70,347.19	
		Formwork to sides beams	m2	0.29	258	4.91	R 214.26	R 55,356.94	
		Formwork to soffits beams	m2	0.79	95	7.19	R 146.31	R 13,877.00	
		Formwork to soffts of slabs	m2	0.30	254	3.11	R 186.19	R 47,305.56	
		Formwork to pockets	m2	25.00	2	5.65	R 338.26	R 841.45	
		Formwork wall	m2	0.12	242	7.88	R 133.50	R 32,330.21	
		High tensile reinforcement	t	8.60	50.175	0.00	R 7,554.00	R 379,024.47	
		Cast in steel	kg	0.21	2,055	251.20	R 30.07	R 61,791.22	
		HD bolts	kg	0.39	1,106	193.52	R 39.03	R 43,189.21	
		Steel handrailing	m	2.48	20	9.30	R 812.26	R 16,433.60	
		Grout	m3	994.87	0.434	0.18	R 5,844.44	R 2,534.93	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	0	0.04	R 42.08	R -	R -
		Working space	m2	7.47	0	1.41	R 29.84	R -	
		Backfill	m3	4.63	0	0.74	R 31.14	R -	
		Blinding	m2	1.22	0	19.45	R 54.09	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
		Concrete column	m3	28.46	0	0.00	R 1,052.00	R -	
		Concrete beam	m3	1.44	0	0.00	R 1,052.00	R -	
		Concrete wall	m3	11.19	0	0.00	R 1,052.00	R -	
		Concrete elevated slabs	m3	11.80	0	0.00	R 1,052.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.88	0	160.92	R 6.54	R -	
		Formwork bases	m2	8.70	0	6.92	R 152.02	R -	
		Formwork to columns	m2	0.15	0	5.95	R 165.41	R -	
		Formwork to sides beams	m2	0.17	0	5.05	R 176.81	R -	
		Formwork to soffits beams	m2	0.51	0	6.36	R 208.32	R -	
		Formwork to soffts of slabs	m2	0.14	0	3.22	R 196.64	R -	
		Formwork to pockets	m2	450.00	0	5.35	R 326.71	R -	
		Formwork wall	m2	0.11	0	6.97	R 150.93	R -	
		High tensile reinforcement	t	4.12	0.000	0.00	R 7,554.00	R -	
		Cast in steel	kg	0.16	0	209.64	R 36.03	R -	
		HD bolts	kg	0.24	0	171.78	R 43.97	R -	
		Galvanised grating	m2	18.82	0	0.16	R 1,230.29	R -	
		Grout	m3	822.89	0.000	6.14	R 6,575.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.48	0	0.05	R 52.60	R -	R -
	Working space	m2	0.38	0	1.56	R 33.72	R -	
	Backfill	m3	1.98	0	0.78	R 67.44	R -	
	Blinding	m2	4.71	0	21.03	R 50.02	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	6.03	0	0.00	R 1,052.00	R -	
	Concrete beam	m3	1.73	0	0.00	R 1,052.00	R -	
	Concrete wall	m3	33.33	0	0.00	R 1,052.00	R -	
	Concrete elevated slabs	m3	24.00	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.62	0	151.91	R 6.93	R -	
	Formwork bases	m2	1.43	0	7.62	R 138.06	R -	
	Formwork to columns	m2	0.13	0	6.99	R 168.05	R -	
	Formwork to sides beams	m2	0.23	0	5.94	R 150.50	R -	
	Formwork to soffits beams	m2	0.69	0	6.26	R 177.10	R -	
	Formwork to soffts of slabs	m2	0.20	0	3.67	R 183.92	R -	
	Formwork to pockets	m2	2.86	0	5.72	R 286.65	R -	
	Formwork wall	m2	0.29	0	7.33	R 143.52	R -	
	High tensile reinforcement	t	7.10	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.02	0	188.96	R 39.98	R -	
	HD bolts	kg	0.01	0	197.35	R 38.28	R -	
	Galvanised grating	m2	3.64	0	0.17	R 6,188.24	R -	
	Grout	m3	40.32	0.000	6.09	R 1,240.39	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	211	0.05	R 52.60	R 11,101.76	R 1,587,014.76
	Working space	m2	2.26	93	1.69	R 31.12	R 2,906.68	
	Backfill	m3	1.23	172	0.76	R 69.21	R 11,876.08	
	Blinding	m2	3.82	32	19.66	R 53.51	R 1,708.95	
	Concrete	m3	0.00	122	0.00	R 1,052.00	R 128,344.00	
	Mesh reinforcement	m2	0.40	305	61.78	R 122.27	R 37,293.14	
	Rough formwork	m2	2.73	45	7.94	R 132.49	R 5,920.96	
	Smooth formwork	m2	0.56	218	6.78	R 155.16	R 33,803.20	
	Finish to concrete	m2	0.22	555	108.86	R 9.66	R 5,359.01	
	Construction joints	m	4.61	26	19.60	R 53.67	R 1,420.43	
	Movement joints	m	14.81	8	15.71	R 66.96	R 551.63	
	Cast in steel	kg	2.30	53	221.43	R 34.11	R 1,809.56	
	Grout	m3	803.00	0.152	0.16	R 6,575.00	R 998.94	
	Brick walls	m2	0.46	265	0.00	R 167.00	R 44,291.30	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	537	0.00		R -	
	Waterproofing membrane	m2	2.00	268	11.21	R 93.84	R 25,187.94	
	Roof construction	m2	1.99	270	34.10	R 221.52	R 59,756.07	
	Ceiling	m2	0.97	553	0.00	R 112.00	R 61,981.03	
	Doors and windows	No	434.63	1	0.15	R 1,113.33	R 1,375.05	
	Floor finish	m2	1.00	537	0.77	R 216.88	R 116,422.86	
	Wall finsih	m2	1.01	531	1.37	R 121.90	R 64,786.88	
	Rod reinforcement	t	8.63	14	0.00	R 7,554.00	R 106,788.88	
	Metalwork	Item	0.00	1	4.56	R 34,446.24	R 34,446.24	
	Structural steel	Item	0.00	1	11.81	R 89,212.74	R 89,212.74	
	Plumbing and drainage	Item	0.00	1	7.52	R 56,806.08	R 56,806.08	
	Small power and lighting	Item	0.00	1	64.07	R 483,984.78	R 483,984.78	
	External works	Item	0.00	1	189.05	R 198,880.60	R 198,880.60	
BUILDINGS - STEEL	Concrete	m3	0.00	70	0.16	R 1,052.00	R 73,640.00	R 1,293,680.38
	Earthworks	m3	2.30	161	8.34	R 126.14	R 20,308.39	
	Reinforcement	t	8.29	8	0.00	R 7,554.00	R 63,785.28	
	Mesh	m2	0.11	636	9.20	R 114.35	R 72,766.80	
	Formwork	m2	0.40	175	7.44	R 141.40	R 24,744.62	
	Brickwork	m2	5.73	97	5.65	R 186.19	R 18,034.56	
	Roof covering	m2	0.83	669	202.02	R 126.45	R 84,555.81	
	Structural steel	t	17.93	31	0.00	R 25,546.00	R 790,743.45	
	Side cladding	m2	1.49	372	0.95	R 120.13	R 44,746.48	
	Doors	No	371.00	1	0.49	R 12,517.54	R 18,725.70	
	Ridge ventilator	m	20.62	27	10.67	R 1,349.25	R 36,315.94	
	Aluminium insulation	m2	0.88	631	1.76	R 71.85	R 45,313.35	
	Total building area	m2	0.00	555	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	179	0.12	R 126.24	R 22,647.46	R 1,220,345.78
	Concrete	m3	0.00	65	0.00	R 1,052.00	R 68,380.00	
	Reinforcement	t	10.55	6	0.16	R 7,554.00	R 46,541.23	
	Mesh	m2	0.11	591	9.84	R 106.91	R 63,174.43	
	Formwork	m2	0.41	159	8.08	R 130.20	R 20,641.15	
	Brickwork	m2	5.78	77	5.59	R 188.19	R 14,456.36	
	Screed	m2	1.10	404	39.96	R 26.33	R 10,626.26	
	Structural steel	t	14.85	30	0.00	R 25,546.00	R 763,799.60	
	Cat ladders	m	2.52	12	9.58	R 2,666.60	R 31,638.32	
	Hand rail	m	0.72	42	26.40	R 967.65	R 40,183.06	
	Kick plates	m	0.73	41	2.64	R 366.53	R 15,012.35	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.87	510	193.17	R 132.25	R 67,491.17	
	Side cladding	m2	4.70	94	0.92	R 121.67	R 11,493.60	
	Floor grating	m2	1.06	28	16.28	R 1,569.16	R 44,260.79	
	Total buiding area	m2	0.00	444	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.39	0	7.88	R 133.50	R -	R -
	Blinding	m2	0.48	0	20.45	R 51.44	R -	
	Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
	Reinforcement	t	8.00	0	0.00	R 7,554.00	R -	
	Mesh	m2	0.50	0	48.38	R 156.14	R -	
	Formwork	m2	0.35	0	7.78	R 135.22	R -	
	Finish to concrete	m2	0.46	0	108.02	R 9.74	R -	
	Movement joints	m	2.57	0	15.71	R 66.96	R -	
	Cast in steel	kg	0.09	0	204.99	R 36.85	R -	
	Grout	m3	72.28	0.000	2.62	R 6,188.24	R -	
	Brickwork	m2	0.25	0	0.17	R 167.00	R -	
	Doors and windows	No	3.00	0	0.28	R 1,855.56	R -	
	Pipework	m	2.93	0	0.22	R 401.53	R -	
	Bolts	kg	0.11	0	0.09	R 36.85	R -	
	Structural steel	t	4.50	0	0.00	R 26,978.57	R -	
	Miscellaneous steel	t	144.21	0	0.00	R 34,336.36	R -	
	Total bridge area	m2	0.00	0	0.00		R -	
	Total control room area	m2	0.00	0	0.00		R -	
PUMP HOUSE	Earthworks	m3	7.76	93	6.28	R 167.52	R 15,599.08	R 106,676.68
	Blinding	m2	0.82	15	15.92	R 66.08	R 967.03	
	Concrete	m3	0.00	12	0.00	R 1,052.00	R 12,624.00	
	Reinforcement	t	5.77	2	0.00	R 7,554.00	R 15,710.23	
	Formwork	m2	0.07	171	5.92	R 177.70	R 30,463.32	
	Finish to concrete	m2	0.34	35	81.15	R 12.96	R 457.54	
	Movement joints	m	0.46	26	15.43	R 68.18	R 1,778.58	
	Cast in steel	kg	28.85	0.416	181.80	R 41.55	R 17.28	
	Grout	m3	24.19	0.496	0.79	R 6,575.00	R 3,261.68	
	Bolts	kg	121.43	0.099	0.16	R 32.83	R 3.24	
	Structural steel	t	43.33	0.208	0.26	R 29,053.85	R 6,034.72	
	Miscellaneous steel	t	24.14	0.373	0.18	R 41,966.67	R 15,646.23	
	Brickwork	m2	0.60	15	4.81	R 218.71	R 3,280.67	
	Roof covering	m2	1.79	5	1.32	R 165.69	R 833.08	
	Total pump house area	m2	0.00	9	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	0	7.10	R 148.17	R -	R -
	Blinding	m2	1.40	0	19.02	R 55.31	R -	
	Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
	Reinforcement	t	5.77	0.000	0.00	R 7,554.00	R -	
	Formwork	m2	0.20	0	7.01	R 150.07	R -	
	Movement joint	m	1.86	0	0.13	R 71.71	R -	
	Cast in steel	kg	0.15	0	14.67	R 35.27	R -	
	Bolts	kg	0.39	0	214.19	R 43.87	R -	
	Chemical anchors	No	7.24	0	0.25	R 184.02	R -	
	Miscellaneous steelwork	t	91.86	0.000	172.18	R 30,216.00	R -	
	Pre-cast concrete	m3	36.75	0	41.05	R 2,922.22	R -	
	Brickwork	m2	8.86	0	0.36	R 220.55	R -	
	Total area	m2	0.00	0	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	1,362	1.69	R 88.89	R 121,032.60	R 333,834.32
	Lining	m2	0.82	1,079	1.50	R 52.60	R 56,769.51	
	Paving	m2	0.84	1,054	0.59	R 89.15	R 93,928.57	
	Pipework	m	28.97	31	0.26	R 341.90	R 10,444.65	
	Manholes	No	17.25	2	0.11	R 3,108.18	R 5,504.43	
	Concrete	m3	2.90	11	0.05	R 1,052.00	R 11,081.86	
	Formwork	m2	0.10	105	5.83	R 180.45	R 19,008.33	
	Mesh	m2	0.78	14	7.36	R 142.93	R 1,930.37	
	Reinforcement	t	5.63	1.871	0.14	R 7,554.00	R 14,134.01	
	Dam area (to top of berm)	m2	0.00	885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	192	5.85	R 179.83	R 34,541.57	R 311,359.83
	Blinding	m2	0.92	30	13.72	R 76.68	R 2,333.63	
	Concrete	m3	0.00	28	0.00	R 1,052.00	R 29,456.00	
	Reinforcement	t	4.44	6.306	0.00	R 7,554.00	R 47,637.84	
	Mesh	m2	1.14	25	41.22	R 183.26	R 4,501.14	
	Formwork	m2	0.15	187	5.63	R 186.86	R 34,879.81	
	Cast in steel	kg	0.03	933	157.23	R 48.04	R 44,841.32	
	Miscellaneous steelwork	t	13.35	2.697	0.18	R 41,966.67	R 113,168.54	
	Total tunnel length	m	0.00	36	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	235	0.00		R -	R 1,118,894.96
	Steel	t	8.75	26.857	0.00	R 25,546.00	R 686,092.57	
	Handrail	m	1.45	162	25.58	R 998.67	R 161,853.55	
	Grating	m2	1.79	131	15.88	R 1,608.69	R 211,196.75	
	Kick flats	m	1.64	143	75.83	R 336.89	R 48,273.18	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	41	90.17	R 283.31	R 11,478.91	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,655	0.00		R -	R 2,217,628.70
	Steel	t	23.48	70.486	0.00	R 25,546.00	R 1,800,623.08	
	Handrail	m	12.68	131	29.85	R 855.81	R 111,701.07	
	Grating	m2	12.33	134	16.37	R 1,560.54	R 209,463.88	
	Kick flats	m	12.52	132	77.41	R 330.01	R 43,623.40	
	Cat ladder	m	94.92	17	8.53	R 2,994.84	R 52,217.27	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	2,445	0.00		R -	R 2,167,863.02
	Steel	t	64.24	38.060	0.00	R 25,546.00	R 972,290.94	
	Handrail	m	29.15	84	28.17	R 906.85	R 76,063.51	
	Grating	m2	3.70	661	15.96	R 1,600.63	R 1,057,711.34	
	Kick flats	m	32.29	76	77.41	R 330.01	R 24,988.30	
	Stair treads	No	217.41	11	91.87	R 278.07	R 3,127.15	
	Cat ladder	m	228.94	11	8.10	R 3,153.83	R 33,681.78	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	331	0.00		R -	R 454,133.68
	Steel	t	22.16	14.937	0.00	R 25,546.00	R 381,576.08	
	Handrail	m	45.11	7	26.08	R 979.52	R 7,187.38	
	Grating	m2	58.13	6	15.86	R 1,610.72	R 9,171.65	
	Kick flats	m	42.58	8	77.41	R 330.01	R 2,565.36	
	Cat ladder	m	19.44	17	8.11	R 3,149.94	R 53,633.21	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 1,061,803.65
	Steel	t	13.69	19.430	0.00	R 25,546.00	R 496,364.94	
	Handrail	m	1.04	256	26.86	R 951.08	R 243,256.92	
	Grating	m2	1.91	139	15.68	R 1,629.21	R 226,895.10	
	Kick flats	m	1.08	246	76.30	R 334.81	R 82,462.45	
	Stair treads	No	5.57	48	95.13	R 268.54	R 12,824.25	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 630,774.59
	Steel	t	11.98	20.451	0.00	R 25,546.00	R 522,434.89	
	Handrail	m	22.00	11	26.10	R 978.77	R 10,899.98	
	Grating	m2	7.32	33	15.97	R 1,599.62	R 53,539.34	
	Kick flats	m	22.59	11	78.04	R 327.34	R 3,550.22	
	Cat ladder	m	18.87	13	8.22	R 3,107.79	R 40,350.16	
PIPING INSTALLATION	Pipe length	m	0.00	22,452	0.00		R -	R 13,287,842.00
	Total work units	WU	0.30	74,840	0.00	R 177.55	R 13,287,842.00	
	Pipe supports	kg	2.49	9,017	0.00		R -	
	WU for pipe supports	WU	0.16	11,974	0.00		R -	
	Number of welds	No	0.56	12,573	0.00		R -	
	Total fittings	No	0.39	8,756	0.00		R -	
	Stud bolts	No	0.35	3,065	0.00		R -	
	Support number	No	0.19	1,713	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	74,840	0.00	R 177.55		R 43,295.28

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	1,346	5.52	R 32.16	R 43,295.28	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	74,840	0.00	R 177.55		R 26,712.71
	Number of examinations	No	164.17	456	3.03	R 58.60	R 26,712.71	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	74,840	0.00	R 177.55		R 25,673.19
	Number of examinations	No	273.85	273	1.89	R 93.94	R 25,673.19	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	74,840	0.00	R 177.55		R 43,972.54
	Number of examinations	No	46.49	1,610	6.50	R 27.32	R 43,972.54	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	74,840	0.00	R 177.55		R 52,126.07
	Number of examinations	No	106.66	702	2.39	R 74.29	R 52,126.07	
MECHANICAL INSTALLATION	Total work units	WU	0.00	74,840	0.00	R 177.55		R 77,024.90
	Mechanical equipment	t	236.32	317	0.73	R 243.22	R 77,024.90	
	Structural steel	t	192.98	388	54.54			
PAINTING & INSULATION	Total work units	WU	0.00	74,840	0.00	R 177.55		R 978,597.67
	Painting to piping	m2	16.80	4,455	0.32	R 75.55	R 336,571.48	
	Insulation to piping	m2	48.21	1,552	2.35	R 236.10	R 366,521.52	
	Mechanical equipment received	t	0.00	317	0.81	R 243.22	R 77,024.90	
	Painting to mechanical equipment	m2	0.23	1,377	3.37	R 72.17	R 99,374.14	
	Insulation to mechanical equipment	m2	0.67	473	1.16	R 209.67	R 99,105.63	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.74	15,223	0.00	R 29.55	R 449,839.65	R 2,082,489.50
	Electrical cable terminations	No	276.76	669	0.38	R 77.76	R 52,057.54	
	Electrical equipment	No	8.25	55	0.10	R 295.50	R 16,253.78	
	DB's	No	5.97	7	0.28	R 1,055.36	R 7,036.27	
	Rack	m	0.59	2,550	1.65	R 92.34	R 235,468.83	
	Support steel	kg	1.34	4,322	1.99	R 14.85	R 64,176.84	
	Instrumentation cable	m	23.73	17,224	0.32	R 28.50	R 490,884.00	
	Instruments	No	0.44	726	0.16	R 178.13	R 129,288.87	
	Hook-ups	No	3.69	1,650	0.15	R 190.00	R 313,427.58	
	Light fittings	No	9.97	203	0.02	R 184.69	R 37,485.28	
	Conduit	m	3.99	1,527	0.11	R 17.91	R 27,345.04	
	Instrument stands	No	0.00	182		R 1,425.00	R 259,225.81	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project I				
Location:	South Africa				
Client:				Date of estimate:	2002

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	8,554	R	3.22
2	Concrete demolitions	m3	0	R	1,005.00
3	Bulk excavation	m3	2,441	R	32.11
4	Vertical piles	No	16		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,052.00
7	Auger pile	m		R	185.00
8	Total paving and asphalt to road works	m2	1,742		
9	Grey paving to road works	m2	0	R	85.00
10	Asphalt to road surface	m2	1,742		
11	Rip bed of road works	m2	1,742	R	7.55
12	Total concrete in paving and bunding	m3	88	R	1,052.00
13	Concrete in paving	m3	65		
14	Rod reinforcement	t		R	7,554.00
15	Concrete in plinths and bases on area finishing	m3	78		
16	Stormwater pipe to drain surface run-off	m	75		
17	Machine excavation	m3		R	34.22
18	Concrete in pump and pipe support bases	m3	85	R	1,052.00
19	Concrete in tank bases	m3	25	R	1,052.00
20	Concrete in pipe and cable rack foundations	m3	0	R	1,052.00
21	Concrete to simple structural foundations	m3	222	R	1,052.00
22	Complex structural foundations - bases	m3	0	R	1,052.00
23	Concrete pipe racks - bases	m3	0	R	1,052.00
24	Concrete structure including concrete columns and beams - bases	m3	125	R	1,052.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,052.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,052.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	122	R	1,052.00
28	One brick wall	m2		R	167.00
29	Concrete in structual steel buildings - all concrete	m3	70	R	1,052.00
30	Total building area - Structural steel buildings	m2	555		
31	Ceiling	m2		R	112.00
32	Structural steel	t		R	25,546.00
33	Steel canopy - concrete	m3	65	R	1,052.00
34	Steel canopy - area	m2	444		
35	Concrete in weighbridge - all concrete	m3	0	R	1,052.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	12	R	1,052.00
39	Total pump house area	m2	9		
40	Concrete in cooling tower	m3	0	R	1,052.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	885		
43	Concrete in cable tunnel	m3	28	R	1,052.00
44	Total lengh of cable tunnel	m	36		
45	Total volume of basic steel platform	m3	235		
46	Total volume of steel pipe rack	m3	1,655		
47	Total volume of steel complex steel structure	m3	2,445		
48	Total volume of steel in stack	m3	331		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	177.55
52	Total process pipe length	m	22,452		
53	Total electrical cable - installation only	m	15,223	R	29.55
54	Total instrumentation cable - installation only	m	17,224	R	22.44

Ratio: Variable ratio

Variables

Material	Normal	Mean
Labour	Normal	Mean
Engineering design	Normal	Mean
Current economic conditions	Volatile	Mean
Current economic factors	Volatile	Mean
Level of scope definition	Poor	Mean
Rework	Extensive	Mean
Scope change	Extensive	Mean
Weather	Normal	Mean
Access	Normal	Mean
Project size	Small	Mean
Project conditions	Normal	Mean
Complexity	Normal	Mean
Repitition	Repitition	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project I			
Location:	South Africa			
Client:	0	Date of estimate:	2002	
	CIVIL CONSTRUCTION COST			R 13,339,234.66
A	SITE CLEARANCE AND DEMOLITIONS		R 27,543.88	
B	BULK EARTHWORKS		R 164,703.20	
C	PILING		R 671,948.99	
D	ROAD WORKS		R 582,334.75	
E	GENERAL PAVING AND BUNDED AREAS		R 214,917.46	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R 274,523.07	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R 363,967.63	
H	TANK BASES AND BUNDING		R 265,091.98	
I	RACK FOUNDATIONS		R -	
J	SIMPLE STRUCTURAL FOUNDATIONS		R 1,386,293.12	
K	COMPLEX STRUCTURAL FOUNDATIONS		R -	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R -	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R 1,136,058.64	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R -	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R -	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R 1,519,372.11	
Q	BUILDINGS - STEEL		R 1,223,385.16	
R	CANOPIES - STEEL		R 1,194,963.38	
S	WEIGHBRIDGE		R -	
T	PUMP HOUSE		R 114,186.91	
U	COOLING TOWER		R -	
V	EMERGENCY DAM		R 375,229.73	
W	HEAVY DUTY CABLE TUNNEL		R 366,394.56	
	Preliminaries and General	35.00%	R 3,458,320.10	
	STRUCTURAL STEEL			R 9,551,403.34
A	STRUCTURAL STEEL - BASIC PLATFORM		R 1,015,691.00	
B	STRUCTURAL STEEL - PIPERACK		R 1,933,359.05	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R 1,946,419.07	
D	STRUCTURAL STEEL - STACK		R 416,918.42	
E	STRUCTURAL STEEL - WALKWAY		R 909,933.50	
F	STRUCTURAL STEEL - CABLE GANTRY		R 600,109.92	
	Preliminaries and General	40.00%	R 2,728,972.38	
	MECHANICAL AND PIPING			R 16,898,139.92
A	PIPING INSTALLATION		R 11,899,560.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R 33,307.21	
C	DYE PENETRATION TESTING (DP)		R 7,529.94	
D	MAGNETIC PARTICLE TESTING (MPI)		R 18,849.59	
E	POST WELD HEAT TREATMENT		R 31,441.97	
F	MATERIAL HARDNESS TEST (HT)		R 17,150.29	
H	MECHANICAL INSTALLATION		R 62,260.94	
	Preliminaries and General	40.00%	R 4,828,039.98	
	PAINTING AND INSULATION			R 993,079.47
A	PAINTING AND INSULATION		R 735,614.42	
	Preliminaries and General	35.00%	R 257,465.05	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY			R 2,479,736.72
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R 1,836,842.02	
	Preliminaries and General	35.00%	R 642,894.71	
	TOTAL COST			R 43,261,594.10

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		8,554		R 3.22	R 27,543.88	R 27,543.88
	Concrete demolitions	m3		0		R 1,005.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		2,441		R 32.11	R 78,380.51	R 164,703.20
	Trimming of sides	m2	2.21	1,106	4.28	R 7.50	R 8,289.03	
	Back fill and compact	m3	1.15	2,120	0.99	R 32.43	R 68,760.00	
	Overhaul	m3/km	1.75	1,395	11.40	R 2.82	R 3,930.21	
	Rip bed	m2	1.79	1,363	8.19	R 3.92	R 5,343.45	
PILING	Site establishment of rig	Item	0.00	1	192.73	R 202,752.71	R 202,752.71	R 671,948.99
	EO for raking equipment	Item	0.00	1	23.95	R 25,190.89	R 25,190.89	
	Number of piles	No	0.00	16	0.00		R -	
	Move rig to new position	No	1.52	11	0.18	R 190.11	R 2,005.89	
	Number of raking piles	No	18.65	1	0.00		R -	
	EO for setting up raking piles	No	0.92	1	0.28	R 293.81	R 274.05	
	EO for raking drilling	m	0.15	6	0.88	R 163.46	R 913.40	
	Auger quantity	m	0.05	320	0.00	R 185.00	R 59,200.00	
	EO for drilling in coarse gravel	m	0.53	30	0.22	R 229.94	R 6,895.04	
	EO for drilling in boulders	m	1.84	9	0.49	R 519.99	R 4,514.63	
	EO for drilling in soft rock	m	1.68	10	0.24	R 249.47	R 2,373.93	
	Temporary casings	m	0.37	44	0.36	R 376.47	R 16,438.27	
	EO casing to raking pile	m	0.18	5	0.51	R 1,004.66	R 4,789.65	
	Mild steel rod reinforcement	t	14.36	1.114	0.96	R 7,225.66	R 8,048.47	
	High tensile rod reinforcement	t	1.33	12.043	7.19	R 7,566.13	R 91,119.04	
	Concrete to piles and bases	m3	0.16	101	0.00	R 1,052.00	R 106,628.05	
	Concrete to raking piles	m3	0.07	12	1.07	R 1,124.89	R 12,994.57	
	Site establishment of test equipment	Item	0.00	1	110.65	R 116,403.05	R 116,403.05	
	Load test to pile	No	98.65	0	26.89	R 28,286.03	R 4,587.80	
	Site establishment of intergity testing	No	255.59	0	48.90	R 51,438.29	R 3,220.09	
	Integrity testing of piles	No	1.28	13	0.27	R 287.80	R 3,599.47	
ROAD WORKS	Red paving	m2	0.15	0	0.98	R 83.54	R -	R 582,334.75
	Grey paving	m2	0.00	0	0.00	R 85.00	R -	
	Kerbing	m	0.14	238	0.00	R 153.09	R 36,384.33	
	Total paving and asphalt	m2	0.00	1,742	0.00		R -	
	Remove top soil	m3	0.55	243	6.11	R 46.13	R 11,226.49	
	Asphalt	m2	0.26	444	0.00	R 111.07	R 49,339.79	
	Rip bed	m2	0.00	1,742	0.00	R 7.55	R 13,152.10	
	Reduce levels	m3	0.42	724	5.18	R 39.14	R 28,341.26	
	Selected fill	m3	1.63	445	0.52	R 75.16	R 33,464.52	
	Imported fill	m3	2.27	196	0.39	R 194.49	R 38,089.64	
	Wearing course	m3	3.87	187	0.26	R 148.48	R 27,820.91	
	Prime	m2	4.74	2,112	1.48	R 35.43	R 74,822.64	
	Three line road marking	m	0.82	1,735	0.18	R 27.89	R 48,378.94	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	236	4.28	R 7.44	R 1,753.35	
		1m Wide concrete V-drain	m	0.93	222	0.79	R 701.17	R 155,570.55	
		200mm Diameter PVC pipe	m	0.96	227	0.11	R 227.46	R 51,740.00	
		Road marking - STOP	No	0.15	35	0.05	R 236.20	R 8,179.79	
		Standard signage	No	0.01	2	4.58	R 306.19	R 727.69	
		100mm Painted line	m	1.79	425	1.49	R 7.87	R 3,342.75	
				0.00		1.54			
				0.00		2.00			
				0.00		0.05			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.97	65	0.74	R 1,052.00	R 68,380.00	R 214,917.46
		Concrete in plinths	m3	0.00	13	0.00	R 1,052.00	R 13,764.49	
		Total concrete	m3	0.00	88	0.00		R -	
		Rip and compact	m2	0.13	511	186.60	R 5.64	R 2,882.24	
		Formwork to plinth	m2	7.40	97	0.12	R 127.74	R 12,373.15	
		Formwork to slab	m2	0.84	55	0.15	R 157.80	R 8,615.88	
		High tensile steel	t	0.01	0.880	0.00	R 7,554.00	R 6,647.52	
		Mesh	m2	599.47	528	51.70	R 146.11	R 77,077.47	
		Construction joint	m	4.11	267	0.05	R 51.85	R 13,860.97	
		Expansion joint	m	2.25	146	0.07	R 77.40	R 11,315.74	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.98	2,253	0.00		R -	R 274,523.07
		Base excavation	m3	1.49	169	0.00	R 34.22	R 5,766.70	
		Backfill	m3	0.59	113	0.65	R 53.00	R 5,982.31	
		Working space	m2	0.46	286	1.41	R 37.59	R 10,735.35	
		Concrete in bases	m3	0.04	78	25.52	R 1,052.00	R 82,056.00	
		Blinding	m2	0.84	104	20.97	R 50.17	R 5,195.39	
		Concrete in sump walls	m3	0.10	8	29.73	R 1,052.00	R 7,971.15	
		Concrete in slabs	m3	0.02	2	0.92	R 1,052.00	R 1,641.12	
		Total concrete	m3	0.00	87	0.04		R -	
		Wood float	m2	0.70	124	159.82	R 6.58	R 818.56	
		Formwork to bases	m2	1.69	132	0.12	R 127.74	R 16,846.18	
		Formwork to sump walls	m2	12.79	97	0.12	R 127.74	R 12,381.15	
		Formwork to sides of slab	m2	5.89	9	0.18	R 187.11	R 1,720.45	
		Mild steel reinforcement	t	0.12	0.976	0.00	R 7,554.00	R 7,370.37	
		High tensile reinforcement	t	10.97	7.942	1.16	R 7,554.00	R 59,991.38	
		Cast in steel	kg	0.45	173	33.88	R 31.05	R 5,382.02	
		Waterstop	m	0.43	18	8.18	R 128.57	R 2,258.11	
		Manhole	No	0.08	6	2.68	R 3,126.62	R 18,927.23	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	75	0.13	R 393.06	R 29,479.58	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.67	142	0.05	R 34.22	R 4,845.06	R 363,967.63
	Working space	m2	0.38	374	0.67	R 22.98	R 8,593.13	
	Backfill	m3	4.27	33	1.35	R 46.15	R 1,529.93	
	Concrete bases	m3	1.01	85	0.00	R 1,052.00	R 89,420.00	
	Concrete plinth	m3	2.31	37	0.00	R 1,052.00	R 38,650.20	
	Total concrete	m3	0.00	122	0.00		R -	
	Wood float	m2	0.48	76	0.05	R 10.52	R 800.45	
	Blinding	m2	1.01	84	0.01	R 57.11	R 4,819.80	
	Formwork bases	m2	0.50	170	0.13	R 135.26	R 22,928.21	
	Formwork plinth	m2	0.57	64	0.13	R 133.00	R 8,551.36	
	High tensile reinforcement	t	10.17	11.973	7.08	R 7,554.00	R 90,444.03	
	Cast in steel	kg	0.11	1,100	0.03	R 32.31	R 35,529.15	
	HD Bolts	kg	0.08	1,522	0.03	R 33.06	R 50,313.29	
	Grout	m3	34.16	1.076	6.67	R 7,013.08	R 7,543.02	
TANK BASES AND BUNDING	Restricted excavation	m3	5.69	142	0.05	R 49.59	R 7,057.44	R 265,091.98
	Working space	m2	4.26	33	1.63	R 30.47	R 1,016.85	
	Backfill	m3	1.36	105	0.74	R 67.21	R 7,025.55	
	Concrete bases	m3	0.77	25	0.00	R 1,052.00	R 26,300.00	
	Concrete sump wall	m3	2.96	8	0.00	R 1,052.00	R 8,872.29	
	Concrete slab	m3	0.57	44	0.00	R 1,052.00	R 46,489.90	
	Concrete plinth	m3	4.29	6	21.81	R 1,052.00	R 6,136.67	
	Concrete column	m3	20.06	1	172.54	R 1,052.00	R 1,311.21	
	Total concrete	m3	0.00	85	1.17		R -	
	Blinding	m2	2.60	33	1.08	R 48.23	R 1,571.82	
	Wood float	m2	0.25	337	1.16	R 6.10	R 2,054.12	
	Formwork to bases	m2	0.42	59	1.17	R 125.73	R 7,458.55	
	Formwork to plinths	m2	0.35	17	8.37	R 135.65	R 2,270.17	
	Formwork to columns	m2	0.12	11	7.76	R 147.53	R 1,560.21	
	Formwork to sumps	m2	0.11	74	7.13	R 145.48	R 10,735.43	
	Formwork to slabs	m2	4.12	11	7.23	R 129.61	R 1,389.06	
	Formwork to slabs n/e 300mm	m	2.23	20	8.12	R 44.69	R 885.82	
	Mild steel reinforcement	t	0.23	0.839	23.54	R 7,554.00	R 6,336.49	
	High tensile reinforcement	t	22.72	3.728	1.03	R 7,554.00	R 28,162.16	
	Mesh	m2	0.17	268	58.44	R 129.26	R 34,619.04	
	Cast in items	kg	0.19	456	211.37	R 35.74	R 16,300.44	
	HD Bolts	kg	0.09	898	206.63	R 36.56	R 32,843.33	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	195.16	0.434	0.17	R 6,060.91	R 2,630.64	
	Construction joint	m	0.30	145	24.83	R 42.37	R 6,153.54	
	Expansion joint	m	0.46	95	16.94	R 62.10	R 5,911.23	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.75	0	0.05	R 52.60	R -	R -
	Working space	m2	0.42	0	1.97	R 103.51	R -	
	Backfill	m3	2.48	0	0.87	R 60.16	R -	
	Blinding	m2	0.38	0	22.94	R 45.85	R -	
	Concrete bases	m3	5.90	0	0.00	R 1,052.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	1.36		R -	
	Wood float	m2	0.36	0	175.61	R 5.99	R -	
	Formwork bases	m2	0.48	0	9.72	R 108.19	R -	
	Formwork plinths	m2	0.09	0	6.90	R 152.42	R -	
	High tensile reinforcement	t	9.32	0.000	0.00	R 7,554.00	R -	
	HD Bolts	kg	0.03	0	219.23	R 34.46	R -	
	Grout	m3	80.40	0.000	0.19	R 5,642.91	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.24	941	0.06	R 57.86	R 54,434.94	R 1,386,293.12
	Working space	m2	0.51	1,858	1.88	R 30.80	R 57,217.89	
	Backfill	m3	2.71	348	0.80	R 72.71	R 25,270.24	
	Blinding	m2	0.33	666	21.23	R 49.54	R 32,971.77	
	Concrete bases	m3	0.00	222	0.00	R 1,052.00	R 233,544.00	
	Concrete plinth	m3	2.62	60	0.00	R 1,052.00	R 63,475.36	
	Concrete slab	m3	3.68	85	0.00	R 1,052.00	R 89,114.64	
	Total concrete	m3	0.00	367	0.00		R -	
	Wood float	m2	0.54	683	155.52	R 6.76	R 4,622.45	
	Formwork bases	m2	0.50	442	8.52	R 123.43	R 54,570.28	
	Formwork plinths	m2	0.11	563	8.62	R 122.10	R 68,762.35	
	High tensile reinforcement	t	13.51	27.174	0.00	R 7,554.00	R 205,274.87	
	HD Bolts	kg	0.02	10,026	220.19	R 34.31	R 343,945.99	
	Cast in items	kg	0.05	4,258	240.88	R 31.36	R 133,517.52	
	Grout	m3	70.20	3.163	0.17	R 6,188.24	R 19,570.83	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.10	0	0.05	R 56.36	R -	R -
	Working space	m2	0.57	0	1.75	R 32.14	R -	
	Backfill	m3	2.22	0	0.83	R 68.19	R -	
	Blinding	m2	0.65	0	20.54	R 51.21	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	27.39	0	0.00	R 1,052.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.38	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.61	0	160.64	R 6.55	R -	
	Formwork bases	m2	0.51	0	8.08	R 130.16	R -	
	Formwork plinths	m2	0.32	0	7.47	R 140.88	R -	
	Formwork to columns	m2	0.29	0	7.99	R 131.66	R -	
	High tensile reinforcement	t	9.14	0.000	0.00	R 7,554.00	R -	
	HD bolts	kg	0.04	0	203.89	R 37.05	R -	
	Grout	m3	110.36	0.000	0.17	R 6,188.24	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.78	0	0.06	R 61.62	R -	R -
	Working space	m2	0.30	0	2.22	R 27.74	R -	
	Backfill	m3	2.08	0	0.84	R 73.23	R -	
	Blinding	m2	0.68	0	19.88	R 52.92	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	1.23	0	149.09	R 1,052.00	R -	
	Concrete beam	m3	2.65	0	0.94	R 1,052.00	R -	
	Total concrete	m3	3.03	0	0.94		R -	
	Wood float	m2	0.48	0	7.52	R 7.06	R -	
	Formwork bases	m2	0.49	0	6.62	R 139.96	R -	
	Formwork to columns	m2	0.15	0	7.91	R 132.92	R -	
	Formwork to sides beams	m2	0.33	0	6.16	R 159.00	R -	
	Formwork to soffits beams	m2	0.70	0	6.62	R 170.84	R -	
	Formwork corbels	m2	10.79	0	5.53	R 190.19	R -	
	High tensile reinforcement	t	9.39	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.03	0	255.87	R 29.52	R -	
	HD bolts	kg	1.49	0	213.64	R 35.36	R -	
	Grout	m3	517.21	0.000	0.16	R 6,488.11	R -	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.84	480	0.05	R 57.11	R 27,401.92	R 1,136,058.64
	Working space	m2	0.62	776	1.80	R 31.76	R 24,639.73	
	Backfill	m3	1.14	422	0.81	R 70.26	R 29,626.41	
	Blinding	m2	0.61	206	19.20	R 54.78	R 11,278.54	
	Concrete bases	m3	0.00	125	0.95	R 1,052.00	R 131,500.00	
	Concrete column	m3	2.47	51	1.05	R 1,052.00	R 53,238.87	
	Concrete beam	m3	0.86	59	1.01	R 1,052.00	R 61,957.12	
	Concrete surface slab	m3	1.68	74	0.93	R 1,052.00	R 78,307.10	
	Concrete wall	m3	2.40	21	1.01	R 1,052.00	R 22,229.17	
	Concrete elevated slab	m3	1.08	47	0.00	R 1,052.00	R 49,295.25	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	377	0.00		R -	
		Wood float	m2	0.62	605	162.04	R 6.49	R 3,928.81	
		Formwork bases	m2	0.41	308	7.42	R 141.86	R 43,707.15	
		Formwork to columns	m2	0.17	293	6.35	R 165.59	R 48,481.09	
		Formwork to sides beams	m2	0.30	199	5.24	R 200.68	R 39,967.78	
		Formwork to soffits beams	m2	0.81	72	7.66	R 137.40	R 9,955.22	
		Formwork to soffts of slabs	m2	0.31	238	3.22	R 182.39	R 43,494.39	
		Formwork to pockets	m2	26.37	2	5.77	R 326.85	R 627.22	
		Formwork wall	m2	0.13	158	8.15	R 129.11	R 20,425.20	
		High tensile reinforcement	t	8.57	43.975	0.00	R 7,554.00	R 332,186.02	
		Cast in steel	kg	0.22	1,713	247.92	R 30.47	R 52,203.58	
		HD bolts	kg	0.40	944	196.49	R 38.45	R 36,292.74	
		Steel handrailing	m	2.62	17	9.62	R 785.24	R 13,158.16	
		Grout	m3	1,029.38	0.366	0.18	R 5,891.20	R 2,157.18	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.11	0	0.04	R 39.83	R -	R -
		Working space	m2	6.99	0	1.30	R 30.64	R -	
		Backfill	m3	3.84	0	0.60	R 23.90	R -	
		Blinding	m2	0.97	0	16.38	R 64.22	R -	
		Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
		Concrete column	m3	25.53	0	0.00	R 1,052.00	R -	
		Concrete beam	m3	1.26	0	0.00	R 1,052.00	R -	
		Concrete wall	m3	9.93	0	0.00	R 1,052.00	R -	
		Concrete elevated slabs	m3	9.68	0	0.00	R 1,052.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.78	0	130.19	R 8.08	R -	
		Formwork bases	m2	8.21	0	6.56	R 160.45	R -	
		Formwork to columns	m2	0.12	0	5.13	R 178.50	R -	
		Formwork to sides beams	m2	0.15	0	4.41	R 204.98	R -	
		Formwork to soffits beams	m2	0.47	0	5.89	R 238.66	R -	
		Formwork to soffts of slabs	m2	0.12	0	2.78	R 238.47	R -	
		Formwork to pockets	m2	389.84	0	4.41	R 378.90	R -	
		Formwork wall	m2	0.09	0	6.02	R 174.75	R -	
		High tensile reinforcement	t	3.85	0.000	0.00	R 7,554.00	R -	
		Cast in steel	kg	0.15	0	200.26	R 37.72	R -	
		HD bolts	kg	0.21	0	158.02	R 47.80	R -	
		Galvanised grating	m2	15.99	0	0.14	R 1,435.73	R -	
		Grout	m3	739.76	0.000	5.26	R 7,438.38	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Restricted excavation	m3	1.60	0	0.05	R 54.10	R -	R -
	Working space	m2	0.41	0	1.69	R 32.01	R -	
MAJOR EQUIPMENT	Backfill	m3	2.06	0	0.79	R 68.12	R -	
BASES AND ELEVATED	Blinding	m2	4.82	0	21.23	R 49.55	R -	
CONCRETE STRUCTURE	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	6.68	0	0.00	R 1,052.00	R -	
	Concrete beam	m3	1.94	0	0.00	R 1,052.00	R -	
	Concrete wall	m3	35.21	0	0.00	R 1,052.00	R -	
	Concrete elevated slabs	m3	23.72	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.93	0	168.29	R 6.25	R -	
	Formwork bases	m2	1.43	0	8.32	R 126.46	R -	
	Formwork to columns	m2	0.14	0	6.98	R 154.38	R -	
	Formwork to sides beams	m2	0.24	0	6.24	R 150.64	R -	
	Formwork to soffits beams	m2	0.76	0	6.81	R 168.51	R -	
	Formwork to soffts of slabs	m2	0.22	0	3.99	R 170.82	R -	
	Formwork to pockets	m2	3.09	0	6.16	R 263.61	R -	
	Formwork wall	m2	0.30	0	7.74	R 135.87	R -	
	High tensile reinforcement	t	7.19	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.02	0	204.57	R 36.93	R -	
	HD bolts	kg	0.01	0	209.29	R 36.09	R -	
	Galvanised grating	m2	3.89	0	0.19	R 5,495.52	R -	
	Grout	m3	41.23	0.000	6.16	R 1,225.45	R -	
BUILDINGS - CONCRETE	Excavations	m3	1.82	222	0.05	R 54.10	R 11,998.85	R 1,519,372.11
FRAME	Working space	m2	2.49	89	1.82	R 29.73	R 2,652.27	
	Backfill	m3	1.25	178	0.78	R 69.62	R 12,387.15	
	Blinding	m2	3.81	32	20.41	R 51.53	R 1,648.33	
	Concrete	m3	0.00	122	0.00	R 1,052.00	R 128,344.00	
	Mesh reinforcement	m2	0.50	244	65.86	R 114.69	R 27,944.84	
	Rough formwork	m2	3.17	39	8.67	R 121.28	R 4,674.85	
	Smooth formwork	m2	0.57	215	6.89	R 152.76	R 32,861.63	
	Finish to concrete	m2	0.23	524	106.65	R 9.86	R 5,167.86	
	Construction joints	m	4.94	25	21.40	R 49.16	R 1,214.05	
	Movement joints	m	14.92	8	17.17	R 61.28	R 501.05	
	Cast in steel	kg	2.36	52	238.73	R 31.64	R 1,637.75	
	Grout	m3	892.63	0.137	0.19	R 5,664.62	R 774.21	
	Brick walls	m2	0.49	251	0.00	R 167.00	R 41,884.88	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.53	553	0.00		R -	
	Waterproofing membrane	m2	2.29	241	12.37	R 85.08	R 20,532.61	
	Roof construction	m2	2.02	273	37.48	R 201.53	R 55,020.21	
	Ceiling	m2	1.00	551	0.00	R 112.00	R 61,721.57	
	Doors and windows	No	478.75	1	0.16	R 1,016.52	R 1,173.44	
	Floor finish	m2	1.03	538	0.78	R 215.09	R 115,809.52	
	Wall finsih	m2	1.05	525	1.51	R 110.65	R 58,041.56	
	Rod reinforcement	t	9.11	13	0.00	R 7,554.00	R 101,178.11	
	Metalwork	Item	0.00	1	4.43	R 33,458.82	R 33,458.82	
	Structural steel	Item	0.00	1	11.47	R 86,617.40	R 86,617.40	
	Plumbing and drainage	Item	0.00	1	7.30	R 55,149.60	R 55,149.60	
	Small power and lighting	Item	0.00	1	62.20	R 469,869.59	R 469,869.59	
	External works	Item	0.00	1	177.86	R 187,107.97	R 187,107.97	
BUILDINGS - STEEL	Concrete	m3	0.00	70	0.17	R 1,052.00	R 73,640.00	R 1,223,385.16
	Earthworks	m3	2.39	167	9.08	R 115.81	R 19,375.59	
	Reinforcement	t	8.40	8	0.00	R 7,554.00	R 62,917.90	
	Mesh	m2	0.12	583	10.82	R 97.27	R 56,742.18	
	Formwork	m2	0.39	178	8.09	R 130.06	R 23,090.37	
	Brickwork	m2	6.09	91	6.21	R 169.46	R 15,447.27	
	Roof covering	m2	0.87	639	212.62	R 120.15	R 76,773.89	
	Structural steel	t	18.72	30	0.00	R 25,546.00	R 757,575.74	
	Side cladding	m2	1.55	359	0.96	R 115.86	R 41,600.22	
	Doors	No	403.79	1	0.49	R 12,627.02	R 17,355.77	
	Ridge ventilator	m	21.89	25	11.88	R 1,427.65	R 36,193.08	
	Aluminium insulation	m2	0.88	628	1.77	R 67.94	R 42,673.16	
	Total building area	m2	0.00	555	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.09	201	0.13	R 140.52	R 28,235.92	R 1,194,963.38
	Concrete	m3	0.00	65	0.00	R 1,052.00	R 68,380.00	
	Reinforcement	t	11.50	6	0.18	R 7,554.00	R 42,685.92	
	Mesh	m2	0.13	506	9.99	R 105.26	R 53,214.85	
	Formwork	m2	0.44	147	8.54	R 123.17	R 18,166.77	
	Brickwork	m2	5.88	76	5.74	R 183.41	R 13,854.54	
	Screed	m2	1.13	391	43.50	R 24.18	R 9,466.45	
	Structural steel	t	14.69	30	0.00	R 25,546.00	R 772,193.81	
	Cat ladders	m	2.84	11	10.12	R 2,524.49	R 26,876.17	
	Hand rail	m	0.74	41	28.05	R 910.68	R 37,056.64	
	Kick plates	m	0.75	40	2.78	R 328.01	R 13,244.99	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.91	486	202.12	R 126.39	R 61,427.78	
	Side cladding	m2	4.83	92	0.95	R 120.07	R 11,047.64	
	Floor grating	m2	1.11	27	17.87	R 1,429.78	R 39,111.90	
	Total buiding area	m2	0.00	444	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.25	0	8.25	R 127.54	R -	R -
	Blinding	m2	0.47	0	18.95	R 55.52	R -	
	Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
	Reinforcement	t	8.11	0	0.00	R 7,554.00	R -	
	Mesh	m2	0.48	0	50.58	R 149.35	R -	
	Formwork	m2	0.32	0	7.97	R 131.95	R -	
	Finish to concrete	m2	0.46	0	106.57	R 9.87	R -	
	Movement joints	m	2.41	0	15.33	R 68.64	R -	
	Cast in steel	kg	0.09	0	177.94	R 42.45	R -	
	Grout	m3	69.65	0.000	2.51	R 6,725.11	R -	
	Brickwork	m2	0.24	0	0.16	R 167.00	R -	
	Doors and windows	No	2.74	0	0.26	R 2,033.04	R -	
	Pipework	m	2.64	0	0.22	R 418.77	R -	
	Bolts	kg	0.11	0	0.08	R 42.45	R -	
	Structural steel	t	3.96	0	0.00	R 29,214.36	R -	
	Miscellaneous steel	t	137.72	0	0.00	R 34,902.97	R -	
	Total bridge area	m2	0.00	0	0.00		R -	
	Total control room area	m2	0.00	0	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.72	105	6.22	R 169.02	R 17,690.12	R 114,186.91
	Blinding	m2	0.75	16	14.71	R 71.50	R 1,147.20	
	Concrete	m3	0.00	12	0.00	R 1,052.00	R 12,624.00	
	Reinforcement	t	6.12	2	0.00	R 7,554.00	R 14,804.85	
	Formwork	m2	0.07	170	5.76	R 182.75	R 31,012.49	
	Finish to concrete	m2	0.33	37	79.25	R 13.27	R 488.00	
	Movement joints	m	0.45	27	12.72	R 82.72	R 2,216.38	
	Cast in steel	kg	24.81	0.484	168.50	R 44.83	R 21.69	
	Grout	m3	24.37	0.492	0.65	R 8,182.22	R 4,028.76	
	Bolts	kg	119.05	0.101	0.13	R 29.24	R 2.95	
	Structural steel	t	36.80	0.245	0.23	R 32,242.68	R 7,886.36	
	Miscellaneous steel	t	20.99	0.429	0.19	R 39,608.99	R 16,982.21	
	Brickwork	m2	0.51	18	4.39	R 239.52	R 4,220.89	
	Roof covering	m2	1.58	6	1.28	R 186.60	R 1,061.01	
	Total pump house area	m2	0.00	9	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	6.28	R 167.46	R -	R -
	Blinding	m2	1.18	0	16.70	R 62.99	R -	
	Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
	Reinforcement	t	6.09	0.000	0.00	R 7,554.00	R -	
	Formwork	m2	0.21	0	6.11	R 172.30	R -	
	Movement joint	m	1.69	0	0.12	R 78.34	R -	
	Cast in steel	kg	0.14	0	13.43	R 38.91	R -	
	Bolts	kg	0.38	0	194.12	R 45.30	R -	
	Chemical anchors	No	6.25	0	0.23	R 198.08	R -	
	Miscellaneous steelwork	t	91.29	0.000	166.75	R 32,640.74	R -	
	Pre-cast concrete	m3	31.72	0	38.14	R 3,473.58	R -	
	Brickwork	m2	7.87	0	0.30	R 242.08	R -	
	Total area	m2	0.00	0	4.35		R -	
EMERGENCY DAM	Earthworks	m3	0.57	1,553	1.81	R 85.52	R 132,775.35	R 375,229.73
	Lining	m2	0.71	1,243	1.23	R 47.34	R 58,830.75	
	Paving	m2	0.67	1,322	0.55	R 86.07	R 113,814.42	
	Pipework	m	29.28	30	0.25	R 343.05	R 10,369.45	
	Manholes	No	17.88	2	0.11	R 3,138.98	R 5,306.28	
	Concrete	m3	2.47	12	0.05	R 1,052.00	R 12,896.65	
	Formwork	m2	0.10	127	6.45	R 163.10	R 20,735.36	
	Mesh	m2	0.77	16	7.29	R 144.36	R 2,302.69	
	Reinforcement	t	5.09	2.409	0.13	R 7,554.00	R 18,198.78	
	Dam area (to top of berm)	m2	0.00	885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.22	174	5.24	R 200.74	R 34,972.23	R 366,394.56
	Blinding	m2	0.84	33	13.09	R 80.39	R 2,670.54	
	Concrete	m3	0.00	28	0.00	R 1,052.00	R 29,456.00	
	Reinforcement	t	4.42	6.339	0.00	R 7,554.00	R 47,884.35	
	Mesh	m2	0.91	31	38.81	R 194.63	R 6,002.86	
	Formwork	m2	0.15	189	5.34	R 197.19	R 37,341.95	
	Cast in steel	kg	0.02	1,225	140.12	R 53.91	R 66,040.22	
	Miscellaneous steelwork	t	11.31	3.183	0.17	R 44,622.78	R 142,026.42	
	Total tunnel length	m	0.00	36	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	235	0.00		R -	R 1,015,691.00
	Steel	t	9.69	24.254	0.00	R 25,546.00	R 619,582.31	
	Handrail	m	1.44	164	27.97	R 913.45	R 149,440.99	
	Grating	m2	1.91	123	16.52	R 1,546.03	R 189,863.80	
	Kick flats	m	1.70	138	74.68	R 342.07	R 47,226.56	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.69	35	93.72	R 272.59	R 9,577.34	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,655	0.00		R -	R 1,933,359.05
	Steel	t	26.85	61.650	0.00	R 25,546.00	R 1,574,916.37	
	Handrail	m	13.50	123	30.52	R 837.04	R 102,610.03	
	Grating	m2	12.80	129	19.13	R 1,335.29	R 172,706.61	
	Kick flats	m	13.26	125	86.91	R 293.95	R 36,690.10	
	Cat ladder	m	98.54	17	9.24	R 2,764.93	R 46,435.94	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	2,445	0.00		R -	R 1,946,419.07
	Steel	t	75.23	32.500	0.00	R 25,546.00	R 830,253.49	
	Handrail	m	31.35	78	31.29	R 816.46	R 63,669.15	
	Grating	m2	3.80	643	16.49	R 1,548.78	R 995,768.19	
	Kick flats	m	34.15	72	82.62	R 309.20	R 22,139.60	
	Stair treads	No	230.61	11	107.15	R 238.42	R 2,527.76	
	Cat ladder	m	234.22	10	8.32	R 3,071.22	R 32,060.89	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	331	0.00		R -	R 416,918.42
	Steel	t	24.17	13.692	0.00	R 25,546.00	R 349,781.83	
	Handrail	m	45.39	7	29.85	R 855.89	R 6,241.49	
	Grating	m2	60.81	5	16.81	R 1,519.37	R 8,270.88	
	Kick flats	m	45.25	7	80.02	R 319.24	R 2,335.15	
	Cat ladder	m	19.81	17	8.49	R 3,009.20	R 50,289.07	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 909,933.50
	Steel	t	16.29	16.330	0.00	R 25,546.00	R 417,159.85	
	Handrail	m	1.06	250	31.56	R 809.53	R 202,329.15	
	Grating	m2	1.95	136	17.00	R 1,502.96	R 204,868.86	
	Kick flats	m	1.16	230	78.69	R 324.66	R 74,723.67	
	Stair treads	No	5.90	45	106.18	R 240.58	R 10,851.97	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 600,109.92
	Steel	t	12.31	19.899	0.00	R 25,546.00	R 508,341.24	
	Handrail	m	24.24	10	33.42	R 764.29	R 7,725.15	
	Grating	m2	7.14	34	18.56	R 1,376.72	R 47,230.90	
	Kick flats	m	22.49	11	88.65	R 288.17	R 3,139.31	
	Cat ladder	m	20.83	12	8.92	R 2,862.53	R 33,673.31	
PIPING INSTALLATION	Pipe length	m	0.00	22,452	0.00		R -	R 11,899,560.00
	Total work units	WU	0.34	67,021	0.00	R 177.55	R 11,899,560.00	
	Pipe supports	kg	2.53	8,862	0.00		R -	
	WU for pipe supports	WU	0.16	10,819	0.00		R -	
	Number of welds	No	0.59	13,343	0.00		R -	
	Total fittings	No	0.38	8,516	0.00		R -	
	Stud bolts	No	0.35	2,962	0.00		R -	
	Support number	No	0.19	1,639	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	67,021	0.00	R 177.55		R 33,307.21

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	58.88	1,138	6.07	R 29.26	R 33,307.21	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	67,021	0.00	R 177.55		R 7,529.94
	Number of examinations	No	163.88	409	9.64	R 18.41	R 7,529.94	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	67,021	0.00	R 177.55		R 18,849.59
	Number of examinations	No	285.47	235	2.21	R 80.29	R 18,849.59	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	67,021	0.00	R 177.55		R 31,441.97
	Number of examinations	No	53.69	1,248	7.05	R 25.19	R 31,441.97	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	67,021	0.00	R 177.55		R 17,150.29
	Number of examinations	No	112.73	595	6.16	R 28.85	R 17,150.29	
MECHANICAL INSTALLATION	Total work units	WU	0.00	67,021	0.00	R 177.55		R 62,260.94
	Mechanical equipment	t	253.62	264	0.75	R 235.61	R 62,260.94	
	Structural steel	t	213.92	313	53.20			
PAINTING & INSULATION	Total work units	WU	0.00	67,021	0.00	R 177.55		R 735,614.42
	Painting to piping	m2	17.85	3,754	0.33	R 66.68	R 250,308.33	
	Insulation to piping	m2	48.75	1,375	2.66	R 199.89	R 274,821.93	
	Mechanical equipment received	t	0.00	264	0.84	R 235.61	R 62,260.94	
	Painting to mechanical equipment	m2	0.24	1,095	3.63	R 64.91	R 71,042.85	
	Insulation to mechanical equipment	m2	0.70	379	1.16	R 203.61	R 77,180.37	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	26.02	15,223	0.00	R 29.55	R 449,839.65	R 1,836,842.02
	Electrical cable terminations	No	316.51	585	0.41	R 72.45	R 42,394.93	
	Electrical equipment	No	8.55	48	0.11	R 273.97	R 13,177.12	
	DB's	No	6.21	6	0.32	R 867.79	R 4,884.02	
	Rack	m	0.70	2,450	1.61	R 89.35	R 218,934.10	
	Support steel	kg	1.40	3,483	2.16	R 13.71	R 47,738.30	
	Instrumentation cable	m	27.72	17,224	0.33	R 28.50	R 490,884.00	
	Instruments	No	0.55	621	0.18	R 162.86	R 101,179.30	
	Hook-ups	No	4.03	1,140	0.16	R 183.87	R 209,604.93	
	Light fittings	No	10.09	194	0.02	R 168.86	R 32,723.47	
	Conduit	m	4.04	1,509	0.13	R 18.39	R 27,760.55	
	Instrument stands	No	0.00	154		R 1,287.10	R 197,721.64	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project I				
Location:	South Africa				
Client:			Date of estimate:	2002	

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	8,554	R	3.22
2	Concrete demolitions	m3	0	R	1,005.00
3	Bulk excavation	m3	2,441	R	32.11
4	Vertical piles	No	16		
5	Raking piles	No	0		
6	Concrete in piles	m3		R	1,052.00
7	Auger pile	m		R	185.00
8	Total paving and asphalt to road works	m2	1,742		
9	Grey paving to road works	m2	0	R	85.00
10	Asphalt to road surface	m2	1,742		
11	Rip bed of road works	m2	1,742	R	7.55
12	Total concrete in paving and bunding	m3	88	R	1,052.00
13	Concrete in paving	m3	65		
14	Rod reinforcement	t		R	7,554.00
15	Concrete in plinths and bases on area finishing	m3	78		
16	Stormwater pipe to drain surface run-off	m	75		
17	Machine excavation	m3		R	34.22
18	Concrete in pump and pipe support bases	m3	85	R	1,052.00
19	Concrete in tank bases	m3	25	R	1,052.00
20	Concrete in pipe and cable rack foundations	m3	0	R	1,052.00
21	Concrete to simple structural foundations	m3	222	R	1,052.00
22	Complex structural foundations - bases	m3	0	R	1,052.00
23	Concrete pipe racks - bases	m3	0	R	1,052.00
24	Concrete structure including concrete columns and beams - bases	m3	125	R	1,052.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	1,052.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	1,052.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	122	R	1,052.00
28	One brick wall	m2		R	167.00
29	Concrete in structual steel buildings - all concrete	m3	70	R	1,052.00
30	Total building area - Structural steel buildings	m2	555		
31	Ceiling	m2		R	112.00
32	Structural steel	t		R	25,546.00
33	Steel canopy - concrete	m3	65	R	1,052.00
34	Steel canopy - area	m2	444		
35	Concrete in weighbridge - all concrete	m3	0	R	1,052.00
36	Total weighbridge area	m2	0		
37	Total control room area - weighbridge	m2	0		
38	Concrete in pump house - all concrete	m3	12	R	1,052.00
39	Total pump house area	m2	9		
40	Concrete in cooling tower	m3	0	R	1,052.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	885		
43	Concrete in cable tunnel	m3	28	R	1,052.00
44	Total lengh of cable tunnel	m	36		
45	Total volume of basic steel platform	m3	235		
46	Total volume of steel pipe rack	m3	1,655		
47	Total volume of steel complex steel structure	m3	2,445		
48	Total volume of steel in stack	m3	331		
49	Total volume of steel in walkway	m3	266		
50	Total volume of steel in cable gantry	m3	245		
51	Piping work unit cost	WU		R	177.55
52	Total process pipe length	m	22,452		
53	Total electrical cable - installation only	m	15,223	R	29.55
54	Total instrumentation cable - installation only	m	17,224	R	22.44

Ratio: Variable ratio

Variables

Material	Normal	Median
Labour	Normal	Median
Engineering design	Normal	Median
Current economic conditions	Volatile	Median
Current economic factors	Volatile	Median
Level of scope definition	Poor	Median
Rework	Extensive	Median
Scope change	Extensive	Median
Weather	Normal	Median
Access	Normal	Median
Project size	Small	Median
Project conditions	Normal	Median
Complexity	Normal	Median
Repitition	Repitition	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

Project name:	Project I				
Location:	South Africa				
Client:	0	Date of estimate:	2002		

	CIVIL CONSTRUCTION COST				R 13,695,234.79
A	SITE CLEARANCE AND DEMOLITIONS		R	27,543.88	
B	BULK EARTHWORKS		R	169,225.57	
C	PILING		R	684,083.24	
D	ROAD WORKS		R	503,961.03	
E	GENERAL PAVING AND BUNDED AREAS		R	221,834.38	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	283,758.16	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	386,874.13	
H	TANK BASES AND BUNDING		R	288,084.81	
I	RACK FOUNDATIONS		R	-	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,523,109.07	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	-	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	1,268,889.77	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,548,399.68	
Q	BUILDINGS - STEEL		R	1,287,693.10	
R	CANOPIES - STEEL		R	1,211,404.41	
S	WEIGHBRIDGE		R	-	
T	PUMP HOUSE		R	99,923.52	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	331,425.16	
W	HEAVY DUTY CABLE TUNNEL		R	308,408.46	
	Preliminaries and General	35.00%	R	3,550,616.43	
	STRUCTURAL STEEL				R 10,511,207.42
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,111,840.33	
B	STRUCTURAL STEEL - PIPERACK		R	2,142,998.75	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	2,108,294.64	
D	STRUCTURAL STEEL - STACK		R	460,992.36	
E	STRUCTURAL STEEL - WALKWAY		R	1,042,531.18	
F	STRUCTURAL STEEL - CABLE GANTRY		R	641,348.03	
	Preliminaries and General	40.00%	R	3,003,202.12	
	MECHANICAL AND PIPING				R 18,395,799.55
A	PIPING INSTALLATION		R	12,888,899.86	
B	RADIOGRAPHIC EXAMINATION (RT)		R	40,607.49	
C	DYE PENETRATION TESTING (DP)		R	25,082.89	
D	MAGNETIC PARTICLE TESTING (MPI)		R	24,312.69	
E	POST WELD HEAT TREATMENT		R	38,627.98	
F	MATERIAL HARDNESS TEST (HT)		R	46,409.10	
H	MECHANICAL INSTALLATION		R	75,916.82	
	Preliminaries and General	40.00%	R	5,255,942.73	
	PAINTING AND INSULATION				R 1,310,348.73
A	PAINTING AND INSULATION		R	970,628.69	
	Preliminaries and General	35.00%	R	339,720.04	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 2,716,437.85
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	2,012,176.19	
	Preliminaries and General	35.00%	R	704,261.67	

TOTAL COST	R	46,629,028.35

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		8,554		R 3.22	R 27,543.88	R 27,543.88
	Concrete demolitions	m3		0		R 1,005.00	R -	
BULK EARTHWORKS	Bulk excavation	m3		2,441		R 32.11	R 78,380.51	R 169,225.57
	Trimming of sides	m2	2.18	1,118	4.19	R 7.66	R 8,571.22	
	Back fill and compact	m3	1.12	2,173	0.96	R 33.57	R 72,938.17	
	Overhaul	m3/km	1.66	1,468	11.52	R 2.79	R 4,093.45	
	Rip bed	m2	1.76	1,385	8.49	R 3.78	R 5,242.22	
PILING	Site establishment of rig	Item	0.00	1	194.07	R 204,165.40	R 204,165.40	R 684,083.24
	EO for raking equipment	Item	0.00	1	24.13	R 25,382.51	R 25,382.51	
	Number of piles	No	0.00	16	0.00		R -	
	Move rig to new position	No	1.52	11	0.19	R 199.88	R 2,105.98	
	Number of raking piles	No	19.42	1	0.00		R -	
	EO for setting up raking piles	No	0.89	1	0.26	R 269.76	R 249.78	
	EO for raking drilling	m	0.14	6	0.75	R 138.88	R 793.21	
	Auger quantity	m	0.05	325	0.00	R 185.00	R 60,057.97	
	EO for drilling in coarse gravel	m	0.55	29	0.22	R 232.19	R 6,763.44	
	EO for drilling in boulders	m	1.73	9	0.51	R 538.77	R 4,991.13	
	EO for drilling in soft rock	m	1.65	10	0.24	R 247.22	R 2,396.25	
	Temporary casings	m	0.37	43	0.32	R 336.64	R 14,501.42	
	EO casing to raking pile	m	0.17	5	0.54	R 743.91	R 3,652.16	
	Mild steel rod reinforcement	t	14.90	1.074	0.71	R 5,432.17	R 5,834.04	
	High tensile rod reinforcement	t	1.17	13.675	7.30	R 7,681.85	R 105,051.00	
	Concrete to piles and bases	m3	0.16	100	0.00	R 1,052.00	R 105,671.75	
	Concrete to raking piles	m3	0.08	10	1.07	R 1,124.14	R 11,790.20	
	Site establishment of test equipment	Item	0.00	1	113.74	R 119,657.49	R 119,657.49	
	Load test to pile	No	92.14	0	24.09	R 25,343.43	R 4,400.89	
	Site establishment of intergity testing	No	257.32	0	49.61	R 52,184.46	R 3,244.78	
	Integrity testing of piles	No	1.29	12	0.26	R 272.02	R 3,373.86	
ROAD WORKS	Red paving	m2	0.14	0	0.94	R 79.60	R -	R 503,961.03
	Grey paving	m2	0.00	0	0.00	R 85.00	R -	
	Kerbing	m	0.12	203	0.00	R 176.01	R 35,698.24	
	Total paving and asphalt	m2	0.00	1,742	0.00		R -	
	Remove top soil	m3	0.50	179	5.24	R 39.55	R 7,072.96	
	Asphalt	m2	0.20	355	0.00	R 108.97	R 38,644.42	
	Rip bed	m2	0.00	1,742	0.00	R 7.55	R 13,152.10	
	Reduce levels	m3	0.36	635	4.59	R 34.62	R 21,970.72	
	Selected fill	m3	1.46	433	0.46	R 75.27	R 32,618.24	
	Imported fill	m3	1.98	218	0.32	R 234.68	R 51,255.22	
	Wearing course	m3	3.89	163	0.20	R 176.90	R 28,826.63	
	Prime	m2	4.43	1,921	1.45	R 25.14	R 48,304.68	
	Three line road marking	m	0.79	1,526	0.11	R 18.86	R 28,775.79	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.96	194	4.05	R 5.78	R 1,123.51	
	1m Wide concrete V-drain	m	0.91	185	0.75	R 753.33	R 139,146.63	
	200mm Diameter PVC pipe	m	0.93	189	0.09	R 246.54	R 46,502.82	
	Road marking - STOP	No	0.15	30	0.03	R 273.57	R 8,283.16	
	Standard signage	No	0.01	2	4.28	R 336.56	R 682.60	
	100mm Painted line	m	1.70	344	1.40	R 5.53	R 1,903.30	
			0.00		1.55			
			0.00		1.91			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.84	65	0.73	R 1,052.00	R 68,380.00	R 221,834.38
		Concrete in plinths	m3	0.00	13	0.00	R 1,052.00	R 14,140.62	
		Total concrete	m3	0.00	88	0.00		R -	
		Rip and compact	m2	0.13	514	195.72	R 5.37	R 2,763.37	
		Formwork to plinth	m2	7.16	96	0.12	R 122.48	R 11,792.73	
		Formwork to slab	m2	0.81	53	0.15	R 154.79	R 8,157.11	
		High tensile steel	t	0.01	0.880	0.00	R 7,554.00	R 6,647.52	
		Mesh	m2	617.32	543	47.05	R 160.57	R 87,226.80	
		Construction joint	m	3.71	241	0.05	R 48.09	R 11,583.85	
		Expansion joint	m	2.15	140	0.08	R 79.65	R 11,142.38	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.29	2,256	0.00		R -	R 283,758.16
		Base excavation	m3	1.42	178	0.00	R 34.22	R 6,086.03	
		Backfill	m3	0.57	126	0.62	R 55.58	R 6,978.47	
		Working space	m2	0.44	314	1.35	R 41.23	R 12,963.25	
		Concrete in bases	m3	0.04	78	24.10	R 1,052.00	R 82,056.00	
		Blinding	m2	0.79	110	19.00	R 55.37	R 6,098.87	
		Concrete in sump walls	m3	0.11	8	30.43	R 1,052.00	R 8,615.88	
		Concrete in slabs	m3	0.02	1	0.83	R 1,052.00	R 1,289.45	
		Total concrete	m3	0.00	87	0.03		R -	
		Wood float	m2	0.61	144	125.58	R 8.38	R 1,208.95	
		Formwork to bases	m2	1.71	133	0.12	R 127.74	R 17,002.76	
		Formwork to sump walls	m2	11.31	93	0.12	R 121.73	R 11,271.58	
		Formwork to sides of slab	m2	5.64	7	0.17	R 174.33	R 1,205.77	
		Mild steel reinforcement	t	0.09	0.813	0.00	R 7,554.00	R 6,137.70	
		High tensile reinforcement	t	9.68	9.028	0.94	R 7,554.00	R 68,196.64	
		Cast in steel	kg	0.45	175	32.25	R 32.62	R 5,708.65	
		Waterstop	m	0.45	18	8.36	R 125.86	R 2,269.02	
		Manhole	No	0.08	6	2.71	R 3,111.28	R 17,500.92	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	75	0.13	R 388.91	R 29,168.21	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.52	130	0.05	R 34.22	R 4,433.69	R 386,874.13
		Working space	m2	0.32	400	0.70	R 23.98	R 9,601.43	
		Backfill	m3	4.01	32	1.27	R 43.51	R 1,405.77	
		Concrete bases	m3	0.90	85	0.00	R 1,052.00	R 89,420.00	
		Concrete plinth	m3	1.97	43	0.00	R 1,052.00	R 45,489.83	
		Total concrete	m3	0.00	128	0.00		R -	
		Wood float	m2	0.49	89	0.05	R 10.52	R 936.56	
		Blinding	m2	0.90	94	0.01	R 56.36	R 5,309.98	
		Formwork bases	m2	0.50	172	0.12	R 130.75	R 22,451.77	
		Formwork plinth	m2	0.55	79	0.13	R 132.25	R 10,465.63	
		High tensile reinforcement	t	9.97	12.858	6.70	R 7,554.00	R 97,130.16	
		Cast in steel	kg	0.11	1,205	0.03	R 31.56	R 38,028.27	
		HD Bolts	kg	0.08	1,662	0.03	R 32.31	R 53,714.10	
		Grout	m3	33.24	1.301	6.20	R 6,523.15	R 8,486.94	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.48	137	0.05	R 48.84	R 6,688.85	R 288,084.81
		Working space	m2	3.90	35	1.52	R 32.21	R 1,132.25	
		Backfill	m3	1.32	104	0.76	R 64.45	R 6,689.99	
		Concrete bases	m3	0.72	25	0.00	R 1,052.00	R 26,300.00	
		Concrete sump wall	m3	2.60	10	0.00	R 1,052.00	R 10,123.73	
		Concrete slab	m3	0.55	45	0.00	R 1,052.00	R 47,571.06	
		Concrete plinth	m3	3.76	7	19.97	R 1,052.00	R 6,986.72	
		Concrete column	m3	19.77	1	170.04	R 1,052.00	R 1,330.63	
		Total concrete	m3	0.00	88	1.10		R -	
		Blinding	m2	2.43	36	1.07	R 52.67	R 1,900.89	
		Wood float	m2	0.25	355	1.10	R 6.19	R 2,196.64	
		Formwork to bases	m2	0.40	62	1.12	R 132.94	R 8,220.44	
		Formwork to plinths	m2	0.34	19	7.91	R 143.23	R 2,786.00	
		Formwork to columns	m2	0.11	11	7.35	R 153.35	R 1,740.76	
		Formwork to sumps	m2	0.10	92	6.86	R 149.02	R 13,751.65	
		Formwork to slabs	m2	3.97	11	7.06	R 134.20	R 1,527.99	
		Formwork to slabs n/e 300mm	m	2.07	22	7.84	R 46.75	R 1,019.08	
		Mild steel reinforcement	t	0.22	0.879	22.50	R 7,554.00	R 6,642.70	
		High tensile reinforcement	t	21.45	4.090	0.92	R 7,554.00	R 30,896.27	
		Mesh	m2	0.15	296	53.36	R 141.56	R 41,877.92	
		Cast in items	kg	0.19	472	214.80	R 35.17	R 16,616.26	
		HD Bolts	kg	0.09	960	201.79	R 37.43	R 35,928.32	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	188.38	0.466	0.17	R 6,188.24	R 2,882.47	
	Construction joint	m	0.29	155	24.28	R 43.32	R 6,705.76	
	Expansion joint	m	0.45	102	16.28	R 64.64	R 6,568.43	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.35	0	0.05	R 51.10	R -	R -
	Working space	m2	0.35	0	1.62	R 82.92	R -	
	Backfill	m3	2.38	0	0.82	R 62.48	R -	
	Blinding	m2	0.41	0	25.14	R 41.85	R -	
	Concrete bases	m3	5.91	0	0.00	R 1,052.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	1.36		R -	
	Wood float	m2	0.35	0	180.41	R 5.83	R -	
	Formwork bases	m2	0.49	0	10.53	R 99.95	R -	
	Formwork plinths	m2	0.09	0	6.78	R 155.10	R -	
	High tensile reinforcement	t	9.06	0.000	0.00	R 7,554.00	R -	
	HD Bolts	kg	0.03	0	199.28	R 37.91	R -	
	Grout	m3	75.01	0.000	0.18	R 5,821.34	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.92	870	0.05	R 54.10	R 47,065.31	R 1,523,109.07
	Working space	m2	0.46	1,897	1.84	R 29.47	R 55,909.92	
	Backfill	m3	2.60	334	0.77	R 70.26	R 23,502.69	
	Blinding	m2	0.33	664	22.25	R 47.28	R 31,401.38	
	Concrete bases	m3	0.00	222	0.00	R 1,052.00	R 233,544.00	
	Concrete plinth	m3	2.44	69	0.00	R 1,052.00	R 72,145.10	
	Concrete slab	m3	3.24	91	0.00	R 1,052.00	R 95,855.06	
	Total concrete	m3	0.00	382	0.00		R -	
	Wood float	m2	0.51	748	143.25	R 7.34	R 5,496.47	
	Formwork bases	m2	0.48	459	8.40	R 125.22	R 57,485.05	
	Formwork plinths	m2	0.10	696	8.43	R 124.85	R 86,858.49	
	High tensile reinforcement	t	12.89	29.622	0.00	R 7,554.00	R 223,761.86	
	HD Bolts	kg	0.02	10,717	187.15	R 40.36	R 432,585.36	
	Cast in items	kg	0.05	4,258	232.84	R 32.44	R 138,129.64	
	Grout	m3	69.76	3.183	0.17	R 6,085.95	R 19,368.75	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.05	0	0.06	R 57.86	R -	R -
	Working space	m2	0.54	0	1.68	R 34.40	R -	
	Backfill	m3	2.18	0	0.81	R 71.50	R -	
	Blinding	m2	0.67	0	21.00	R 50.09	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	26.63	0	0.00	R 1,052.00	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.94	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.60	0	158.48	R 6.64	R -	
	Formwork bases	m2	0.48	0	7.24	R 145.30	R -	
	Formwork plinths	m2	0.30	0	7.35	R 143.21	R -	
	Formwork to columns	m2	0.29	0	7.73	R 136.02	R -	
	High tensile reinforcement	t	8.66	0.000	0.00	R 7,554.00	R -	
	HD bolts	kg	0.04	0	191.12	R 39.53	R -	
	Grout	m3	103.22	0.000	0.16	R 6,431.44	R -	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.60	0	0.05	R 57.11	R -	R -
	Working space	m2	0.28	0	2.17	R 26.28	R -	
	Backfill	m3	1.94	0	0.82	R 69.28	R -	
	Blinding	m2	0.67	0	20.47	R 51.40	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	1.08	0	145.98	R 1,052.00	R -	
	Concrete beam	m3	2.44	0	0.88	R 1,052.00	R -	
	Total concrete	m3	2.90	0	0.88		R -	
	Wood float	m2	0.46	0	7.39	R 7.21	R -	
	Formwork bases	m2	0.48	0	6.42	R 142.37	R -	
	Formwork to columns	m2	0.15	0	7.33	R 143.49	R -	
	Formwork to sides beams	m2	0.32	0	5.96	R 163.77	R -	
	Formwork to soffits beams	m2	0.69	0	6.42	R 176.57	R -	
	Formwork corbels	m2	10.52	0	5.09	R 206.68	R -	
	High tensile reinforcement	t	9.06	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.03	0	253.36	R 29.81	R -	
	HD bolts	kg	1.47	0	207.27	R 36.44	R -	
	Grout	m3	490.65	0.000	0.16	R 6,488.11	R -	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.74	468	0.05	R 54.10	R 25,322.07	R 1,268,889.77
	Working space	m2	0.60	783	1.69	R 32.05	R 25,093.78	
	Backfill	m3	1.13	413	0.80	R 67.93	R 28,030.44	
	Blinding	m2	0.61	204	18.88	R 55.72	R 11,392.29	
	Concrete bases	m3	0.00	125	0.90	R 1,052.00	R 131,500.00	
	Concrete column	m3	2.15	58	1.04	R 1,052.00	R 61,081.62	
	Concrete beam	m3	0.82	71	0.95	R 1,052.00	R 74,554.72	
	Concrete surface slab	m3	1.70	74	0.89	R 1,052.00	R 77,352.94	
	Concrete wall	m3	2.13	27	0.95	R 1,052.00	R 28,696.06	
	Concrete elevated slab	m3	1.01	58	0.00	R 1,052.00	R 60,605.43	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total concrete	m3	0.00	412	0.00		R -	
	Wood float	m2	0.61	681	151.32	R 6.95	R 4,732.73	
	Formwork bases	m2	0.39	320	7.17	R 146.66	R 46,921.76	
	Formwork to columns	m2	0.16	366	6.18	R 170.25	R 62,337.20	
	Formwork to sides beams	m2	0.28	249	4.89	R 215.26	R 53,661.78	
	Formwork to soffits beams	m2	0.76	93	7.51	R 140.15	R 13,093.19	
	Formwork to soffts of slabs	m2	0.29	250	3.05	R 183.80	R 45,924.09	
	Formwork to pockets	m2	25.30	2	5.72	R 345.48	R 792.74	
	Formwork wall	m2	0.13	210	7.92	R 132.82	R 27,868.57	
	High tensile reinforcement	t	8.49	48.589	0.00	R 7,554.00	R 367,042.70	
	Cast in steel	kg	0.21	1,950	240.73	R 31.38	R 61,199.65	
	HD bolts	kg	0.37	1,130	198.17	R 38.12	R 43,064.58	
	Steel handrailing	m	2.54	19	8.96	R 843.55	R 16,127.72	
	Grout	m3	982.00	0.420	0.18	R 5,938.71	R 2,493.70	
MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.18	0	0.04	R 42.08	R -	R -
	Working space	m2	6.83	0	1.34	R 31.42	R -	
	Backfill	m3	4.43	0	0.68	R 28.73	R -	
	Blinding	m2	1.11	0	18.39	R 57.22	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	25.69	0	0.00	R 1,052.00	R -	
	Concrete beam	m3	1.25	0	0.00	R 1,052.00	R -	
	Concrete wall	m3	10.93	0	0.00	R 1,052.00	R -	
	Concrete elevated slabs	m3	9.98	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	0.87	0	154.20	R 6.82	R -	
	Formwork bases	m2	8.01	0	6.69	R 157.30	R -	
	Formwork to columns	m2	0.13	0	5.59	R 165.56	R -	
	Formwork to sides beams	m2	0.17	0	4.69	R 188.12	R -	
	Formwork to soffits beams	m2	0.49	0	6.35	R 224.48	R -	
	Formwork to soffts of slabs	m2	0.13	0	3.06	R 218.45	R -	
	Formwork to pockets	m2	423.54	0	4.82	R 343.31	R -	
	Formwork wall	m2	0.10	0	6.79	R 154.92	R -	
	High tensile reinforcement	t	4.10	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.16	0	215.32	R 35.08	R -	
	HD bolts	kg	0.24	0	171.62	R 44.02	R -	
	Galvanised grating	m2	18.29	0	0.16	R 1,252.44	R -	
	Grout	m3	769.82	0.000	6.03	R 6,694.55	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.51	0	0.05	R 51.85	R -	R -
	Working space	m2	0.36	0	1.58	R 32.79	R -	
	Backfill	m3	2.03	0	0.77	R 67.02	R -	
	Blinding	m2	4.64	0	21.67	R 48.54	R -	
	Concrete bases	m3	0.00	0	0.00	R 1,052.00	R -	
	Concrete column	m3	5.95	0	0.00	R 1,052.00	R -	
	Concrete beam	m3	1.73	0	0.00	R 1,052.00	R -	
	Concrete wall	m3	32.21	0	0.00	R 1,052.00	R -	
	Concrete elevated slabs	m3	23.11	0	0.00	R 1,052.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.60	0	154.52	R 6.81	R -	
	Formwork bases	m2	1.40	0	7.77	R 135.39	R -	
	Formwork to columns	m2	0.13	0	7.22	R 173.17	R -	
	Formwork to sides beams	m2	0.23	0	6.15	R 145.63	R -	
	Formwork to soffits beams	m2	0.74	0	6.08	R 171.16	R -	
	Formwork to soffts of slabs	m2	0.22	0	3.66	R 182.50	R -	
	Formwork to pockets	m2	2.95	0	5.76	R 287.38	R -	
	Formwork wall	m2	0.29	0	7.40	R 142.11	R -	
	High tensile reinforcement	t	6.98	0.000	0.00	R 7,554.00	R -	
	Cast in steel	kg	0.02	0	184.00	R 41.05	R -	
	HD bolts	kg	0.01	0	202.49	R 37.31	R -	
	Galvanised grating	m2	3.68	0	0.18	R 5,753.13	R -	
	Grout	m3	40.33	0.000	5.91	R 1,277.71	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.70	208	0.05	R 52.60	R 10,936.74	R 1,548,399.68
	Working space	m2	2.24	93	1.71	R 30.79	R 2,855.81	
	Backfill	m3	1.21	172	0.75	R 70.33	R 12,121.82	
	Blinding	m2	3.73	33	20.26	R 51.92	R 1,700.51	
	Concrete	m3	0.00	122	0.00	R 1,052.00	R 128,344.00	
	Mesh reinforcement	m2	0.41	296	64.13	R 117.79	R 34,867.28	
	Rough formwork	m2	3.01	41	8.15	R 129.11	R 5,239.40	
	Smooth formwork	m2	0.56	220	6.78	R 155.26	R 34,129.31	
	Finish to concrete	m2	0.23	542	106.02	R 9.92	R 5,380.50	
	Construction joints	m	4.58	27	19.88	R 52.93	R 1,408.75	
	Movement joints	m	14.52	8	16.26	R 64.71	R 543.73	
	Cast in steel	kg	2.26	54	227.14	R 33.26	R 1,798.71	
	Grout	m3	819.73	0.149	0.17	R 6,060.91	R 902.04	
	Brick walls	m2	0.46	264	0.00	R 167.00	R 44,154.18	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.39	536	0.00		R -	
	Waterproofing membrane	m2	2.05	261	11.37	R 92.49	R 24,129.45	
	Roof construction	m2	1.96	274	34.50	R 218.96	R 59,939.07	
	Ceiling	m2	0.99	539	0.00	R 112.00	R 60,349.33	
	Doors and windows	No	441.65	1	0.15	R 1,087.44	R 1,319.14	
	Floor finish	m2	0.99	542	0.77	R 218.30	R 118,222.18	
	Wall finsih	m2	1.01	530	1.44	R 115.63	R 61,334.90	
	Rod reinforcement	t	8.69	14	0.00	R 7,554.00	R 106,077.71	
	Metalwork	Item	0.00	1	4.40	R 33,269.97	R 33,269.97	
	Structural steel	Item	0.00	1	11.41	R 86,169.56	R 86,169.56	
	Plumbing and drainage	Item	0.00	1	7.26	R 54,858.23	R 54,858.23	
	Small power and lighting	Item	0.00	1	61.87	R 467,387.56	R 467,387.56	
	External works	Item	0.00	1	181.52	R 190,959.79	R 190,959.79	
BUILDINGS - STEEL	Concrete	m3	0.00	70	0.15	R 1,052.00	R 73,640.00	R 1,287,693.10
	Earthworks	m3	2.40	168	8.66	R 121.48	R 20,365.80	
	Reinforcement	t	7.75	9	0.00	R 7,554.00	R 68,261.13	
	Mesh	m2	0.11	624	9.45	R 111.33	R 69,493.34	
	Formwork	m2	0.38	186	7.58	R 138.72	R 25,796.30	
	Brickwork	m2	5.93	94	5.82	R 180.62	R 16,904.85	
	Roof covering	m2	0.85	653	205.51	R 124.31	R 81,164.11	
	Structural steel	t	18.01	31	0.00	R 25,546.00	R 787,168.54	
	Side cladding	m2	1.52	365	0.95	R 117.82	R 43,061.64	
	Doors	No	359.57	2	0.48	R 12,152.60	R 18,757.92	
	Ridge ventilator	m	20.83	27	11.59	R 1,440.88	R 38,383.21	
	Aluminium insulation	m2	0.91	612	1.70	R 73.00	R 44,696.25	
	Total building area	m2	0.00	555	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.92	190	0.13	R 133.00	R 25,225.42	R 1,211,404.41
	Concrete	m3	0.00	65	0.00	R 1,052.00	R 68,380.00	
	Reinforcement	t	11.18	6	0.17	R 7,554.00	R 43,932.64	
	Mesh	m2	0.12	555	9.80	R 107.35	R 59,568.80	
	Formwork	m2	0.42	154	8.15	R 129.02	R 19,832.96	
	Brickwork	m2	5.67	78	5.41	R 194.53	R 15,242.78	
	Screed	m2	1.09	408	40.18	R 26.19	R 10,687.37	
	Structural steel	t	14.81	30	0.00	R 25,546.00	R 766,121.18	
	Cat ladders	m	2.55	12	10.04	R 2,544.78	R 29,936.91	
	Hand rail	m	0.71	42	26.52	R 963.20	R 40,481.02	
	Kick plates	m	0.72	41	2.66	R 362.20	R 15,026.97	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.87	512	204.81	R 124.73	R 63,917.37	
		Side cladding	m2	4.58	97	0.93	R 115.64	R 11,203.71	
		Floor grating	m2	1.06	28	17.24	R 1,482.09	R 41,847.28	
		Total buiding area	m2	0.00	444	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.49	0	8.36	R 125.79	R -	R -
		Blinding	m2	0.50	0	20.95	R 50.21	R -	
		Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
		Reinforcement	t	8.15	0	0.00	R 7,554.00	R -	
		Mesh	m2	0.49	0	50.35	R 150.03	R -	
		Formwork	m2	0.35	0	8.50	R 123.82	R -	
		Finish to concrete	m2	0.48	0	115.38	R 9.12	R -	
		Movement joints	m	2.55	0	16.11	R 65.32	R -	
		Cast in steel	kg	0.09	0	196.98	R 38.35	R -	
		Grout	m3	74.30	0.000	2.67	R 6,294.02	R -	
		Brickwork	m2	0.25	0	0.17	R 167.00	R -	
		Doors and windows	No	2.84	0	0.26	R 2,015.52	R -	
		Pipework	m	2.97	0	0.23	R 393.48	R -	
		Bolts	kg	0.11	0	0.08	R 38.35	R -	
		Structural steel	t	4.46	0	0.00	R 28,974.25	R -	
		Miscellaneous steel	t	149.30	0	0.00	R 33,361.51	R -	
		Total bridge area	m2	0.00	0	0.00		R -	
		Total control room area	m2	0.00	0	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.33	100	6.95	R 151.30	R 15,125.72	R 99,923.52
		Blinding	m2	0.86	14	16.54	R 63.60	R 888.23	
		Concrete	m3	0.00	12	0.00	R 1,052.00	R 12,624.00	
		Reinforcement	t	6.52	2	0.00	R 7,554.00	R 13,907.64	
		Formwork	m2	0.07	162	6.04	R 174.15	R 28,132.18	
		Finish to concrete	m2	0.37	32	87.71	R 11.99	R 385.29	
		Movement joints	m	0.50	24	14.72	R 71.48	R 1,710.75	
		Cast in steel	kg	28.62	0.419	188.19	R 40.14	R 16.83	
		Grout	m3	25.91	0.463	0.75	R 6,914.55	R 3,202.68	
		Bolts	kg	139.07	0.086	0.15	R 30.19	R 2.61	
		Structural steel	t	42.93	0.210	0.26	R 28,895.08	R 6,058.37	
		Miscellaneous steel	t	24.06	0.374	0.20	R 37,369.61	R 13,979.90	
		Brickwork	m2	0.59	15	5.03	R 209.20	R 3,187.40	
		Roof covering	m2	1.92	5	1.40	R 149.97	R 701.93	
		Total pump house area	m2	0.00	9	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.88	0	7.07	R 148.78	R -	R -
	Blinding	m2	1.28	0	20.34	R 51.73	R -	
	Concrete	m3	0.00	0	0.00	R 1,052.00	R -	
	Reinforcement	t	6.09	0.000	0.00	R 7,554.00	R -	
	Formwork	m2	0.23	0	6.87	R 153.13	R -	
	Movement joint	m	1.92	0	0.13	R 69.60	R -	
	Cast in steel	kg	0.15	0	15.12	R 35.25	R -	
	Bolts	kg	0.39	0	214.30	R 41.63	R -	
	Chemical anchors	No	7.41	0	0.26	R 182.75	R -	
	Miscellaneous steelwork	t	97.10	0.000	181.45	R 28,895.08	R -	
	Pre-cast concrete	m3	36.83	0	41.34	R 2,939.72	R -	
	Brickwork	m2	8.99	0	0.36	R 226.79	R -	
	Total area	m2	0.00	0	4.64		R -	
EMERGENCY DAM	Earthworks	m3	0.66	1,335	1.81	R 95.02	R 126,861.51	R 331,425.16
	Lining	m2	0.82	1,075	1.52	R 52.60	R 56,523.33	
	Paving	m2	0.84	1,058	0.61	R 85.63	R 90,600.32	
	Pipework	m	30.49	29	0.28	R 341.97	R 9,926.39	
	Manholes	No	19.03	2	0.13	R 2,689.63	R 4,102.92	
	Concrete	m3	2.75	11	0.05	R 1,052.00	R 11,104.25	
	Formwork	m2	0.10	106	6.50	R 161.88	R 17,087.22	
	Mesh	m2	0.87	12	8.29	R 126.97	R 1,539.16	
	Reinforcement	t	5.83	1.811	0.14	R 7,554.00	R 13,680.07	
	Dam area (to top of berm)	m2	0.00	885	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.87	192	5.75	R 182.91	R 35,184.77	R 308,408.46
	Blinding	m2	0.91	31	14.07	R 74.77	R 2,313.30	
	Concrete	m3	0.00	28	0.00	R 1,052.00	R 29,456.00	
	Reinforcement	t	4.26	6.572	0.00	R 7,554.00	R 49,642.38	
	Mesh	m2	1.06	26	41.04	R 184.09	R 4,872.52	
	Formwork	m2	0.15	182	5.75	R 182.82	R 33,332.81	
	Cast in steel	kg	0.03	980	155.57	R 48.56	R 47,585.13	
	Miscellaneous steelwork	t	13.20	2.727	0.19	R 38,880.88	R 106,021.56	
	Total tunnel length	m	0.00	36	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	235	0.00		R -	R 1,111,840.33
	Steel	t	8.98	26.180	0.00	R 25,546.00	R 668,786.03	
	Handrail	m	1.39	169	24.25	R 1,053.47	R 178,196.94	
	Grating	m2	1.85	127	15.99	R 1,597.48	R 203,473.16	
	Kick flats	m	1.65	143	73.64	R 346.92	R 49,538.11	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.85	40	86.61	R 294.96	R 11,846.09	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	1,655	0.00		R -	R 2,142,998.75
	Steel	t	24.06	68.795	0.00	R 25,546.00	R 1,757,425.24	
	Handrail	m	12.77	130	29.24	R 873.82	R 113,215.39	
	Grating	m2	12.54	132	18.10	R 1,411.33	R 186,284.68	
	Kick flats	m	12.97	128	84.50	R 302.32	R 38,581.20	
	Cat ladder	m	98.36	17	9.05	R 2,822.54	R 47,492.24	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	2,445	0.00		R -	R 2,108,294.64
	Steel	t	67.65	36.144	0.00	R 25,546.00	R 923,339.65	
	Handrail	m	31.02	79	29.61	R 862.69	R 67,989.23	
	Grating	m2	3.58	684	16.52	R 1,546.03	R 1,057,146.17	
	Kick flats	m	33.01	74	79.29	R 322.20	R 23,864.26	
	Stair treads	No	221.91	11	100.34	R 254.60	R 2,805.14	
	Cat ladder	m	226.79	11	8.31	R 3,074.92	R 33,150.20	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	331	0.00		R -	R 460,992.36
	Steel	t	21.75	15.219	0.00	R 25,546.00	R 388,781.78	
	Handrail	m	45.51	7	26.54	R 962.44	R 6,999.31	
	Grating	m2	57.31	6	16.04	R 1,592.79	R 9,198.73	
	Kick flats	m	43.48	8	76.98	R 331.87	R 2,526.68	
	Cat ladder	m	19.02	17	8.31	R 3,073.07	R 53,485.86	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	266	0.00		R -	R 1,042,531.18
	Steel	t	13.95	19.074	0.00	R 25,546.00	R 487,263.39	
	Handrail	m	1.05	252	27.53	R 928.01	R 234,297.77	
	Grating	m2	1.85	144	16.13	R 1,584.18	R 227,779.09	
	Kick flats	m	1.09	245	77.42	R 329.98	R 80,738.52	
	Stair treads	No	5.55	48	98.29	R 259.92	R 12,452.41	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	245	0.00		R -	R 641,348.03
	Steel	t	11.59	21.135	0.00	R 25,546.00	R 539,914.84	
	Handrail	m	21.90	11	29.41	R 868.76	R 9,720.63	
	Grating	m2	6.82	36	17.67	R 1,446.08	R 51,964.88	
	Kick flats	m	22.29	11	87.16	R 293.09	R 3,222.04	
	Cat ladder	m	20.23	12	8.47	R 3,015.55	R 36,525.64	
PIPING INSTALLATION	Pipe length	m	0.00	22,452	0.00		R -	R 12,888,899.86
	Total work units	WU	0.31	72,593	0.00	R 177.55	R 12,888,899.86	
	Pipe supports	kg	2.41	9,302	0.00		R -	
	WU for pipe supports	WU	0.15	11,096	0.00		R -	
	Number of welds	No	0.57	12,717	0.00		R -	
	Total fittings	No	0.38	8,420	0.00		R -	
	Stud bolts	No	0.35	2,929	0.00		R -	
	Support number	No	0.18	1,701	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	72,593	0.00	R 177.55		R 40,607.49

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	54.54	1,331	5.82	R 30.51	R 40,607.49	
DYE PENETRATION	Total work units	WU	0.00	72,593	0.00	R 177.55		R 25,082.89
TESTING (DP)	Number of examinations	No	159.90	454	3.21	R 55.25	R 25,082.89	
MAGNETIC PARTICLE	Total work units	WU	0.00	72,593	0.00	R 177.55		R 24,312.69
TESTING (MPI)	Number of examinations	No	260.60	279	2.03	R 87.28	R 24,312.69	
POST WELD HEAT	Total work units	WU	0.00	72,593	0.00	R 177.55		R 38,627.98
TREATMENT	Number of examinations	No	48.44	1,499	6.89	R 25.78	R 38,627.98	
MATERIAL HARDNESS	Total work units	WU	0.00	72,593	0.00	R 177.55		R 46,409.10
TEST (HT)	Number of examinations	No	107.62	675	2.58	R 68.80	R 46,409.10	
MECHANICAL	Total work units	WU	0.00	72,593	0.00	R 177.55		R 75,916.82
INSTALLATION	Mechanical equipment	t	231.89	313	0.73	R 242.51	R 75,916.82	
	Structural steel	t	200.27	362	53.56			
	Total work units	WU	0.00	72,593	0.00	R 177.55		R 970,628.69
PAINTING & INSULATION	Painting to piping	m2	16.75	4,335	0.31	R 71.61	R 310,432.42	
	Insulation to piping	m2	44.34	1,637	2.48	R 229.95	R 376,516.58	
	Mechanical equipment received	t	0.00	313	0.82	R 242.51	R 75,916.82	
	Painting to mechanical equipment	m2	0.22	1,446	3.27	R 74.08	R 107,152.32	
	Insulation to mechanical equipment	m2	0.67	465	1.12	R 216.25	R 100,610.55	
ELECTRICAL &	Electrical cable	m	23.55	15,223	0.00	R 29.55	R 449,839.65	R 2,012,176.19
INSTRUMENTATION -	Electrical cable terminations	No	289.26	646	0.40	R 74.68	R 48,265.01	
INSTALLATION ONLY	Electrical equipment	No	8.11	53	0.10	R 289.30	R 15,225.18	
	DB's	No	5.88	6	0.28	R 1,030.59	R 6,690.65	
	Rack	m	0.62	2,588	1.55	R 92.97	R 240,626.21	
	Support steel	kg	1.32	4,189	2.09	R 14.14	R 59,229.84	
	Instrumentation cable	m	24.84	17,224	0.32	R 28.50	R 490,884.00	
	Instruments	No	0.47	693	0.16	R 177.33	R 122,955.46	
	Hook-ups	No	3.85	1,477	0.15	R 194.63	R 287,567.07	
	Light fittings	No	9.76	203	0.02	R 183.87	R 37,254.32	
	Conduit	m	3.98	1,559	0.12	R 19.02	R 29,654.19	
	Instrument stands	No	0.00	174		R 1,287.10	R 223,984.61	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:			
Project name:	Project J		
Location:	South Africa		
Client:		Date of estimate:	2000

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	9,445	R	2.95
2	Concrete demolitions	m3	0	R	945.20
3	Bulk excavation	m3	3,102	R	29.66
4	Vertical piles	No	23		
5	Raking piles	No	5		
6	Concrete in piles	m3		R	923.00
7	Auger pile	m		R	128.00
8	Total paving and asphalt to road works	m2	2,015		
9	Grey paving to road works	m2	125	R	75.00
10	Asphalt to road surface	m2	1,890		
11	Rip bed of road works	m2	2,015	R	6.55
12	Total concrete in paving and bunding	m3	112	R	923.00
13	Concrete in paving	m3	85		
14	Rod reinforcement	t		R	5,845.00
15	Concrete in plinths and bases on area finishing	m3	122		
16	Stormwater pipe to drain surface run-off	m	95		
17	Machine excavation	m3		R	29.55
18	Concrete in pump and pipe support bases	m3	111	R	923.00
19	Concrete in tank bases	m3	55	R	923.00
20	Concrete in pipe and cable rack foundations	m3	0	R	923.00
21	Concrete to simple structural foundations	m3	189	R	923.00
22	Complex structural foundations - bases	m3	45	R	923.00
23	Concrete pipe racks - bases	m3	0	R	923.00
24	Concrete structure including concrete columns and beams - bases	m3	88	R	923.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	923.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	923.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	118	R	923.00
28	One brick wall	m2		R	142.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	923.00
30	Total building area - Structural steel buildings	m2	645		
31	Ceiling	m2		R	85.00
32	Structural steel	t		R	22,345.00
33	Steel canopy - concrete	m3	58	R	923.00
34	Steel canopy - area	m2	402		
35	Concrete in weighbridge - all concrete	m3	48	R	923.00
36	Total weighbridge area	m2	125		
37	Total control room area - weighbridge	m2	10		
38	Concrete in pump house - all concrete	m3	15	R	923.00
39	Total pump house area	m2	10		
40	Concrete in cooling tower	m3	0	R	923.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	905		
43	Concrete in cable tunnel	m3	25	R	923.00
44	Total lengh of cable tunnel	m	35		
45	Total volume of basic steel platform	m3	302		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	3,111		
48	Total volume of steel in stack	m3	245		
49	Total volume of steel in walkway	m3	235		
50	Total volume of steel in cable gantry	m3	222		
51	Piping work unit cost	WU		R	152.00
52	Total process pipe length	m	25,665		
53	Total electrical cable - installation only	m	18,452	R	24.55
54	Total instrumentation cable - installation only	m	15,442	R	19.23

Ratio: Project Ratio Mean

Variables

Material	Complex	Mean
Labour	Complex	Mean
Engineering design	Simple	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Extensive	Mean
Weather	Poor	Mean
Access	Poor	Mean
Project size	Small	Mean
Project conditions	Poor	Mean
Complexity	Normal	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

	Project name:	Project J				
	Location:	South Africa				
	Client:	0	Date of estimate:		2000	
	CIVIL CONSTRUCTION COST				R	12,459,540.88
A	SITE CLEARANCE AND DEMOLITIONS		R	27,862.75		
B	BULK EARTHWORKS		R	194,505.17		
C	PILING		R	708,989.59		
D	ROAD WORKS		R	570,164.53		
E	GENERAL PAVING AND BUNDED AREAS		R	231,997.66		
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	355,004.24		
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	403,628.19		
H	TANK BASES AND BUNDING		R	484,525.69		
I	RACK FOUNDATIONS		R	-		
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,024,825.74		
K	COMPLEX STRUCTURAL FOUNDATIONS		R	156,846.10		
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-		
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	661,444.11		
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-		
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-		
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,211,843.36		
Q	BUILDINGS - STEEL		R	1,245,205.28		
R	CANOPIES - STEEL		R	947,133.71		
S	WEIGHBRIDGE		R	283,744.51		
T	PUMP HOUSE		R	121,922.74		
U	COOLING TOWER		R	-		
V	EMERGENCY DAM		R	317,353.74		
W	HEAVY DUTY CABLE TUNNEL		R	282,292.45		
	Preliminaries and General	35.00%	R	3,230,251.34		
	STRUCTURAL STEEL				R	9,402,221.83
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,136,342.52		
B	STRUCTURAL STEEL - PIPERACK		R	2,001,016.26		
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	2,168,365.39		
D	STRUCTURAL STEEL - STACK		R	256,461.50		
E	STRUCTURAL STEEL - WALKWAY		R	690,249.59		
F	STRUCTURAL STEEL - CABLE GANTRY		R	463,437.48		
	Preliminaries and General	40.00%	R	2,686,349.09		
	MECHANICAL AND PIPING				R	16,803,425.26
A	PIPING INSTALLATION		R	11,821,454.55		
B	RADIOGRAPHIC EXAMINATION (RT)		R	33,236.08		
C	DYE PENETRATION TESTING (DP)		R	11,942.80		
D	MAGNETIC PARTICLE TESTING (MPI)		R	18,531.60		
E	POST WELD HEAT TREATMENT		R	32,216.01		
F	MATERIAL HARDNESS TEST (HT)		R	24,806.61		
H	MECHANICAL INSTALLATION		R	60,258.97		
	Preliminaries and General	40.00%	R	4,800,978.65		
	PAINTING AND INSULATION				R	961,546.37
A	PAINTING AND INSULATION		R	712,256.57		
	Preliminaries and General	35.00%	R	249,289.80		
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R	2,320,297.31
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	1,718,738.75		
	Preliminaries and General	35.00%	R	601,558.56		
	TOTAL COST				R	41,947,031.65

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		9,445		R 2.95	R 27,862.75	R 27,862.75
	Concrete demolitions	m3		0		R 945.20	R -	
BULK EARTHWORKS	Bulk excavation	m3		3,102		R 29.66	R 92,005.32	R 194,505.17
	Trimming of sides	m2	2.18	1,423	4.30	R 6.90	R 9,814.95	
	Back fill and compact	m3	1.15	2,697	0.98	R 30.27	R 81,637.37	
	Overhaul	m3/km	1.73	1,793	11.34	R 2.62	R 4,689.79	
	Rip bed	m2	1.78	1,743	8.13	R 3.65	R 6,357.73	
PILING	Site establishment of rig	Item	0.00	1	192.30	R 177,492.90	R 177,492.90	R 708,989.59
	EO for raking equipment	Item	0.00	1	23.89	R 22,050.47	R 22,050.47	
	Number of piles	No	0.00	23	0.00		R -	
	Move rig to new position	No	1.50	15	0.18	R 166.14	R 2,547.48	
	Number of raking piles	No	18.41	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.28	R 258.44	R 347.18	
	EO for raking drilling	m	0.15	8	0.89	R 113.92	R 948.82	
	Auger quantity	m	0.05	460	0.00	R 128.00	R 58,880.00	
	EO for drilling in coarse gravel	m	0.53	43	0.22	R 203.06	R 8,812.04	
	EO for drilling in boulders	m	1.84	13	0.50	R 461.50	R 5,768.75	
	EO for drilling in soft rock	m	1.63	14	0.24	R 221.52	R 3,125.74	
	Temporary casings	m	0.36	64	0.36	R 332.28	R 21,229.00	
	EO casing to raking pile	m	0.18	7	0.51	R 858.39	R 5,957.80	
	Mild steel rod reinforcement	t	14.29	1.610	0.93	R 6,206.16	R 9,988.92	
	High tensile rod reinforcement	t	1.32	17.424	7.23	R 6,673.29	R 116,277.02	
	Concrete to piles and bases	m3	0.15	153	0.00	R 923.00	R 141,526.67	
	Concrete to raking piles	m3	0.07	18	1.06	R 978.38	R 17,461.58	
	Site establishment of test equipment	Item	0.00	1	110.73	R 102,203.79	R 102,203.79	
	Load test to pile	No	99.34	0	27.07	R 24,985.61	R 5,784.87	
	Site establishment of intergity testing	No	258.87	0	48.79	R 45,033.17	R 4,001.09	
	Integrity testing of piles	No	1.25	18	0.27	R 249.21	R 4,585.46	
ROAD WORKS	Red paving	m2	0.15	19	0.97	R 72.75	R 1,364.06	R 570,164.53
	Grey paving	m2	0.00	125	0.00	R 75.00	R 9,375.00	
	Kerbing	m	0.13	262	0.00	R 128.08	R 33,550.95	
	Total paving and asphalt	m2	0.00	2,015	0.00		R -	
	Remove top soil	m3	0.55	288	5.83	R 38.19	R 11,003.25	
	Asphalt	m2	0.26	524	0.00	R 90.65	R 47,493.23	
	Rip bed	m2	0.00	2,015	0.00	R 6.55	R 13,198.25	
	Reduce levels	m3	0.42	846	4.99	R 32.68	R 27,660.89	
	Selected fill	m3	1.65	513	0.53	R 61.67	R 31,630.52	
	Imported fill	m3	2.23	230	0.39	R 158.13	R 36,369.46	
	Wearing course	m3	3.86	219	0.29	R 112.71	R 24,710.46	
	Prime	m2	4.74	2,431	1.47	R 31.63	R 76,886.50	
	Three line road marking	m	0.83	2,018	0.20	R 25.62	R 51,690.80	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	1.02	267	4.19	R 6.40	R 1,711.10	
	1m Wide concrete V-drain	m	0.97	254	0.81	R 573.81	R 145,799.00	
	200mm Diameter PVC pipe	m	0.96	251	0.11	R 181.88	R 45,736.65	
	Road marking - STOP	No	0.15	39	0.05	R 194.68	R 7,649.62	
	Standard signage	No	0.01	3	4.48	R 248.48	R 650.89	
	100mm Painted line	m	1.83	479	1.42	R 7.68	R 3,683.89	
			0.00		1.52			
			0.00		1.94			
			0.00		0.06			
GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.02	85	0.74	R 923.00	R 78,455.00	R 231,997.66
	Concrete in plinths	m3	0.00	17	0.00	R 923.00	R 15,628.49	
	Total concrete	m3	0.00	112	0.00		R -	
	Rip and compact	m2	0.13	654	187.19	R 4.93	R 3,224.00	
	Formwork to plinth	m2	7.26	123	0.12	R 110.76	R 13,615.54	
	Formwork to slab	m2	0.83	71	0.15	R 138.45	R 9,767.65	
	High tensile steel	t	0.01	1.120	0.00	R 5,845.00	R 6,546.40	
	Mesh	m2	585.35	656	51.00	R 114.61	R 75,135.99	
	Construction joint	m	4.00	340	0.05	R 46.15	R 15,691.00	
	Expansion joint	m	2.22	189	0.08	R 73.84	R 13,933.61	
MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.72	2,669	0.00		R -	R 355,004.24
	Base excavation	m3	1.50	271	0.00	R 29.55	R 8,011.33	
	Backfill	m3	0.59	181	0.64	R 46.17	R 8,345.14	
	Working space	m2	0.45	460	1.43	R 32.29	R 14,836.68	
	Concrete in bases	m3	0.04	122	25.24	R 923.00	R 112,606.00	
	Blinding	m2	0.83	165	20.88	R 44.20	R 7,277.31	
	Concrete in sump walls	m3	0.10	12	29.51	R 923.00	R 11,260.60	
	Concrete in slabs	m3	0.02	2	0.91	R 923.00	R 2,252.12	
	Total concrete	m3	0.00	137	0.04		R -	
	Wood float	m2	0.70	195	158.37	R 5.83	R 1,137.65	
	Formwork to bases	m2	1.69	206	0.12	R 110.76	R 22,836.50	
	Formwork to sump walls	m2	12.63	154	0.12	R 110.76	R 17,066.57	
	Formwork to sides of slab	m2	5.81	14	0.18	R 166.14	R 2,355.27	
	Mild steel reinforcement	t	0.12	1.535	0.00	R 5,845.00	R 8,973.72	
	High tensile reinforcement	t	10.68	12.794	1.19	R 5,845.00	R 74,780.97	
	Cast in steel	kg	0.46	265	34.10	R 27.07	R 7,178.76	
	Waterstop	m	0.43	28	8.10	R 113.95	R 3,233.02	
	Manhole	No	0.08	8	2.68	R 2,649.25	R 20,134.33	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	95	0.13	R 344.40	R 32,718.28	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.69	188	0.05	R 29.55	R 5,543.28	R 403,628.19
	Working space	m2	0.38	494	0.67	R 19.80	R 9,773.69	
	Backfill	m3	4.42	42	1.32	R 39.01	R 1,655.46	
	Concrete bases	m3	1.01	111	0.00	R 923.00	R 102,453.00	
	Concrete plinth	m3	2.29	48	0.00	R 923.00	R 44,739.30	
	Total concrete	m3	0.00	159	0.00		R -	
	Wood float	m2	0.47	103	0.05	R 9.23	R 951.90	
	Blinding	m2	1.01	110	0.01	R 46.15	R 5,071.93	
	Formwork bases	m2	0.49	227	0.13	R 119.99	R 27,181.41	
	Formwork plinth	m2	0.58	84	0.12	R 110.76	R 9,256.41	
	High tensile reinforcement	t	10.00	15.947	7.15	R 5,845.00	R 93,211.16	
	Cast in steel	kg	0.11	1,450	0.03	R 27.69	R 40,143.35	
	HD Bolts	kg	0.08	1,993	0.03	R 27.69	R 55,197.11	
	Grout	m3	34.52	1.404	6.52	R 6,017.96	R 8,450.18	
TANK BASES AND BUNDING	Restricted excavation	m3	5.84	321	0.05	R 46.15	R 14,823.38	R 484,525.69
	Working space	m2	4.36	74	1.63	R 28.31	R 2,085.80	
	Backfill	m3	1.38	233	0.72	R 64.10	R 14,918.86	
	Concrete bases	m3	0.75	55	0.00	R 923.00	R 50,765.00	
	Concrete sump wall	m3	2.86	19	0.00	R 923.00	R 17,750.00	
	Concrete slab	m3	0.57	96	0.00	R 923.00	R 89,061.40	
	Concrete plinth	m3	4.11	13	21.05	R 923.00	R 12,351.58	
	Concrete column	m3	19.22	3	164.76	R 923.00	R 2,641.26	
	Total concrete	m3	0.00	187	1.11		R -	
	Blinding	m2	2.67	70	1.05	R 43.85	R 3,070.44	
	Wood float	m2	0.25	748	1.12	R 5.60	R 4,189.59	
	Formwork to bases	m2	0.42	131	1.14	R 113.67	R 14,885.35	
	Formwork to plinths	m2	0.35	38	8.12	R 120.97	R 4,625.19	
	Formwork to columns	m2	0.12	24	7.63	R 130.00	R 3,100.07	
	Formwork to sumps	m2	0.11	175	7.10	R 126.09	R 22,044.21	
	Formwork to slabs	m2	4.07	24	7.32	R 112.42	R 2,665.34	
	Formwork to slabs n/e 300mm	m	2.17	44	8.21	R 39.18	R 1,742.03	
	Mild steel reinforcement	t	0.23	1.862	23.56	R 5,845.00	R 10,885.54	
	High tensile reinforcement	t	23.09	8.097	1.02	R 5,845.00	R 47,328.45	
	Mesh	m2	0.16	603	61.15	R 95.58	R 57,644.24	
	Cast in items	kg	0.19	984	214.69	R 27.23	R 26,790.50	
	HD Bolts	kg	0.10	1,870	207.02	R 28.23	R 52,787.84	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	204.15	0.916	0.17	R 5,429.41	R 4,972.39	
	Construction joint	m	0.30	322	24.89	R 37.08	R 11,927.33	
	Expansion joint	m	0.46	210	16.88	R 54.68	R 11,469.89	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.71	0	0.05	R 46.15	R -	R -
	Working space	m2	0.41	0	1.98	R 91.38	R -	
	Backfill	m3	2.45	0	0.87	R 53.05	R -	
	Blinding	m2	0.37	0	22.19	R 41.60	R -	
	Concrete bases	m3	5.81	0	0.00	R 923.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	1.34		R -	
	Wood float	m2	0.35	0	173.00	R 5.34	R -	
	Formwork bases	m2	0.47	0	9.63	R 95.85	R -	
	Formwork plinths	m2	0.09	0	6.99	R 132.05	R -	
	High tensile reinforcement	t	9.33	0.000	0.00	R 5,845.00	R -	
	HD Bolts	kg	0.03	0	225.70	R 25.90	R -	
	Grout	m3	79.73	0.000	0.18	R 5,127.78	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.29	811	0.06	R 55.38	R 44,902.66	R 1,024,825.74
	Working space	m2	0.50	1,622	1.90	R 29.15	R 47,265.96	
	Backfill	m3	2.66	305	0.80	R 69.23	R 21,100.87	
	Blinding	m2	0.33	573	21.39	R 43.15	R 24,713.76	
	Concrete bases	m3	0.00	189	0.00	R 923.00	R 174,447.00	
	Concrete plinth	m3	2.58	52	0.00	R 923.00	R 48,057.02	
	Concrete slab	m3	3.63	73	0.00	R 923.00	R 67,615.12	
	Total concrete	m3	0.00	314	0.00		R -	
	Wood float	m2	0.55	571	161.77	R 5.71	R 3,260.74	
	Formwork bases	m2	0.49	386	8.32	R 110.94	R 42,790.18	
	Formwork plinths	m2	0.11	473	8.34	R 110.67	R 52,383.94	
	High tensile reinforcement	t	13.32	23.598	0.00	R 5,845.00	R 137,928.80	
	HD Bolts	kg	0.02	9,450	217.74	R 26.84	R 253,675.25	
	Cast in items	kg	0.05	3,780	241.09	R 24.24	R 91,642.54	
	Grout	m3	68.22	2.770	0.17	R 5,429.41	R 15,041.91	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.08	94	0.05	R 46.15	R 4,319.64	R 156,846.10
	Working space	m2	0.56	167	1.66	R 27.80	R 4,646.77	
	Backfill	m3	2.15	44	0.79	R 58.42	R 2,543.21	
	Blinding	m2	0.65	69	20.36	R 45.33	R 3,138.51	
	Concrete bases	m3	0.00	45	0.00	R 923.00	R 41,535.00	
	Concrete column	m3	28.05	2	0.00	R 923.00	R 1,480.75	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.23	9	0.00	R 923.00	R 7,941.68	
	Total concrete	m3	0.00	55	0.00		R -	
	Wood float	m2	0.60	92	158.85	R 5.81	R 534.65	
	Formwork bases	m2	0.52	87	8.23	R 112.15	R 9,705.35	
	Formwork plinths	m2	0.33	26	7.44	R 124.06	R 3,234.64	
	Formwork to columns	m2	0.28	6	8.09	R 114.09	R 653.69	
	High tensile reinforcement	t	9.06	6.094	0.00	R 5,845.00	R 35,617.39	
	HD bolts	kg	0.04	1,380	209.18	R 27.94	R 38,566.50	
	Grout	m3	108.76	0.508	0.16	R 5,768.75	R 2,928.32	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.80	0	0.06	R 55.38	R -	R -
	Working space	m2	0.30	0	2.12	R 26.12	R -	
	Backfill	m3	2.06	0	0.82	R 67.54	R -	
	Blinding	m2	0.67	0	19.99	R 46.17	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	1.19	0	151.33	R 923.00	R -	
	Concrete beam	m3	2.68	0	0.95	R 923.00	R -	
	Total concrete	m3	2.97	0	0.95		R -	
	Wood float	m2	0.47	0	7.50	R 6.10	R -	
	Formwork bases	m2	0.48	0	6.55	R 123.07	R -	
	Formwork to columns	m2	0.15	0	7.98	R 115.66	R -	
	Formwork to sides beams	m2	0.33	0	6.11	R 140.92	R -	
	Formwork to soffits beams	m2	0.69	0	6.55	R 151.06	R -	
	Formwork corbels	m2	10.88	0	5.37	R 171.88	R -	
	High tensile reinforcement	t	9.10	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.03	0	262.64	R 22.25	R -	
	HD bolts	kg	1.48	0	215.28	R 27.15	R -	
	Grout	m3	505.30	0.000	0.16	R 5,768.75	R -	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.84	338	0.05	R 46.15	R 15,595.01	R 661,444.11
	Working space	m2	0.61	554	1.79	R 25.78	R 14,282.45	
	Backfill	m3	1.15	294	0.79	R 58.42	R 17,165.67	
	Blinding	m2	0.61	144	20.06	R 46.01	R 6,637.79	
	Concrete bases	m3	0.00	88	0.97	R 923.00	R 81,224.00	
	Concrete column	m3	2.44	36	1.07	R 923.00	R 33,288.52	
	Concrete beam	m3	0.84	43	1.02	R 923.00	R 39,629.20	
	Concrete surface slab	m3	1.68	52	0.97	R 923.00	R 48,347.62	
	Concrete wall	m3	2.50	14	1.05	R 923.00	R 13,315.41	
	Concrete elevated slab	m3	1.10	33	0.00	R 923.00	R 30,262.30	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	267	0.00		R -	
		Wood float	m2	0.64	417	169.32	R 5.45	R 2,270.73	
		Formwork bases	m2	0.41	215	7.65	R 120.65	R 25,896.38	
		Formwork to columns	m2	0.17	212	6.34	R 145.58	R 30,885.62	
		Formwork to sides beams	m2	0.30	143	5.15	R 179.22	R 25,649.97	
		Formwork to soffits beams	m2	0.84	51	7.57	R 121.93	R 6,232.18	
		Formwork to soffts of slabs	m2	0.31	169	3.23	R 160.52	R 27,123.49	
		Formwork to pockets	m2	26.55	1	5.75	R 285.76	R 388.17	
		Formwork wall	m2	0.13	111	8.09	R 114.09	R 12,660.84	
		High tensile reinforcement	t	8.87	30.056	0.00	R 5,845.00	R 175,676.09	
		Cast in steel	kg	0.22	1,212	255.59	R 22.87	R 27,712.12	
		HD bolts	kg	0.41	650	201.38	R 29.02	R 18,872.79	
		Steel handrailing	m	2.58	12	9.71	R 601.96	R 7,012.51	
		Grout	m3	1,039.37	0.256	0.18	R 5,127.78	R 1,315.26	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.23	0	0.04	R 36.92	R -	R -
		Working space	m2	7.92	0	1.42	R 26.00	R -	
		Backfill	m3	4.13	0	0.63	R 23.26	R -	
		Blinding	m2	1.05	0	17.95	R 51.42	R -	
		Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
		Concrete column	m3	26.31	0	0.00	R 923.00	R -	
		Concrete beam	m3	1.43	0	0.00	R 923.00	R -	
		Concrete wall	m3	10.41	0	0.00	R 923.00	R -	
		Concrete elevated slabs	m3	10.92	0	0.00	R 923.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	138.41	R 6.67	R -	
		Formwork bases	m2	8.50	0	6.94	R 133.00	R -	
		Formwork to columns	m2	0.14	0	5.63	R 146.51	R -	
		Formwork to sides beams	m2	0.17	0	4.72	R 163.94	R -	
		Formwork to soffits beams	m2	0.50	0	6.30	R 195.55	R -	
		Formwork to soffts of slabs	m2	0.13	0	2.98	R 190.31	R -	
		Formwork to pockets	m2	418.49	0	4.85	R 309.73	R -	
		Formwork wall	m2	0.10	0	6.38	R 144.67	R -	
		High tensile reinforcement	t	4.05	0.000	0.00	R 5,845.00	R -	
		Cast in steel	kg	0.15	0	200.08	R 29.21	R -	
		HD bolts	kg	0.22	0	167.91	R 34.81	R -	
		Galvanised grating	m2	17.15	0	0.15	R 1,082.41	R -	
		Grout	m3	771.45	0.000	5.40	R 6,153.33	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.58	0	0.05	R 46.15	R -	R -
	Working space	m2	0.42	0	1.76	R 26.22	R -	
	Backfill	m3	2.04	0	0.80	R 57.69	R -	
	Blinding	m2	4.82	0	20.78	R 44.42	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	6.67	0	0.00	R 923.00	R -	
	Concrete beam	m3	1.99	0	0.00	R 923.00	R -	
	Concrete wall	m3	35.85	0	0.00	R 923.00	R -	
	Concrete elevated slabs	m3	24.74	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.82	0	162.71	R 5.67	R -	
	Formwork bases	m2	1.44	0	8.18	R 112.84	R -	
	Formwork to columns	m2	0.14	0	6.98	R 134.74	R -	
	Formwork to sides beams	m2	0.23	0	6.34	R 132.23	R -	
	Formwork to soffits beams	m2	0.75	0	6.85	R 145.58	R -	
	Formwork to soffts of slabs	m2	0.22	0	3.87	R 149.59	R -	
	Formwork to pockets	m2	3.09	0	6.17	R 238.50	R -	
	Formwork wall	m2	0.29	0	7.54	R 122.41	R -	
	High tensile reinforcement	t	7.31	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.02	0	212.67	R 27.48	R -	
	HD bolts	kg	0.01	0	208.59	R 28.02	R -	
	Galvanised grating	m2	3.97	0	0.19	R 4,857.89	R -	
	Grout	m3	42.08	0.000	6.37	R 917.58	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.82	215	0.05	R 46.15	R 9,911.17	R 1,211,843.36
	Working space	m2	2.50	86	1.84	R 25.08	R 2,154.60	
	Backfill	m3	1.25	172	0.79	R 58.42	R 10,036.63	
	Blinding	m2	3.86	31	20.30	R 45.47	R 1,389.95	
	Concrete	m3	0.00	118	0.00	R 923.00	R 108,914.00	
	Mesh reinforcement	m2	0.51	231	65.77	R 88.87	R 20,562.15	
	Rough formwork	m2	3.09	38	8.61	R 107.20	R 4,093.76	
	Smooth formwork	m2	0.57	207	6.80	R 135.74	R 28,099.59	
	Finish to concrete	m2	0.23	513	105.40	R 8.76	R 4,492.78	
	Construction joints	m	4.97	24	21.29	R 43.35	R 1,029.32	
	Movement joints	m	15.36	8	17.11	R 53.95	R 414.42	
	Cast in steel	kg	2.35	50	232.74	R 25.11	R 1,261.04	
	Grout	m3	882.88	0.134	0.18	R 5,127.78	R 685.35	
	Brick walls	m2	0.50	236	0.00	R 142.00	R 33,512.00	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total building area	m2	4.47	527	0.00		R -	
		Waterproofing membrane	m2	2.22	238	12.03	R 76.72	R 18,229.41	
		Roof construction	m2	2.04	259	38.22	R 152.93	R 39,541.51	
		Ceiling	m2	0.98	538	0.00	R 85.00	R 45,749.08	
		Doors and windows	No	474.69	1	0.17	R 835.29	R 928.15	
		Floor finish	m2	1.03	512	0.79	R 179.75	R 92,047.83	
		Wall finsih	m2	1.04	507	1.47	R 96.60	R 48,992.23	
		Rod reinforcement	t	9.25	13	0.00	R 5,845.00	R 74,563.24	
		Metalwork	Item	0.00	1	4.44	R 25,951.80	R 25,951.80	
		Structural steel	Item	0.00	1	11.50	R 67,217.50	R 67,217.50	
		Plumbing and drainage	Item	0.00	1	7.32	R 42,785.40	R 42,785.40	
		Small power and lighting	Item	0.00	1	62.40	R 364,728.00	R 364,728.00	
		External works	Item	0.00	1	178.28	R 164,552.44	R 164,552.44	
	BUILDINGS - STEEL	Concrete	m3	0.00	85	0.17	R 923.00	R 78,455.00	R 1,245,205.28
		Earthworks	m3	2.37	201	9.13	R 101.10	R 20,365.65	
		Reinforcement	t	8.82	10	0.00	R 5,845.00	R 56,329.37	
		Mesh	m2	0.12	708	10.27	R 89.87	R 63,660.34	
		Formwork	m2	0.40	213	8.06	R 114.52	R 24,334.68	
		Brickwork	m2	6.11	106	6.08	R 151.81	R 16,025.69	
		Roof covering	m2	0.87	741	208.48	R 107.18	R 79,461.44	
		Structural steel	t	18.83	34	0.00	R 22,345.00	R 765,402.28	
		Side cladding	m2	1.54	419	0.98	R 105.04	R 43,992.74	
		Doors	No	405.94	2	0.51	R 11,395.95	R 18,107.08	
		Ridge ventilator	m	21.95	29	11.48	R 1,230.43	R 36,156.22	
		Aluminium insulation	m2	0.89	725	1.81	R 59.22	R 42,914.80	
		Total building area	m2	0.00	645	0.00		R -	
	CANOPIES - STEEL	Earthworks	m3	3.12	181	0.13	R 119.99	R 21,713.39	R 947,133.71
		Concrete	m3	0.00	58	0.00	R 923.00	R 53,534.00	
		Reinforcement	t	11.42	5	0.18	R 5,845.00	R 29,685.64	
		Mesh	m2	0.12	483	10.21	R 90.40	R 43,694.09	
		Formwork	m2	0.45	129	8.51	R 108.46	R 13,979.37	
		Brickwork	m2	5.94	68	5.91	R 156.18	R 10,569.49	
		Screed	m2	1.12	359	43.13	R 21.40	R 7,681.22	
		Structural steel	t	14.72	27	0.00	R 22,345.00	R 610,237.09	
		Cat ladders	m	2.74	10	9.66	R 2,313.15	R 23,055.31	
		Hand rail	m	0.73	37	27.40	R 815.51	R 30,508.80	
		Kick plates	m	0.76	36	2.76	R 295.47	R 10,617.58	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.91	442	195.47	R 114.31	R 50,499.25	
		Side cladding	m2	4.76	84	0.93	R 106.31	R 8,978.47	
		Floor grating	m2	1.09	25	17.29	R 1,292.37	R 32,380.02	
		Total buiding area	m2	0.00	402	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.30	158	8.02	R 115.09	R 18,229.83	R 283,744.51
		Blinding	m2	0.47	102	18.72	R 49.31	R 5,035.46	
		Concrete	m3	0.00	48	0.00	R 923.00	R 44,304.00	
		Reinforcement	t	7.97	6	0.00	R 5,845.00	R 35,202.01	
		Mesh	m2	0.49	98	50.23	R 116.36	R 11,398.99	
		Formwork	m2	0.31	155	7.58	R 121.77	R 18,854.37	
		Finish to concrete	m2	0.44	109	103.65	R 8.90	R 971.45	
		Movement joints	m	2.46	20	15.35	R 60.13	R 1,173.27	
		Cast in steel	kg	0.09	533	179.47	R 32.57	R 17,369.66	
		Grout	m3	71.08	0.675	2.53	R 6,153.33	R 4,155.32	
		Brickwork	m2	0.24	42	0.15	R 142.00	R 5,916.67	
		Doors and windows	No	2.74	4	0.26	R 1,775.00	R 6,478.10	
		Pipework	m	2.59	48	0.21	R 364.82	R 17,607.25	
		Bolts	kg	0.11	436	0.08	R 32.57	R 14,211.54	
		Structural steel	t	3.99	3	0.00	R 22,480.77	R 56,342.78	
		Miscellaneous steel	t	131.32	1	0.00	R 27,833.33	R 26,493.81	
		Total bridge area	m2	0.00	125	0.00		R -	
		Total control room area	m2	0.00	10	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.59	129	6.07	R 152.06	R 19,592.84	R 121,922.74
		Blinding	m2	0.71	21	14.50	R 63.66	R 1,344.83	
		Concrete	m3	0.00	15	0.00	R 923.00	R 13,845.00	
		Reinforcement	t	5.75	3	0.00	R 5,845.00	R 15,247.83	
		Formwork	m2	0.07	214	5.72	R 161.36	R 34,577.92	
		Finish to concrete	m2	0.31	48	77.96	R 11.84	R 572.87	
		Movement joints	m	0.42	36	12.46	R 74.08	R 2,645.61	
		Cast in steel	kg	23.71	0.633	163.17	R 35.82	R 22.66	
		Grout	m3	22.24	0.674	0.62	R 7,100.00	R 4,788.67	
		Bolts	kg	109.85	0.137	0.13	R 22.21	R 3.03	
		Structural steel	t	35.84	0.279	0.22	R 26,568.18	R 7,413.00	
		Miscellaneous steel	t	20.04	0.499	0.18	R 32,472.22	R 16,203.70	
		Brickwork	m2	0.49	20	4.24	R 217.69	R 4,442.63	
		Roof covering	m2	1.46	7	1.22	R 178.43	R 1,222.15	
		Total pump house area	m2	0.00	10	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.79	0	6.10	R 151.31	R -	R -
	Blinding	m2	1.17	0	16.23	R 56.87	R -	
	Concrete	m3	0.00	0	0.00	R 923.00	R -	
	Reinforcement	t	5.89	0.000	0.00	R 5,845.00	R -	
	Formwork	m2	0.21	0	6.04	R 152.81	R -	
	Movement joint	m	1.61	0	0.12	R 71.66	R -	
	Cast in steel	kg	0.13	0	12.88	R 29.80	R -	
	Bolts	kg	0.37	0	196.16	R 35.99	R -	
	Chemical anchors	No	6.13	0	0.22	R 162.45	R -	
	Miscellaneous steelwork	t	88.98	0.000	162.42	R 26,568.18	R -	
	Pre-cast concrete	m3	30.27	0	35.98	R 3,076.67	R -	
	Brickwork	m2	7.79	0	0.30	R 211.21	R -	
	Total area	m2	0.00	0	4.37		R -	
EMERGENCY DAM	Earthworks	m3	0.55	1,645	1.68	R 62.03	R 102,060.31	R 317,353.74
	Lining	m2	0.70	1,293	1.16	R 36.92	R 47,732.29	
	Paving	m2	0.65	1,392	0.53	R 69.66	R 96,988.68	
	Pipework	m	28.23	32	0.24	R 258.44	R 8,285.09	
	Manholes	No	16.47	2	0.10	R 2,584.40	R 5,030.42	
	Concrete	m3	2.43	13	0.04	R 923.00	R 12,176.80	
	Formwork	m2	0.08	165	5.85	R 157.78	R 26,018.80	
	Mesh	m2	0.70	19	6.64	R 139.01	R 2,619.79	
	Reinforcement	t	4.69	2.813	0.12	R 5,845.00	R 16,441.56	
	Dam area (to top of berm)	m2	0.00	905	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.04	151	5.56	R 166.01	R 25,067.09	R 282,292.45
	Blinding	m2	0.85	29	13.49	R 68.42	R 2,012.38	
	Concrete	m3	0.00	25	0.00	R 923.00	R 23,075.00	
	Reinforcement	t	4.52	5.531	0.00	R 5,845.00	R 32,328.54	
	Mesh	m2	0.90	28	38.60	R 151.42	R 4,206.25	
	Formwork	m2	0.15	167	5.36	R 172.20	R 28,700.25	
	Cast in steel	kg	0.02	1,250	140.16	R 41.70	R 52,127.93	
	Miscellaneous steelwork	t	11.14	3.142	0.16	R 36,531.25	R 114,775.02	
	Total tunnel length	m	0.00	35	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	302	0.00		R -	R 1,136,342.52
	Steel	t	9.58	31.524	0.00	R 22,345.00	R 704,403.97	
	Handrail	m	1.45	208	28.73	R 777.76	R 161,988.31	
	Grating	m2	1.91	158	16.97	R 1,316.74	R 208,195.86	
	Kick flats	m	1.71	177	76.94	R 290.42	R 51,290.75	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.72	45	95.97	R 232.83	R 10,463.63	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 2,001,016.26
	Steel	t	27.86	71.967	0.00	R 22,345.00	R 1,608,102.12	
	Handrail	m	13.37	150	30.43	R 734.31	R 110,118.78	
	Grating	m2	12.47	161	18.55	R 1,204.58	R 193,679.82	
	Kick flats	m	13.35	150	84.90	R 263.19	R 39,528.09	
	Cat ladder	m	98.85	20	9.14	R 2,444.75	R 49,587.46	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,111	0.00		R -	R 2,168,365.39
	Steel	t	76.43	40.704	0.00	R 22,345.00	R 909,528.92	
	Handrail	m	31.26	100	30.84	R 724.55	R 72,106.93	
	Grating	m2	3.84	810	16.10	R 1,387.89	R 1,124,406.30	
	Kick flats	m	34.08	91	83.17	R 268.67	R 24,525.29	
	Stair treads	No	230.28	14	101.90	R 219.28	R 2,962.44	
	Cat ladder	m	238.13	13	8.38	R 2,666.47	R 34,835.52	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	245	0.00		R -	R 256,461.50
	Steel	t	25.51	9.604	0.00	R 22,345.00	R 214,603.10	
	Handrail	m	45.84	5	30.11	R 742.11	R 3,966.35	
	Grating	m2	60.74	4	17.06	R 1,309.79	R 5,283.15	
	Kick flats	m	46.49	5	79.97	R 279.42	R 1,472.52	
	Cat ladder	m	20.35	12	8.64	R 2,586.23	R 31,136.39	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	235	0.00		R -	R 690,249.59
	Steel	t	16.54	14.208	0.00	R 22,345.00	R 317,477.33	
	Handrail	m	1.10	214	31.41	R 711.40	R 151,980.41	
	Grating	m2	1.98	119	16.95	R 1,318.29	R 156,463.60	
	Kick flats	m	1.16	203	80.43	R 277.82	R 56,282.34	
	Stair treads	No	6.10	39	106.99	R 208.85	R 8,045.91	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	222	0.00		R -	R 463,437.48
	Steel	t	12.73	17.439	0.00	R 22,345.00	R 389,677.14	
	Handrail	m	25.10	9	32.05	R 697.19	R 6,166.40	
	Grating	m2	7.46	30	17.66	R 1,265.29	R 37,653.37	
	Kick flats	m	22.84	10	84.46	R 264.56	R 2,571.50	
	Cat ladder	m	20.48	11	8.85	R 2,524.86	R 27,369.07	
PIPING INSTALLATION	Pipe length	m	0.00	25,665	0.00		R -	R 11,821,454.55
	Total work units	WU	0.33	77,773	0.00	R 152.00	R 11,821,454.55	
	Pipe supports	kg	2.61	9,833	0.00		R -	
	WU for pipe supports	WU	0.16	12,444	0.00		R -	
	Number of welds	No	0.61	15,656	0.00		R -	
	Total fittings	No	0.38	9,753	0.00		R -	
	Stud bolts	No	0.34	3,316	0.00		R -	
	Support number	No	0.19	1,868	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	77,773	0.00	R 152.00		R 33,236.08

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	EXAMINATION (RT)	Number of examinations	No	59.98	1,297	5.93	R 25.63	R 33,236.08	
	DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	77,773	0.00	R 152.00		R 11,942.80
		Number of examinations	No	168.34	462	5.88	R 25.85	R 11,942.80	
	MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	77,773	0.00	R 152.00		R 18,531.60
		Number of examinations	No	300.90	258	2.12	R 71.70	R 18,531.60	
	POST WELD HEAT TREATMENT	Total work units	WU	0.00	77,773	0.00	R 152.00		R 32,216.01
		Number of examinations	No	52.95	1,469	6.93	R 21.93	R 32,216.01	
	MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	77,773	0.00	R 152.00		R 24,806.61
		Number of examinations	No	114.83	677	4.15	R 36.63	R 24,806.61	
	MECHANICAL INSTALLATION	Total work units	WU	0.00	77,773	0.00	R 152.00		R 60,258.97
		Mechanical equipment	t	261.57	297	0.75	R 202.67	R 60,258.97	
		Structural steel	t	218.09	357	53.95			
	PAINTING & INSULATION	Total work units	WU	0.00	77,773	0.00	R 152.00		R 712,256.57
		Painting to piping	m2	17.88	4,350	0.34	R 58.46	R 254,290.45	
		Insulation to piping	m2	51.67	1,505	2.60	R 171.95	R 258,809.49	
		Mechanical equipment received	t	0.00	297	0.82	R 202.67	R 60,258.97	
		Painting to mechanical equipment	m2	0.25	1,189	3.69	R 54.92	R 65,321.38	
		Insulation to mechanical equipment	m2	0.70	425	1.17	R 173.22	R 73,576.28	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.17	18,452	0.00	R 24.55	R 452,996.60	R 1,718,738.75
		Electrical cable terminations	No	311.25	733	0.43	R 57.09	R 41,854.61	
		Electrical equipment	No	9.05	59	0.11	R 223.18	R 13,231.01	
		DB's	No	6.39	7	0.32	R 697.44	R 4,568.72	
		Rack	m	0.69	2,888	1.65	R 70.14	R 202,547.10	
		Support steel	kg	1.42	4,185	2.13	R 11.53	R 48,235.35	
		Instrumentation cable	m	27.43	15,442	0.35	R 28.50	R 440,097.00	
		Instruments	No	0.58	563	0.18	R 158.33	R 89,135.37	
		Hook-ups	No	3.98	971	0.16	R 178.13	R 172,891.89	
		Light fittings	No	10.26	236	0.02	R 136.39	R 32,180.75	
		Conduit	m	4.13	1,798	0.13	R 14.88	R 26,758.62	
		Instrument stands	No	0.00	136		R 1,425.00	R 194,241.74	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:			
Project name:	Project J		
Location:	South Africa		
Client:		Date of estimate:	2000

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	9,445	R	2.95
2	Concrete demolitions	m3	0	R	945.20
3	Bulk excavation	m3	3,102	R	29.66
4	Vertical piles	No	23		
5	Raking piles	No	5		
6	Concrete in piles	m3		R	923.00
7	Auger pile	m		R	128.00
8	Total paving and asphalt to road works	m2	2,015		
9	Grey paving to road works	m2	125	R	75.00
10	Asphalt to road surface	m2	1,890		
11	Rip bed of road works	m2	2,015	R	6.55
12	Total concrete in paving and bunding	m3	112	R	923.00
13	Concrete in paving	m3	85		
14	Rod reinforcement	t		R	5,845.00
15	Concrete in plinths and bases on area finishing	m3	122		
16	Stormwater pipe to drain surface run-off	m	95		
17	Machine excavation	m3		R	29.55
18	Concrete in pump and pipe support bases	m3	111	R	923.00
19	Concrete in tank bases	m3	55	R	923.00
20	Concrete in pipe and cable rack foundations	m3	0	R	923.00
21	Concrete to simple structural foundations	m3	189	R	923.00
22	Complex structural foundations - bases	m3	45	R	923.00
23	Concrete pipe racks - bases	m3	0	R	923.00
24	Concrete structure including concrete columns and beams - bases	m3	88	R	923.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	923.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	923.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	118	R	923.00
28	One brick wall	m2		R	142.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	923.00
30	Total building area - Structural steel buildings	m2	645		
31	Ceiling	m2		R	85.00
32	Structural steel	t		R	22,345.00
33	Steel canopy - concrete	m3	58	R	923.00
34	Steel canopy - area	m2	402		
35	Concrete in weighbridge - all concrete	m3	48	R	923.00
36	Total weighbridge area	m2	125		
37	Total control room area - weighbridge	m2	10		
38	Concrete in pump house - all concrete	m3	15	R	923.00
39	Total pump house area	m2	10		
40	Concrete in cooling tower	m3	0	R	923.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	905		
43	Concrete in cable tunnel	m3	25	R	923.00
44	Total lengh of cable tunnel	m	35		
45	Total volume of basic steel platform	m3	302		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	3,111		
48	Total volume of steel in stack	m3	245		
49	Total volume of steel in walkway	m3	235		
50	Total volume of steel in cable gantry	m3	222		
51	Piping work unit cost	WU		R	152.00
52	Total process pipe length	m	25,665		
53	Total electrical cable - installation only	m	18,452	R	24.55
54	Total instrumentation cable - installation only	m	15,442	R	19.23

Ratio: Project Ratio Median

Variables

Material	Complex	Median
Labour	Complex	Median
Engineering design	Simple	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Extensive	Median
Weather	Poor	Median
Access	Poor	Median
Project size	Small	Median
Project conditions	Poor	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project J			
Location:	South Africa			
Client:	0	Date of estimate:	2000	

	CIVIL CONSTRUCTION COST				R 12,727,429.39
A	SITE CLEARANCE AND DEMOLITIONS		R	27,862.75	
B	BULK EARTHWORKS		R	199,807.72	
C	PILING		R	710,803.34	
D	ROAD WORKS		R	431,032.19	
E	GENERAL PAVING AND BUNDED AREAS		R	243,227.46	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	373,228.96	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	423,896.34	
H	TANK BASES AND BUNDING		R	527,850.04	
I	RACK FOUNDATIONS		R	-	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,103,921.39	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	164,068.31	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	774,945.40	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,269,093.17	
Q	BUILDINGS - STEEL		R	1,319,575.65	
R	CANOPIES - STEEL		R	960,209.94	
S	WEIGHBRIDGE		R	259,446.36	
T	PUMP HOUSE		R	109,317.75	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	298,019.96	
W	HEAVY DUTY CABLE TUNNEL		R	231,418.74	
	Preliminaries and General	35.00%	R	3,299,703.92	
	STRUCTURAL STEEL				R 10,688,883.48
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,257,725.45	
B	STRUCTURAL STEEL - PIPERACK		R	2,349,971.87	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	2,412,739.51	
D	STRUCTURAL STEEL - STACK		R	294,021.61	
E	STRUCTURAL STEEL - WALKWAY		R	820,517.58	
F	STRUCTURAL STEEL - CABLE GANTRY		R	499,940.75	
	Preliminaries and General	40.00%	R	3,053,966.71	
	MECHANICAL AND PIPING				R 18,573,316.52
A	PIPING INSTALLATION		R	13,003,600.00	
B	RADIOGRAPHIC EXAMINATION (RT)		R	42,369.15	
C	DYE PENETRATION TESTING (DP)		R	26,141.30	
D	MAGNETIC PARTICLE TESTING (MPI)		R	25,124.02	
E	POST WELD HEAT TREATMENT		R	43,031.92	
F	MATERIAL HARDNESS TEST (HT)		R	51,011.03	
H	MECHANICAL INSTALLATION		R	75,377.25	
	Preliminaries and General	40.00%	R	5,306,661.86	
	PAINTING AND INSULATION				R 1,292,846.88
A	PAINTING AND INSULATION		R	957,664.35	
	Preliminaries and General	35.00%	R	335,182.52	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 2,653,186.00
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	1,965,322.96	
	Preliminaries and General	35.00%	R	687,863.04	

TOTAL COST	R	45,935,662.27

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		9,445		R 2.95	R 27,862.75	R 27,862.75
	Concrete demolitions	m3		0		R 945.20	R -	
BULK EARTHWORKS	Bulk excavation	m3		3,102		R 29.66	R 92,005.32	R 199,807.72
	Trimming of sides	m2	2.20	1,410	4.18	R 7.10	R 10,004.93	
	Back fill and compact	m3	1.12	2,770	0.95	R 31.22	R 86,471.17	
	Overhaul	m3/km	1.62	1,915	11.35	R 2.61	R 5,003.82	
	Rip bed	m2	1.71	1,814	8.51	R 3.49	R 6,322.48	
PILING	Site establishment of rig	Item	0.00	1	192.39	R 177,575.97	R 177,575.97	R 710,803.34
	EO for raking equipment	Item	0.00	1	24.25	R 22,382.75	R 22,382.75	
	Number of piles	No	0.00	23	0.00		R -	
	Move rig to new position	No	1.48	16	0.19	R 175.37	R 2,725.34	
	Number of raking piles	No	19.43	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.24	R 221.52	R 281.96	
	EO for raking drilling	m	0.14	8	0.61	R 78.08	R 660.19	
	Auger quantity	m	0.05	460	0.00	R 128.00	R 58,880.00	
	EO for drilling in coarse gravel	m	0.55	42	0.22	R 203.06	R 8,491.60	
	EO for drilling in boulders	m	1.65	14	0.51	R 470.73	R 6,561.69	
	EO for drilling in soft rock	m	1.57	15	0.23	R 212.29	R 3,109.98	
	Temporary casings	m	0.38	61	0.31	R 286.13	R 17,318.39	
	EO casing to raking pile	m	0.17	7	0.57	R 646.10	R 4,498.89	
	Mild steel rod reinforcement	t	14.65	1.570	0.70	R 4,690.69	R 7,364.22	
	High tensile rod reinforcement	t	1.16	19.828	7.26	R 6,700.98	R 132,864.26	
	Concrete to piles and bases	m3	0.16	144	0.00	R 923.00	R 132,681.25	
	Concrete to raking piles	m3	0.08	15	1.08	R 996.84	R 14,749.95	
	Site establishment of test equipment	Item	0.00	1	115.74	R 106,828.02	R 106,828.02	
	Load test to pile	No	93.50	0	22.16	R 20,453.68	R 5,031.39	
	Site establishment of intergity testing	No	255.00	0	49.96	R 46,113.08	R 4,159.22	
	Integrity testing of piles	No	1.19	19	0.26	R 239.98	R 4,638.27	
ROAD WORKS	Red paving	m2	0.14	18	0.93	R 69.75	R 1,220.63	R 431,032.19
	Grey paving	m2	0.00	125	0.00	R 75.00	R 9,375.00	
	Kerbing	m	0.09	181	0.00	R 144.72	R 26,245.22	
	Total paving and asphalt	m2	0.00	2,015	0.00		R -	
	Remove top soil	m3	0.49	197	4.45	R 29.15	R 5,755.76	
	Asphalt	m2	0.20	403	0.00	R 90.01	R 36,272.23	
	Rip bed	m2	0.00	2,015	0.00	R 6.55	R 13,198.25	
	Reduce levels	m3	0.36	725	4.30	R 28.17	R 20,430.89	
	Selected fill	m3	1.50	484	0.46	R 61.23	R 29,609.99	
	Imported fill	m3	1.94	249	0.33	R 185.54	R 46,251.15	
	Wearing course	m3	3.89	186	0.20	R 140.83	R 26,260.79	
	Prime	m2	4.34	2,099	1.47	R 18.55	R 38,941.62	
	Three line road marking	m	0.78	1,637	0.10	R 14.47	R 23,692.08	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	0.99	180	4.06	R 4.34	R 779.48	
		1m Wide concrete V-drain	m	1.00	181	0.78	R 619.41	R 112,329.52	
		200mm Diameter PVC pipe	m	0.93	169	0.09	R 192.48	R 32,462.71	
		Road marking - STOP	No	0.15	27	0.03	R 237.34	R 6,456.32	
		Standard signage	No	0.01	2	4.28	R 266.29	R 482.91	
		100mm Painted line	m	1.61	292	1.33	R 4.34	R 1,267.64	
				0.00		1.64			
				0.00		1.84			
				0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.88	85	0.75	R 923.00	R 78,455.00	R 243,227.46
		Concrete in plinths	m3	0.00	17	0.00	R 923.00	R 16,076.84	
		Total concrete	m3	0.00	112	0.00		R -	
		Rip and compact	m2	0.13	654	193.57	R 4.77	R 3,117.74	
		Formwork to plinth	m2	6.92	121	0.12	R 110.76	R 13,350.21	
		Formwork to slab	m2	0.80	68	0.15	R 138.45	R 9,414.60	
		High tensile steel	t	0.01	1.120	0.00	R 5,845.00	R 6,546.40	
		Mesh	m2	607.27	680	43.37	R 134.77	R 91,663.18	
		Construction joint	m	3.64	309	0.04	R 36.92	R 11,423.05	
		Expansion joint	m	2.10	179	0.08	R 73.84	R 13,180.44	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.12	2,669	0.00		R -	R 373,228.96
		Base excavation	m3	1.42	284	0.00	R 29.55	R 8,383.95	
		Backfill	m3	0.56	200	0.63	R 46.90	R 9,371.73	
		Working space	m2	0.43	507	1.35	R 34.74	R 17,602.99	
		Concrete in bases	m3	0.04	122	23.71	R 923.00	R 112,606.00	
		Blinding	m2	0.71	194	19.17	R 48.15	R 9,348.88	
		Concrete in sump walls	m3	0.11	13	31.87	R 923.00	R 12,386.66	
		Concrete in slabs	m3	0.02	2	0.81	R 923.00	R 2,252.12	
		Total concrete	m3	0.00	138	0.03		R -	
		Wood float	m2	0.61	226	123.90	R 7.45	R 1,683.60	
		Formwork to bases	m2	1.73	211	0.12	R 110.76	R 23,377.01	
		Formwork to sump walls	m2	11.18	150	0.12	R 110.76	R 16,617.94	
		Formwork to sides of slab	m2	5.67	14	0.17	R 156.91	R 2,170.82	
		Mild steel reinforcement	t	0.08	1.177	0.00	R 5,845.00	R 6,879.76	
		High tensile reinforcement	t	9.37	14.713	0.92	R 5,845.00	R 85,996.98	
		Cast in steel	kg	0.45	271	33.55	R 27.51	R 7,458.59	
		Waterstop	m	0.44	31	8.37	R 110.27	R 3,363.38	
		Manhole	No	0.08	8	2.72	R 2,827.82	R 21,491.42	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	95	0.12	R 339.34	R 32,237.13	
	PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.61	179	0.05	R 29.55	R 5,280.88	R 423,896.34
		Working space	m2	0.33	542	0.68	R 20.09	R 10,881.81	
		Backfill	m3	3.97	45	1.27	R 37.53	R 1,689.35	
		Concrete bases	m3	0.93	111	0.00	R 923.00	R 102,453.00	
		Concrete plinth	m3	2.01	55	0.00	R 923.00	R 50,971.64	
		Total concrete	m3	0.00	166	0.00		R -	
		Wood float	m2	0.46	120	0.05	R 9.23	R 1,108.08	
		Blinding	m2	0.93	119	0.01	R 46.15	R 5,508.23	
		Formwork bases	m2	0.47	236	0.12	R 110.76	R 26,158.21	
		Formwork plinth	m2	0.53	104	0.12	R 110.76	R 11,540.75	
		High tensile reinforcement	t	10.15	16.377	6.60	R 5,845.00	R 95,722.03	
		Cast in steel	kg	0.10	1,662	0.03	R 27.69	R 46,027.39	
		HD Bolts	kg	0.08	2,078	0.03	R 27.69	R 57,534.24	
		Grout	m3	33.79	1.634	5.98	R 5,519.54	R 9,020.73	
	TANK BASES AND BUNDING	Restricted excavation	m3	5.54	305	0.05	R 46.15	R 14,061.91	R 527,850.04
		Working space	m2	3.95	77	1.56	R 29.58	R 2,282.04	
		Backfill	m3	1.34	227	0.75	R 61.53	R 13,991.95	
		Concrete bases	m3	0.70	55	0.00	R 923.00	R 50,765.00	
		Concrete sump wall	m3	2.55	22	0.00	R 923.00	R 19,907.84	
		Concrete slab	m3	0.56	98	0.00	R 923.00	R 90,651.79	
		Concrete plinth	m3	3.73	15	19.74	R 923.00	R 13,609.92	
		Concrete column	m3	19.00	3	160.09	R 923.00	R 2,671.84	
		Total concrete	m3	0.00	192	0.99		R -	
		Blinding	m2	2.44	79	1.05	R 46.76	R 3,687.41	
		Wood float	m2	0.25	770	1.05	R 5.77	R 4,437.66	
		Formwork to bases	m2	0.39	141	1.05	R 122.09	R 17,217.81	
		Formwork to plinths	m2	0.34	43	7.56	R 127.84	R 5,544.21	
		Formwork to columns	m2	0.11	26	7.22	R 134.74	R 3,545.91	
		Formwork to sumps	m2	0.10	216	6.85	R 126.09	R 27,196.51	
		Formwork to slabs	m2	3.83	26	7.32	R 114.66	R 2,940.23	
		Formwork to slabs n/e 300mm	m	2.05	48	8.05	R 41.95	R 2,010.02	
		Mild steel reinforcement	t	0.22	1.914	22.00	R 5,845.00	R 11,186.11	
		High tensile reinforcement	t	22.12	8.699	0.90	R 5,845.00	R 50,845.94	
		Mesh	m2	0.15	655	54.97	R 106.33	R 69,621.31	
		Cast in items	kg	0.19	1,013	218.75	R 26.72	R 27,060.74	
		HD Bolts	kg	0.09	2,138	198.48	R 29.45	R 62,962.53	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	200.00	0.962	0.16	R 5,768.75	R 5,550.20	
	Construction joint	m	0.29	339	24.07	R 38.35	R 12,986.80	
	Expansion joint	m	0.44	223	15.71	R 58.75	R 13,114.37	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.28	0	0.05	R 46.15	R -	R -
	Working space	m2	0.30	0	1.58	R 72.92	R -	
	Backfill	m3	2.36	0	0.78	R 59.17	R -	
	Blinding	m2	0.40	0	24.38	R 37.86	R -	
	Concrete bases	m3	5.73	0	0.00	R 923.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	1.35		R -	
	Wood float	m2	0.35	0	182.61	R 5.05	R -	
	Formwork bases	m2	0.49	0	11.01	R 83.83	R -	
	Formwork plinths	m2	0.09	0	6.94	R 133.00	R -	
	High tensile reinforcement	t	9.11	0.000	0.00	R 5,845.00	R -	
	HD Bolts	kg	0.03	0	198.55	R 29.44	R -	
	Grout	m3	76.52	0.000	0.17	R 5,429.41	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.89	735	0.05	R 46.15	R 33,929.94	R 1,103,921.39
	Working space	m2	0.45	1,634	1.88	R 24.55	R 40,106.31	
	Backfill	m3	2.48	296	0.78	R 59.17	R 17,540.29	
	Blinding	m2	0.35	540	21.52	R 42.89	R 23,160.78	
	Concrete bases	m3	0.00	189	0.00	R 923.00	R 174,447.00	
	Concrete plinth	m3	2.36	64	0.00	R 923.00	R 58,934.80	
	Concrete slab	m3	2.96	80	0.00	R 923.00	R 73,918.22	
	Total concrete	m3	0.00	333	0.00		R -	
	Wood float	m2	0.51	653	155.50	R 5.94	R 3,874.91	
	Formwork bases	m2	0.45	420	8.00	R 115.38	R 48,457.50	
	Formwork plinths	m2	0.10	639	7.78	R 118.64	R 75,751.67	
	High tensile reinforcement	t	12.87	25.869	0.00	R 5,845.00	R 151,205.24	
	HD Bolts	kg	0.02	9,450	190.91	R 30.62	R 289,326.12	
	Cast in items	kg	0.05	3,780	225.21	R 25.95	R 98,104.44	
	Grout	m3	67.67	2.793	0.17	R 5,429.41	R 15,164.16	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	91	0.05	R 46.15	R 4,215.80	R 164,068.31
	Working space	m2	0.50	183	1.64	R 28.14	R 5,141.22	
	Backfill	m3	2.15	42	0.76	R 60.72	R 2,580.05	
	Blinding	m2	0.66	68	20.25	R 45.58	R 3,107.74	
	Concrete bases	m3	0.00	45	0.00	R 923.00	R 41,535.00	
	Concrete column	m3	27.56	2	0.00	R 923.00	R 1,507.08	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.67	10	0.00	R 923.00	R 8,894.00	
	Total concrete	m3	0.00	56	0.00		R -	
	Wood float	m2	0.59	95	157.14	R 5.87	R 560.18	
	Formwork bases	m2	0.49	92	7.78	R 118.64	R 10,895.28	
	Formwork plinths	m2	0.31	31	7.42	R 124.39	R 3,866.62	
	Formwork to columns	m2	0.29	6	7.75	R 119.10	R 670.56	
	High tensile reinforcement	t	8.97	6.273	0.00	R 5,845.00	R 36,665.66	
	HD bolts	kg	0.04	1,407	200.18	R 29.20	R 41,074.41	
	Grout	m3	96.76	0.582	0.16	R 5,768.75	R 3,354.70	
	CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.62	0	0.05	R 46.15	R -	R -
		Working space	m2	0.25	0	2.02	R 22.85	R -	
		Backfill	m3	1.91	0	0.79	R 58.42	R -	
		Blinding	m2	0.68	0	20.00	R 46.15	R -	
		Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
		Concrete column	m3	1.08	0	145.46	R 923.00	R -	
		Concrete beam	m3	2.50	0	0.88	R 923.00	R -	
		Total concrete	m3	2.76	0	0.88		R -	
		Wood float	m2	0.44	0	7.44	R 6.35	R -	
		Formwork bases	m2	0.45	0	6.41	R 124.06	R -	
		Formwork to columns	m2	0.14	0	7.35	R 125.58	R -	
		Formwork to sides beams	m2	0.32	0	5.90	R 143.99	R -	
		Formwork to soffits beams	m2	0.68	0	6.41	R 156.44	R -	
		Formwork corbels	m2	10.42	0	4.87	R 189.53	R -	
		High tensile reinforcement	t	8.81	0.000	0.00	R 5,845.00	R -	
		Cast in steel	kg	0.03	0	260.94	R 22.40	R -	
		HD bolts	kg	1.43	0	199.28	R 29.33	R -	
		Grout	m3	476.47	0.000	0.16	R 5,768.75	R -	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.71	326	0.05	R 46.15	R 15,067.05	R 774,945.40
		Working space	m2	0.58	563	1.69	R 27.31	R 15,371.41	
		Backfill	m3	1.15	284	0.78	R 59.17	R 16,797.16	
		Blinding	m2	0.62	142	19.41	R 47.55	R 6,749.43	
		Concrete bases	m3	0.00	88	0.88	R 923.00	R 81,224.00	
		Concrete column	m3	2.01	44	1.07	R 923.00	R 40,409.95	
		Concrete beam	m3	0.83	53	1.00	R 923.00	R 48,686.69	
		Concrete surface slab	m3	1.64	54	0.92	R 923.00	R 49,526.83	
		Concrete wall	m3	2.14	20	1.00	R 923.00	R 18,883.15	
		Concrete elevated slab	m3	0.97	45	0.00	R 923.00	R 41,659.74	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	304	0.00		R -	
		Wood float	m2	0.60	506	152.05	R 6.07	R 3,073.44	
		Formwork bases	m2	0.39	226	7.60	R 121.45	R 27,403.51	
		Formwork to columns	m2	0.15	292	6.20	R 148.87	R 43,451.56	
		Formwork to sides beams	m2	0.29	182	4.91	R 187.98	R 34,192.49	
		Formwork to soffits beams	m2	0.79	67	7.19	R 128.37	R 8,571.45	
		Formwork to soffts of slabs	m2	0.30	179	3.11	R 163.36	R 29,219.37	
		Formwork to pockets	m2	25.00	2	5.65	R 296.78	R 519.74	
		Formwork wall	m2	0.12	170	7.88	R 117.13	R 19,969.49	
		High tensile reinforcement	t	8.60	35.323	0.00	R 5,845.00	R 206,465.48	
		Cast in steel	kg	0.21	1,447	251.20	R 23.27	R 33,659.45	
		HD bolts	kg	0.39	779	193.52	R 30.20	R 23,526.40	
		Steel handrailing	m	2.48	14	9.30	R 628.49	R 8,951.85	
		Grout	m3	994.87	0.305	0.18	R 5,127.78	R 1,565.76	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	0	0.04	R 36.92	R -	R -
		Working space	m2	7.47	0	1.41	R 26.18	R -	
		Backfill	m3	4.63	0	0.74	R 27.32	R -	
		Blinding	m2	1.22	0	19.45	R 47.46	R -	
		Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
		Concrete column	m3	28.46	0	0.00	R 923.00	R -	
		Concrete beam	m3	1.44	0	0.00	R 923.00	R -	
		Concrete wall	m3	11.19	0	0.00	R 923.00	R -	
		Concrete elevated slabs	m3	11.80	0	0.00	R 923.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.88	0	160.92	R 5.74	R -	
		Formwork bases	m2	8.70	0	6.92	R 133.38	R -	
		Formwork to columns	m2	0.15	0	5.95	R 145.13	R -	
		Formwork to sides beams	m2	0.17	0	5.05	R 155.13	R -	
		Formwork to soffits beams	m2	0.51	0	6.36	R 182.77	R -	
		Formwork to soffts of slabs	m2	0.14	0	3.22	R 172.52	R -	
		Formwork to pockets	m2	450.00	0	5.35	R 286.65	R -	
		Formwork wall	m2	0.11	0	6.97	R 132.42	R -	
		High tensile reinforcement	t	4.12	0.000	0.00	R 5,845.00	R -	
		Cast in steel	kg	0.16	0	209.64	R 27.88	R -	
		HD bolts	kg	0.24	0	171.78	R 34.03	R -	
		Galvanised grating	m2	18.82	0	0.16	R 951.95	R -	
		Grout	m3	822.89	0.000	6.14	R 5,768.75	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.48	0	0.05	R 46.15	R -	R -
	Working space	m2	0.38	0	1.56	R 29.58	R -	
	Backfill	m3	1.98	0	0.78	R 59.17	R -	
	Blinding	m2	4.71	0	21.03	R 43.89	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	6.03	0	0.00	R 923.00	R -	
	Concrete beam	m3	1.73	0	0.00	R 923.00	R -	
	Concrete wall	m3	33.33	0	0.00	R 923.00	R -	
	Concrete elevated slabs	m3	24.00	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.62	0	151.91	R 6.08	R -	
	Formwork bases	m2	1.43	0	7.62	R 121.13	R -	
	Formwork to columns	m2	0.13	0	6.99	R 147.44	R -	
	Formwork to sides beams	m2	0.23	0	5.94	R 132.05	R -	
	Formwork to soffits beams	m2	0.69	0	6.26	R 155.39	R -	
	Formwork to soffts of slabs	m2	0.20	0	3.67	R 161.36	R -	
	Formwork to pockets	m2	2.86	0	5.72	R 251.50	R -	
	Formwork wall	m2	0.29	0	7.33	R 125.92	R -	
	High tensile reinforcement	t	7.10	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.02	0	188.96	R 30.93	R -	
	HD bolts	kg	0.01	0	197.35	R 29.62	R -	
	Galvanised grating	m2	3.64	0	0.17	R 5,429.41	R -	
	Grout	m3	40.32	0.000	6.09	R 959.77	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.73	204	0.05	R 46.15	R 9,421.06	R 1,269,093.17
	Working space	m2	2.26	90	1.69	R 27.31	R 2,466.63	
	Backfill	m3	1.23	166	0.76	R 60.72	R 10,078.16	
	Blinding	m2	3.82	31	19.66	R 46.95	R 1,450.23	
	Concrete	m3	0.00	118	0.00	R 923.00	R 108,914.00	
	Mesh reinforcement	m2	0.40	295	61.78	R 94.61	R 27,909.92	
	Rough formwork	m2	2.73	43	7.94	R 116.25	R 5,024.59	
	Smooth formwork	m2	0.56	211	6.78	R 136.14	R 28,685.74	
	Finish to concrete	m2	0.22	536	108.86	R 8.48	R 4,547.71	
	Construction joints	m	4.61	26	19.60	R 47.09	R 1,205.39	
	Movement joints	m	14.81	8	15.71	R 58.75	R 468.11	
	Cast in steel	kg	2.30	51	221.43	R 26.40	R 1,354.26	
	Grout	m3	803.00	0.147	0.16	R 5,768.75	R 847.71	
	Brick walls	m2	0.46	257	0.00	R 142.00	R 36,426.09	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.40	519	0.00		R -	
	Waterproofing membrane	m2	2.00	260	11.21	R 82.34	R 21,374.74	
	Roof construction	m2	1.99	261	34.10	R 171.41	R 44,721.02	
	Ceiling	m2	0.97	535	0.00	R 85.00	R 45,496.91	
	Doors and windows	No	434.63	1	0.15	R 946.67	R 1,130.87	
	Floor finish	m2	1.00	519	0.77	R 184.42	R 95,748.57	
	Wall finsih	m2	1.01	514	1.37	R 103.65	R 53,282.07	
	Rod reinforcement	t	8.63	14	0.00	R 5,845.00	R 79,920.05	
	Metalwork	Item	0.00	1	4.56	R 26,653.20	R 26,653.20	
	Structural steel	Item	0.00	1	11.81	R 69,029.45	R 69,029.45	
	Plumbing and drainage	Item	0.00	1	7.52	R 43,954.40	R 43,954.40	
	Small power and lighting	Item	0.00	1	64.07	R 374,489.15	R 374,489.15	
	External works	Item	0.00	1	189.05	R 174,493.15	R 174,493.15	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.16	R 923.00	R 78,455.00	R 1,319,575.65
	Earthworks	m3	2.30	196	8.34	R 110.67	R 21,636.27	
	Reinforcement	t	8.29	10	0.00	R 5,845.00	R 59,930.64	
	Mesh	m2	0.11	773	9.20	R 100.33	R 77,524.70	
	Formwork	m2	0.40	213	7.44	R 124.06	R 26,362.57	
	Brickwork	m2	5.73	113	5.65	R 163.36	R 18,389.01	
	Roof covering	m2	0.83	777	202.02	R 110.61	R 85,954.30	
	Structural steel	t	17.93	36	0.00	R 22,345.00	R 803,821.81	
	Side cladding	m2	1.49	433	0.95	R 105.08	R 45,486.55	
	Doors	No	371.00	2	0.49	R 10,949.05	R 19,035.41	
	Ridge ventilator	m	20.62	31	10.67	R 1,180.19	R 36,916.58	
	Aluminium insulation	m2	0.88	733	1.76	R 62.85	R 46,062.80	
	Total building area	m2	0.00	645	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.76	160	0.12	R 110.76	R 17,730.46	R 960,209.94
	Concrete	m3	0.00	58	0.00	R 923.00	R 53,534.00	
	Reinforcement	t	10.55	5	0.16	R 5,845.00	R 32,133.65	
	Mesh	m2	0.11	527	9.84	R 93.80	R 49,458.61	
	Formwork	m2	0.41	141	8.08	R 114.23	R 16,159.74	
	Brickwork	m2	5.78	70	5.59	R 165.12	R 11,483.87	
	Screed	m2	1.10	365	39.96	R 23.10	R 8,441.30	
	Structural steel	t	14.85	27	0.00	R 22,345.00	R 604,894.95	
	Cat ladders	m	2.52	11	9.58	R 2,332.46	R 25,056.13	
	Hand rail	m	0.72	38	26.40	R 846.40	R 31,823.18	
	Kick plates	m	0.73	37	2.64	R 320.61	R 11,889.11	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.87	462	193.17	R 115.68	R 53,449.97	
	Side cladding	m2	4.70	86	0.92	R 106.42	R 9,102.42	
	Floor grating	m2	1.06	26	16.28	R 1,372.54	R 35,052.56	
	Total buiding area	m2	0.00	402	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.39	163	7.88	R 117.13	R 19,059.72	R 259,446.36
	Blinding	m2	0.48	100	20.45	R 45.13	R 4,513.45	
	Concrete	m3	0.00	48	0.00	R 923.00	R 44,304.00	
	Reinforcement	t	8.00	6	0.00	R 5,845.00	R 35,070.00	
	Mesh	m2	0.50	96	48.38	R 120.81	R 11,598.18	
	Formwork	m2	0.35	137	7.78	R 118.64	R 16,270.29	
	Finish to concrete	m2	0.46	104	108.02	R 8.54	R 891.62	
	Movement joints	m	2.57	19	15.71	R 58.75	R 1,097.32	
	Cast in steel	kg	0.09	533	204.99	R 28.51	R 15,207.25	
	Grout	m3	72.28	0.664	2.62	R 5,429.41	R 3,605.59	
	Brickwork	m2	0.25	40	0.17	R 142.00	R 5,680.00	
	Doors and windows	No	3.00	3	0.28	R 1,577.78	R 5,259.26	
	Pipework	m	2.93	43	0.22	R 352.29	R 15,029.44	
	Bolts	kg	0.11	436	0.09	R 28.51	R 12,442.29	
	Structural steel	t	4.50	2	0.00	R 20,875.00	R 46,388.89	
	Miscellaneous steel	t	144.21	1	0.00	R 26,568.18	R 23,029.07	
	Total bridge area	m2	0.00	125	0.00		R -	
	Total control room area	m2	0.00	10	0.00		R -	
PUMP HOUSE	Earthworks	m3	7.76	116	6.28	R 146.97	R 17,107.83	R 109,317.75
	Blinding	m2	0.82	18	15.92	R 57.98	R 1,060.56	
	Concrete	m3	0.00	15	0.00	R 923.00	R 13,845.00	
	Reinforcement	t	5.77	3	0.00	R 5,845.00	R 15,194.97	
	Formwork	m2	0.07	214	5.92	R 155.91	R 33,409.75	
	Finish to concrete	m2	0.34	44	81.15	R 11.37	R 501.79	
	Movement joints	m	0.46	33	15.43	R 59.82	R 1,950.60	
	Cast in steel	kg	28.85	0.520	181.80	R 32.15	R 16.72	
	Grout	m3	24.19	0.620	0.79	R 5,768.75	R 3,577.15	
	Bolts	kg	121.43	0.124	0.16	R 25.40	R 3.14	
	Structural steel	t	43.33	0.231	0.26	R 22,480.77	R 5,188.27	
	Miscellaneous steel	t	24.14	0.414	0.18	R 32,472.22	R 13,451.62	
	Brickwork	m2	0.60	17	4.81	R 191.89	R 3,198.20	
	Roof covering	m2	1.79	6	1.32	R 145.37	R 812.14	
	Total pump house area	m2	0.00	10	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.91	0	7.10	R 130.00	R -	R -
	Blinding	m2	1.40	0	19.02	R 48.53	R -	
	Concrete	m3	0.00	0	0.00	R 923.00	R -	
	Reinforcement	t	5.77	0.000	0.00	R 5,845.00	R -	
	Formwork	m2	0.20	0	7.01	R 131.67	R -	
	Movement joint	m	1.86	0	0.13	R 62.92	R -	
	Cast in steel	kg	0.15	0	14.67	R 27.29	R -	
	Bolts	kg	0.39	0	214.19	R 33.95	R -	
	Chemical anchors	No	7.24	0	0.25	R 142.39	R -	
	Miscellaneous steelwork	t	91.86	0.000	172.18	R 23,380.00	R -	
	Pre-cast concrete	m3	36.75	0	41.05	R 2,563.89	R -	
	Brickwork	m2	8.86	0	0.36	R 193.50	R -	
	Total area	m2	0.00	0	4.77		R -	
EMERGENCY DAM	Earthworks	m3	0.65	1,392	1.69	R 77.99	R 108,590.95	R 298,019.96
	Lining	m2	0.82	1,104	1.50	R 46.15	R 50,933.84	
	Paving	m2	0.84	1,077	0.59	R 78.22	R 84,273.10	
	Pipework	m	28.97	31	0.26	R 299.98	R 9,370.98	
	Manholes	No	17.25	2	0.11	R 2,727.05	R 4,938.59	
	Concrete	m3	2.90	11	0.05	R 923.00	R 9,942.69	
	Formwork	m2	0.10	108	5.83	R 158.32	R 17,054.35	
	Mesh	m2	0.78	14	7.36	R 125.41	R 1,731.93	
	Reinforcement	t	5.63	1.913	0.14	R 5,845.00	R 11,183.51	
	Dam area (to top of berm)	m2	0.00	905	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.86	172	5.85	R 157.78	R 27,058.89	R 231,418.74
	Blinding	m2	0.92	27	13.72	R 67.27	R 1,828.10	
	Concrete	m3	0.00	25	0.00	R 923.00	R 23,075.00	
	Reinforcement	t	4.44	5.631	0.00	R 5,845.00	R 32,911.04	
	Mesh	m2	1.14	22	41.22	R 141.80	R 3,109.65	
	Formwork	m2	0.15	167	5.63	R 163.94	R 27,323.86	
	Cast in steel	kg	0.03	833	157.23	R 37.17	R 30,979.03	
	Miscellaneous steelwork	t	13.35	2.622	0.18	R 32,472.22	R 85,133.17	
	Total tunnel length	m	0.00	35	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	302	0.00		R -	R 1,257,725.45
	Steel	t	8.75	34.514	0.00	R 22,345.00	R 771,221.71	
	Handrail	m	1.45	208	25.58	R 873.53	R 181,936.05	
	Grating	m2	1.79	169	15.88	R 1,407.12	R 237,401.67	
	Kick flats	m	1.64	184	75.83	R 294.67	R 54,262.82	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	5.80	52	90.17	R 247.81	R 12,903.19	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 2,349,971.87
	Steel	t	23.48	85.392	0.00	R 22,345.00	R 1,908,080.28	
	Handrail	m	12.68	158	29.85	R 748.58	R 118,367.14	
	Grating	m2	12.33	163	16.37	R 1,365.00	R 221,964.22	
	Kick flats	m	12.52	160	77.41	R 288.66	R 46,226.75	
	Cat ladder	m	94.92	21	8.53	R 2,619.58	R 55,333.48	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,111	0.00		R -	R 2,412,739.51
	Steel	t	64.24	48.428	0.00	R 22,345.00	R 1,082,118.54	
	Handrail	m	29.15	107	28.17	R 793.22	R 84,655.46	
	Grating	m2	3.70	841	15.96	R 1,400.06	R 1,177,187.82	
	Kick flats	m	32.29	96	77.41	R 288.66	R 27,810.91	
	Stair treads	No	217.41	14	91.87	R 243.22	R 3,480.38	
	Cat ladder	m	228.94	14	8.10	R 2,758.64	R 37,486.39	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	245	0.00		R -	R 294,021.61
	Steel	t	22.16	11.056	0.00	R 22,345.00	R 247,045.35	
	Handrail	m	45.11	5	26.08	R 856.79	R 4,653.35	
	Grating	m2	58.13	4	15.86	R 1,408.89	R 5,938.04	
	Kick flats	m	42.58	6	77.41	R 288.66	R 1,660.90	
	Cat ladder	m	19.44	13	8.11	R 2,755.24	R 34,723.97	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	235	0.00		R -	R 820,517.58
	Steel	t	13.69	17.166	0.00	R 22,345.00	R 383,570.12	
	Handrail	m	1.04	226	26.86	R 831.91	R 187,978.80	
	Grating	m2	1.91	123	15.68	R 1,425.06	R 175,335.07	
	Kick flats	m	1.08	218	76.30	R 292.86	R 63,723.54	
	Stair treads	No	5.57	42	95.13	R 234.89	R 9,910.04	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	222	0.00		R -	R 499,940.75
	Steel	t	11.98	18.531	0.00	R 22,345.00	R 414,072.62	
	Handrail	m	22.00	10	26.10	R 856.13	R 8,639.13	
	Grating	m2	7.32	30	15.97	R 1,399.19	R 42,434.33	
	Kick flats	m	22.59	10	78.04	R 286.33	R 2,813.84	
	Cat ladder	m	18.87	12	8.22	R 2,718.37	R 31,980.82	
PIPING INSTALLATION	Pipe length	m	0.00	25,665	0.00		R -	R 13,003,600.00
	Total work units	WU	0.30	85,550	0.00	R 152.00	R 13,003,600.00	
	Pipe supports	kg	2.49	10,307	0.00		R -	
	WU for pipe supports	WU	0.16	13,688	0.00		R -	
	Number of welds	No	0.56	14,372	0.00		R -	
	Total fittings	No	0.39	10,009	0.00		R -	
	Stud bolts	No	0.35	3,503	0.00		R -	
	Support number	No	0.19	1,958	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	85,550	0.00	R 152.00		R 42,369.15

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	55.60	1,539	5.52	R 27.54	R 42,369.15	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	85,550	0.00	R 152.00		R 26,141.30
	Number of examinations	No	164.17	521	3.03	R 50.17	R 26,141.30	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	85,550	0.00	R 152.00		R 25,124.02
	Number of examinations	No	273.85	312	1.89	R 80.42	R 25,124.02	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	85,550	0.00	R 152.00		R 43,031.92
	Number of examinations	No	46.49	1,840	6.50	R 23.38	R 43,031.92	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	85,550	0.00	R 152.00		R 51,011.03
	Number of examinations	No	106.66	802	2.39	R 63.60	R 51,011.03	
MECHANICAL INSTALLATION	Total work units	WU	0.00	85,550	0.00	R 152.00		R 75,377.25
	Mechanical equipment	t	236.32	362	0.73	R 208.22	R 75,377.25	
	Structural steel	t	192.98	443	54.54			
PAINTING & INSULATION	Total work units	WU	0.00	85,550	0.00	R 152.00		R 957,664.35
	Painting to piping	m2	16.80	5,092	0.32	R 64.68	R 329,371.83	
	Insulation to piping	m2	48.21	1,775	2.35	R 202.13	R 358,681.21	
	Mechanical equipment received	t	0.00	362	0.81	R 208.22	R 75,377.25	
	Painting to mechanical equipment	m2	0.23	1,574	3.37	R 61.79	R 97,248.41	
	Insulation to mechanical equipment	m2	0.67	540	1.16	R 179.50	R 96,985.65	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.74	18,452	0.00	R 24.55	R 452,996.60	R 1,965,322.96
	Electrical cable terminations	No	276.76	811	0.38	R 64.61	R 52,422.88	
	Electrical equipment	No	8.25	67	0.10	R 245.50	R 16,367.85	
	DB's	No	5.97	8	0.28	R 876.79	R 7,085.65	
	Rack	m	0.59	3,091	1.65	R 76.72	R 237,121.34	
	Support steel	kg	1.34	5,239	1.99	R 12.34	R 64,627.23	
	Instrumentation cable	m	23.73	15,442	0.32	R 28.50	R 440,097.00	
	Instruments	No	0.44	651	0.16	R 178.13	R 115,912.61	
	Hook-ups	No	3.69	1,479	0.15	R 190.00	R 281,000.27	
	Light fittings	No	9.97	246	0.02	R 153.44	R 37,748.35	
	Conduit	m	3.99	1,851	0.11	R 14.88	R 27,536.95	
	Instrument stands	No	0.00	163		R 1,425.00	R 232,406.24	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:					
Project name:	Project J				
Location:	South Africa				
Client:				Date of estimate:	2000

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	9,445	R	2.95
2	Concrete demolitions	m3	0	R	945.20
3	Bulk excavation	m3	3,102	R	29.66
4	Vertical piles	No	23		
5	Raking piles	No	5		
6	Concrete in piles	m3		R	923.00
7	Auger pile	m		R	128.00
8	Total paving and asphalt to road works	m2	2,015		
9	Grey paving to road works	m2	125	R	75.00
10	Asphalt to road surface	m2	1,890		
11	Rip bed of road works	m2	2,015	R	6.55
12	Total concrete in paving and bunding	m3	112	R	923.00
13	Concrete in paving	m3	85		
14	Rod reinforcement	t		R	5,845.00
15	Concrete in plinths and bases on area finishing	m3	122		
16	Stormwater pipe to drain surface run-off	m	95		
17	Machine excavation	m3		R	29.55
18	Concrete in pump and pipe support bases	m3	111	R	923.00
19	Concrete in tank bases	m3	55	R	923.00
20	Concrete in pipe and cable rack foundations	m3	0	R	923.00
21	Concrete to simple structural foundations	m3	189	R	923.00
22	Complex structural foundations - bases	m3	45	R	923.00
23	Concrete pipe racks - bases	m3	0	R	923.00
24	Concrete structure including concrete columns and beams - bases	m3	88	R	923.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	923.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	923.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	118	R	923.00
28	One brick wall	m2		R	142.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	923.00
30	Total building area - Structural steel buildings	m2	645		
31	Ceiling	m2		R	85.00
32	Structural steel	t		R	22,345.00
33	Steel canopy - concrete	m3	58	R	923.00
34	Steel canopy - area	m2	402		
35	Concrete in weighbridge - all concrete	m3	48	R	923.00
36	Total weighbridge area	m2	125		
37	Total control room area - weighbridge	m2	10		
38	Concrete in pump house - all concrete	m3	15	R	923.00
39	Total pump house area	m2	10		
40	Concrete in cooling tower	m3	0	R	923.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	905		
43	Concrete in cable tunnel	m3	25	R	923.00
44	Total lengh of cable tunnel	m	35		
45	Total volume of basic steel platform	m3	302		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	3,111		
48	Total volume of steel in stack	m3	245		
49	Total volume of steel in walkway	m3	235		
50	Total volume of steel in cable gantry	m3	222		
51	Piping work unit cost	WU		R	152.00
52	Total process pipe length	m	25,665		
53	Total electrical cable - installation only	m	18,452	R	24.55
54	Total instrumentation cable - installation only	m	15,442	R	19.23

Ratio: Variable ratio

Variables

Material	Complex	Mean
Labour	Complex	Mean
Engineering design	Simple	Mean
Current economic conditions	Normal	Mean
Current economic factors	Normal	Mean
Level of scope definition	Normal	Mean
Rework	Normal	Mean
Scope change	Extensive	Mean
Weather	Poor	Mean
Access	Poor	Mean
Project size	Small	Mean
Project conditions	Poor	Mean
Complexity	Normal	Mean
Repitition	Occasional	Mean

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:

Project name:	Project J				
Location:	South Africa				
Client:		0	Date of estimate:	2000	

	CIVIL CONSTRUCTION COST			R	12,447,715.29
A	SITE CLEARANCE AND DEMOLITIONS		R 27,862.75		
B	BULK EARTHWORKS		R 194,098.63		
C	PILING		R 706,273.94		
D	ROAD WORKS		R 571,274.06		
E	GENERAL PAVING AND BUNDED AREAS		R 231,382.41		
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R 357,168.82		
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R 404,878.58		
H	TANK BASES AND BUNDING		R 474,283.19		
I	RACK FOUNDATIONS		R -		
J	SIMPLE STRUCTURAL FOUNDATIONS		R 956,235.55		
K	COMPLEX STRUCTURAL FOUNDATIONS		R 156,312.47		
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R -		
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R 662,045.91		
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R -		
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R -		
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R 1,214,573.43		
Q	BUILDINGS - STEEL		R 1,262,023.58		
R	CANOPIES - STEEL		R 930,142.14		
S	WEIGHBRIDGE		R 285,583.79		
T	PUMP HOUSE		R 142,057.21		
U	COOLING TOWER		R -		
V	EMERGENCY DAM		R 368,072.74		
W	HEAVY DUTY CABLE TUNNEL		R 276,260.65		
	Preliminaries and General	35.00%	R 3,227,185.45		
	STRUCTURAL STEEL			R	9,264,415.90
A	STRUCTURAL STEEL - BASIC PLATFORM		R 1,119,316.23		
B	STRUCTURAL STEEL - PIPERACK		R 1,955,012.46		
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R 2,154,617.05		
D	STRUCTURAL STEEL - STACK		R 253,408.14		
E	STRUCTURAL STEEL - WALKWAY		R 691,463.63		
F	STRUCTURAL STEEL - CABLE GANTRY		R 443,622.41		
	Preliminaries and General	40.00%	R 2,646,975.97		
	MECHANICAL AND PIPING			R	16,735,834.28
A	PIPING INSTALLATION		R 11,770,500.00		
B	RADIOGRAPHIC EXAMINATION (RT)		R 34,604.93		
C	DYE PENETRATION TESTING (DP)		R 12,210.55		
D	MAGNETIC PARTICLE TESTING (MPI)		R 18,582.97		
E	POST WELD HEAT TREATMENT		R 33,702.03		
F	MATERIAL HARDNESS TEST (HT)		R 23,282.61		
H	MECHANICAL INSTALLATION		R 61,284.25		
	Preliminaries and General	40.00%	R 4,781,666.94		
	PAINTING AND INSULATION			R	995,626.15
A	PAINTING AND INSULATION		R 737,500.85		
	Preliminaries and General	35.00%	R 258,125.30		
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY			R	2,295,125.72
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R 1,700,093.13		
	Preliminaries and General	35.00%	R 595,032.59		

TOTAL COST	R	41,738,717.34

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		9,445		R 2.95	R 27,862.75	R 27,862.75
	Concrete demolitions	m3		0		R 945.20	R -	
BULK EARTHWORKS	Bulk excavation	m3		3,102		R 29.66	R 92,005.32	R 194,098.63
	Trimming of sides	m2	2.19	1,420	4.37	R 6.79	R 9,645.09	
	Back fill and compact	m3	1.15	2,691	0.98	R 30.27	R 81,435.05	
	Overhaul	m3/km	1.73	1,795	11.49	R 2.58	R 4,630.96	
	Rip bed	m2	1.78	1,745	8.11	R 3.66	R 6,382.22	
PILING	Site establishment of rig	Item	0.00	1	191.05	R 176,339.15	R 176,339.15	R 706,273.94
	EO for raking equipment	Item	0.00	1	23.87	R 22,034.65	R 22,034.65	
	Number of piles	No	0.00	23	0.00		R -	
	Move rig to new position	No	1.46	16	0.18	R 164.16	R 2,579.81	
	Number of raking piles	No	18.11	1	0.00		R -	
	EO for setting up raking piles	No	0.93	1	0.28	R 259.76	R 356.56	
	EO for raking drilling	m	0.15	8	0.88	R 112.73	R 940.81	
	Auger quantity	m	0.05	460	0.00	R 128.00	R 58,880.00	
	EO for drilling in coarse gravel	m	0.52	44	0.21	R 197.79	R 8,712.31	
	EO for drilling in boulders	m	1.84	13	0.50	R 457.54	R 5,730.43	
	EO for drilling in soft rock	m	1.63	14	0.23	R 214.93	R 3,034.04	
	Temporary casings	m	0.36	64	0.36	R 328.98	R 20,935.32	
	EO casing to raking pile	m	0.18	7	0.50	R 874.21	R 6,118.12	
	Mild steel rod reinforcement	t	13.95	1.649	0.95	R 6,278.10	R 10,353.64	
	High tensile rod reinforcement	t	1.32	17.443	7.18	R 6,628.46	R 115,621.00	
	Concrete to piles and bases	m3	0.15	153	0.00	R 923.00	R 141,526.67	
	Concrete to raking piles	m3	0.07	18	1.06	R 974.42	R 17,496.35	
	Site establishment of test equipment	Item	0.00	1	109.59	R 101,153.55	R 101,153.55	
	Load test to pile	No	99.70	0	26.73	R 24,671.79	R 5,691.42	
	Site establishment of intergity testing	No	255.67	0	48.42	R 44,694.30	R 4,020.71	
	Integrity testing of piles	No	1.22	19	0.27	R 251.19	R 4,749.41	
ROAD WORKS	Red paving	m2	0.15	18	0.96	R 72.21	R 1,334.67	R 571,274.06
	Grey paving	m2	0.00	125	0.00	R 75.00	R 9,375.00	
	Kerbing	m	0.13	259	0.00	R 133.94	R 34,701.10	
	Total paving and asphalt	m2	0.00	2,015	0.00		R -	
	Remove top soil	m3	0.53	266	5.86	R 38.36	R 10,184.75	
	Asphalt	m2	0.25	502	0.00	R 92.70	R 46,565.63	
	Rip bed	m2	0.00	2,015	0.00	R 6.55	R 13,198.25	
	Reduce levels	m3	0.41	833	5.02	R 32.87	R 27,389.57	
	Selected fill	m3	1.63	511	0.52	R 63.03	R 32,211.61	
	Imported fill	m3	2.22	230	0.38	R 167.13	R 38,497.56	
	Wearing course	m3	3.86	216	0.25	R 130.72	R 28,221.70	
	Prime	m2	4.78	2,445	1.47	R 28.17	R 68,882.30	
	Three line road marking	m	0.82	2,007	0.17	R 22.58	R 45,306.91	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		One line road marking	m	1.00	259	4.27	R 6.31	R 1,637.08	
		1m Wide concrete V-drain	m	0.96	249	0.80	R 617.87	R 153,668.36	
		200mm Diameter PVC pipe	m	0.96	249	0.10	R 191.92	R 47,768.36	
		Road marking - STOP	No	0.16	40	0.05	R 210.58	R 8,495.01	
		Standard signage	No	0.01	3	4.61	R 265.59	R 688.07	
		100mm Painted line	m	1.84	477	1.43	R 6.60	R 3,148.12	
				0.00		1.57			
				0.00		1.98			
				0.00		0.05			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	5.03	85	0.74	R 923.00	R 78,455.00	R 231,382.41
		Concrete in plinths	m3	0.00	17	0.00	R 923.00	R 15,588.56	
		Total concrete	m3	0.00	112	0.00		R -	
		Rip and compact	m2	0.13	669	185.77	R 4.97	R 3,321.68	
		Formwork to plinth	m2	7.32	124	0.12	R 113.40	R 14,010.81	
		Formwork to slab	m2	0.85	73	0.15	R 139.11	R 10,092.88	
		High tensile steel	t	0.01	1.120	0.00	R 5,845.00	R 6,546.40	
		Mesh	m2	579.90	649	50.98	R 114.65	R 74,461.54	
		Construction joint	m	4.04	343	0.05	R 46.15	R 15,842.31	
		Expansion joint	m	2.24	191	0.07	R 68.57	R 13,063.24	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.63	2,684	0.00		R -	R 357,168.82
		Base excavation	m3	1.49	267	0.00	R 29.55	R 7,898.50	
		Backfill	m3	0.59	180	0.64	R 46.22	R 8,315.99	
		Working space	m2	0.46	454	1.42	R 32.67	R 14,835.22	
		Concrete in bases	m3	0.04	122	25.29	R 923.00	R 112,606.00	
		Blinding	m2	0.82	166	21.27	R 43.40	R 7,224.18	
		Concrete in sump walls	m3	0.10	12	29.46	R 923.00	R 11,019.30	
		Concrete in slabs	m3	0.02	2	0.91	R 923.00	R 2,252.12	
		Total concrete	m3	0.00	136	0.04		R -	
		Wood float	m2	0.69	197	158.92	R 5.81	R 1,146.75	
		Formwork to bases	m2	1.68	205	0.12	R 113.40	R 23,261.64	
		Formwork to sump walls	m2	12.84	153	0.12	R 114.06	R 17,478.99	
		Formwork to sides of slab	m2	5.79	14	0.18	R 164.82	R 2,329.39	
		Mild steel reinforcement	t	0.12	1.547	0.00	R 5,845.00	R 9,042.42	
		High tensile reinforcement	t	10.58	12.892	1.16	R 5,845.00	R 75,353.53	
		Cast in steel	kg	0.48	256	34.97	R 26.40	R 6,769.62	
		Waterstop	m	0.42	28	8.18	R 112.86	R 3,180.90	
		Manhole	No	0.08	8	2.71	R 2,757.68	R 22,081.11	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	95	0.12	R 340.77	R 32,373.15	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.68	187	0.05	R 29.55	R 5,515.17	R 404,878.58
	Working space	m2	0.39	483	0.67	R 19.90	R 9,613.32	
	Backfill	m3	4.40	42	1.30	R 38.46	R 1,629.69	
	Concrete bases	m3	1.04	111	0.00	R 923.00	R 102,453.00	
	Concrete plinth	m3	2.31	48	0.00	R 923.00	R 44,365.67	
	Total concrete	m3	0.00	159	0.00		R -	
	Wood float	m2	0.47	102	0.05	R 9.23	R 938.25	
	Blinding	m2	1.04	107	0.01	R 49.45	R 5,291.99	
	Formwork bases	m2	0.51	217	0.13	R 118.01	R 25,649.07	
	Formwork plinth	m2	0.58	82	0.12	R 114.06	R 9,394.44	
	High tensile reinforcement	t	9.90	16.072	7.08	R 5,845.00	R 93,940.80	
	Cast in steel	kg	0.11	1,475	0.03	R 27.69	R 40,836.98	
	HD Bolts	kg	0.08	2,006	0.03	R 28.35	R 56,875.70	
	Grout	m3	33.85	1.420	6.39	R 5,897.31	R 8,374.50	
TANK BASES AND BUNDING	Restricted excavation	m3	5.68	312	0.05	R 46.15	R 14,413.63	R 474,283.19
	Working space	m2	4.27	73	1.63	R 28.31	R 2,072.63	
	Backfill	m3	1.41	221	0.72	R 63.78	R 14,120.60	
	Concrete bases	m3	0.79	55	0.00	R 923.00	R 50,765.00	
	Concrete sump wall	m3	2.87	19	0.00	R 923.00	R 17,661.78	
	Concrete slab	m3	0.58	95	0.00	R 923.00	R 87,310.81	
	Concrete plinth	m3	4.19	13	20.75	R 923.00	R 12,124.02	
	Concrete column	m3	19.80	3	166.09	R 923.00	R 2,563.70	
	Total concrete	m3	0.00	185	1.10		R -	
	Blinding	m2	2.78	66	1.07	R 44.48	R 2,950.52	
	Wood float	m2	0.26	722	1.17	R 5.56	R 4,012.67	
	Formwork to bases	m2	0.43	129	1.12	R 115.35	R 14,853.33	
	Formwork to plinths	m2	0.36	37	8.00	R 123.18	R 4,503.59	
	Formwork to columns	m2	0.12	23	7.49	R 127.66	R 2,903.10	
	Formwork to sumps	m2	0.12	165	7.23	R 123.98	R 20,501.36	
	Formwork to slabs	m2	4.01	24	7.45	R 113.32	R 2,671.30	
	Formwork to slabs n/e 300mm	m	2.15	44	8.15	R 39.68	R 1,745.96	
	Mild steel reinforcement	t	0.23	1.793	23.26	R 5,845.00	R 10,481.54	
	High tensile reinforcement	t	23.46	7.870	1.03	R 5,845.00	R 46,000.49	
	Mesh	m2	0.16	589	61.95	R 94.35	R 55,532.86	
	Cast in items	kg	0.20	927	212.58	R 27.50	R 25,475.59	
	HD Bolts	kg	0.10	1,860	206.28	R 28.34	R 52,695.26	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Grout	m3	209.20	0.883	0.17	R 5,452.32	R 4,812.26	
	Construction joint	m	0.29	326	23.87	R 38.66	R 12,610.71	
	Expansion joint	m	0.46	207	16.58	R 55.66	R 11,500.48	
PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.73	0	0.05	R 48.13	R -	R -
	Working space	m2	0.42	0	1.99	R 95.91	R -	
	Backfill	m3	2.51	0	0.91	R 53.05	R -	
	Blinding	m2	0.38	0	22.38	R 41.25	R -	
	Concrete bases	m3	5.96	0	0.00	R 923.00	R -	
	Concrete plinth	m3	0.00	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	1.36		R -	
	Wood float	m2	0.35	0	171.90	R 5.37	R -	
	Formwork bases	m2	0.48	0	9.77	R 94.52	R -	
	Formwork plinths	m2	0.09	0	6.89	R 134.02	R -	
	High tensile reinforcement	t	9.33	0.000	0.00	R 5,845.00	R -	
	HD Bolts	kg	0.03	0	230.82	R 25.32	R -	
	Grout	m3	82.68	0.000	0.18	R 5,008.53	R -	
SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	4.09	773	0.06	R 50.77	R 39,262.41	R 956,235.55
	Working space	m2	0.49	1,569	1.89	R 26.81	R 42,070.17	
	Backfill	m3	2.62	295	0.79	R 63.91	R 18,856.55	
	Blinding	m2	0.35	536	21.21	R 43.51	R 23,307.45	
	Concrete bases	m3	0.00	189	0.00	R 923.00	R 174,447.00	
	Concrete plinth	m3	2.74	50	0.00	R 923.00	R 45,993.56	
	Concrete slab	m3	3.79	69	0.00	R 923.00	R 63,783.18	
	Total concrete	m3	0.00	308	0.00		R -	
	Wood float	m2	0.57	541	161.06	R 5.73	R 3,099.81	
	Formwork bases	m2	0.51	374	8.43	R 109.45	R 40,905.67	
	Formwork plinths	m2	0.11	471	8.34	R 110.65	R 52,158.24	
	High tensile reinforcement	t	13.32	23.121	0.00	R 5,845.00	R 135,140.50	
	HD Bolts	kg	0.02	8,269	222.62	R 26.26	R 217,105.06	
	Cast in items	kg	0.05	3,576	247.21	R 23.64	R 84,542.06	
	Grout	m3	69.74	2.710	0.16	R 5,743.11	R 15,563.89	
COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.09	94	0.05	R 48.79	R 4,577.45	R 156,312.47
	Working space	m2	0.55	171	1.62	R 30.08	R 5,137.32	
	Backfill	m3	2.12	44	0.78	R 62.95	R 2,781.35	
	Blinding	m2	0.65	69	19.96	R 46.24	R 3,191.00	
	Concrete bases	m3	0.00	45	0.00	R 923.00	R 41,535.00	
	Concrete column	m3	27.55	2	0.00	R 923.00	R 1,507.58	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	5.12	9	0.00	R 923.00	R 8,119.10	
	Total concrete	m3	0.00	55	0.00		R -	
	Wood float	m2	0.61	91	154.75	R 5.96	R 541.34	
	Formwork bases	m2	0.51	89	7.84	R 117.79	R 10,496.49	
	Formwork plinths	m2	0.34	26	7.25	R 127.37	R 3,274.74	
	Formwork to columns	m2	0.29	6	7.98	R 115.66	R 661.22	
	High tensile reinforcement	t	9.11	6.088	0.00	R 5,845.00	R 35,583.42	
	HD bolts	kg	0.04	1,293	210.45	R 27.77	R 35,921.83	
	Grout	m3	105.72	0.524	0.16	R 5,692.51	R 2,984.63	
	CONCRETE PIPE RACKS AND FOUNDATIONS							
	Restricted excavation	m3	2.87	0	0.06	R 53.40	R -	R -
	Working space	m2	0.31	0	2.14	R 24.95	R -	
	Backfill	m3	2.08	0	0.81	R 65.64	R -	
	Blinding	m2	0.66	0	19.40	R 47.59	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	1.17	0	146.71	R 923.00	R -	
	Concrete beam	m3	2.72	0	0.92	R 923.00	R -	
	Total concrete	m3	3.00	0	0.92		R -	
	Wood float	m2	0.46	0	7.52	R 6.29	R -	
	Formwork bases	m2	0.46	0	6.50	R 122.67	R -	
	Formwork to columns	m2	0.16	0	7.94	R 116.29	R -	
	Formwork to sides beams	m2	0.33	0	5.99	R 142.09	R -	
	Formwork to soffits beams	m2	0.67	0	6.50	R 154.16	R -	
	Formwork corbels	m2	11.08	0	5.47	R 168.67	R -	
	High tensile reinforcement	t	9.10	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.03	0	267.90	R 21.82	R -	
	HD bolts	kg	1.52	0	217.02	R 26.93	R -	
	Grout	m3	522.85	0.000	0.16	R 5,847.06	R -	
	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS							
	Restricted excavation	m3	3.82	336	0.06	R 50.77	R 17,077.93	R 662,045.91
	Working space	m2	0.61	554	1.80	R 28.27	R 15,664.16	
	Backfill	m3	1.12	300	0.82	R 61.69	R 18,495.35	
	Blinding	m2	0.61	145	19.54	R 47.24	R 6,830.68	
	Concrete bases	m3	0.00	88	0.92	R 923.00	R 81,224.00	
	Concrete column	m3	2.40	37	1.03	R 923.00	R 33,843.33	
	Concrete beam	m3	0.85	43	1.02	R 923.00	R 39,916.32	
	Concrete surface slab	m3	1.69	52	0.92	R 923.00	R 48,081.86	
	Concrete wall	m3	2.48	15	0.99	R 923.00	R 13,642.58	
	Concrete elevated slab	m3	1.12	33	0.00	R 923.00	R 30,313.93	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	268	0.00		R -	
		Wood float	m2	0.65	414	166.66	R 5.54	R 2,295.40	
		Formwork bases	m2	0.42	209	7.73	R 119.48	R 24,949.50	
		Formwork to columns	m2	0.17	214	6.45	R 143.15	R 30,617.84	
		Formwork to sides beams	m2	0.31	142	5.09	R 181.18	R 25,690.19	
		Formwork to soffits beams	m2	0.81	53	7.79	R 118.45	R 6,296.48	
		Formwork to soffts of slabs	m2	0.30	173	3.26	R 154.11	R 26,633.11	
		Formwork to pockets	m2	26.59	1	5.99	R 283.00	R 390.21	
		Formwork wall	m2	0.14	107	8.34	R 110.62	R 11,860.83	
		High tensile reinforcement	t	9.05	29.570	0.00	R 5,845.00	R 172,836.56	
		Cast in steel	kg	0.22	1,213	255.48	R 22.88	R 27,741.58	
		HD bolts	kg	0.41	650	199.00	R 29.37	R 19,106.26	
		Steel handrailing	m	2.57	12	9.50	R 615.08	R 7,080.92	
		Grout	m3	1,001.57	0.267	0.17	R 5,452.32	R 1,456.91	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.31	0	0.04	R 40.22	R -	R -
		Working space	m2	8.42	0	1.53	R 26.31	R -	
		Backfill	m3	4.34	0	0.69	R 27.63	R -	
		Blinding	m2	1.09	0	18.77	R 49.18	R -	
		Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
		Concrete column	m3	27.72	0	0.00	R 923.00	R -	
		Concrete beam	m3	1.51	0	0.00	R 923.00	R -	
		Concrete wall	m3	10.85	0	0.00	R 923.00	R -	
		Concrete elevated slabs	m3	11.72	0	0.00	R 923.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.82	0	145.67	R 6.34	R -	
		Formwork bases	m2	9.09	0	7.27	R 127.02	R -	
		Formwork to columns	m2	0.14	0	5.96	R 136.45	R -	
		Formwork to sides beams	m2	0.18	0	4.88	R 154.88	R -	
		Formwork to soffits beams	m2	0.53	0	6.76	R 189.08	R -	
		Formwork to soffts of slabs	m2	0.13	0	3.21	R 185.29	R -	
		Formwork to pockets	m2	424.29	0	4.98	R 287.86	R -	
		Formwork wall	m2	0.11	0	6.60	R 139.83	R -	
		High tensile reinforcement	t	4.06	0.000	0.00	R 5,845.00	R -	
		Cast in steel	kg	0.16	0	215.66	R 27.10	R -	
		HD bolts	kg	0.23	0	186.12	R 31.41	R -	
		Galvanised grating	m2	17.79	0	0.16	R 1,019.05	R -	
		Grout	m3	833.88	0.000	5.74	R 5,847.06	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.61	0	0.05	R 48.13	R -	R -
	Working space	m2	0.43	0	1.85	R 26.03	R -	
	Backfill	m3	2.06	0	0.85	R 56.86	R -	
	Blinding	m2	4.79	0	20.87	R 44.23	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	6.72	0	0.00	R 923.00	R -	
	Concrete beam	m3	1.97	0	0.00	R 923.00	R -	
	Concrete wall	m3	34.78	0	0.00	R 923.00	R -	
	Concrete elevated slabs	m3	24.33	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.81	0	161.28	R 5.72	R -	
	Formwork bases	m2	1.44	0	8.54	R 108.03	R -	
	Formwork to columns	m2	0.14	0	6.90	R 136.81	R -	
	Formwork to sides beams	m2	0.24	0	6.48	R 133.84	R -	
	Formwork to soffits beams	m2	0.74	0	6.75	R 142.41	R -	
	Formwork to soffts of slabs	m2	0.22	0	3.90	R 152.29	R -	
	Formwork to pockets	m2	3.08	0	6.06	R 236.62	R -	
	Formwork wall	m2	0.30	0	7.54	R 122.37	R -	
	High tensile reinforcement	t	7.45	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.02	0	214.18	R 27.29	R -	
	HD bolts	kg	0.01	0	208.82	R 27.99	R -	
	Galvanised grating	m2	3.94	0	0.19	R 4,894.70	R -	
	Grout	m3	42.29	0.000	6.40	R 913.49	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.79	211	0.05	R 47.47	R 10,030.31	R 1,214,573.43
	Working space	m2	2.46	86	1.83	R 25.98	R 2,235.45	
	Backfill	m3	1.24	170	0.76	R 62.46	R 10,637.24	
	Blinding	m2	3.94	30	20.31	R 45.46	R 1,360.61	
	Concrete	m3	0.00	118	0.00	R 923.00	R 108,914.00	
	Mesh reinforcement	m2	0.52	227	64.72	R 90.31	R 20,464.89	
	Rough formwork	m2	3.11	38	8.62	R 107.11	R 4,059.40	
	Smooth formwork	m2	0.59	200	6.76	R 136.45	R 27,224.47	
	Finish to concrete	m2	0.23	507	103.71	R 8.90	R 4,510.09	
	Construction joints	m	4.96	24	21.76	R 42.43	R 1,009.61	
	Movement joints	m	15.29	8	16.79	R 54.96	R 424.24	
	Cast in steel	kg	2.34	50	236.13	R 24.75	R 1,248.99	
	Grout	m3	902.05	0.131	0.17	R 5,295.90	R 692.77	
	Brick walls	m2	0.50	236	0.00	R 142.00	R 33,464.19	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.47	528	0.00		R -	
	Waterproofing membrane	m2	2.24	236	11.97	R 77.11	R 18,168.81	
	Roof construction	m2	2.06	256	39.47	R 148.09	R 37,862.96	
	Ceiling	m2	1.00	527	0.00	R 85.00	R 44,830.74	
	Doors and windows	No	487.96	1	0.16	R 868.12	R 939.00	
	Floor finish	m2	1.04	507	0.77	R 184.42	R 93,526.17	
	Wall finsih	m2	1.06	498	1.44	R 98.71	R 49,182.53	
	Rod reinforcement	t	9.06	13	0.00	R 5,845.00	R 76,162.96	
	Metalwork	Item	0.00	1	4.46	R 26,047.83	R 26,047.83	
	Structural steel	Item	0.00	1	11.54	R 67,434.60	R 67,434.60	
	Plumbing and drainage	Item	0.00	1	7.35	R 42,931.53	R 42,931.53	
	Small power and lighting	Item	0.00	1	62.58	R 365,805.15	R 365,805.15	
	External works	Item	0.00	1	179.20	R 165,404.90	R 165,404.90	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.17	R 923.00	R 78,455.00	R 1,262,023.58
	Earthworks	m3	2.39	203	9.05	R 102.00	R 20,720.69	
	Reinforcement	t	8.77	10	0.00	R 5,845.00	R 56,645.90	
	Mesh	m2	0.11	748	10.30	R 89.57	R 67,039.94	
	Formwork	m2	0.41	208	7.86	R 117.41	R 24,383.30	
	Brickwork	m2	5.83	111	5.94	R 155.46	R 17,203.70	
	Roof covering	m2	0.86	752	209.64	R 106.59	R 80,140.84	
	Structural steel	t	18.61	35	0.00	R 22,345.00	R 774,420.84	
	Side cladding	m2	1.52	425	0.99	R 105.98	R 45,077.32	
	Doors	No	400.08	2	0.53	R 11,779.01	R 18,989.68	
	Ridge ventilator	m	21.98	29	11.20	R 1,193.33	R 35,023.82	
	Aluminium insulation	m2	0.87	743	1.80	R 59.10	R 43,922.52	
	Total building area	m2	0.00	645	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	3.12	181	0.12	R 113.40	R 20,529.74	R 930,142.14
	Concrete	m3	0.00	58	0.00	R 923.00	R 53,534.00	
	Reinforcement	t	11.20	5	0.19	R 5,845.00	R 30,262.96	
	Mesh	m2	0.12	480	9.88	R 93.42	R 44,886.33	
	Formwork	m2	0.45	129	8.56	R 107.86	R 13,880.32	
	Brickwork	m2	5.98	67	6.05	R 152.51	R 10,259.56	
	Screed	m2	1.15	350	42.15	R 21.90	R 7,664.42	
	Structural steel	t	15.10	27	0.00	R 22,345.00	R 594,936.42	
	Cat ladders	m	2.66	10	9.42	R 2,371.36	R 23,742.31	
	Hand rail	m	0.73	37	27.64	R 808.53	R 29,576.21	
	Kick plates	m	0.76	35	2.74	R 295.62	R 10,327.49	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Roof covering	m2	0.92	436	194.51	R 114.88	R 50,042.38	
		Side cladding	m2	4.95	81	0.92	R 106.18	R 8,619.57	
		Floor grating	m2	1.08	25	17.23	R 1,296.60	R 31,880.42	
		Total buiding area	m2	0.00	402	0.00		R -	
	WEIGHBRIDGE	Earthworks	m3	3.25	156	7.97	R 115.77	R 18,059.77	R 285,583.79
		Blinding	m2	0.48	100	18.50	R 49.90	R 5,005.24	
		Concrete	m3	0.00	48	0.00	R 923.00	R 44,304.00	
		Reinforcement	t	7.64	6	0.00	R 5,845.00	R 36,715.65	
		Mesh	m2	0.48	100	50.65	R 115.41	R 11,523.81	
		Formwork	m2	0.31	156	7.51	R 122.94	R 19,123.67	
		Finish to concrete	m2	0.44	108	101.85	R 9.06	R 982.24	
		Movement joints	m	2.41	20	14.56	R 63.40	R 1,265.03	
		Cast in steel	kg	0.09	560	180.31	R 32.42	R 18,152.89	
		Grout	m3	71.50	0.671	2.50	R 5,927.52	R 3,979.36	
		Brickwork	m2	0.24	42	0.16	R 142.00	R 5,934.33	
		Doors and windows	No	2.85	4	0.26	R 1,629.51	R 5,727.62	
		Pipework	m	2.58	48	0.21	R 369.09	R 17,872.59	
		Bolts	kg	0.10	460	0.09	R 32.42	R 14,920.19	
		Structural steel	t	4.15	2	0.00	R 22,793.87	R 54,868.33	
		Miscellaneous steel	t	128.59	1	0.00	R 27,928.33	R 27,149.07	
		Total bridge area	m2	0.00	125	0.00		R -	
		Total control room area	m2	0.00	10	0.00		R -	
	PUMP HOUSE	Earthworks	m3	8.23	123	5.59	R 165.01	R 20,377.66	R 142,057.21
		Blinding	m2	0.66	23	13.58	R 67.96	R 1,541.30	
		Concrete	m3	0.00	15	0.00	R 923.00	R 13,845.00	
		Reinforcement	t	5.44	3	0.00	R 5,845.00	R 16,106.15	
		Formwork	m2	0.06	253	5.11	R 180.68	R 45,713.39	
		Finish to concrete	m2	0.29	52	76.80	R 12.02	R 623.20	
		Movement joints	m	0.37	41	11.10	R 83.16	R 3,410.80	
		Cast in steel	kg	22.60	0.664	154.40	R 37.86	R 25.13	
		Grout	m3	20.08	0.747	0.60	R 7,691.67	R 5,746.38	
		Bolts	kg	103.40	0.145	0.12	R 22.74	R 3.30	
		Structural steel	t	31.18	0.321	0.21	R 28,512.20	R 9,143.55	
		Miscellaneous steel	t	18.76	0.533	0.17	R 34,970.09	R 18,638.64	
		Brickwork	m2	0.44	23	3.94	R 234.39	R 5,335.74	
		Roof covering	m2	1.32	8	1.15	R 204.20	R 1,546.96	
		Total pump house area	m2	0.00	10	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.77	0	6.01	R 153.52	R -	R -
	Blinding	m2	1.18	0	15.43	R 59.82	R -	
	Concrete	m3	0.00	0	0.00	R 923.00	R -	
	Reinforcement	t	6.01	0.000	0.00	R 5,845.00	R -	
	Formwork	m2	0.20	0	5.85	R 157.66	R -	
	Movement joint	m	1.58	0	0.11	R 73.52	R -	
	Cast in steel	kg	0.13	0	12.55	R 28.89	R -	
	Bolts	kg	0.38	0	202.28	R 35.47	R -	
	Chemical anchors	No	6.08	0	0.23	R 161.53	R -	
	Miscellaneous steelwork	t	86.02	0.000	164.78	R 24,948.17	R -	
	Pre-cast concrete	m3	29.95	0	36.19	R 3,047.64	R -	
	Brickwork	m2	8.17	0	0.30	R 216.70	R -	
	Total area	m2	0.00	0	4.26		R -	
EMERGENCY DAM	Earthworks	m3	0.53	1,701	1.54	R 61.90	R 105,279.32	R 368,072.74
	Lining	m2	0.66	1,368	1.05	R 40.22	R 55,026.15	
	Paving	m2	0.60	1,514	0.49	R 82.07	R 124,239.18	
	Pipework	m	27.33	33	0.22	R 281.38	R 9,318.44	
	Manholes	No	15.46	2	0.10	R 2,961.94	R 6,344.98	
	Concrete	m3	2.28	15	0.04	R 923.00	R 13,435.79	
	Formwork	m2	0.08	184	5.40	R 171.04	R 31,402.33	
	Mesh	m2	0.65	22	6.10	R 151.26	R 3,379.98	
	Reinforcement	t	4.33	3.361	0.11	R 5,845.00	R 19,646.56	
	Dam area (to top of berm)	m2	0.00	905	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	5.80	145	5.63	R 163.86	R 23,745.07	R 276,260.65
	Blinding	m2	0.83	30	13.60	R 67.89	R 2,034.24	
	Concrete	m3	0.00	25	0.00	R 923.00	R 23,075.00	
	Reinforcement	t	4.49	5.571	0.00	R 5,845.00	R 32,565.27	
	Mesh	m2	0.89	28	37.67	R 155.18	R 4,358.93	
	Formwork	m2	0.15	167	5.39	R 171.17	R 28,665.67	
	Cast in steel	kg	0.02	1,129	135.13	R 43.26	R 48,837.44	
	Miscellaneous steelwork	t	11.47	3.051	0.16	R 37,027.15	R 112,979.03	
	Total tunnel length	m	0.00	35	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	302	0.00		R -	R 1,119,316.23
	Steel	t	9.76	30.929	0.00	R 22,345.00	R 691,109.44	
	Handrail	m	1.48	204	28.03	R 797.16	R 162,585.52	
	Grating	m2	1.97	154	16.83	R 1,328.08	R 203,964.25	
	Kick flats	m	1.74	173	76.28	R 292.94	R 50,801.32	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.62	46	93.91	R 237.94	R 10,855.70	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 1,955,012.46
	Steel	t	28.52	70.298	0.00	R 22,345.00	R 1,570,809.29	
	Handrail	m	13.48	149	30.71	R 727.56	R 108,251.23	
	Grating	m2	12.54	160	18.63	R 1,199.59	R 191,822.89	
	Kick flats	m	13.81	145	87.93	R 254.14	R 36,892.98	
	Cat ladder	m	100.35	20	9.45	R 2,364.19	R 47,236.07	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,111	0.00		R -	R 2,154,617.05
	Steel	t	79.15	39.304	0.00	R 22,345.00	R 878,256.98	
	Handrail	m	32.28	96	30.80	R 725.39	R 69,910.97	
	Grating	m2	3.76	828	16.14	R 1,384.26	R 1,145,767.17	
	Kick flats	m	35.02	89	82.60	R 270.52	R 24,032.66	
	Stair treads	No	227.23	14	102.43	R 218.15	R 2,986.68	
	Cat ladder	m	243.85	13	8.47	R 2,638.58	R 33,662.58	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	245	0.00		R -	R 253,408.14
	Steel	t	25.83	9.484	0.00	R 22,345.00	R 211,921.00	
	Handrail	m	46.03	5	31.40	R 711.67	R 3,787.67	
	Grating	m2	60.32	4	17.06	R 1,310.17	R 5,321.62	
	Kick flats	m	46.47	5	80.54	R 277.43	R 1,462.68	
	Cat ladder	m	20.36	12	8.70	R 2,569.02	R 30,915.17	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	235	0.00		R -	R 691,463.63
	Steel	t	16.48	14.263	0.00	R 22,345.00	R 318,702.26	
	Handrail	m	1.07	220	32.32	R 691.47	R 151,865.91	
	Grating	m2	1.93	122	17.04	R 1,311.49	R 159,807.63	
	Kick flats	m	1.17	200	84.54	R 264.32	R 52,960.47	
	Stair treads	No	6.13	38	105.45	R 211.90	R 8,127.36	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	222	0.00		R -	R 443,622.41
	Steel	t	13.34	16.648	0.00	R 22,345.00	R 371,997.75	
	Handrail	m	24.96	9	32.88	R 679.55	R 6,045.27	
	Grating	m2	7.52	30	17.98	R 1,242.82	R 36,703.55	
	Kick flats	m	23.46	9	86.61	R 257.99	R 2,441.18	
	Cat ladder	m	20.99	11	8.94	R 2,499.64	R 26,434.66	
PIPING INSTALLATION	Pipe length	m	0.00	25,665	0.00		R -	R 11,770,500.00
	Total work units	WU	0.33	77,438	0.00	R 152.00	R 11,770,500.00	
	Pipe supports	kg	2.57	10,003	0.00		R -	
	WU for pipe supports	WU	0.17	13,054	0.00		R -	
	Number of welds	No	0.63	16,114	0.00		R -	
	Total fittings	No	0.39	9,991	0.00		R -	
	Stud bolts	No	0.34	3,368	0.00		R -	
	Support number	No	0.19	1,886	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	77,438	0.00	R 152.00		R 34,604.93

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	57.24	1,353	5.94	R 25.58	R 34,604.93	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	77,438	0.00	R 152.00		R 12,210.55
	Number of examinations	No	166.59	465	5.79	R 26.27	R 12,210.55	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	77,438	0.00	R 152.00		R 18,582.97
	Number of examinations	No	296.58	261	2.14	R 71.17	R 18,582.97	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	77,438	0.00	R 152.00		R 33,702.03
	Number of examinations	No	51.23	1,512	6.82	R 22.30	R 33,702.03	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	77,438	0.00	R 152.00		R 23,282.61
	Number of examinations	No	112.11	691	4.51	R 33.71	R 23,282.61	
MECHANICAL INSTALLATION	Total work units	WU	0.00	77,438	0.00	R 152.00		R 61,284.25
	Mechanical equipment	t	259.30	299	0.74	R 205.21	R 61,284.25	
	Structural steel	t	214.13	362	53.47			
PAINTING & INSULATION	Total work units	WU	0.00	77,438	0.00	R 152.00		R 737,500.85
	Painting to piping	m2	17.15	4,515	0.34	R 58.45	R 263,888.25	
	Insulation to piping	m2	50.44	1,535	2.60	R 174.46	R 267,825.32	
	Mechanical equipment received	t	0.00	299	0.82	R 205.21	R 61,284.25	
	Painting to mechanical equipment	m2	0.25	1,195	3.59	R 57.13	R 68,242.55	
	Insulation to mechanical equipment	m2	0.71	422	1.14	R 180.57	R 76,260.48	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	25.37	18,452	0.00	R 24.55	R 452,996.60	R 1,700,093.13
	Electrical cable terminations	No	315.83	727	0.45	R 54.21	R 39,430.99	
	Electrical equipment	No	8.98	58	0.12	R 212.16	R 12,395.17	
	DB's	No	6.29	7	0.32	R 664.48	R 4,321.05	
	Rack	m	0.70	2,934	1.68	R 67.00	R 196,586.47	
	Support steel	kg	1.44	4,205	2.16	R 11.35	R 47,709.53	
	Instrumentation cable	m	26.77	15,442	0.37	R 28.50	R 440,097.00	
	Instruments	No	0.57	577	0.18	R 155.86	R 89,910.68	
	Hook-ups	No	4.05	1,015	0.16	R 178.92	R 181,535.41	
	Light fittings	No	10.02	237	0.02	R 134.26	R 31,761.87	
	Conduit	m	4.21	1,841	0.12	R 14.63	R 26,925.49	
	Instrument stands	No	0.00	137		R 1,287.10	R 176,422.86	

Induvidual marked cells indicate information collected from "Project information".

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:						
Project name:	Project J					
Location:	South Africa					
Client:				Date of estimate:		2000

PROJECT INFORMATION

		KEY QUANTITIES		KEY RATES	
1	Site clearance	m2	9,445	R	2.95
2	Concrete demolitions	m3	0	R	945.20
3	Bulk excavation	m3	3,102	R	29.66
4	Vertical piles	No	23		
5	Raking piles	No	5		
6	Concrete in piles	m3		R	923.00
7	Auger pile	m		R	128.00
8	Total paving and asphalt to road works	m2	2,015		
9	Grey paving to road works	m2	125	R	75.00
10	Asphalt to road surface	m2	1,890		
11	Rip bed of road works	m2	2,015	R	6.55
12	Total concrete in paving and bunding	m3	112	R	923.00
13	Concrete in paving	m3	85		
14	Rod reinforcement	t		R	5,845.00
15	Concrete in plinths and bases on area finishing	m3	122		
16	Stormwater pipe to drain surface run-off	m	95		
17	Machine excavation	m3		R	29.55
18	Concrete in pump and pipe support bases	m3	111	R	923.00
19	Concrete in tank bases	m3	55	R	923.00
20	Concrete in pipe and cable rack foundations	m3	0	R	923.00
21	Concrete to simple structural foundations	m3	189	R	923.00
22	Complex structural foundations - bases	m3	45	R	923.00
23	Concrete pipe racks - bases	m3	0	R	923.00
24	Concrete structure including concrete columns and beams - bases	m3	88	R	923.00
25	Major equipment bases with blast proof walls - bases	m3	0	R	923.00
26	Major equipment bases and elevated concrete structure - bases	m3	0	R	923.00
27	Concrete frame buildings with brick in-fill - all concrete	m3	118	R	923.00
28	One brick wall	m2		R	142.00
29	Concrete in structual steel buildings - all concrete	m3	85	R	923.00
30	Total building area - Structural steel buildings	m2	645		
31	Ceiling	m2		R	85.00
32	Structural steel	t		R	22,345.00
33	Steel canopy - concrete	m3	58	R	923.00
34	Steel canopy - area	m2	402		
35	Concrete in weighbridge - all concrete	m3	48	R	923.00
36	Total weighbridge area	m2	125		
37	Total control room area - weighbridge	m2	10		
38	Concrete in pump house - all concrete	m3	15	R	923.00
39	Total pump house area	m2	10		
40	Concrete in cooling tower	m3	0	R	923.00
41	Total cooling tower area	m2	0		
42	Emergency earth dam area - top of berm	m2	905		
43	Concrete in cable tunnel	m3	25	R	923.00
44	Total lengh of cable tunnel	m	35		
45	Total volume of basic steel platform	m3	302		
46	Total volume of steel pipe rack	m3	2,005		
47	Total volume of steel complex steel structure	m3	3,111		
48	Total volume of steel in stack	m3	245		
49	Total volume of steel in walkway	m3	235		
50	Total volume of steel in cable gantry	m3	222		
51	Piping work unit cost	WU		R	152.00
52	Total process pipe length	m	25,665		
53	Total electrical cable - installation only	m	18,452	R	24.55
54	Total instrumentation cable - installation only	m	15,442	R	19.23

Ratio: Variable ratio

Variables

Material	Complex	Median
Labour	Complex	Median
Engineering design	Simple	Median
Current economic conditions	Normal	Median
Current economic factors	Normal	Median
Level of scope definition	Normal	Median
Rework	Normal	Median
Scope change	Extensive	Median
Weather	Poor	Median
Access	Poor	Median
Project size	Small	Median
Project conditions	Poor	Median
Complexity	Normal	Median
Repitition	Occasional	Median

Addendum G - Ratio Conceptual Estimate (RCE)

RATIO CONCEPTUAL ESTIMATE FOR:				
Project name:	Project J			
Location:	South Africa			
Client:	0	Date of estimate:	2000	

	CIVIL CONSTRUCTION COST				R 12,649,247.48
A	SITE CLEARANCE AND DEMOLITIONS		R	27,862.75	
B	BULK EARTHWORKS		R	198,494.53	
C	PILING		R	731,849.56	
D	ROAD WORKS		R	507,357.69	
E	GENERAL PAVING AND BUNDED AREAS		R	235,534.74	
F	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS		R	367,701.13	
G	PUMP AND PIPE SUPPORT BASES AND PLINTHS		R	428,884.05	
H	TANK BASES AND BUNDING		R	514,186.11	
I	RACK FOUNDATIONS		R	-	
J	SIMPLE STRUCTURAL FOUNDATIONS		R	1,021,990.33	
K	COMPLEX STRUCTURAL FOUNDATIONS		R	166,240.81	
L	CONCRETE PIPE RACKS AND FOUNDATIONS		R	-	
M	CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS		R	725,559.20	
N	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS		R	-	
O	MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE		R	-	
P	BUILDINGS - CONCRETE COLUMNS WITH BRICK IN-FILL		R	1,258,236.34	
Q	BUILDINGS - STEEL		R	1,340,023.73	
R	CANOPIES - STEEL		R	935,687.17	
S	WEIGHBRIDGE		R	259,188.30	
T	PUMP HOUSE		R	120,253.06	
U	COOLING TOWER		R	-	
V	EMERGENCY DAM		R	310,090.59	
W	HEAVY DUTY CABLE TUNNEL		R	220,672.87	
	Preliminaries and General	35.00%	R	3,279,434.53	
	STRUCTURAL STEEL				R 10,212,327.80
A	STRUCTURAL STEEL - BASIC PLATFORM		R	1,256,571.49	
B	STRUCTURAL STEEL - PIPERACK		R	2,194,053.07	
C	STRUCTURAL STEEL - COMPLEX STRUCTURES		R	2,332,346.02	
D	STRUCTURAL STEEL - STACK		R	286,334.77	
E	STRUCTURAL STEEL - WALKWAY		R	781,684.30	
F	STRUCTURAL STEEL - CABLE GANTRY		R	443,530.20	
	Preliminaries and General	40.00%	R	2,917,807.94	
	MECHANICAL AND PIPING				R 18,102,445.50
A	PIPING INSTALLATION		R	12,671,721.58	
B	RADIOGRAPHIC EXAMINATION (RT)		R	43,958.99	
C	DYE PENETRATION TESTING (DP)		R	26,072.89	
D	MAGNETIC PARTICLE TESTING (MPI)		R	23,975.63	
E	POST WELD HEAT TREATMENT		R	42,090.15	
F	MATERIAL HARDNESS TEST (HT)		R	47,743.93	
H	MECHANICAL INSTALLATION		R	74,755.03	
	Preliminaries and General	40.00%	R	5,172,127.28	
	PAINTING AND INSULATION				R 1,275,126.71
A	PAINTING AND INSULATION		R	944,538.31	
	Preliminaries and General	35.00%	R	330,588.41	
	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY				R 2,518,746.62
A	ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY		R	1,865,738.24	
	Preliminaries and General	35.00%	R	653,008.38	

TOTAL COST	R	44,757,894.11

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
SITE CLEARANCE AND DEMOLITIONS	Site clearance	m2		9,445		R 2.95	R 27,862.75	R 27,862.75
	Concrete demolitions	m3		0		R 945.20	R -	
BULK EARTHWORKS	Bulk excavation	m3		3,102		R 29.66	R 92,005.32	R 198,494.53
	Trimming of sides	m2	2.18	1,424	4.33	R 6.85	R 9,751.73	
	Back fill and compact	m3	1.14	2,728	0.95	R 31.29	R 85,360.12	
	Overhaul	m3/km	1.60	1,934	11.36	R 2.61	R 5,049.05	
	Rip bed	m2	1.72	1,802	8.45	R 3.51	R 6,328.31	
PILING	Site establishment of rig	Item	0.00	1	193.47	R 178,573.47	R 178,573.47	R 731,849.56
	EO for raking equipment	Item	0.00	1	24.16	R 22,299.02	R 22,299.02	
	Number of piles	No	0.00	23	0.00		R -	
	Move rig to new position	No	1.47	16	0.19	R 175.37	R 2,738.56	
	Number of raking piles	No	18.93	1	0.00		R -	
	EO for setting up raking piles	No	0.91	1	0.26	R 238.00	R 316.31	
	EO for raking drilling	m	0.14	9	0.72	R 92.62	R 807.97	
	Auger quantity	m	0.04	528	0.00	R 128.00	R 67,567.21	
	EO for drilling in coarse gravel	m	0.53	43	0.22	R 203.72	R 8,769.73	
	EO for drilling in boulders	m	1.69	14	0.51	R 473.37	R 6,447.73	
	EO for drilling in soft rock	m	1.61	14	0.23	R 212.95	R 3,038.09	
	Temporary casings	m	0.36	64	0.32	R 298.66	R 19,005.41	
	EO casing to raking pile	m	0.18	7	0.55	R 651.37	R 4,468.04	
	Mild steel rod reinforcement	t	14.30	1.608	0.71	R 4,927.18	R 7,924.84	
	High tensile rod reinforcement	t	1.17	19.742	7.56	R 6,981.84	R 137,838.82	
	Concrete to piles and bases	m3	0.15	153	0.00	R 923.00	R 141,526.67	
	Concrete to raking piles	m3	0.08	16	1.07	R 986.29	R 15,979.16	
	Site establishment of test equipment	Item	0.00	1	109.03	R 100,634.03	R 100,634.03	
	Load test to pile	No	94.28	0	22.72	R 20,971.88	R 5,116.18	
	Site establishment of intergity testing	No	251.29	0	49.60	R 45,784.10	R 4,190.59	
	Integrity testing of piles	No	1.18	19	0.26	R 236.68	R 4,607.75	
ROAD WORKS	Red paving	m2	0.14	18	0.93	R 69.48	R 1,246.96	R 507,357.69
	Grey paving	m2	0.00	125	0.00	R 75.00	R 9,375.00	
	Kerbing	m	0.11	216	0.00	R 158.36	R 34,189.84	
	Total paving and asphalt	m2	0.00	2,015	0.00		R -	
	Remove top soil	m3	0.49	194	5.09	R 33.34	R 6,456.39	
	Asphalt	m2	0.20	393	0.00	R 91.25	R 35,853.75	
	Rip bed	m2	0.00	2,015	0.00	R 6.55	R 13,198.25	
	Reduce levels	m3	0.36	727	4.49	R 29.42	R 21,382.78	
	Selected fill	m3	1.46	499	0.46	R 63.46	R 31,655.22	
	Imported fill	m3	1.85	270	0.31	R 201.92	R 54,443.87	
	Wearing course	m3	3.95	184	0.19	R 152.54	R 28,043.93	
	Prime	m2	4.40	2,194	1.44	R 21.20	R 46,525.63	
	Three line road marking	m	0.78	1,712	0.11	R 16.63	R 28,461.72	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	One line road marking	m	0.96	206	4.15	R 5.66	R 1,167.86	
	1m Wide concrete V-drain	m	0.95	204	0.78	R 677.80	R 138,493.28	
	200mm Diameter PVC pipe	m	0.93	201	0.09	R 227.37	R 45,650.76	
	Road marking - STOP	No	0.16	35	0.04	R 249.31	R 8,688.82	
	Standard signage	No	0.01	2	4.28	R 298.63	R 644.72	
	100mm Painted line	m	1.75	378	1.44	R 4.98	R 1,878.91	
			0.00		1.57			
			0.00		1.89			
			0.00		0.03			
	GENERAL PAVING AND BUNDING	Concrete in slabs	m3	4.98	85	0.73	R 923.00	R 78,455.00	R 235,534.74
		Concrete in plinths	m3	0.00	17	0.00	R 923.00	R 15,769.85	
		Total concrete	m3	0.00	112	0.00		R -	
		Rip and compact	m2	0.13	657	196.17	R 4.71	R 3,093.40	
		Formwork to plinth	m2	7.19	123	0.12	R 107.46	R 13,209.15	
		Formwork to slab	m2	0.83	71	0.15	R 137.13	R 9,699.60	
		High tensile steel	t	0.01	1.120	0.00	R 5,845.00	R 6,546.40	
		Mesh	m2	587.69	658	46.19	R 126.55	R 83,293.89	
		Construction joint	m	3.76	320	0.04	R 39.56	R 12,656.87	
		Expansion joint	m	2.18	185	0.08	R 69.23	R 12,810.58	
	MAN HOLES, VALVE BOXES, CATCH BASINS AND SUMPS	Total area finish and roads	m2	12.01	2,672	0.00		R -	R 367,701.13
		Base excavation	m3	1.42	281	0.00	R 29.55	R 8,314.89	
		Backfill	m3	0.56	198	0.63	R 47.23	R 9,367.62	
		Working space	m2	0.43	507	1.36	R 34.80	R 17,642.58	
		Concrete in bases	m3	0.04	122	23.79	R 923.00	R 112,606.00	
		Blinding	m2	0.75	183	19.05	R 48.45	R 8,889.60	
		Concrete in sump walls	m3	0.11	13	30.21	R 923.00	R 11,823.63	
		Concrete in slabs	m3	0.02	2	0.86	R 923.00	R 1,849.96	
		Total concrete	m3	0.00	137	0.03		R -	
		Wood float	m2	0.60	227	127.67	R 7.23	R 1,642.69	
		Formwork to bases	m2	1.70	207	0.12	R 114.06	R 23,595.67	
		Formwork to sump walls	m2	11.17	143	0.12	R 106.15	R 15,185.13	
		Formwork to sides of slab	m2	5.60	11	0.17	R 160.21	R 1,798.62	
		Mild steel reinforcement	t	0.09	1.336	0.00	R 5,845.00	R 7,811.72	
		High tensile reinforcement	t	9.51	14.393	0.98	R 5,845.00	R 84,126.19	
		Cast in steel	kg	0.47	260	33.23	R 27.77	R 7,231.02	
		Waterstop	m	0.44	29	8.32	R 110.90	R 3,255.11	
		Manhole	No	0.08	7	2.74	R 2,806.45	R 20,567.24	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stormwater pipe	m	0.00	95	0.12	R 336.77	R 31,993.48	
PUMP AND PIPE SUPPORT BASES AND PLINTHS	Restricted base excavation	m3	1.60	178	0.05	R 29.55	R 5,259.79	R 428,884.05
	Working space	m2	0.34	529	0.68	R 20.07	R 10,620.09	
	Backfill	m3	4.02	44	1.22	R 36.09	R 1,599.83	
	Concrete bases	m3	0.95	111	0.00	R 923.00	R 102,453.00	
	Concrete plinth	m3	1.98	56	0.00	R 923.00	R 51,874.94	
	Total concrete	m3	0.00	167	0.00		R -	
	Wood float	m2	0.48	118	0.05	R 9.23	R 1,085.57	
	Blinding	m2	0.95	117	0.01	R 48.13	R 5,644.58	
	Formwork bases	m2	0.51	219	0.12	R 112.74	R 24,640.59	
	Formwork plinth	m2	0.55	103	0.12	R 113.40	R 11,648.16	
	High tensile reinforcement	t	9.68	17.272	6.68	R 5,845.00	R 100,953.17	
	Cast in steel	kg	0.10	1,603	0.03	R 27.03	R 43,338.67	
	HD Bolts	kg	0.08	2,229	0.03	R 27.03	R 60,261.38	
	Grout	m3	32.78	1.715	6.01	R 5,542.62	R 9,504.26	
TANK BASES AND BUNDING	Restricted excavation	m3	5.40	297	0.05	R 43.51	R 12,933.58	R 514,186.11
	Working space	m2	3.87	77	1.51	R 28.76	R 2,206.63	
	Backfill	m3	1.36	218	0.73	R 59.49	R 12,967.87	
	Concrete bases	m3	0.73	55	0.00	R 923.00	R 50,765.00	
	Concrete sump wall	m3	2.61	21	0.00	R 923.00	R 19,471.51	
	Concrete slab	m3	0.57	97	0.00	R 923.00	R 89,510.08	
	Concrete plinth	m3	3.96	14	19.78	R 923.00	R 12,812.51	
	Concrete column	m3	19.17	3	162.78	R 923.00	R 2,647.65	
	Total concrete	m3	0.00	190	0.98		R -	
	Blinding	m2	2.49	76	1.04	R 46.66	R 3,558.49	
	Wood float	m2	0.25	753	1.09	R 5.67	R 4,268.72	
	Formwork to bases	m2	0.41	134	1.06	R 119.80	R 16,099.24	
	Formwork to plinths	m2	0.35	40	7.70	R 130.18	R 5,205.71	
	Formwork to columns	m2	0.11	25	7.09	R 134.41	R 3,416.30	
	Formwork to sumps	m2	0.10	205	6.87	R 125.02	R 25,641.34	
	Formwork to slabs	m2	3.86	25	7.38	R 118.39	R 2,971.58	
	Formwork to slabs n/e 300mm	m	1.99	49	7.80	R 41.55	R 2,024.16	
	Mild steel reinforcement	t	0.22	1.868	22.21	R 5,845.00	R 10,917.40	
	High tensile reinforcement	t	22.07	8.602	0.92	R 5,845.00	R 50,277.48	
	Mesh	m2	0.15	656	56.32	R 103.79	R 68,075.11	
	Cast in items	kg	0.19	992	219.32	R 26.65	R 26,426.96	
	HD Bolts	kg	0.09	2,013	198.15	R 29.50	R 59,388.17	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Grout	m3	199.33	0.952	0.16	R 5,692.51	R 5,421.15	
		Construction joint	m	0.28	348	23.00	R 40.13	R 13,969.49	
		Expansion joint	m	0.44	220	15.35	R 60.13	R 13,210.01	
	PIPE AND CABLE RACK FOUNDATIONS	Restricted excavation	m3	3.46	0	0.05	R 42.19	R -	R -
		Working space	m2	0.36	0	1.71	R 72.03	R -	
		Backfill	m3	2.44	0	0.86	R 49.14	R -	
		Blinding	m2	0.41	0	24.97	R 36.97	R -	
		Concrete bases	m3	5.86	0	0.00	R 923.00	R -	
		Concrete plinth	m3	0.00	0	0.00	R 923.00	R -	
		Total concrete	m3	0.00	0	1.32		R -	
		Wood float	m2	0.35	0	179.26	R 5.15	R -	
		Formwork bases	m2	0.49	0	10.50	R 87.87	R -	
		Formwork plinths	m2	0.09	0	6.78	R 136.11	R -	
		High tensile reinforcement	t	9.12	0.000	0.00	R 5,845.00	R -	
		HD Bolts	kg	0.03	0	204.45	R 28.59	R -	
		Grout	m3	78.34	0.000	0.18	R 5,189.56	R -	
	SIMPLE STRUCTURAL FOUNDATIONS	Restricted excavation	m3	3.82	722	0.05	R 46.81	R 33,782.73	R 1,021,990.33
		Working space	m2	0.46	1,569	1.81	R 25.91	R 40,655.20	
		Backfill	m3	2.47	293	0.77	R 61.02	R 17,859.76	
		Blinding	m2	0.36	519	21.52	R 42.89	R 22,252.51	
		Concrete bases	m3	0.00	189	0.00	R 923.00	R 174,447.00	
		Concrete plinth	m3	2.60	56	0.00	R 923.00	R 51,985.06	
		Concrete slab	m3	3.36	73	0.00	R 923.00	R 67,205.78	
		Total concrete	m3	0.00	318	0.00		R -	
		Wood float	m2	0.54	588	152.08	R 6.07	R 3,566.09	
		Formwork bases	m2	0.49	384	8.29	R 111.39	R 42,776.47	
		Formwork plinths	m2	0.10	567	8.12	R 113.63	R 64,458.91	
		High tensile reinforcement	t	13.20	24.102	0.00	R 5,845.00	R 140,878.40	
		HD Bolts	kg	0.02	8,820	201.01	R 29.08	R 256,467.51	
		Cast in items	kg	0.05	3,625	234.10	R 24.97	R 90,500.31	
		Grout	m3	68.58	2.756	0.17	R 5,498.72	R 15,154.59	
	COMPLEX STRUCTURAL FOUNDATIONS	Restricted excavation	m3	2.03	91	0.05	R 49.45	R 4,505.81	R 166,240.81
		Working space	m2	0.49	184	1.54	R 32.06	R 5,911.12	
		Backfill	m3	2.11	43	0.76	R 64.82	R 2,796.44	
		Blinding	m2	0.66	69	20.13	R 45.85	R 3,143.06	
		Concrete bases	m3	0.00	45	0.00	R 923.00	R 41,535.00	
		Concrete column	m3	27.28	2	0.00	R 923.00	R 1,522.74	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Concrete plinth	m3	4.63	10	0.00	R 923.00	R 8,972.23	
	Total concrete	m3	0.00	56	0.00		R -	
	Wood float	m2	0.62	92	152.39	R 6.06	R 555.15	
	Formwork bases	m2	0.49	92	7.46	R 123.74	R 11,363.73	
	Formwork plinths	m2	0.33	30	7.12	R 129.57	R 3,833.30	
	Formwork to columns	m2	0.28	6	7.58	R 121.72	R 711.75	
	High tensile reinforcement	t	8.85	6.370	0.00	R 5,845.00	R 37,230.01	
	HD bolts	kg	0.04	1,385	198.18	R 29.49	R 40,834.15	
	Grout	m3	99.99	0.564	0.16	R 5,900.46	R 3,326.33	
CONCRETE PIPE RACKS AND FOUNDATIONS	Restricted excavation	m3	2.65	0	0.05	R 48.13	R -	R -
	Working space	m2	0.29	0	2.04	R 23.62	R -	
	Backfill	m3	1.92	0	0.80	R 60.11	R -	
	Blinding	m2	0.65	0	19.44	R 47.49	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	1.08	0	139.12	R 923.00	R -	
	Concrete beam	m3	2.49	0	0.90	R 923.00	R -	
	Total concrete	m3	2.83	0	0.90		R -	
	Wood float	m2	0.43	0	7.50	R 6.63	R -	
	Formwork bases	m2	0.44	0	6.34	R 123.03	R -	
	Formwork to columns	m2	0.15	0	7.65	R 120.72	R -	
	Formwork to sides beams	m2	0.32	0	5.84	R 145.52	R -	
	Formwork to soffits beams	m2	0.67	0	6.34	R 157.93	R -	
	Formwork corbels	m2	10.82	0	5.01	R 184.10	R -	
	High tensile reinforcement	t	8.78	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.03	0	261.30	R 22.37	R -	
	HD bolts	kg	1.47	0	212.00	R 27.57	R -	
	Grout	m3	487.33	0.000	0.16	R 5,927.52	R -	
CONCRETE STRUCTURE INCLUDING CONCRETE COLUMNS AND BEAMS	Restricted excavation	m3	3.67	323	0.05	R 48.13	R 15,558.50	R 725,559.20
	Working space	m2	0.57	564	1.71	R 28.07	R 15,843.03	
	Backfill	m3	1.12	288	0.80	R 60.21	R 17,324.67	
	Blinding	m2	0.61	144	18.98	R 48.64	R 6,984.63	
	Concrete bases	m3	0.00	88	0.86	R 923.00	R 81,224.00	
	Concrete column	m3	2.13	41	1.05	R 923.00	R 38,133.33	
	Concrete beam	m3	0.83	50	0.97	R 923.00	R 45,825.46	
	Concrete surface slab	m3	1.72	51	0.89	R 923.00	R 47,341.22	
	Concrete wall	m3	2.19	19	0.94	R 923.00	R 17,440.92	
	Concrete elevated slab	m3	1.03	40	0.00	R 923.00	R 36,894.72	

		Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
		Total concrete	m3	0.00	289	0.00		R -	
		Wood float	m2	0.62	464	156.25	R 5.91	R 2,742.04	
		Formwork bases	m2	0.41	217	7.32	R 126.09	R 27,301.66	
		Formwork to columns	m2	0.16	257	6.33	R 145.78	R 37,475.60	
		Formwork to sides beams	m2	0.29	173	4.78	R 192.98	R 33,367.33	
		Formwork to soffits beams	m2	0.77	64	7.55	R 122.27	R 7,869.49	
		Formwork to soffts of slabs	m2	0.30	173	2.94	R 156.92	R 27,150.87	
		Formwork to pockets	m2	25.57	2	5.88	R 313.79	R 506.98	
		Formwork wall	m2	0.14	140	8.34	R 110.66	R 15,489.32	
		High tensile reinforcement	t	8.94	32.343	0.00	R 5,845.00	R 189,044.01	
		Cast in steel	kg	0.21	1,354	256.72	R 22.77	R 30,822.49	
		HD bolts	kg	0.39	745	205.68	R 28.42	R 21,183.34	
		Steel handrailing	m	2.52	13	8.99	R 650.32	R 8,360.75	
		Grout	m3	961.51	0.301	0.17	R 5,569.83	R 1,674.82	
	MAJOR EQUIPMENT BASES WITH BLAST PROOF WALLS	Restricted excavation	m3	1.39	0	0.04	R 40.88	R -	R -
		Working space	m2	8.03	0	1.47	R 27.78	R -	
		Backfill	m3	4.60	0	0.74	R 30.34	R -	
		Blinding	m2	1.20	0	20.56	R 44.90	R -	
		Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
		Concrete column	m3	27.78	0	0.00	R 923.00	R -	
		Concrete beam	m3	1.41	0	0.00	R 923.00	R -	
		Concrete wall	m3	11.29	0	0.00	R 923.00	R -	
		Concrete elevated slabs	m3	11.63	0	0.00	R 923.00	R -	
		Total concrete	m3	0.00	0	0.00		R -	
		Wood float	m2	0.86	0	164.09	R 5.62	R -	
		Formwork bases	m2	8.97	0	7.37	R 125.26	R -	
		Formwork to columns	m2	0.15	0	6.15	R 141.86	R -	
		Formwork to sides beams	m2	0.18	0	5.13	R 150.05	R -	
		Formwork to soffits beams	m2	0.55	0	6.51	R 179.87	R -	
		Formwork to soffts of slabs	m2	0.13	0	3.31	R 176.84	R -	
		Formwork to pockets	m2	442.01	0	5.22	R 278.85	R -	
		Formwork wall	m2	0.11	0	7.26	R 127.10	R -	
		High tensile reinforcement	t	4.12	0.000	0.00	R 5,845.00	R -	
		Cast in steel	kg	0.16	0	221.74	R 26.36	R -	
		HD bolts	kg	0.26	0	197.73	R 29.56	R -	
		Galvanised grating	m2	19.18	0	0.17	R 935.73	R -	
		Grout	m3	813.57	0.000	6.25	R 5,593.94	R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
MAJOR EQUIPMENT BASES AND ELEVATED CONCRETE STRUCTURE	Restricted excavation	m3	1.53	0	0.05	R 47.47	R -	R -
	Working space	m2	0.39	0	1.65	R 28.71	R -	
	Backfill	m3	2.02	0	0.81	R 58.65	R -	
	Blinding	m2	4.69	0	21.15	R 43.65	R -	
	Concrete bases	m3	0.00	0	0.00	R 923.00	R -	
	Concrete column	m3	6.13	0	0.00	R 923.00	R -	
	Concrete beam	m3	1.77	0	0.00	R 923.00	R -	
	Concrete wall	m3	33.08	0	0.00	R 923.00	R -	
	Concrete elevated slabs	m3	23.64	0	0.00	R 923.00	R -	
	Total concrete	m3	0.00	0	0.00		R -	
	Wood float	m2	4.63	0	156.29	R 5.91	R -	
	Formwork bases	m2	1.40	0	7.84	R 117.75	R -	
	Formwork to columns	m2	0.12	0	7.06	R 149.42	R -	
	Formwork to sides beams	m2	0.23	0	6.38	R 130.71	R -	
	Formwork to soffits beams	m2	0.71	0	6.18	R 144.67	R -	
	Formwork to soffts of slabs	m2	0.21	0	3.73	R 162.32	R -	
	Formwork to pockets	m2	2.92	0	5.69	R 247.64	R -	
	Formwork wall	m2	0.30	0	7.18	R 128.49	R -	
	High tensile reinforcement	t	7.17	0.000	0.00	R 5,845.00	R -	
	Cast in steel	kg	0.02	0	192.33	R 30.39	R -	
	HD bolts	kg	0.01	0	199.06	R 29.36	R -	
	Galvanised grating	m2	3.79	0	0.18	R 5,127.78	R -	
	Grout	m3	41.89	0.000	6.17	R 946.78	R -	
BUILDINGS - CONCRETE FRAME	Excavations	m3	1.74	205	0.05	R 46.81	R 9,587.21	R 1,258,236.34
	Working space	m2	2.34	88	1.71	R 27.32	R 2,394.63	
	Backfill	m3	1.21	170	0.74	R 62.95	R 10,699.97	
	Blinding	m2	3.90	30	20.21	R 45.68	R 1,382.83	
	Concrete	m3	0.00	118	0.00	R 923.00	R 108,914.00	
	Mesh reinforcement	m2	0.44	270	62.68	R 93.25	R 25,212.42	
	Rough formwork	m2	2.93	40	8.08	R 114.20	R 4,592.56	
	Smooth formwork	m2	0.58	205	6.58	R 140.29	R 28,753.98	
	Finish to concrete	m2	0.22	531	105.89	R 8.72	R 4,630.29	
	Construction joints	m	4.80	25	20.55	R 44.93	R 1,104.92	
	Movement joints	m	14.84	8	15.55	R 59.36	R 472.04	
	Cast in steel	kg	2.29	52	226.24	R 25.84	R 1,333.37	
	Grout	m3	825.36	0.143	0.16	R 5,642.79	R 806.74	
	Brick walls	m2	0.48	248	0.00	R 142.00	R 35,275.79	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Total building area	m2	4.46	527	0.00		R -	
	Waterproofing membrane	m2	2.03	259	11.26	R 82.00	R 21,270.92	
	Roof construction	m2	2.01	262	37.53	R 155.76	R 40,764.76	
	Ceiling	m2	0.99	531	0.00	R 85.00	R 45,163.90	
	Doors and windows	No	449.54	1	0.15	R 937.74	R 1,098.88	
	Floor finish	m2	1.01	520	0.76	R 186.49	R 96,925.67	
	Wall finsih	m2	1.05	500	1.41	R 100.91	R 50,456.85	
	Rod reinforcement	t	8.53	14	0.00	R 5,845.00	R 80,850.21	
	Metalwork	Item	0.00	1	4.54	R 26,527.95	R 26,527.95	
	Structural steel	Item	0.00	1	11.75	R 68,687.10	R 68,687.10	
	Plumbing and drainage	Item	0.00	1	7.48	R 43,745.65	R 43,745.65	
	Small power and lighting	Item	0.00	1	63.76	R 372,652.15	R 372,652.15	
	External works	Item	0.00	1	189.53	R 174,931.58	R 174,931.58	
BUILDINGS - STEEL	Concrete	m3	0.00	85	0.16	R 923.00	R 78,455.00	R 1,340,023.73
	Earthworks	m3	2.39	203	8.48	R 108.86	R 22,141.89	
	Reinforcement	t	8.18	10	0.00	R 5,845.00	R 60,720.65	
	Mesh	m2	0.11	783	9.12	R 101.19	R 79,221.35	
	Formwork	m2	0.39	216	7.28	R 126.72	R 27,418.37	
	Brickwork	m2	5.58	116	5.59	R 165.10	R 19,071.38	
	Roof covering	m2	0.84	770	196.40	R 113.77	R 87,583.50	
	Structural steel	t	17.84	36	0.00	R 22,345.00	R 807,715.26	
	Side cladding	m2	1.44	449	0.97	R 110.52	R 49,651.81	
	Doors	No	355.36	2	0.52	R 11,507.68	R 20,887.30	
	Ridge ventilator	m	20.90	31	10.76	R 1,224.26	R 37,791.23	
	Aluminium insulation	m2	0.86	754	1.74	R 65.49	R 49,366.00	
	Total building area	m2	0.00	645	0.00		R -	
CANOPIES - STEEL	Earthworks	m3	2.85	165	0.12	R 108.78	R 17,968.17	R 935,687.17
	Concrete	m3	0.00	58	0.00	R 923.00	R 53,534.00	
	Reinforcement	t	10.35	6	0.17	R 5,845.00	R 32,741.03	
	Mesh	m2	0.11	538	9.89	R 93.35	R 50,197.10	
	Formwork	m2	0.43	134	7.96	R 116.02	R 15,571.24	
	Brickwork	m2	5.58	72	5.79	R 159.33	R 11,483.32	
	Screed	m2	1.11	361	39.95	R 23.10	R 8,351.08	
	Structural steel	t	15.34	26	0.00	R 22,345.00	R 585,600.28	
	Cat ladders	m	2.42	11	9.30	R 2,401.95	R 26,042.50	
	Hand rail	m	0.72	37	27.49	R 812.80	R 29,762.15	
	Kick plates	m	0.74	35	2.67	R 303.93	R 10,784.59	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Roof covering	m2	0.88	456	199.33	R 112.10	R 51,086.45	
	Side cladding	m2	4.81	84	0.88	R 98.49	R 8,224.13	
	Floor grating	m2	1.04	25	16.33	R 1,368.40	R 34,341.14	
	Total buiding area	m2	0.00	402	0.00		R -	
WEIGHBRIDGE	Earthworks	m3	3.36	161	8.42	R 109.68	R 17,669.71	R 259,188.30
	Blinding	m2	0.52	92	20.40	R 45.25	R 4,154.38	
	Concrete	m3	0.00	48	0.00	R 923.00	R 44,304.00	
	Reinforcement	t	7.65	6	0.00	R 5,845.00	R 36,667.66	
	Mesh	m2	0.51	93	51.51	R 113.48	R 10,591.26	
	Formwork	m2	0.35	138	8.11	R 113.88	R 15,746.41	
	Finish to concrete	m2	0.46	104	110.27	R 8.37	R 870.70	
	Movement joints	m	2.51	19	14.96	R 61.69	R 1,180.10	
	Cast in steel	kg	0.09	538	205.44	R 28.45	R 15,295.17	
	Grout	m3	72.44	0.663	2.67	R 5,743.11	R 3,805.48	
	Brickwork	m2	0.25	40	0.16	R 142.00	R 5,663.82	
	Doors and windows	No	2.96	3	0.27	R 1,670.59	R 5,652.06	
	Pipework	m	2.88	43	0.22	R 345.97	R 15,038.46	
	Bolts	kg	0.11	431	0.09	R 28.45	R 12,255.74	
	Structural steel	t	4.64	2	0.00	R 21,648.15	R 46,705.82	
	Miscellaneous steel	t	138.99	1	0.00	R 26,227.56	R 23,587.51	
	Total bridge area	m2	0.00	125	0.00		R -	
	Total control room area	m2	0.00	10	0.00		R -	
PUMP HOUSE	Earthworks	m3	8.07	121	6.09	R 151.61	R 18,354.41	R 120,253.06
	Blinding	m2	0.77	20	14.83	R 62.23	R 1,214.52	
	Concrete	m3	0.00	15	0.00	R 923.00	R 13,845.00	
	Reinforcement	t	5.83	3	0.00	R 5,845.00	R 15,040.44	
	Formwork	m2	0.07	226	5.44	R 169.54	R 38,282.22	
	Finish to concrete	m2	0.33	46	83.84	R 11.01	R 504.77	
	Movement joints	m	0.40	38	13.22	R 69.83	R 2,623.16	
	Cast in steel	kg	26.14	0.574	166.92	R 35.02	R 20.09	
	Grout	m3	21.82	0.688	0.69	R 6,334.31	R 4,354.91	
	Bolts	kg	120.16	0.125	0.15	R 24.04	R 3.00	
	Structural steel	t	37.56	0.266	0.24	R 24,138.64	R 6,426.81	
	Miscellaneous steel	t	22.80	0.439	0.18	R 33,400.00	R 14,650.96	
	Brickwork	m2	0.51	20	4.63	R 199.17	R 3,943.91	
	Roof covering	m2	1.60	6	1.26	R 158.43	R 988.86	
	Total pump house area	m2	0.00	10	0.00		R -	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
COOLING TOWER	Earthworks	m3	0.81	0	7.00	R 131.94	R -	R -
	Blinding	m2	1.36	0	18.13	R 50.92	R -	
	Concrete	m3	0.00	0	0.00	R 923.00	R -	
	Reinforcement	t	6.31	0.000	0.00	R 5,845.00	R -	
	Formwork	m2	0.22	0	6.81	R 135.55	R -	
	Movement joint	m	1.83	0	0.13	R 67.91	R -	
	Cast in steel	kg	0.15	0	13.59	R 26.47	R -	
	Bolts	kg	0.41	0	220.79	R 32.45	R -	
	Chemical anchors	No	7.19	0	0.26	R 139.63	R -	
	Miscellaneous steelwork	t	90.74	0.000	180.11	R 22,857.54	R -	
	Pre-cast concrete	m3	36.34	0	41.86	R 2,538.70	R -	
	Brickwork	m2	9.25	0	0.36	R 194.46	R -	
	Total area	m2	0.00	0	4.75		R -	
EMERGENCY DAM	Earthworks	m3	0.63	1,428	1.67	R 71.63	R 102,312.30	R 310,090.59
	Lining	m2	0.82	1,108	1.36	R 42.85	R 47,502.60	
	Paving	m2	0.74	1,222	0.56	R 76.14	R 93,022.22	
	Pipework	m	28.09	32	0.27	R 267.41	R 8,613.95	
	Manholes	No	15.84	2	0.11	R 2,512.54	R 5,108.47	
	Concrete	m3	2.60	12	0.05	R 923.00	R 11,432.46	
	Formwork	m2	0.08	151	5.45	R 169.40	R 25,543.90	
	Mesh	m2	0.70	18	6.84	R 135.04	R 2,396.82	
	Reinforcement	t	5.11	2.422	0.12	R 5,845.00	R 14,157.88	
	Dam area (to top of berm)	m2	0.00	905	0.00		R -	
HEAVY DUTY CABLE TUNNEL	Earthworks	m3	6.52	163	5.74	R 160.92	R 26,230.21	R 220,672.87
	Blinding	m2	0.88	28	14.87	R 62.08	R 1,766.43	
	Concrete	m3	0.00	25	0.00	R 923.00	R 23,075.00	
	Reinforcement	t	4.46	5.606	0.00	R 5,845.00	R 32,768.70	
	Mesh	m2	1.04	24	40.91	R 142.86	R 3,443.71	
	Formwork	m2	0.16	156	5.74	R 160.68	R 24,994.89	
	Cast in steel	kg	0.03	854	154.59	R 37.81	R 32,276.42	
	Miscellaneous steelwork	t	13.63	2.567	0.20	R 29,648.55	R 76,117.52	
	Total tunnel length	m	0.00	35	0.00		R -	
STRUCTURAL STEEL - BASIC PLATFORM	Total volume	m3	0.00	302	0.00		R -	R 1,256,571.49
	Steel	t	8.78	34.391	0.00	R 22,345.00	R 768,461.53	
	Handrail	m	1.40	215	24.70	R 904.68	R 194,755.38	
	Grating	m2	1.91	158	15.86	R 1,408.70	R 222,321.14	
	Kick flats	m	1.66	182	70.29	R 317.89	R 57,957.25	

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
	Stair treads	No	6.07	50	84.99	R 262.92	R 13,076.19	
STRUCTURAL STEEL - PIPERACK	Total volume	m3	0.00	2,005	0.00		R -	R 2,194,053.07
	Steel	t	25.30	79.258	0.00	R 22,345.00	R 1,771,019.17	
	Handrail	m	12.87	156	29.17	R 765.93	R 119,330.29	
	Grating	m2	12.19	164	17.26	R 1,294.40	R 212,888.85	
	Kick flats	m	12.75	157	84.52	R 264.37	R 41,584.91	
	Cat ladder	m	100.12	20	9.09	R 2,458.20	R 49,229.86	
STRUCTURAL STEEL - COMPLEX STRUCTURES	Total volume	m3	0.00	3,111	0.00		R -	R 2,332,346.02
	Steel	t	70.86	43.906	0.00	R 22,345.00	R 981,082.41	
	Handrail	m	31.51	99	29.05	R 769.29	R 75,952.00	
	Grating	m2	3.61	861	15.89	R 1,406.48	R 1,211,350.02	
	Kick flats	m	33.45	93	77.73	R 287.48	R 26,739.21	
	Stair treads	No	219.83	14	95.32	R 234.42	R 3,317.43	
	Cat ladder	m	243.15	13	8.43	R 2,649.98	R 33,904.94	
STRUCTURAL STEEL - STACK	Total volume	m3	0.00	245	0.00		R -	R 286,334.77
	Steel	t	22.59	10.846	0.00	R 22,345.00	R 242,342.85	
	Handrail	m	44.67	5	27.44	R 814.22	R 4,465.35	
	Grating	m2	57.72	4	16.73	R 1,335.34	R 5,668.16	
	Kick flats	m	43.64	6	75.96	R 294.18	R 1,651.44	
	Cat ladder	m	19.55	13	8.69	R 2,570.08	R 32,206.97	
STRUCTURAL STEEL - WALKWAY	Total volume	m3	0.00	235	0.00		R -	R 781,684.30
	Steel	t	14.28	16.452	0.00	R 22,345.00	R 367,630.39	
	Handrail	m	1.06	222	29.20	R 765.37	R 169,566.99	
	Grating	m2	1.85	127	16.00	R 1,397.00	R 177,456.64	
	Kick flats	m	1.10	214	83.07	R 269.00	R 57,656.21	
	Stair treads	No	5.70	41	98.24	R 227.46	R 9,374.07	
STRUCTURAL STEEL - CABLE GANTRY	Total volume	m3	0.00	222	0.00		R -	R 443,530.20
	Steel	t	13.65	16.266	0.00	R 22,345.00	R 363,470.25	
	Handrail	m	22.53	10	28.23	R 791.53	R 7,799.15	
	Grating	m2	7.28	31	16.96	R 1,317.79	R 40,205.06	
	Kick flats	m	23.00	10	81.64	R 273.70	R 2,642.26	
	Cat ladder	m	20.24	11	8.33	R 2,681.09	R 29,413.48	
PIPING INSTALLATION	Pipe length	m	0.00	25,665	0.00		R -	R 12,671,721.58
	Total work units	WU	0.31	83,367	0.00	R 152.00	R 12,671,721.58	
	Pipe supports	kg	2.44	10,515	0.00		R -	
	WU for pipe supports	WU	0.17	13,875	0.00		R -	
	Number of welds	No	0.58	14,959	0.00		R -	
	Total fittings	No	0.39	9,899	0.00		R -	
	Stud bolts	No	0.34	3,380	0.00		R -	
	Support number	No	0.19	1,990	0.00		R -	
RADIOGRAPHIC	Total work units	WU	0.00	83,367	0.00	R 152.00		R 43,958.99

	Item description	Unit	Quantity ratio	Quantity	Rate ratio	Rate	Sub-total	Total
EXAMINATION (RT)	Number of examinations	No	53.22	1,566	5.42	R 28.06	R 43,958.99	
DYE PENETRATION TESTING (DP)	Total work units	WU	0.00	83,367	0.00	R 152.00		R 26,072.89
	Number of examinations	No	162.82	512	2.99	R 50.92	R 26,072.89	
MAGNETIC PARTICLE TESTING (MPI)	Total work units	WU	0.00	83,367	0.00	R 152.00		R 23,975.63
	Number of examinations	No	273.85	304	1.93	R 78.76	R 23,975.63	
POST WELD HEAT TREATMENT	Total work units	WU	0.00	83,367	0.00	R 152.00		R 42,090.15
	Number of examinations	No	45.85	1,818	6.57	R 23.15	R 42,090.15	
MATERIAL HARDNESS TEST (HT)	Total work units	WU	0.00	83,367	0.00	R 152.00		R 47,743.93
	Number of examinations	No	108.05	772	2.46	R 61.88	R 47,743.93	
MECHANICAL INSTALLATION	Total work units	WU	0.00	83,367	0.00	R 152.00		R 74,755.03
	Mechanical equipment	t	235.66	354	0.72	R 211.32	R 74,755.03	
	Structural steel	t	195.76	426	53.70			
PAINTING & INSULATION	Total work units	WU	0.00	83,367	0.00	R 152.00		R 944,538.31
	Painting to piping	m2	16.71	4,989	0.31	R 61.77	R 308,188.58	
	Insulation to piping	m2	45.37	1,837	2.46	R 197.44	R 362,776.43	
	Mechanical equipment received	t	0.00	354	0.82	R 211.32	R 74,755.03	
	Painting to mechanical equipment	m2	0.23	1,510	3.21	R 65.91	R 99,511.45	
	Insulation to mechanical equipment	m2	0.68	523	1.11	R 189.89	R 99,306.82	
ELECTRICAL & INSTRUMENTATION - INSTALLATION ONLY	Electrical cable	m	22.60	18,452	0.00	R 24.55	R 452,996.60	R 1,865,738.24
	Electrical cable terminations	No	283.59	817	0.42	R 58.06	R 47,410.57	
	Electrical equipment	No	8.40	65	0.11	R 230.67	R 15,008.60	
	DB's	No	6.09	8	0.28	R 825.93	R 6,394.81	
	Rack	m	0.61	3,032	1.63	R 72.05	R 218,444.98	
	Support steel	kg	1.32	4,982	2.10	R 11.69	R 58,237.34	
	Instrumentation cable	m	24.48	15,442	0.34	R 28.50	R 440,097.00	
	Instruments	No	0.48	631	0.17	R 169.79	R 107,114.40	
	Hook-ups	No	3.85	1,305	0.15	R 186.45	R 243,243.54	
	Light fittings	No	9.86	251	0.02	R 146.26	R 36,643.76	
	Conduit	m	4.09	1,871	0.12	R 15.02	R 28,107.82	
	Instrument stands	No	0.00	154		R 1,375.86	R 212,038.81	

Induvidual marked cells indicate information collected from "Project information".

ADDENDUM H - A typical scope definition breakdown of a portion of a specific project

Contract No.: XYZ

Contract Name: ABC

ESTIMATING CHECKLIST FOR CAPITAL PROJECTS				**Required?**		**Included**	**Excluded**	**Comments**
				Yes	**No**			
Note: This estimate was measured using the following drawings:								
U-AZ-2-1001-0001RB								
U-AZ-2-1002-0001RB								
U-AZ-2-1003-0001RB								
U-BZ-2-1010-0001RB								
Preliminaries and General allowed for this work is based on a on-site construction period of:								
12 Months								
All rates are bases dated November 2009 and will be subjected to escalation								
Civil works will be escalated using the SAFSEC formula								
Structural steel and piping will be based on actual price increases in the market place								
P&G's have been priced based upon the time period stated								
This price include for normal working conditions only. No shut down conditions or hazardous area conditions have been allowed for.								
Free and unhindered access is assumed.								
	1		**LAND AND SITE DEVELOPMENT**					
1 LAND & SITE	**1.01**		**Land acquisition**					
1 LAND & SITE	1.01.01		Purchase		x	No	Yes	
1 LAND & SITE	1.01.02		Freehold		x	No	Yes	
1 LAND & SITE	1.01.03		Leasehold		x	No	Yes	
1 LAND & SITE	1.01.04		Rental		x	No	Yes	
1 LAND & SITE	1.01.05		Development grants or tax concessions obtainable		x	No	Yes	
1 LAND & SITE	**1.02**		**Rates, taxes, stamp duty, levies, tariffs**		**x**	**No**	**Yes**	
1 LAND & SITE	**1.03**		**Lump sum contributions to local authorities**		**x**	**No**	**Yes**	
1 LAND & SITE	**1.04**		**Compensation for damage**		**x**	**No**	**Yes**	
1 LAND & SITE	**1.05**		**Fees (e.g. Legal)**		**x**	**No**	**Yes**	
1 LAND & SITE	**1.06**		**Access to site including wayleaves and easements**					
1 LAND & SITE	1.06.01		Roads		x	No	Yes	
1 LAND & SITE	1.06.02		Footpaths		x	No	Yes	
1 LAND & SITE	1.06.03		Rail tracks		x	No	Yes	
1 LAND & SITE	1.06.04		Conveyors		x	No	Yes	
1 LAND & SITE	1.06.05		Canals and waterways		x	No	Yes	
1 LAND & SITE	1.06.06		Landing strips and helicopter pads		x	No	Yes	
1 LAND & SITE	1.06.07		Tunnels and bridges		x	No	Yes	
1 LAND & SITE	**1.07**		**Services to and from site including wayleaves and easements**					
1 LAND & SITE	1.07.01		Electricity		x	No	Yes	
1 LAND & SITE	1.07.02		Gas		x	No	Yes	
1 LAND & SITE	1.07.03		Water		x	No	Yes	
1 LAND & SITE	1.07.04		Telephone and communications		x	No	Yes	
1 LAND & SITE	1.07.05		Sewer		x	No	Yes	
1 LAND & SITE	1.07.06		Pipelines (Refer to section 13.00)		x	No	Yes	
1 LAND & SITE	**1.08**		**Surveys and investigations**					
1 LAND & SITE	1.08.01		Ecological and environmental surveys		x	No	Yes	
1 LAND & SITE	1.08.02		Geological, geotechnical, hydrographic and seismic surveys	x		Yes	No	One day consultant involvement
1 LAND & SITE	1.08.03		Trial holes, boreholes, samples, analyses and tests		x	No	Yes	
1 LAND & SITE	1.08.04		Site instrumental tests		x	No	Yes	
1 LAND & SITE	1.08.05		Topographical survey	x		Yes	No	One day consultant involvement
1 LAND & SITE	**1.09**		**Demolition, site clearance and diversions**					
1 LAND & SITE	1.09.01		Demolition and site clearance (see also section 02.00)	x		Yes	No	
1 LAND & SITE	1.09.02		Diversion of roads, pipelines and services		x	No	Yes	
1 LAND & SITE	1.09.03		Diversion of canals and waterways		x	No	Yes	
1 LAND & SITE	1.09.04		Relocation of plant/buildings/townships etc.		x	No	Yes	
1 LAND & SITE	1.09.05		Protection of adjoining properties		x	No	Yes	
1 LAND & SITE	1.09.06		Removal of underground obstructions		x	No	Yes	
1 LAND & SITE	**1.10**		**Ground stabilization**					
1 LAND & SITE	1.10.01		Ground protection, compaction and/or grouting		x	No	Yes	
1 LAND & SITE	1.10.02		Ground stabilization		x	No	Yes	
1 LAND & SITE	1.10.03		Sink holes, subsidence and fault lines		x	No	Yes	
1 LAND & SITE	1.10.04		Diaphragm walls		x	No	Yes	

ADDENDUM H - A typical scope definition breakdown of a portion of a specific project

Contract No.: XYZ

Contract Name: ABC

ESTIMATING CHECKLIST FOR CAPITAL PROJECTS				Required?		Included	Excluded	Comments
				Yes	No			
1 LAND & SITE	1.10.05		Suppression of vegetation		x	No	Yes	
1 LAND & SITE	1.10.06		Preliminary drainage, dewatering or sand drains		x	No	Yes	
1 LAND & SITE	**1.11**		**Fencing**					
1 LAND & SITE	1.11.01		Permanent and temporary fencing (see also section 02.00)		x	No	Yes	
1 LAND & SITE	1.11.02		Gates (see also section 02.00)		x	No	Yes	
1 LAND & SITE	1.11.03		Hoardings		x	No	Yes	
1 LAND & SITE	**1.12**		**Signs and illuminated boards**		**x**	**No**	**Yes**	
1 LAND & SITE	**1.13**		**Site screening**					
1 LAND & SITE	1.13.01		Screening embankments (see also section 02.00)		x	No	Yes	
1 LAND & SITE	1.13.02		Tree/bush planting (see also section 02.00)		x	No	Yes	
1 LAND & SITE	**1.14**		**Pre-production mine development**					
1 LAND & SITE	1.14.01		Shafts/bores/raises/adits		x	No	Yes	
1 LAND & SITE	1.14.02		Drives/gates/headings		x	No	Yes	
1 LAND & SITE	1.14.03		Rooms/stopes		x	No	Yes	
	2		**CIVIL ENGINEERING**					
2 CIVIL	**2.01**		**Excavation**					
2 CIVIL	2.01.01		Site clearance, demolition	x		Yes	No	
2 CIVIL	2.01.02		Excavation of topsoil including lifting turf		x	No	Yes	
2 CIVIL	2.01.03		Reduce level excavation or cut and fill		x	No	Yes	
2 CIVIL	2.01.04		Excavation of soft spots and filling		x	No	Yes	
2 CIVIL	2.01.05		Rock removal including ripping, drilling and blasting		x	No	Yes	
2 CIVIL	2.01.06		Excavation for foundations and basements	x		Yes	No	
2 CIVIL	2.01.07		Excavation for existing services		x	No	Yes	
2 CIVIL	2.01.08		Excavation of pits, basins, channels and ducts		x	No	Yes	
2 CIVIL	2.01.09		Excavation for transport facilities and paving		x	No	Yes	
2 CIVIL	2.01.10		Excavation for exposed pipe or cable tracks		x	No	Yes	
2 CIVIL	2.01.11		Excavation for pipes		x	No	Yes	
2 CIVIL	2.01.12		Excavation for cables		x	No	Yes	
2 CIVIL	2.01.13		Diaphragm walls (see also section 01.00)		x	No	Yes	
2 CIVIL	2.01.14		Dewatering (see also section 01.00)		x	No	Yes	
2 CIVIL	2.01.15		Forming earth bunds and embankments		x	No	Yes	
2 CIVIL	2.01.16		Sand padding (if not included elsewhere)		x	No	Yes	
2 CIVIL	2.01.17		Disposal of surplus including offsite tips	x		Yes	No	
2 CIVIL	2.01.18		Double handling of surplus		x	No	Yes	
2 CIVIL	**2.02**		**Filling and shoring**					
2 CIVIL	2.02.01		Selected, non-selected or imported filling	x		Yes	No	
2 CIVIL	2.02.02		Bulk fill: embankments, terraces, earth bunds		x	No	Yes	
2 CIVIL	2.02.03		Under structures, paving and slabs		x	No	Yes	
2 CIVIL	2.02.04		Make up levels and soft spots		x	No	Yes	
2 CIVIL	2.02.05		Borrow pits and quarries		x	No	Yes	
2 CIVIL	2.02.06		Blinding	x		Yes	No	
2 CIVIL	2.02.07		Compaction	x		Yes	No	
2 CIVIL	2.02.08		Sand padding to pipes and cables		x	No	Yes	
2 CIVIL	2.02.09		Temporary shoring or support work		x	No	Yes	
2 CIVIL		a)	timber		x	No	Yes	
2 CIVIL		b)	steel		x	No	Yes	
2 CIVIL		c)	scaffolding		x	No	Yes	
2 CIVIL	**2.03**		**Geotechniques**					
2 CIVIL	2.03.01		Piling		x	No	Yes	
2 CIVIL		a)	bored, cast or driven		x	No	Yes	
2 CIVIL		b)	precast concrete, prestressed and precast planks		x	No	Yes	
2 CIVIL		c)	timber		x	No	Yes	
2 CIVIL		d)	steel-isolated and interlocking sheet		x	No	Yes	
2 CIVIL		e)	cofferdams and caissons		x	No	Yes	
2 CIVIL		f)	pre-boring and disposal of surplus		x	No	Yes	
2 CIVIL		g)	enlarged bases		x	No	Yes	
2 CIVIL		h)	jetting		x	No	Yes	

ADDENDUM H - A typical scope definition breakdown of a portion of a specific project

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ESTIMATING CHECKLIST FOR CAPITAL PROJECTS				Required?		Included	Excluded	Comments
				Yes	No			
2 CIVIL		i)	obstructions		x	No	Yes	
2 CIVIL		j)	permanent casings		x	No	Yes	
2 CIVIL		k)	concrete or backfill to empty bore		x	No	Yes	
2 CIVIL		l)	trim heads		x	No	Yes	
2 CIVIL		m)	excavations, concrete, reinforcement and formwork		x	No	Yes	
2 CIVIL		n)	tests: Kentledge, non-destructive, sacrificial provisions; penetration, compression, lateral, uplift; inclinometers		x	No	Yes	
2 CIVIL		o)	delays: rigs standing		x	No	Yes	
2 CIVIL	2.03.02		Diaphragm walls		x	No	Yes	
2 CIVIL		a)	excavations, disposal, backfill, concrete, reinforcement		x	No	Yes	
2 CIVIL		b)	trim level of wall		x	No	Yes	
2 CIVIL		c)	joints		x	No	Yes	
2 CIVIL		d)	guide walls: excavation, disposal, backfill, concrete, reinforcement and formwork		x	No	Yes	
2 CIVIL		e)	tests		x	No	Yes	
2 CIVIL		f)	delays: rigs standing		x	No	Yes	
2 CIVIL	2.03.03		Underpinning		x	No	Yes	
2 CIVIL		a)	excavation, disposal, support work, breaking out existing, backfilling concrete, formwork, reinforcement, brickwork, tanking		x	No	Yes	
2 CIVIL	2.03.04		Ground and rock anchors		x	No	Yes	
2 CIVIL		a)	drill grout holes, drive injection pipes, grouting		x	No	Yes	
2 CIVIL	2.03.05		gun-applied concrete		x	No	Yes	
2 CIVIL		a)	slabs, walls, beams, columns, sprayed concrete, mesh reinforced concrete and expanded metal		x	No	Yes	
2 CIVIL	2.03.06		Reinforced earth		x	No	Yes	
2 CIVIL		a)	strips, planks, grids, anchors, fabrics, GRP, weldmesh, expanded metal		x	No	Yes	
2 CIVIL	**2.04**		**Concrete supply, yard facilities, formwork and sundries**					
2 CIVIL	2.04.01		Concrete supply: site mix, premix, pumped, additives: waterproof, sulphate resisting	x		Yes	No	30Mpa/19mm stone
2 CIVIL	2.04.02		Site set up: batching plant, hard standings, aggregate bins, cement silo, debagging machines, water supply, storage tanks		x	No	Yes	
2 CIVIL	2.04.03		Transport: mixer trucks, dump trucks, dumpers, conveyors, monorail, pumps, chutes		x	No	Yes	
2 CIVIL	2.04.04		Vibrators, vibrators, pokers, screed boards	x		Yes	No	
2 CIVIL	2.04.05		Cranage					
2 CIVIL		a)	tower, fixed, rail mounted, climbing		x	No	Yes	
2 CIVIL		b)	mobile, wheel based, tracked		x	No	Yes	
2 CIVIL		c)	fork-lift trucks		x	No	Yes	
2 CIVIL	2.04.06		Formwork / shuttering					
2 CIVIL		a)	timber faced, steel panels	x		Yes	No	
2 CIVIL		b)	face finish: sawn, fair, other		x	No	Yes	
2 CIVIL		c)	decking: coffered, troughed, voids, woodwool, metal profiled		x	No	Yes	
2 CIVIL		d)	vertical: beams, columns, walls		x	No	Yes	
2 CIVIL	2.04.07		Reinforcement					
2 CIVIL		a)	mild steel, high yield steel, stainless steel	x		Yes	No	120kg / m3
2 CIVIL		b)	fabric: laps and joints		x	No	Yes	
2 CIVIL		c)	prestressed: pre-tentioned / post-tentioned		x	No	Yes	
2 CIVIL	2.04.08		Precast concrete		x	No	Yes	
2 CIVIL		a)	beams, columns, slabs, portal farmes		x	No	Yes	
2 CIVIL		b)	segmental units: subways, culverts, ducts		x	No	Yes	
2 CIVIL		c)	copings, sills, cappings, lintels		x	No	Yes	
2 CIVIL		d)	kerbs, paving channels, edgings		x	No	Yes	
2 CIVIL		e)	reinforced: pre-strssed: pre-tentioned, post-tentioned		x	No	Yes	
2 CIVIL	2.04.09		Sundries					

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ESTIMATING CHECKLIST FOR CAPITAL PROJECTS				Required?		Included	Excluded	Comments
				Yes	No			
2 CIVIL		a)	waterproof tanking		x	No	Yes	
2 CIVIL		b)	surface treatments and finishes		x	No	Yes	
2 CIVIL		c)	chemical or acid-resistant tiling		x	No	Yes	
2 CIVIL		d)	cutting, chasing, rebating		x	No	Yes	
2 CIVIL		e)	geotextile fabrics and sheeting		x	No	Yes	
2 CIVIL		f)	grouting		x	No	Yes	
	2.04.10		Cast-in items into Concrete					
		a)	expansion and construction joints	x		Yes	No	
		b)	waterstops		x	No	Yes	
		c)	holding-down bolts		x	No	Yes	
		d)	Galvanized Angles (Corner protection)		x	No	Yes	
		e)	Earthing lugs (connected to reinforcement)		x	No	Yes	
2 CIVIL	**2.05**		**Foundations**					
2 CIVIL	2.05.01		Foundations for structures	x		Yes	No	
2 CIVIL	2.05.02		Retaining and basement walls		x	No	Yes	
2 CIVIL	2.05.03		Foundations, paving and bunds to and around tanks		x	No	Yes	
2 CIVIL	2.05.04		Precast products, including beams and sleepers		x	No	Yes	
2 CIVIL	2.05.05		Foundations for plant, machinery, equipment and pipe work		x	No	Yes	
2 CIVIL	2.05.06		Foundations for electrical and instrumentation installations		x	No	Yes	
2 CIVIL	2.05.07		Foundations for import / export loading facilities		x	No	Yes	
2 CIVIL	**2.06**		**Pits, basins and channels**					
2 CIVIL	2.06.01		Firewater		x	No	Yes	
2 CIVIL	2.06.02		Sewage treatment		x	No	Yes	
2 CIVIL	2.06.03		Oil water separators		x	No	Yes	
2 CIVIL	2.06.04		Slurry ponds		x	No	Yes	
2 CIVIL	2.06.05		Weighbridge pits		x	No	Yes	
2 CIVIL	2.06.06		Cooling water including intake / outfall structures, culverts, strainer, siphon recovery and make-up pump chambers		x	No	Yes	
2 CIVIL	2.06.07		Rail unloader pits		x	No	Yes	
2 CIVIL	**2.07**		**Ducts, etc.**					
2 CIVIL	2.07.01		Cooling water culverts (if not in Section 2.1)		x	No	Yes	
2 CIVIL	2.07.02		Cable ducts		x	No	Yes	
2 CIVIL	2.07.03		Pipe ducts		x	No	Yes	
2 CIVIL	2.07.04		Pipe culverts (under roads, etc)		x	No	Yes	
2 CIVIL	2.07.05		Precast concrete cable tiles and marker posts		x	No	Yes	
2 CIVIL	**2.08**		**Steel encasement**					
2 CIVIL	2.08.01		Steel encasement		x	No	Yes	
2 CIVIL	2.08.02		Fireproofing		x	No	Yes	
2 CIVIL	**2.09**		**Transport facilities and paving**					
2 CIVIL	2.09.01		Roads, turning circles and ramps		x	No	Yes	
2 CIVIL	2.09.02		Paths		x	No	Yes	
2 CIVIL	2.09.03		Car parks, paved areas and hard standings		x	No	Yes	
2 CIVIL	2.09.04		Curbs		x	No	Yes	
2 CIVIL	2.09.05		Paving under plant		x	No	Yes	
2 CIVIL	2.09.06		Rail track, platforms and ancillaries (see Section 14.00)		x	No	Yes	
2 CIVIL	2.09.07		Road / rail canal unloading facilities (see Section 14.00)		x	No	Yes	
2 CIVIL	2.09.08		Bridges and tunnels		x	No	Yes	
2 CIVIL	2.09.09		Airfield landing strips and helipads		x	No	Yes	
2 CIVIL	2.09.10		Traffic signs and markings		x	No	Yes	
2 CIVIL	**2.10**		**Marine work**					
2 CIVIL	2.10.01		Cooling water intakes / outfalls, structures and culverts (if in Section 2.06.07)		x	No	Yes	
2 CIVIL	2.10.02		Tidal work		x	No	Yes	
2 CIVIL	2.10.03		Dredging		x	No	Yes	
2 CIVIL	2.10.04		Hardfilling		x	No	Yes	
2 CIVIL	2.10.05		Jetties and moorings		x	No	Yes	
2 CIVIL	2.10.06		Wharves		x	No	Yes	
2 CIVIL	2.10.07		Reservoirs		x	No	Yes	
2 CIVIL	2.10.08		Dams		x	No	Yes	
2 CIVIL	2.10.09		Breakwaters		x	No	Yes	
2 CIVIL	2.10.10		Foreshore protection		x	No	Yes	
2 CIVIL	2.10.11		Pontoons		x	No	Yes	
2 CIVIL	**2.11**		**Concrete Structures**					
2 CIVIL	2.11.01		Towers and silos		x	No	Yes	

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ESTIMATING CHECKLIST FOR CAPITAL PROJECTS				Required?		Included	Excluded	Comments
				Yes	No			
2 CIVIL	2.11.02		Windshields, stacks and flues		x	No	Yes	
2 CIVIL	2.11.03		Tanks and pits		x	No	Yes	
2 CIVIL	2.11.04		Bunds and firewalls		x	No	Yes	
2 CIVIL	2.11.05		Storage for raw material or product		x	No	Yes	
2 CIVIL	2.11.06		Loading/unloading structures including lifts, gantries, booms and special structures (see also section 14.00)		x	No	Yes	
2 CIVIL	**2.12**		**Cooling towers**					
2 CIVIL	2.12.01		Foundations		x	No	Yes	
2 CIVIL	2.12.02		Shell		x	No	Yes	
2 CIVIL	2.12.03		Collection surround		x	No	Yes	
2 CIVIL	2.12.04		Internal discharge structures		x	No	Yes	
2 CIVIL	2.12.05		Packing		x	No	Yes	
2 CIVIL	2.12.06		Foundations for forced-draught fans		x	No	Yes	
2 CIVIL	**2.13**		**Mining**					
2 CIVIL	2.13.01		Shafts, bores and raises		x	No	Yes	
2 CIVIL	2.13.02		Tunnels, rooms and stopes		x	No	Yes	
2 CIVIL	2.13.03		Service tunnels		x	No	Yes	
2 CIVIL	2.13.04		Storage caverns		x	No	Yes	
2 CIVIL	2.13.05		Adits		x	No	Yes	
2 CIVIL	2.13.06		Drives, gates and headings		x	No	Yes	
2 CIVIL	**2.14**		**Drainage**					
2 CIVIL	2.14.01		Stream or channel diversions		x	No	Yes	
2 CIVIL	2.14.02		Land drainage and open ditches, lined or unlined		x	No	Yes	
2 CIVIL	2.14.03		Surface water drainage		x	No	Yes	
2 CIVIL	2.14.04		Sewer drainage		x	No	Yes	
2 CIVIL	2.14.05		Oily water drainage		x	No	Yes	
2 CIVIL	2.14.06		Other drainage		x	No	Yes	
2 CIVIL	2.14.07		Crossings including river, road, rail, fence open cut or thrust		x	No	Yes	
2 CIVIL	2.14.08		Pipe including fittings and coatings		x	No	Yes	
2 CIVIL	2.14.09		Paddings, beds and surrounds		x	No	Yes	
2 CIVIL	2.14.10		Concrete stools, thrust blocks and supports		x	No	Yes	
2 CIVIL	2.14.11		Manholes, inspection chambers and gullies		x	No	Yes	
2 CIVIL	2.14.12		Pits, basins and channels (see also section 2.06)		x	No	Yes	
2 CIVIL	2.14.13		Septic tanks, soakaways and cesspits		x	No	Yes	
2 CIVIL	2.14.14		Filter beds		x	No	Yes	
2 CIVIL	2.14.15		Sedimentation chambers		x	No	Yes	
2 CIVIL	2.14.16		Pumping stations		x	No	Yes	
2 CIVIL	2.14.17		Valves		x	No	Yes	
2 CIVIL	2.14.18		Outfalls		x	No	Yes	
2 CIVIL	**2.15**		**Water supply**					
2 CIVIL	2.15.01		Dams		x	No	Yes	
2 CIVIL	2.15.02		Reservoirs		x	No	Yes	
2 CIVIL	2.15.03		Stream or channel diversions		x	No	Yes	
2 CIVIL	2.15.04		Leats		x	No	Yes	
2 CIVIL	2.15.05		Pipework		x	No	Yes	
2 CIVIL	2.15.06		Manholes and inspection chambers		x	No	Yes	
2 CIVIL	2.15.07		Compensation water channels		x	No	Yes	
2 CIVIL	2.15.08		Settling tanks		x	No	Yes	
2 CIVIL	2.15.09		Sand filters		x	No	Yes	
2 CIVIL	2.15.10		Chlorination and chemical treatment		x	No	Yes	
2 CIVIL	2.15.11		Pumping stations		x	No	Yes	
2 CIVIL	2.15.12		Valves		x	No	Yes	
2 CIVIL	2.15.13		Intakes		x	No	Yes	
2 CIVIL	**2.16**		**Pipework and cabling (see also sections 6,7 and 8)**					
2 CIVIL	2.16.01		Water		x	No	Yes	
2 CIVIL	2.16.02		Firemains and hydrants		x	No	Yes	
2 CIVIL	2.16.03		Process or any other pipework below ground (see also section 6)		x	No	Yes	
2 CIVIL	2.16.04		Valves and pits		x	No	Yes	
2 CIVIL	2.16.05		Pipe coating		x	No	Yes	
2 CIVIL	2.16.06		Pipe surrounds		x	No	Yes	
2 CIVIL	2.16.07		Cable trenches, ducts, padding, tiles and markers		x	No	Yes	
2 CIVIL	**2.17**		**Brickwork, blockwork and masonry**					
2 CIVIL	2.17.01		Walls and structures	x		Yes	No	
2 CIVIL	2.17.02		Stacks and flue linings		x	No	Yes	

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ESTIMATING CHECKLIST FOR CAPITAL PROJECTS				Required?		Included	Excluded	Comments
				Yes	No			
2 CIVIL	2.17.03		Ancillaries, including damp courses, ties, joint reinforcement, bonding, etc.		x	No	Yes	
2 CIVIL	**2.18**		**Landscaping**					
2 CIVIL	2.18.01		Soft landscaping					
2 CIVIL		a)	cultivating, weeding, herbicides, fertilizing, mulching		x	No	Yes	
2 CIVIL		b)	turfing, grass seeding		x	No	Yes	
2 CIVIL		c)	plants, shrubs, trees		x	No	Yes	
2 CIVIL		d)	hedges		x	No	Yes	
2 CIVIL		e)	protection		x	No	Yes	
2 CIVIL	2.18.02		Hard landscaping					
2 CIVIL		a)	pavings: bricks, blocks, flags, setts, cobbles, gravel, hoggin, concrete including kerbs, edges, channels	x		Yes	No	
2 CIVIL		b)	surfaces: sports, e.g. coloured tarmacadam, sheeted, tufted, including markings and lines		x	No	Yes	
2 CIVIL		c)	walls: retaining walls, blast walls, fences, rock-filled gabions, sight and acoustic screening		x	No	Yes	
2 CIVIL		d)	fencing and hedging: fences, hedges, security fences, gates and hoardings		x	No	Yes	
2 CIVIL		e)	site/street furniture: signs, bollards, barriers, lifting barriers, seats, benches, tables, litterbins, gritbins, dustbins and planters		x	No	Yes	
2 CIVIL		f)	equipment: sports, playground, cycle stands, clothes drying		x	No	Yes	
2 CIVIL		g)	artwork: sculptures, carvings ornamental works, flag-poles, poster hoardings, displays		x	No	Yes	
2 CIVIL	**2.19**		**Roads**					
2 CIVIL	2.19.01		Sub-base					
2 CIVIL		a)	Granular, soil cement, lean mix, hard core		x	No	Yes	
2 CIVIL	2.19.02	a)	macadam: wet mix, dry bound		x	No	Yes	
2 CIVIL		b)	bitumen: open texture, dense		x	No	Yes	
2 CIVIL		c)	tarmacadam: open texture, dense		x	No	Yes	
2 CIVIL		d)	tar surface		x	No	Yes	
2 CIVIL	2.19.03		Surface					
2 CIVIL		a)	cold asphalt wearing course		x	No	Yes	
2 CIVIL		b)	rolled asphalt		x	No	Yes	
2 CIVIL		c)	slurry, sealing, surface dressing bitumen spray		x	No	Yes	
	3		**BUILDINGS INCLUDING BUILDING SERVICES**					
3 BUILDINGS	**3.01**		**Substructure**					
3 BUILDINGS	3.01.01		Site investigation	x		Yes	No	
3 BUILDINGS	3.01.02		Site clearance/demolition	x		Yes	No	
3 BUILDINGS	3.01.03		Removal of vegetable soil		x	No	Yes	
3 BUILDINGS	3.01.04		Reduce level excavation		x	No	Yes	
3 BUILDINGS	3.01.05		Basement excavation		x	No	Yes	
3 BUILDINGS	3.01.06		Soft sports and fillings		x	No	Yes	
3 BUILDINGS	3.01.07		Sheet piling		x	No	Yes	
3 BUILDINGS	3.01.08		Piling		x	No	Yes	
3 BUILDINGS	3.01.09		Dewatering	x		Yes		Under ground water in excavations
3 BUILDINGS	3.01.10		Filling and imported filling to make up levels		x	No	Yes	
3 BUILDINGS	3.01.11		Column bases, pile caps and ground beams	x		Yes	No	
3 BUILDINGS	3.01.12		Strip foundations	x		Yes	No	
3 BUILDINGS	3.01.13		Basements		x	No	Yes	
3 BUILDINGS	3.01.14		Underpinning		x	No	Yes	
3 BUILDINGS	3.01.15		Retaining structures		x	No	Yes	
3 BUILDINGS	3.01.16		Rafts		x	No	Yes	
3 BUILDINGS	3.01.17		Substructure walls		x	No	Yes	
3 BUILDINGS	3.01.18		Floor trenches and covers		x	No	Yes	
3 BUILDINGS	3.01.19		Underfloor drainage		x	No	Yes	
3 BUILDINGS	3.01.20		Ground floor slab		x	No	Yes	
3 BUILDINGS	**3.02**		**Superstructure**					
3 BUILDINGS	3.02.01		Frame and encasing		x	No	Yes	
3 BUILDINGS	3.02.02		Upper floors	x		Yes	No	
3 BUILDINGS	3.02.03		Roofs	x		Yes	No	Cut back existing roof only
3 BUILDINGS	3.02.04		Staircases and ramps		x	No	Yes	
3 BUILDINGS	3.02.05		Lift shafts		x	No	Yes	
3 BUILDINGS	3.02.06		External walls	x		Yes	No	
3 BUILDINGS	3.02.07		Windows		x	No	Yes	
3 BUILDINGS	3.02.08		External doors		x	No	Yes	
3 BUILDINGS	3.02.09		Flues and chimney shafts		x	No	Yes	

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ESTIMATING CHECKLIST FOR CAPITAL PROJECTS			Required?		Included	Excluded	Comments
			Yes	No			
3 BUILDINGS	3.02.10	Fire escapes		x	No	Yes	
3 BUILDINGS	3.02.11	Loading bays		x	No	Yes	
3 BUILDINGS	3.02.12	Blast or impact-resisting requirements		x	No	Yes	
3 BUILDINGS	**3.03**	**Finishings**					
3 BUILDINGS	3.03.01	Internal walls and finishes	x		Yes	No	
3 BUILDINGS	3.03.02	Floor finishes	x		Yes	No	
3 BUILDINGS	3.03.03	Ceiling finishes		x	No	Yes	
3 BUILDINGS	3.03.04	Staircase finishes		x	No	Yes	
3 BUILDINGS	3.03.05	Internal doors and screens		x	No	Yes	
3 BUILDINGS	3.03.06	Internal decoration	x		Yes	No	Face brickwork
3 BUILDINGS	3.03.07	External decoration	x		Yes	No	Face brickwork
3 BUILDINGS	3.03.08	Special acoustic requirements		x	No	Yes	
3 BUILDINGS	3.03.09	Fireproofing and insulation		x	No	Yes	
3 BUILDINGS	**3.04**	**Fittings**					
3 BUILDINGS	3.04.01	Fittings, cupboards, benches and counters		x	No	Yes	
3 BUILDINGS	3.04.02	Furniture general		x	No	Yes	
3 BUILDINGS	3.04.03	Special furniture (e.g. canteen/classroom)		x	No	Yes	
3 BUILDINGS	3.04.04	Carpets and curtaining		x	No	Yes	
3 BUILDINGS	3.04.05	Recreational equipment		x	No	Yes	
3 BUILDINGS	3.04.06	Shutters, screens and blinds		x	No	Yes	
3 BUILDINGS	**3.05**	**Services (see also sections 6,7 and 8)**					
3 BUILDINGS	3.05.01	Sanitary fittings		x	No	Yes	
3 BUILDINGS	3.05.02	Waste, soil and overflow pipes		x	No	Yes	
3 BUILDINGS	3.05.03	Rainwater installation		x	No	Yes	
3 BUILDINGS	3.05.04	Hot, cold and drinking water services		x	No	Yes	
3 BUILDINGS	3.05.05	Heating installation		x	No	Yes	
3 BUILDINGS	3.05.06	Gas installation		x	No	Yes	
3 BUILDINGS	3.05.07	Electrical installation		x	No	Yes	
3 BUILDINGS	3.05.08	Any engineering installation particular to the type of building		x	No	Yes	
3 BUILDINGS	3.05.09	Telephone and telecommunications installations		x	No	Yes	
3 BUILDINGS	3.05.10	Computer installation		x	No	Yes	
3 BUILDINGS	3.05.11	Refuse disposal3.06		x	No	Yes	
3 BUILDINGS	3.05.12	Ventilation/air conditioning installation		x	No	Yes	
3 BUILDINGS	3.05.13	Lifts and escalators		x	No	Yes	
3 BUILDINGS	3.05.14	Overhead cranes and rails		x	No	Yes	
3 BUILDINGS	3.05.15	Window cleaning gear		x	No	Yes	
3 BUILDINGS	3.05.16	Special equipment (e.g. kitchen, laboratory and laundry)		x	No	Yes	
3 BUILDINGS	3.05.17	Security and monitoring systems		x	No	Yes	
3 BUILDINGS	3.05.18	Fire protection (e.g. alarms, sprinklers, dry risers, hose reels and extinguishers)		x	No	Yes	
3 BUILDINGS	3.05.19	Builder's work in connection with services		x	No	Yes	
3 BUILDINGS	3.06	**External works**					
3 BUILDINGS	3.06.01	Alterations to public highways		x	No	Yes	
3 BUILDINGS	3.06.02	Roads		x	No	Yes	
3 BUILDINGS	3.06.03	Parking areas/building		x	No	Yes	
3 BUILDINGS	3.06.04	Paths and paved areas		x	No	Yes	
3 BUILDINGS	3.06.05	Walling and fencing		x	No	Yes	
3 BUILDINGS	3.06.06	Drainage		x	No	Yes	
3 BUILDINGS	3.06.07	Lighting		x	No	Yes	
3 BUILDINGS	3.06.08	Connection of utilities		x	No	Yes	
3 BUILDINGS	3.06.09	Builder's work in connection with services		x	No	Yes	
3 BUILDINGS	3.06.10	Landscaping and planting		x	No	Yes	
	4	**STRUCTURES (Also refer to Section 2 Civil Engineering and Section 3 Buildings**					
4 STRUCTURES	**4.01**	**Supporting structures**					
4 STRUCTURES	4.01.01	Structures for plant and equipment including mezzanine floors, decking and any enclosing sheeting		x	No	Yes	
4 STRUCTURES	4.01.02	Structures in support, around and access to top of plant and equipment		x	No	Yes	
4 STRUCTURES	4.01.03	Pre-assembles units		x	No	Yes	
4 STRUCTURES	4.01.04	Plant and equipment supports		x	No	Yes	
4 STRUCTURES	4.01.05	Pipe racks		x	No	Yes	
4 STRUCTURES	4.01.06	General pipe supports		x	No	Yes	
4 STRUCTURES	4.01.07	Minor access platforms		x	No	Yes	
4 STRUCTURES	4.01.08	Lift structures		x	No	Yes	
4 STRUCTURES	4.01.09	Fire-fighting towers		x	No	Yes	
4 STRUCTURES	4.01.10	Cable racks		x	No	Yes	
4 STRUCTURES	4.01.11	Unloading / loading structures		x	No	Yes	

ADDENDUM H - A typical scope definition breakdown of a portion of a specific project

Contract No.: XYZ

Contract Name: ABC

ESTIMATING CHECKLIST FOR CAPITAL PROJECTS			Required?		Included	Excluded	Comments
			Yes	No			
4 STRUCTURES	**4.02**	**Steelwork**					
4 STRUCTURES	4.02.01	Supply, fabrication and erection	x		Yes	No	Supports as per drawing only
4 STRUCTURES	4.02.02	Rolled sections	x		Yes	No	
4 STRUCTURES	4.02.03	Plates and flats		x	No	Yes	
4 STRUCTURES	4.02.04	Hollow sections		x	No	Yes	
4 STRUCTURES	4.02.05	Built-up box sections		x	No	Yes	
4 STRUCTURES	4.02.06	Grillages, columns, beams and plates		x	No	Yes	
4 STRUCTURES	4.02.07	Deck-framing and portal frames		x	No	Yes	
4 STRUCTURES	4.02.08	Trusses, trestles, towers, bracings, purlins		x	No	Yes	
4 STRUCTURES	4.02.09	Decking, cladding, panelling		x	No	Yes	
4 STRUCTURES	4.02.10	Walkways, platforms		x	No	Yes	
4 STRUCTURES	4.02.11	Bridges, gantries, balconies, ramps		x	No	Yes	
4 STRUCTURES	4.02.12	Stairways, landings, ladders, handrails, gates, cages		x	No	Yes	
4 STRUCTURES	4.02.13	Floor plates, gratings		x	No	Yes	
4 STRUCTURES	4.02.14	Duct covers, frames		x	No	Yes	
4 STRUCTURES	4.02.15	On-site welding	x		Yes	No	Connecting to existing structure
4 STRUCTURES	4.02.16	Tests		x	No	Yes	
4 STRUCTURES	4.02.17	Surface treatments including blast cleaning, flame cleaning, galvanizing, painting	x		Yes	No	No galvanizing
4 STRUCTURES	4.02.18	Ancillary items including anchor bolts, holding down-bolt assemblies, packing, grouting	x		Yes	No	
4 STRUCTURES	4.02.19	Fireproofing to steel	x		Yes	No	Replace portions where new supports are connected
4 STRUCTURES	**4.03**	**Timberwork**					
4 STRUCTURES	4.03.01	Shoring		x	No	Yes	
4 STRUCTURES	4.03.02	Columns, beams, trusses, portal frames		x	No	Yes	
4 STRUCTURES	4.03.03	Trestles, towers, bracings, purlins		x	No	Yes	
4 STRUCTURES	4.03.04	Decking, cladding, panelling, linings, sheeting, casings		x	No	Yes	
4 STRUCTURES	4.03.05	Walkways, platforms, gantries, bridges		x	No	Yes	
4 STRUCTURES	4.03.06	Stairways, landings, ladders		x	No	Yes	
4 STRUCTURES	4.03.07	Handrails, balustrading		x	No	Yes	
4 STRUCTURES	**4.04**	**Pre-cast concrete work**					
4 STRUCTURES	4.04.01	Material: steel, galvanized, alloy, other		x	No	Yes	
4 STRUCTURES	4.04.02	Method: supply, hire, erect, maintain, adapt, dismantle, remove		x	No	Yes	
4 STRUCTURES	4.04.03	Location: internal, external, load bearing, below datum, in vessels		x	No	Yes	
4 STRUCTURES	4.04.04	Type: putlog, independent, birdcage		x	No	Yes	
4 STRUCTURES	4.04.05	Decking: boards, protection fans, safety measures		x	No	Yes	
4 STRUCTURES	4.04.06	Ancillaries: barriers, hand and safety rails, ladders, chutes, enclosing sheeting		x	No	Yes	

Addendum I - Estimate stakeholder scope agreement

Ratio conceptual estimate (RCE) for:

Contract No.: XYZ
Contract Name: ABC

Assessed by	Date	Description	Approved	
			Yes	No
Project manager Project engineer Quantity surveyor Quality control Estimator				