Mangaung Granary

An economic catalyst for broadening agricultural participation in the Mangaung Metro.

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Declaration and acknowledgements

This design dissertation is submitted in partial fulfilment of the requirements for the degree M.Arch Prof (Masters degree in Architecture) at the University of the Free State, The research in this document is entirely my own work unless referenced and stated otherwise.

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Signed: .....

Special acknowledgements go to Jay de Wet and Dr H Auret for their valuable insights, advice and investment into the project.

This dissertation is dedicated to my late mother, Dalene.

Fig A: A grain mill and storage complex on the N8 west of Bloemfontein. Author, 2019

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preamble

This dissertation seeks to be a contemporary and architectural intervention reinterpreting the granary. Breaking away from the brutalist engineered giants of the 20th century distributed across the lands, this project aims towards a refined architectural engagement. In search of making an architectural ensemble of industrial delight, it strives to exalt the cathedral of the Free States rolling fields, the silo. By reacting to the economies of scale, this architectural intervention acts as an economic catalyst enabling broader participation in the agricultural industry. In respect to the Mangaung Metro Municipality the project will affect emerging small scale farmers.

Fig B: Trucks depositing grain at a silo complex (Author. 2019).

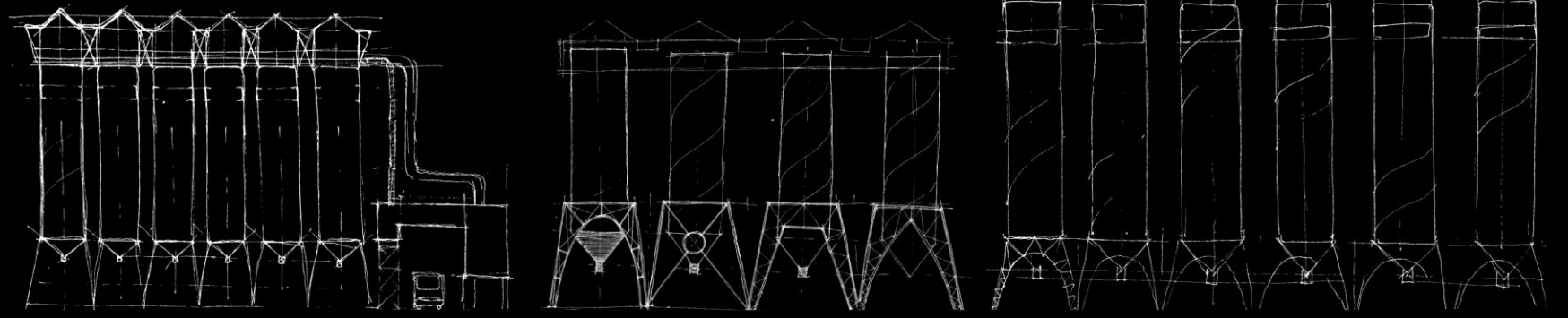
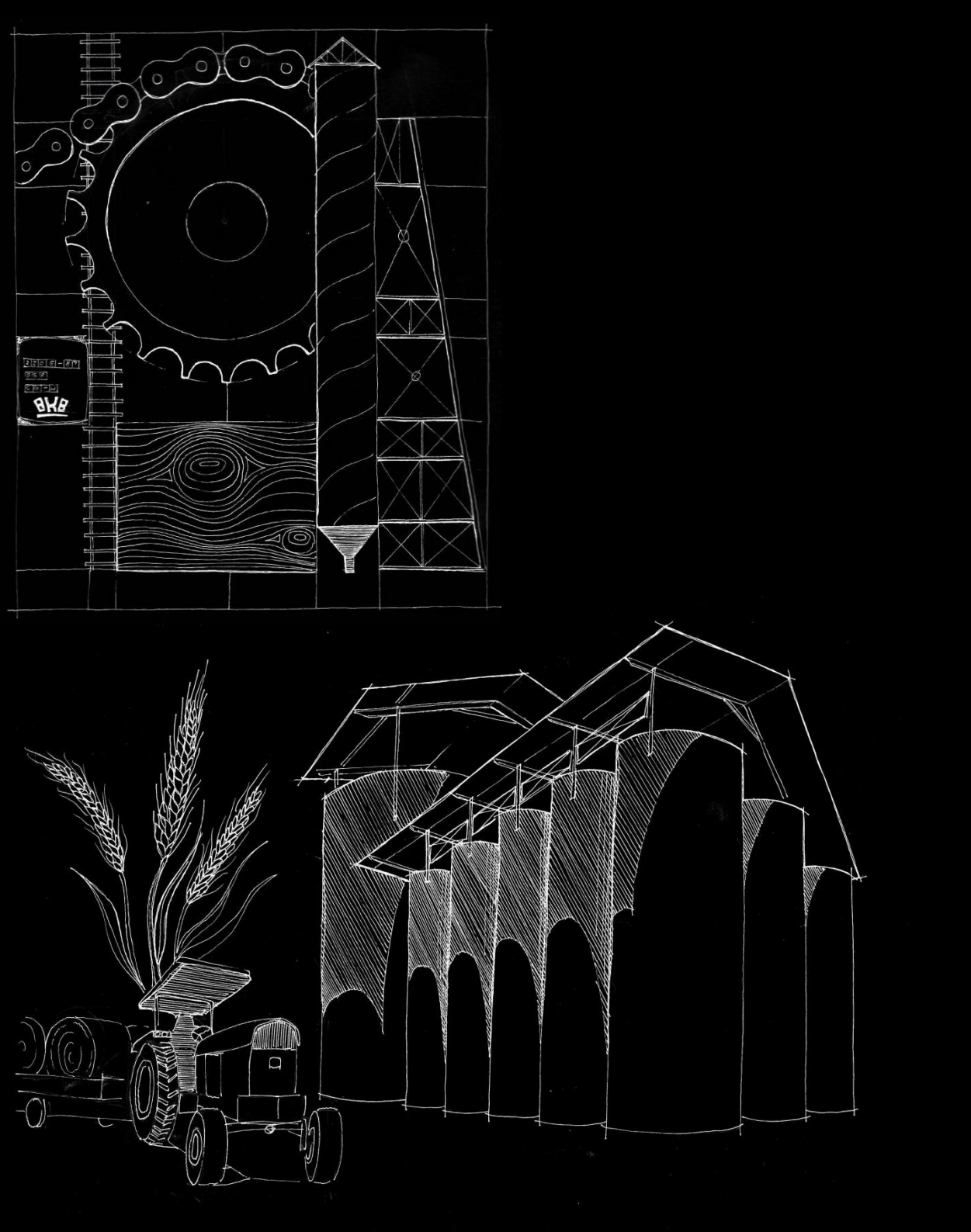


Fig C: initial sketches depicting the silo. (Author. 2019).

01

Project rationale



Project rationale: Introduction

>> Introduction

This architectural dissertation aims at working within the agricultural sector of the Free State, namely focussing on the Mangaung Metropolitan Municipality (MMM) stretching from Bloemfontein to Thaba 'Nchu. The project strives to be a viable cog of infrastructure which serves the granary of South Africa, the Free State.

The thesis proposes a place of agricultural trade, a granary, as well as a commercial administrative component in a poetic agricultural ensemble where rural agricultural typologies and commercial urbanity meet. The effects of this projects aims to reach the emerging small scale farmers giving them access to participate in the economy.

>> Creating a stepping stone for emerging farmers to participate in the agricultural economy.

The biggest costs and losses in agriculture is owed to transportation of seasonal commodities to necessary depots and terminals for dispatch. The Free State and more specifically the Mangaung metro are centrally placed in South Africa and are thus of the furthest points away from the harbours where the produce is exported. Thus this dissertation proposes the first component of the network, a granary terminal where the road and rail system meet (a catalyst for fast trade)

Considering the extreme capital costs and guidance needed to start a farming operation as well as run it logistically, this dissertation aims at constructing a stately complex which aids the emerging farmers of the MMM. In view of the vast amount of new farmers that will be entering the economy in the near future, it is foreseen that effective infrastructure in as well as structures which facilitate guidance (Afrikaans : *opleiding*: a more appropriate word in that it denotes the notion of raising someone rather than "educating" them) will need to be in place to maximise success and allow all people to participate in the agri-economy.

>> In a broader perspective, the project aims to achieve :

- An efficient ensemble of structures which act as an economic catalyst for the emerging small scale farming sector and challenge the status quo of the typical design approach followed. It ought to make provision for the abovementioned with the following:

1. An **efficient agricultural produce terminal** which effectively dispatches commodities on the transport networks to the harbours.
2. An **administrative component** which guides (Afr: *Lei op*) the emerging farmers in the grain sector.
3. A financial partner which provides **financial assistance** in the proceedings of farming as it a capital intensive industry.

Project rationale: Introduction

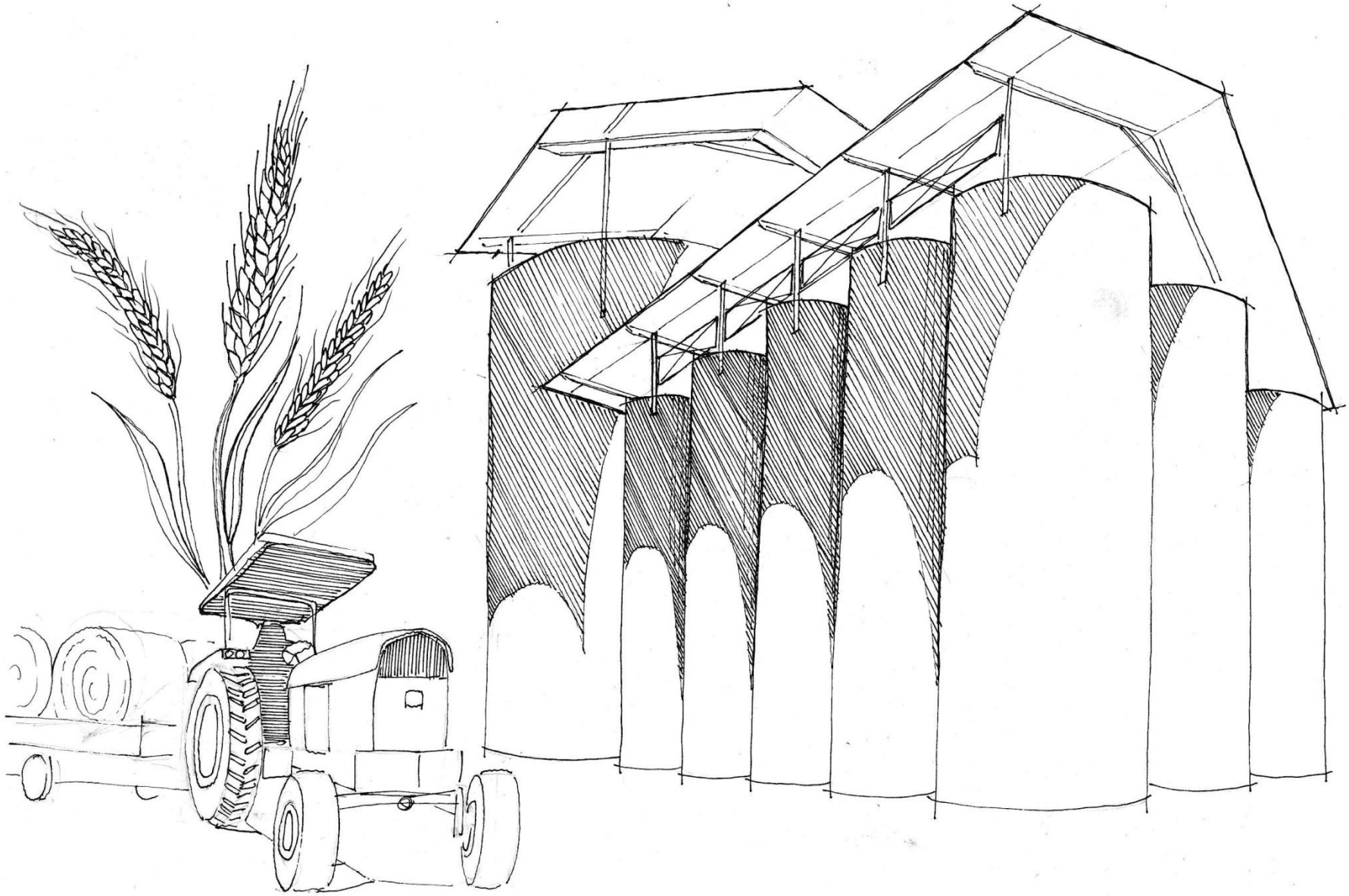
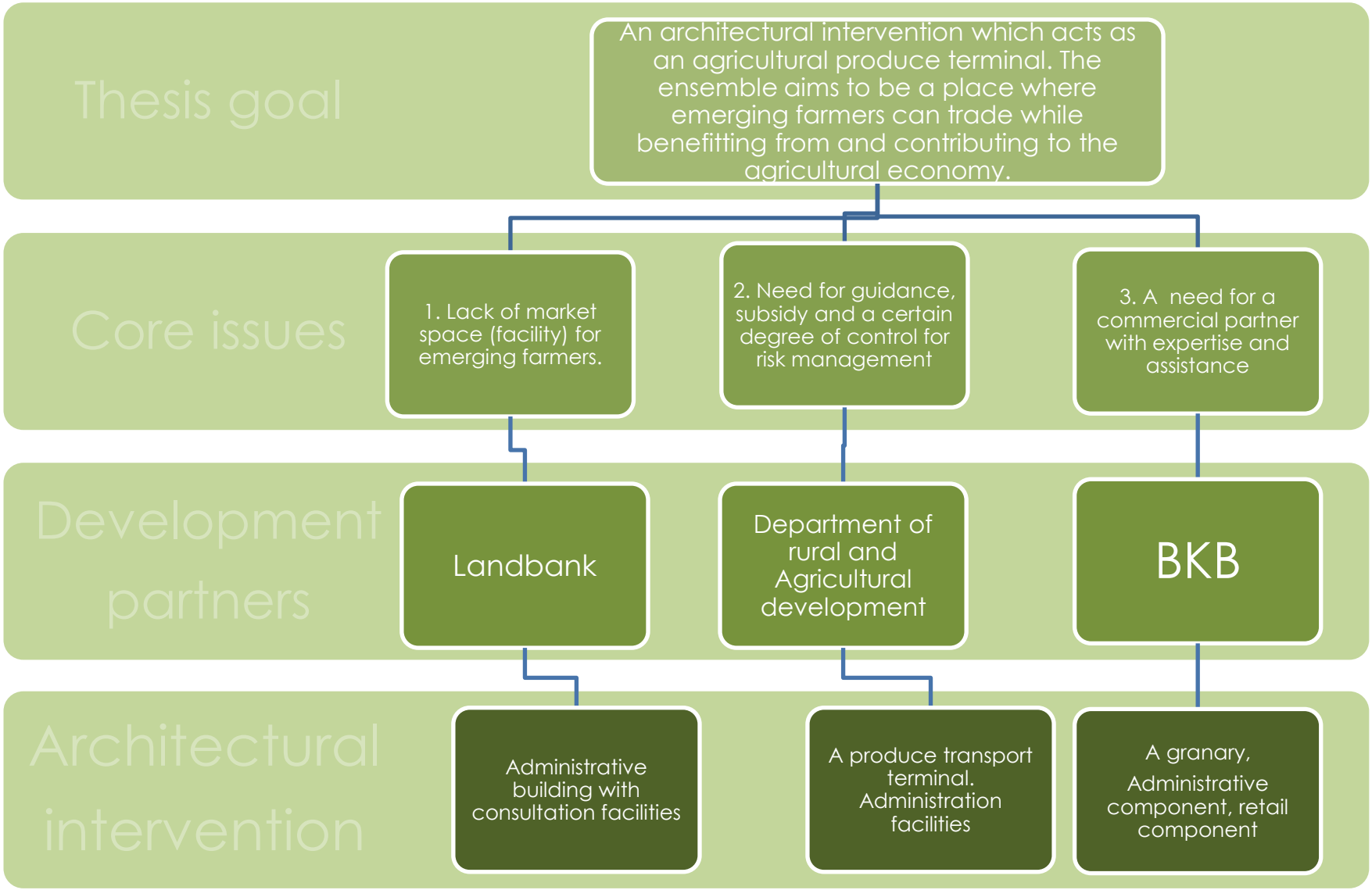


Figure 1.1: An expression of the theme of agricultural participation in the economy.
(Author, 2019).


Thesis goal
An architectural intervention which acts as an agricultural produce terminal. The ensemble aims to be a place where emerging farmers can trade while benefitting from and contributing to the agricultural economy.
Core issues
1. Lack of market space (facility) for emerging farmers.
2. Need for guidance, subsidy and a certain degree of control for risk management
3. A need for a commercial partner with expertise and assistance
Development partners
Landbank
Department of rural and Agricultural development
BKB
Architectural intervention
Administrative building with consultation facilities
A produce transport terminal. Administration facilities
A granary, Administrative component, retail component

Free State Department: Agriculture and Rural Development

Mission:

The mission statement of the Free State agriculture department echoes the goals of this dissertation in that it strives to facilitate the following:

1.Effective development of agricultural support.

2.Cultivate investment attractions into the local agriculture sector.

3.Ensure development of the rural scape and livelihoods of those within it.

4. Constant economic growth.

The goals of the department are:

1.Increasing the profitable production of food products.

2.Effective authoritive and regulatory bodies to conduct operative risk management

3.Transformation orientated education and training for individuals in the sector.

4.Most importantly: creating vibrant and sustainable communities in the rural scape.

(Department of Agriculture and rural development. N.D. Online.)

Figure 1,2: Agriculture and Rural development logo. (Mangaung Metropolitan Municipality, 2019. online).

Landbank: Land and Agricultural Bank of South Africa

The Land Bank is a government financial institution dedicate to the development of the agricultural sector since 1912..
The institution is a key element in the agricultural industry as it is a relatively high capital intensive business. This component is pivotal to the project as without adequate finance nothing will be possible in uplifting new and upcoming farmers.

The goals of the Land Bank are:

1.Increase the equitable land ownership and act as a key player in distributing land equally.

2.Move away from the inequalities of the past and provide a fair chance for everyone in the sector.

3. Be a key player in promoting food security in South Africa as a ready financial partner.

(Land Bank, n.d. Online)

LAND BANK
We stand by you

Figure 1,3: Land bank logo. (Land Bank, n,d; online).

BKB: GrainCo.

BKB has been known as the dominant agricultural authority for agriculture, providing effective assistance to famers for a multitude of needs for a century since 1919. The company has earned the trust of farmers over the years assisting in handling farmers produce, producing grain and other commodities such as wool and mohair.

The goals of BKB are:

1. Cultivate and maintain a mutually beneficial relationship with clients.
2. Build up the South African economy from its core, the agriculture sector. Include all scales of economy for farmers to contribute from grassroots level.
3. Respect traditions but also leave enough room for innovation which is needed for a growing economy.

(BKB, N.D. Online)

Figure 1.4: BKB Logo (100 years edition). (BKB, 2019; online).

Project rationale: a metaphor

Figure 1.5: Touchstone. Author. 2019

The touchstone: a metaphor for the project.

The touchstone for this project seeks not to be a visual source of inspiration but rather one which sheds light on how the architectural system ought to function and address core goals of connecting nodes.

Essentially, the main concept of the ensemble pictured on the right is derived from the idea of a Venn diagram. It is a system of connecting various systems which will later fall into the hermeneutic design process to form the whole (the design intervention), namely:

1. The road network
2. The railway network
3. The maritime system

(These aspects sum up the logistical aspects)

1. Rural agricultural aspects
2. Commercial urbanity

(These aspects sum up the contrasting settings)

All the various elements are collected to intersect at a localised central point to emphasise the goals for the site as well as the workings of a granary terminal: A repository which is place of central accumulation of commodities for dispatch as well as a new central cog needed for the functioning of new and upcoming farmers in the region of concern.

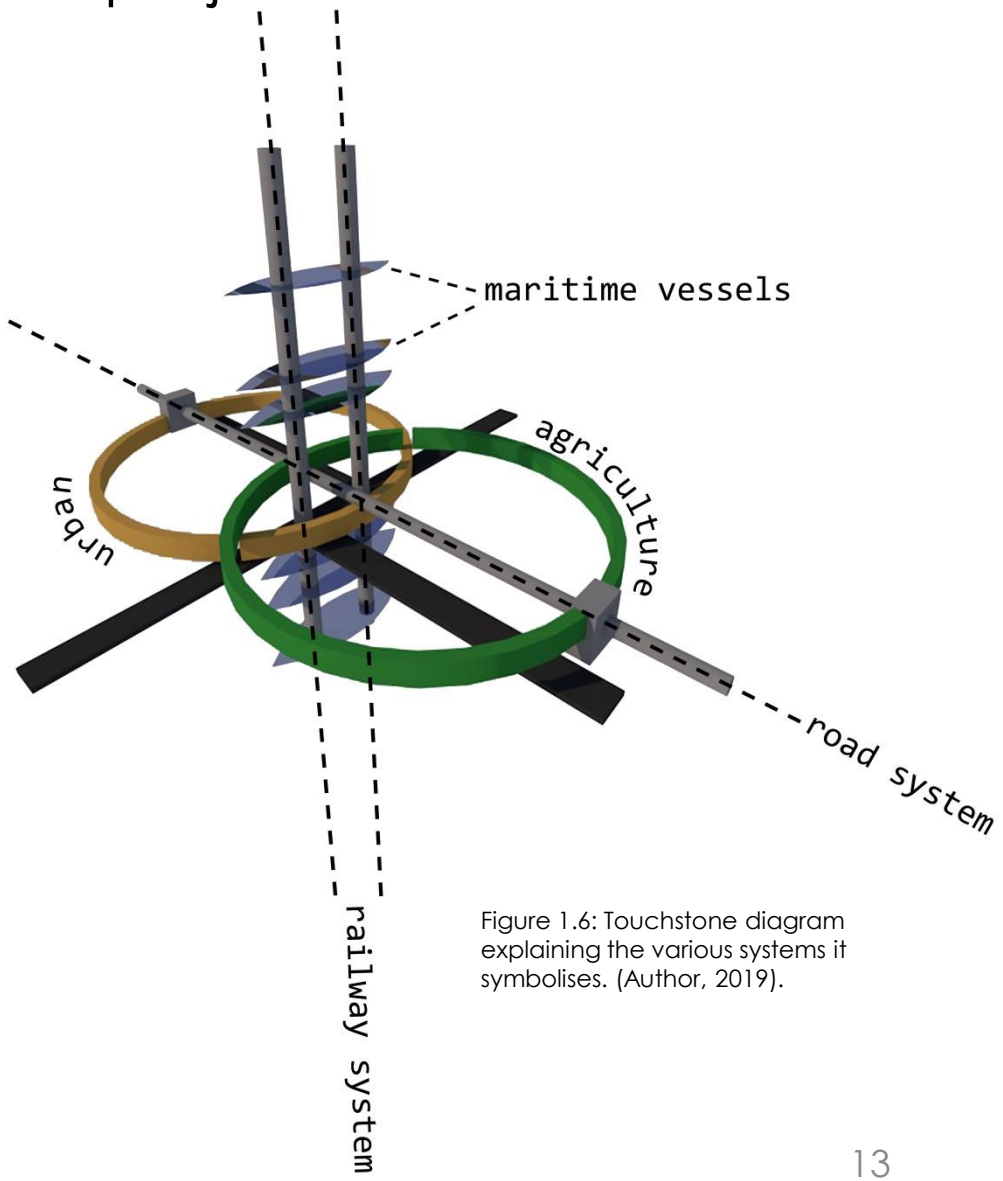


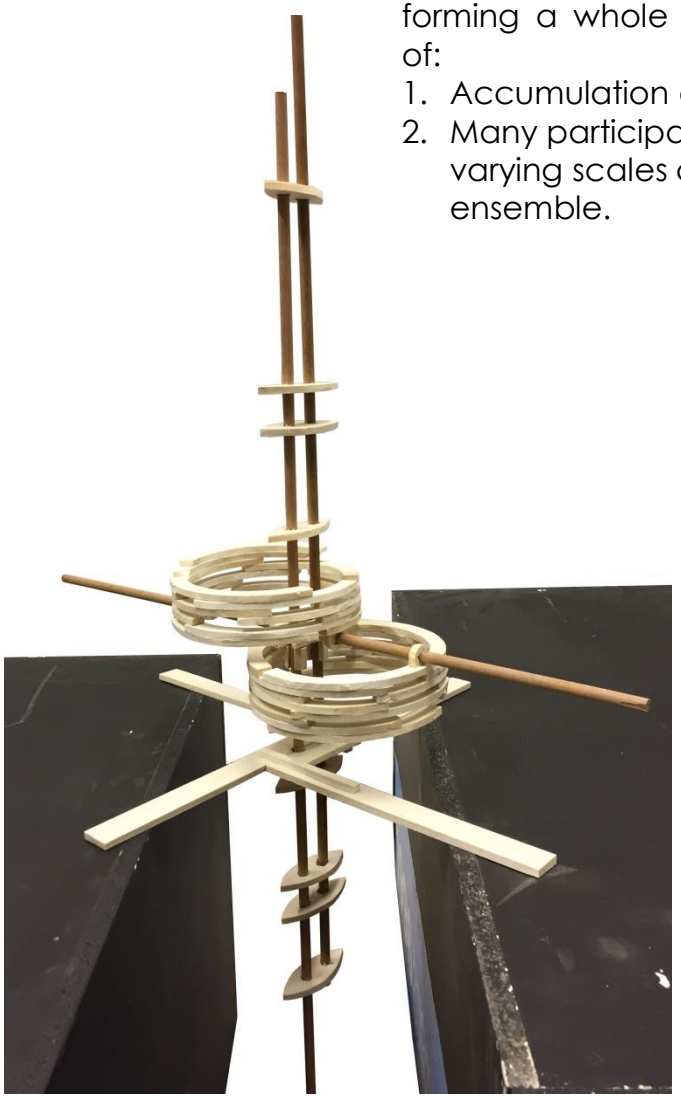
Figure 1.6: Touchstone diagram explaining the various systems it symbolises. (Author, 2019).

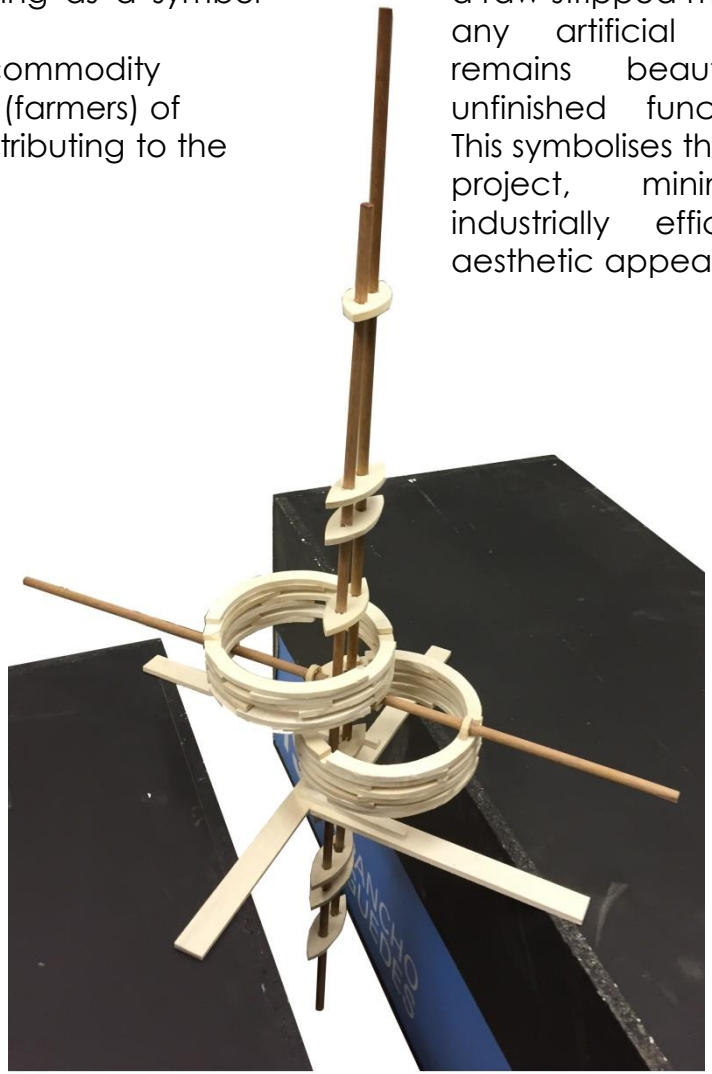
Project rationale: touchstone

The rings on the touchstone became fragmented, with multiple parts forming a whole acting as a symbol of:

1. Accumulation of commodity
2. Many participants (farmers) of varying scales contributing to the ensemble.

The material chosen, wood, serves as a valuable symbol of a raw stripped material free of any artificial finishes but remains beautiful in its unfinished functional state. This symbolises the goals of the project, minimalist and industrially efficient in its aesthetic appeal.





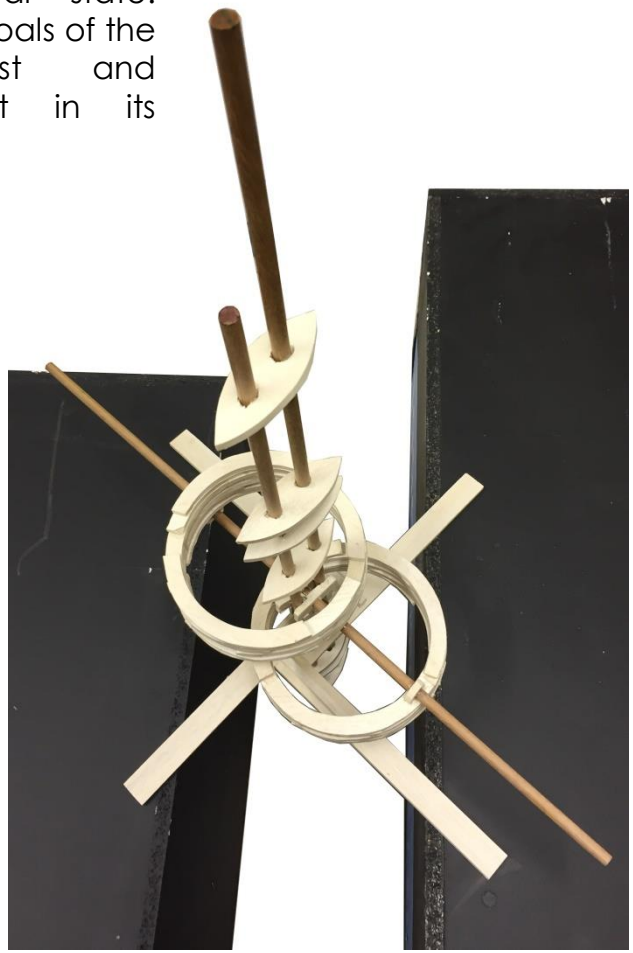


Figure 1.7: Touchstone. Author. 2019

Conceptual approach:
Assemblage

The sketch aims at incorporating some of the theoretical aspects of assemblage such as coding whereby the components are all arranged via the vertical axis of the railway tracks (transport system). This philosophical standpoint looks into arrangements as well as relationships of congregating patterns. Its focus lies in the way material systems fall into place by means of organising itself to result in assemblages which are formed through 2 main processes: stratification and territorialisation.

Stratification, although it is to soon to determine a definite hierarchical component, the more important aspects, (storage and transport) in the form of tracks and a silo has been given vertical prominence.

Territorialisation, the functioning of the site will be inspired by the machine metaphor, each object having a specific function contributing to the operating of the site thus giving prominence to the chain and sprocket in the centre of the assemblage, putting emphasis on this being the key driving factor.

Symbols included in this assemblage; silo: storage, Rails: transport, Scaffolding: industrial, wood: handling of raw commodity.

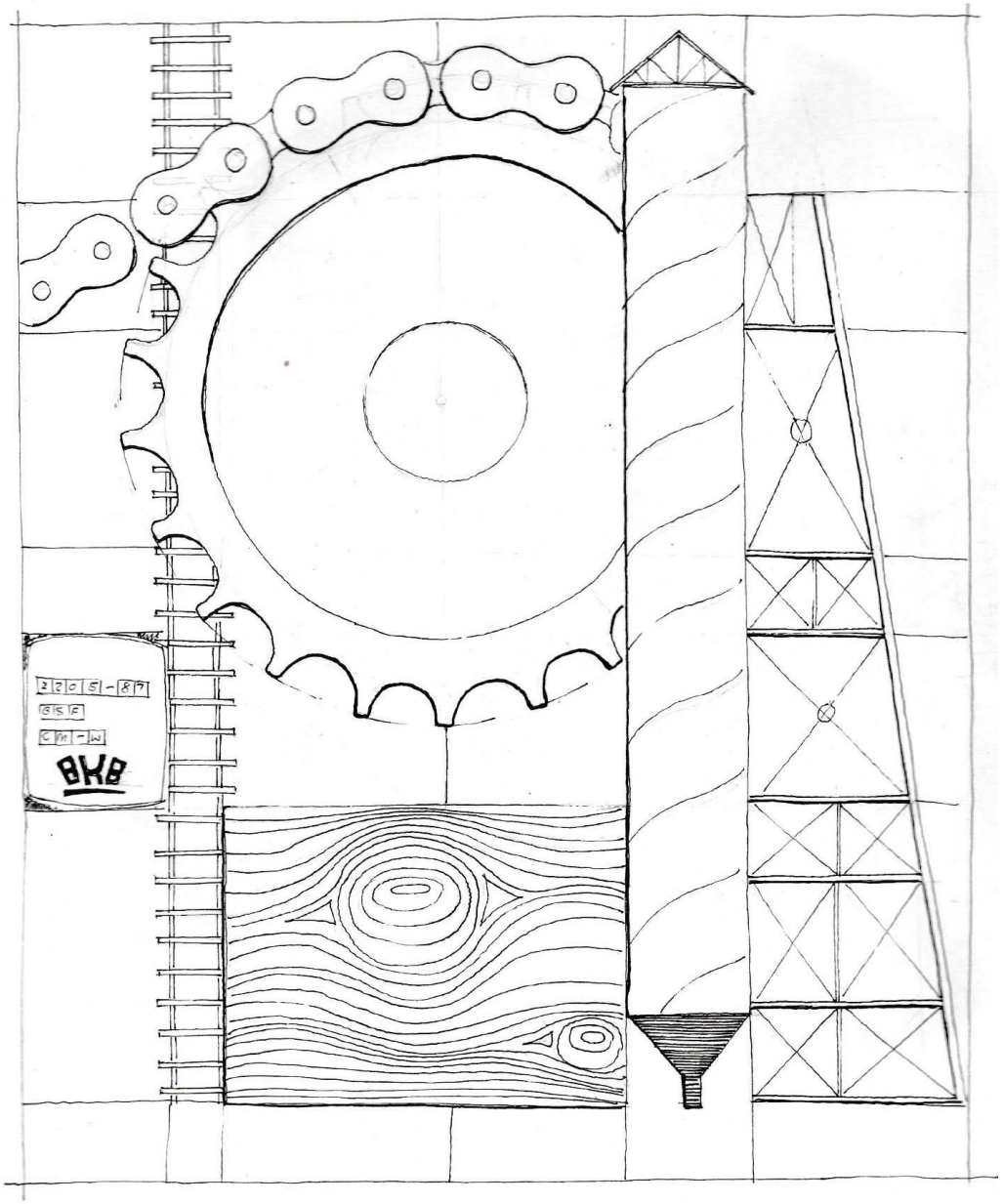


Figure 1.8: initial concepts: Assemblage drawing. (Author, 2019).

Conceptual approach
Frame

This concept aims to acknowledge the various frames and the tensions that need to be mediated and merged in order to have a smoother transition between the various components.

The sketch below aims to depict the difference in the two components, but where they meet, a mediator allows the two to merge.

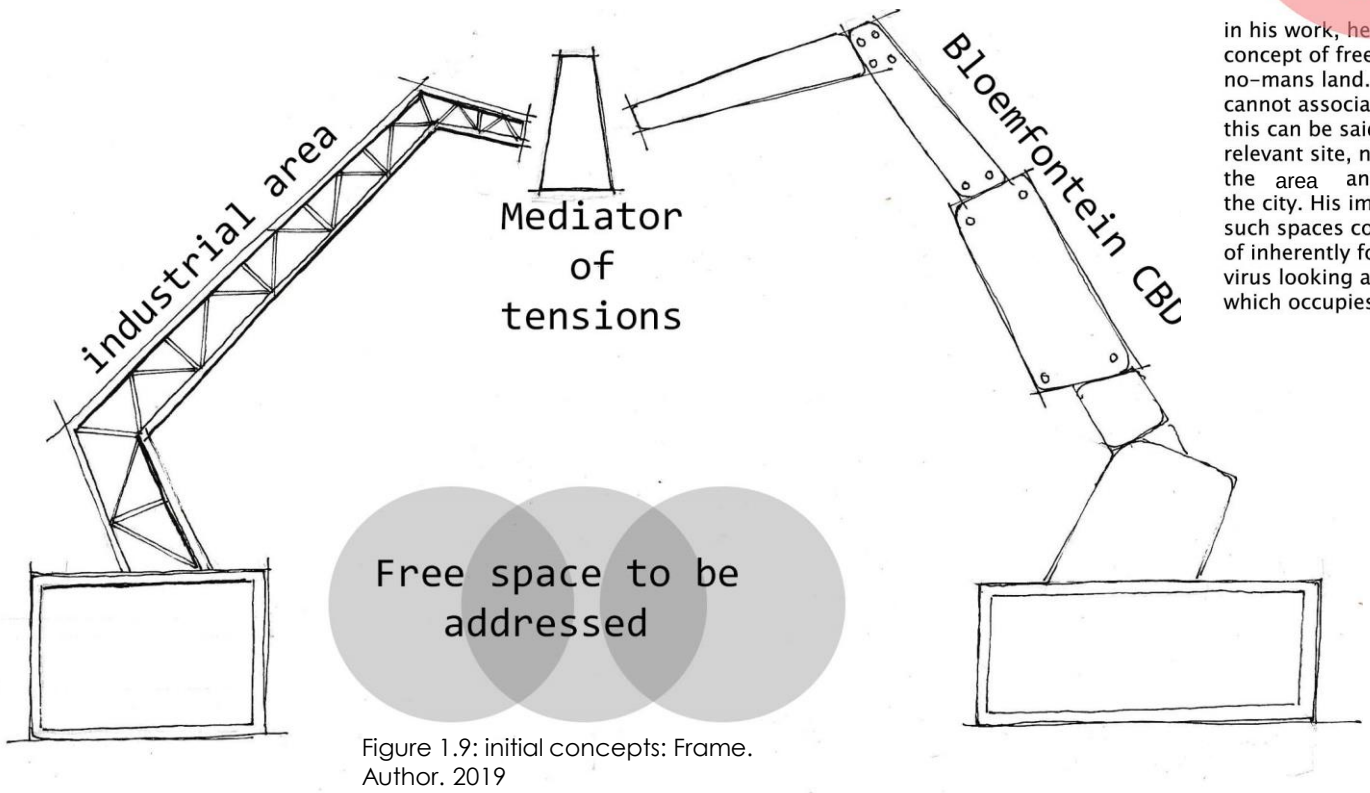


Figure 1.9: initial concepts: Frame. Author. 2019

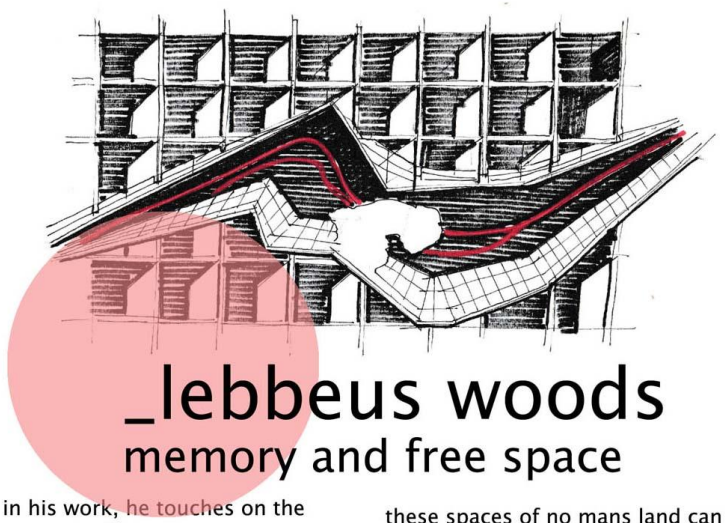


Figure 1.10: initial concepts: Frame: Free space . Author. 2019

Conceptual approach:
Machine metaphor

The inspirational sketch aims to combine ideas of the machine metaphor, transformation and dynamism into one image.

The image depicts 5 cams, each symbolising a department of BKB, acting as a driving force for the rest of the machine to function.

The "pistons" can be seen as a merging between the mechanical term as well as a silo its architectural form.

As a whole, the image can be seen as a dynamic one with moving parts each in relation to each other with specific tasks at hand relating back to the machine metaphor.

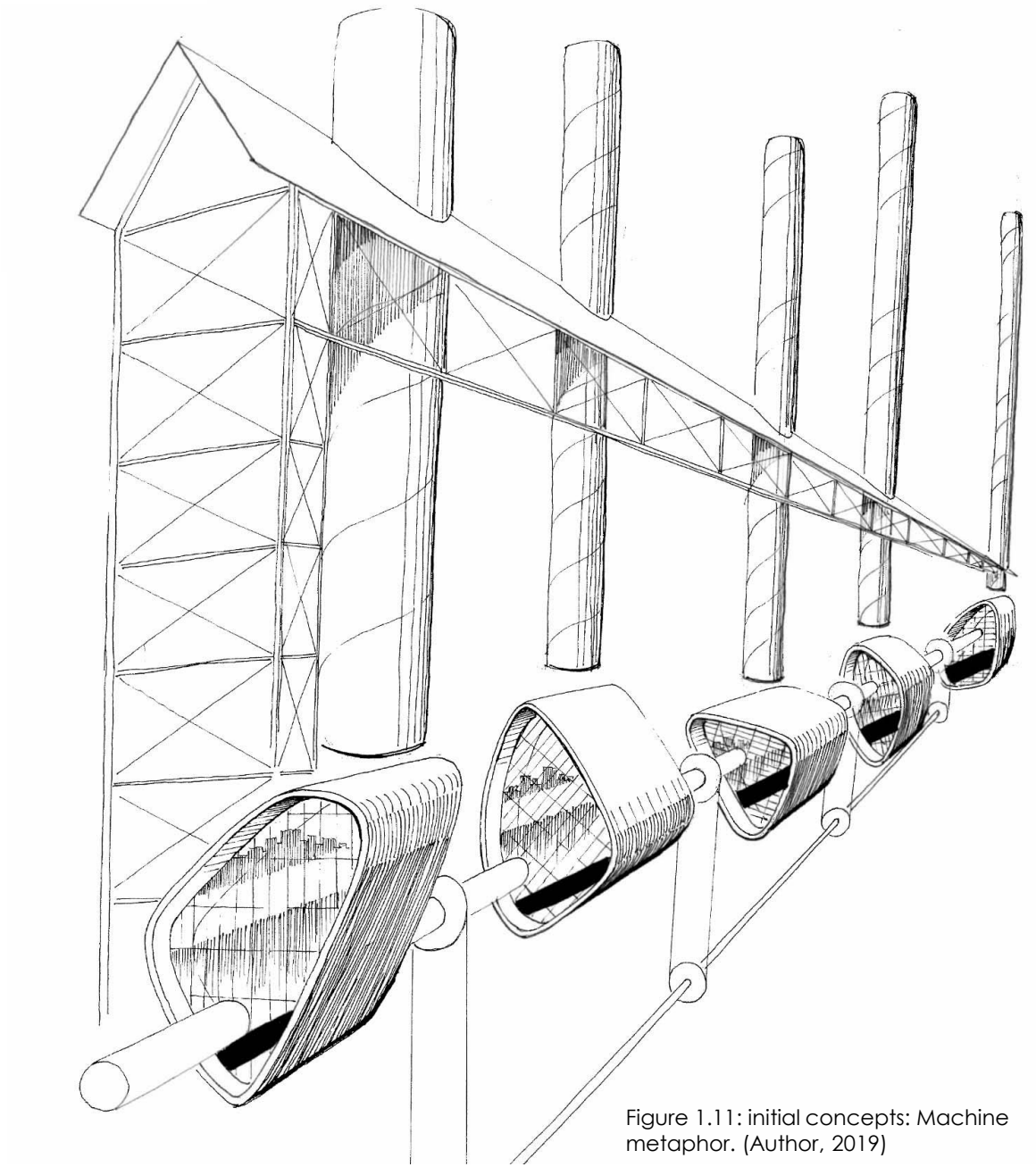


Figure 1.11: initial concepts: Machine metaphor. (Author, 2019)

Existing models

The existing form of a mill and granary has been analysed in terms of what its programme encapsulates. Its brutalist approach in easily revealing the functions within has aided in developing a suitable programme for the proposed granary terminal. Below is the granary and mills on the western outskirts of Bloemfontein on the N8 outbound to Kimberley. The structure acts as an industrial gateway into the city from the respective axis and comments on the workings of the economy of the western Free State, one of grain produce.

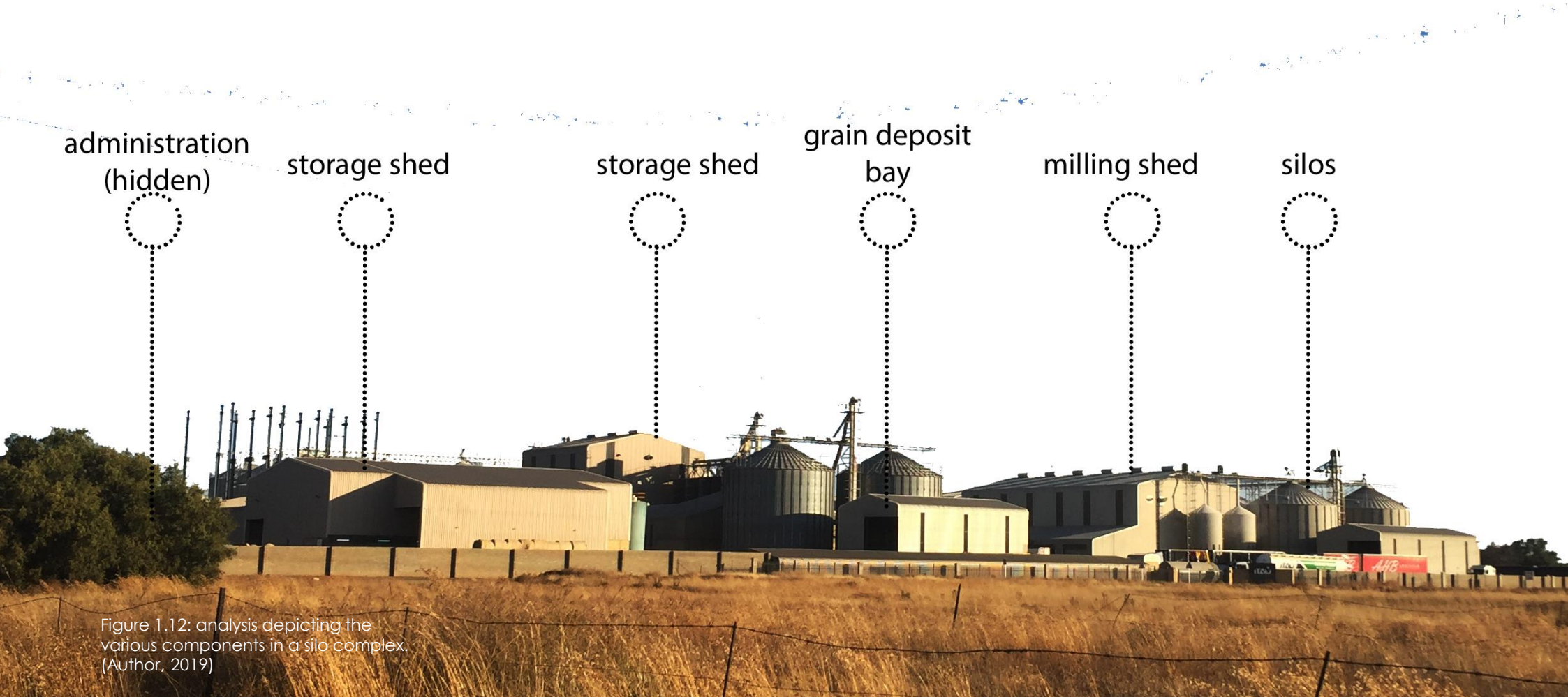


Figure 1.12: analysis depicting the various components in a silo complex. (Author, 2019)

Project rationale: programme development

A

Administration building = 200 person office building

- Department of Agriculture
- BKB
- Land bank

B

Silos = 9x100 000ton silos

- Maize silos x3
- Soya silos x3
- Sunflower silos x3

C

Grain deposit bay

D

Stores: tractors and implements

E

Retail store: BKB

F

Entrance: gatehouse, cars vs trucks

02

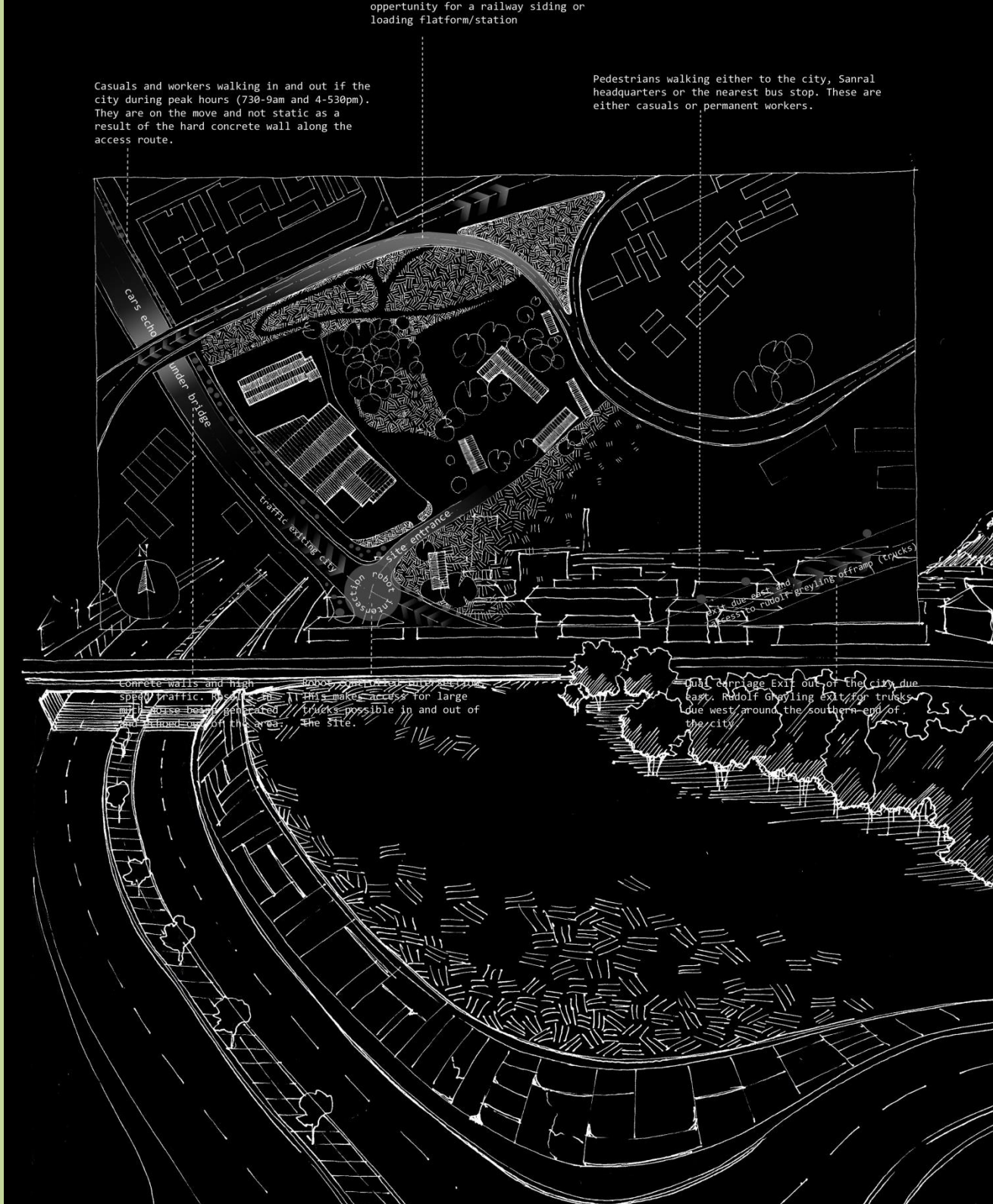
The region of concern

Site analysis

2.1: Macro context

2.2: Meso context

2.3: Micro context



Introduction

This site analysis will comprise of three major components, first, the macro scale analysis. This component will investigate how the project will be embedded within the logistical networks of South Africa and how it connects to major harbours along the coastline. Closing in on the site, it will analyse the various agricultural production methods and focus on the grain production areas.

The meso analysis will look into how the project will fit into the integral cogs of the Mangaung Metro system as a means to achieve a sustainable future for agricultural development in the immediate area. This components analysis will look into place, custodianship of the land, the imminent possibility of loss of place as well as the evident information of the utilisation of the land via farming practices via the N8 corridor. The corridor spans between BFN, Botshabelo and Thaba 'Nchu. It will aim to take a holistic analysis of the context which the project will serve.

Lastly, the micro site analysis will focus more closely on the specific site conditions. The micro site analysis will study the immediate urbanised context of the site, functions of neighbouring components, its proximity from relevant landmarks as well as the feasibility that the site will hold beneficial to the project as it stands on the site.

Key words:

Custodian: A body or individual on who the responsibility lies to protect, preserve or care for something.

Region of concern: in Heideggarian terms, interpreted as one's situation of emplaced care, which one is always already propelled into.

Loss of place: A term used by Christian Norberg-Schulz, interpreted as one's alienation (a fundamental homelessness) from place where one can no longer associate with it.

2.1 >>> macro site contextual analysis

---1200KM---

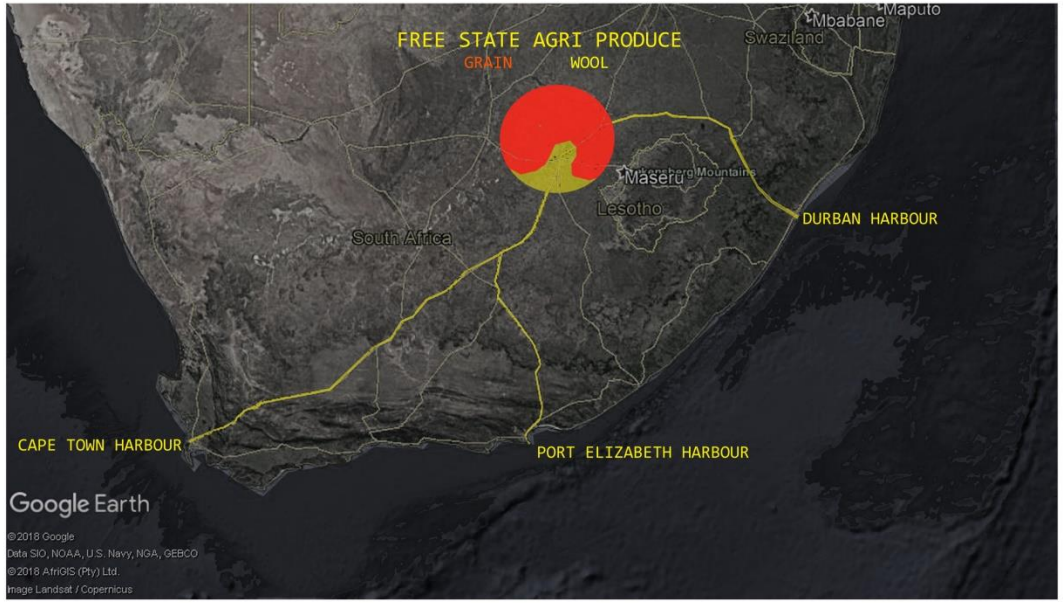


Figure 2.1: Map adapted by author investigating the macro context of the site. (Google Earth, 2019; online).

In the functioning of the country, the Free state is relatively far from all major harbours, namely Durban, Port Elizabeth as well as Cape Town. Thus, the logistical processes in shifting the agricultural produce needs to be as efficient as possible to maximise economic activity.

---225KM---

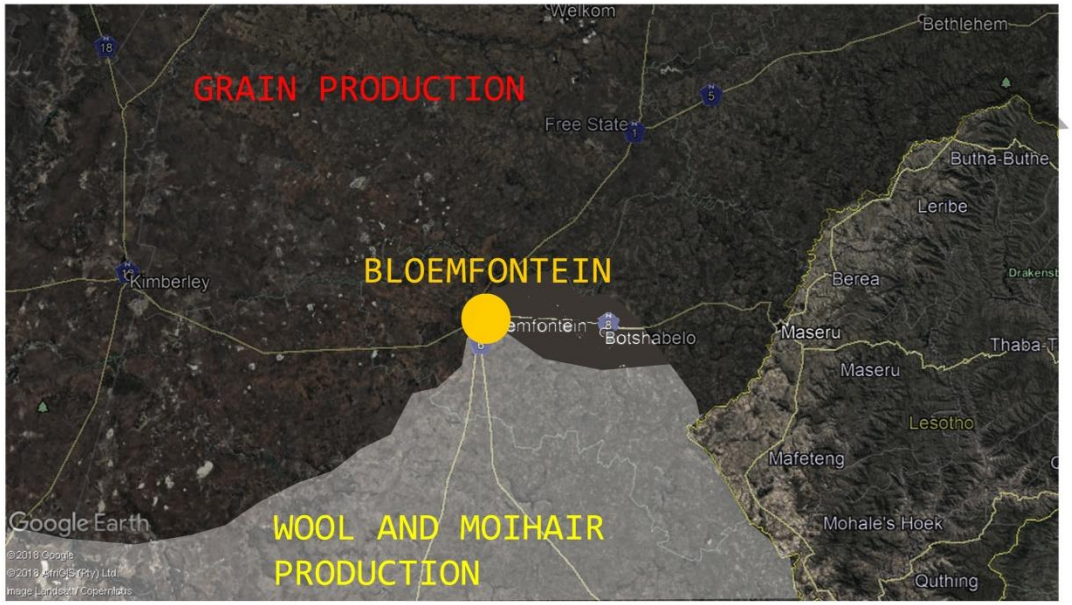


Figure 2.2: Map adapted by author investigating the agricultural produce of central Free State. (Google Earth, 2019; online).

Looking into the greater scheme of the Free State, the agricultural production is split between grain production and wool production. Bloemfontein, the capital of the province convieniently sits centrally in the province adding to the viability of the site.

The region of concern: Introduction

Figure 2.3: Map adapted by author investigating the meso-macro context of the site in relation to the city (BFN). (Google Earth, 2019; online).

Looking at how the site fits in with the rest of the city, its clear how the railway splits the commercial with the industrial/rural components of the city. The site sits on the threshold of this line and acts as the "gateway" between the two extremes.

Figure 2.4: Map adapted by author investigating the meso context of the site in relation to the city railway and N8 highway (BFN). (Google Earth, 2019; online).

Looking closely into the site, it sits on a pivital location, adjacent to the highway into the city, the N8 as well as the railway lines, allowing the site to make provision for the two means to meet.

The meso-macro context - place

Introduction

The art of cultivating ones land presupposes a sense of custodianship for that land, a responsibility towards the place. This stems from the being's inherent nature of care towards ones place where they participate (the act of cultivating the land responsibly) in place. (Auret, 2015: 54) Ones place is directly linked to their history and context, history being an inheritance from the past and context being ones always already situation. The agricultural cycles one undergoes, cultivating the land seasonally is directly linked to one appropriating and re-appropriating ones place as a custodian show of care towards place. "The reality is that buildings and people form a reciprocal relationship in which the shared identity of place is continuously appropriated and re-appropriated as a region of concern by a being of care" (Auret, 2015: 56). A region of concern can be interpreted both as the way people engage with place, but also the way in which place is identified, related to and understood. (Aure,. 2015: 57)

The main areas this project aims to serve is projected at the grain farming areas covered by the Mangaung Metro and functions as a whole with multiple settlements contributing to it with the city of Bloemfontein being the capital. A number of towns form part of this cluster namely: Botshabelo, Dewetsdorp, Mangaung, Soutpan, Thaba Nchu, Van Stadensrus as well as Wepener. Strong growth has been shown by the economy due to the governments involvement by introducing people to the sector over the last five years and has thus improved the livelihoods of many (Municipalities of South Africa, 2019; online) This project will focus its context however on the cluster of Bloemfontein, Botshabelo and Thaba 'Nchu within the MMM.

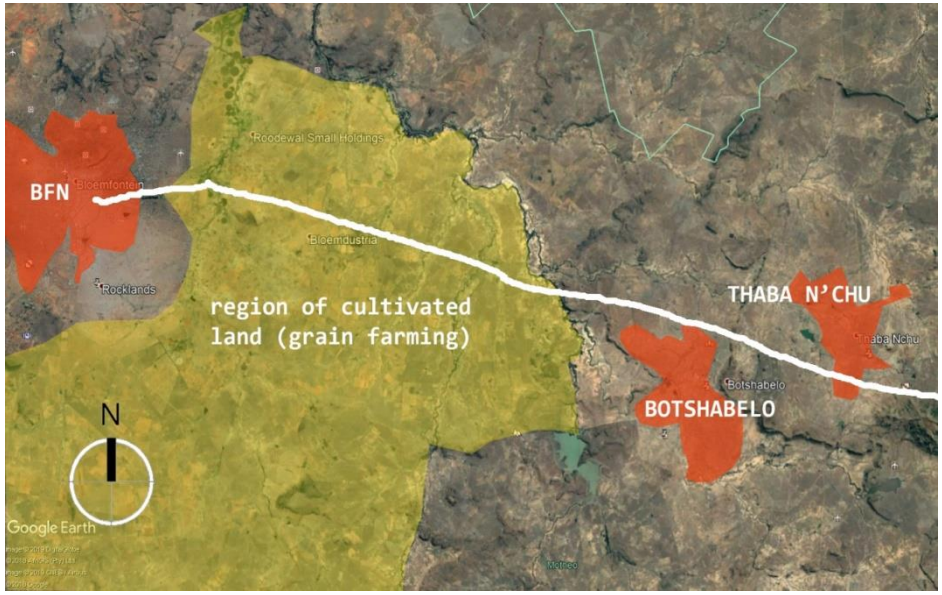


Figure 2.5: Map adapted by author investigating the agricultural grain farming land within the MMM (Google Earth, 2019 ; online).

The region of concern: Macro context

After closely studying maps of the surrounding area of Bloemfontein, Thaba N'chu as well as Botshabelo, it has become clear that there is an overwhelming amount of small scale grain farming taking place, densely populating the cultivated land between the urban settlements. This is contrasting to the norms of where the economy of farming is tending towards today in South Africa as the economies of scale are becoming ever more evident. This is owed to the fact that it is more economical to produce at a large scale and is thus more profitable. As a result, individual farmers are occupying more and more land to make a living in today's economy and the number of small farmers are diminishing (Duffy, 2009; online). This project aims at playing the role of custodian in protecting the smaller scale farmers, especially within the Bloemfontein-Botshabelo-Thaba 'Nchu cluster of the Mangaung Metropolitan Municipality.

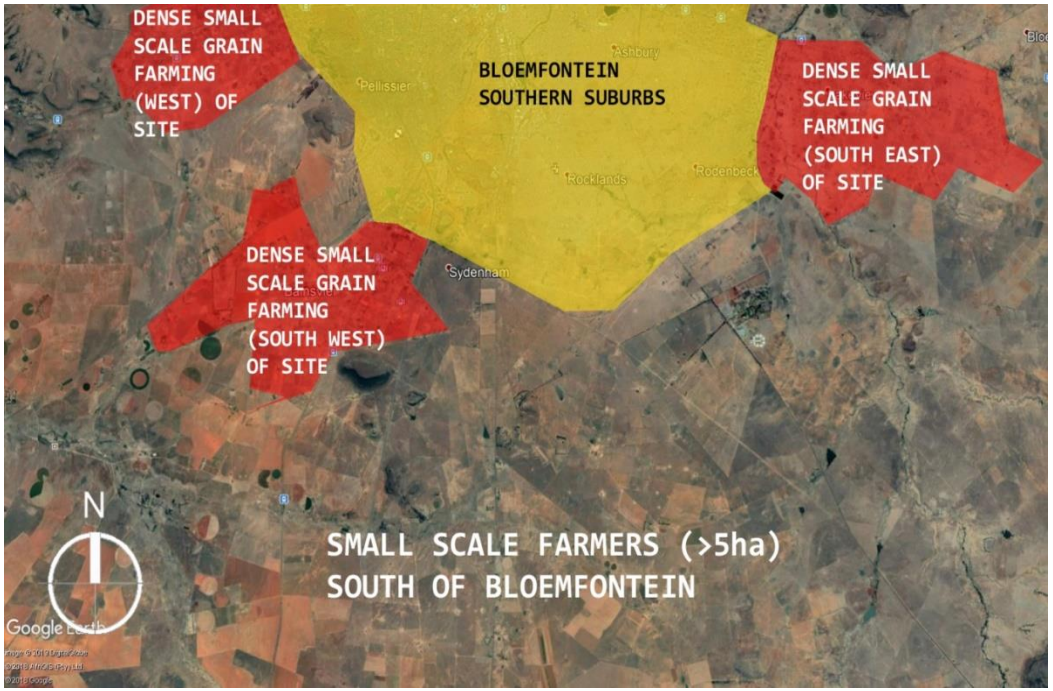


Figure 2.6: Map adapted by author investigating the agricultural grain farming land within the MMM south of BFN. (Google Earth, 2019; online).

The region of concern: Macro context

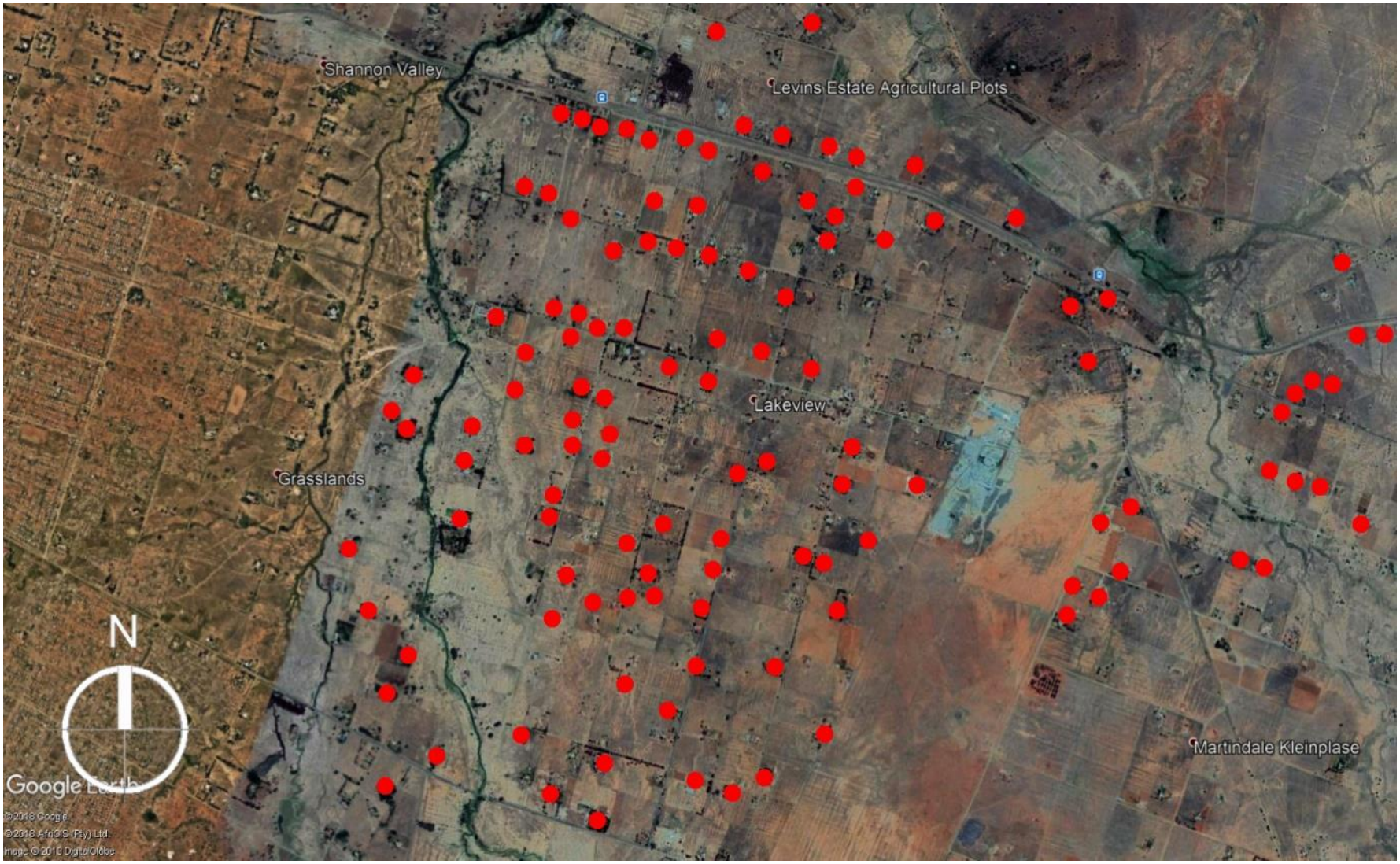


Figure 2.7: Map adapted by author investigating the vast amount of small scale farms smaller than 5ha each denoted by a red dot. (Google Earth, 2019; online).

An interpretation of the context of place (the always already situation)

The phenomenon of economies of scale taking precedence in today's agricultural economy is resulting in a depopulation of the rural areas of South Africa. It is not an uncommon sight to see multiple farms owned by a single body to attain an economic success of cultivating the land. This trend is tending towards a 'loss of place' where people are alienated from their place. In turn, the layeredness of place where the history and context of dwellers is wiped out (the region of concern as a being of care through their inheritance and situation) to be swallowed up to be conglomerated in a bigger whole controlled by a single body. However, all the different scales of production ought to be included into the scheme along the N8 highway.

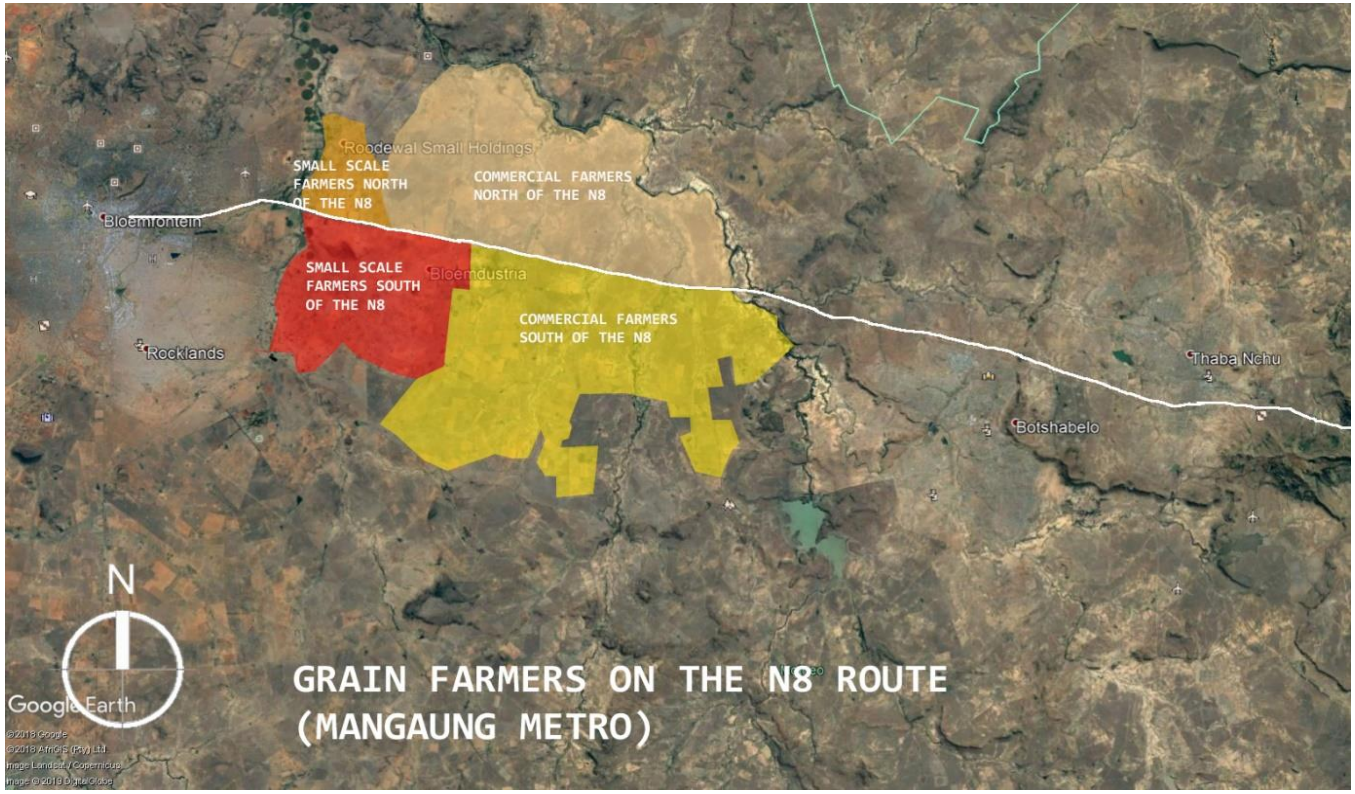


Figure 2.8: Map adapted by author investigating the various scales of farming operations along the N8 between BFN and Botschabelo. (Google Earth, 2019; online).

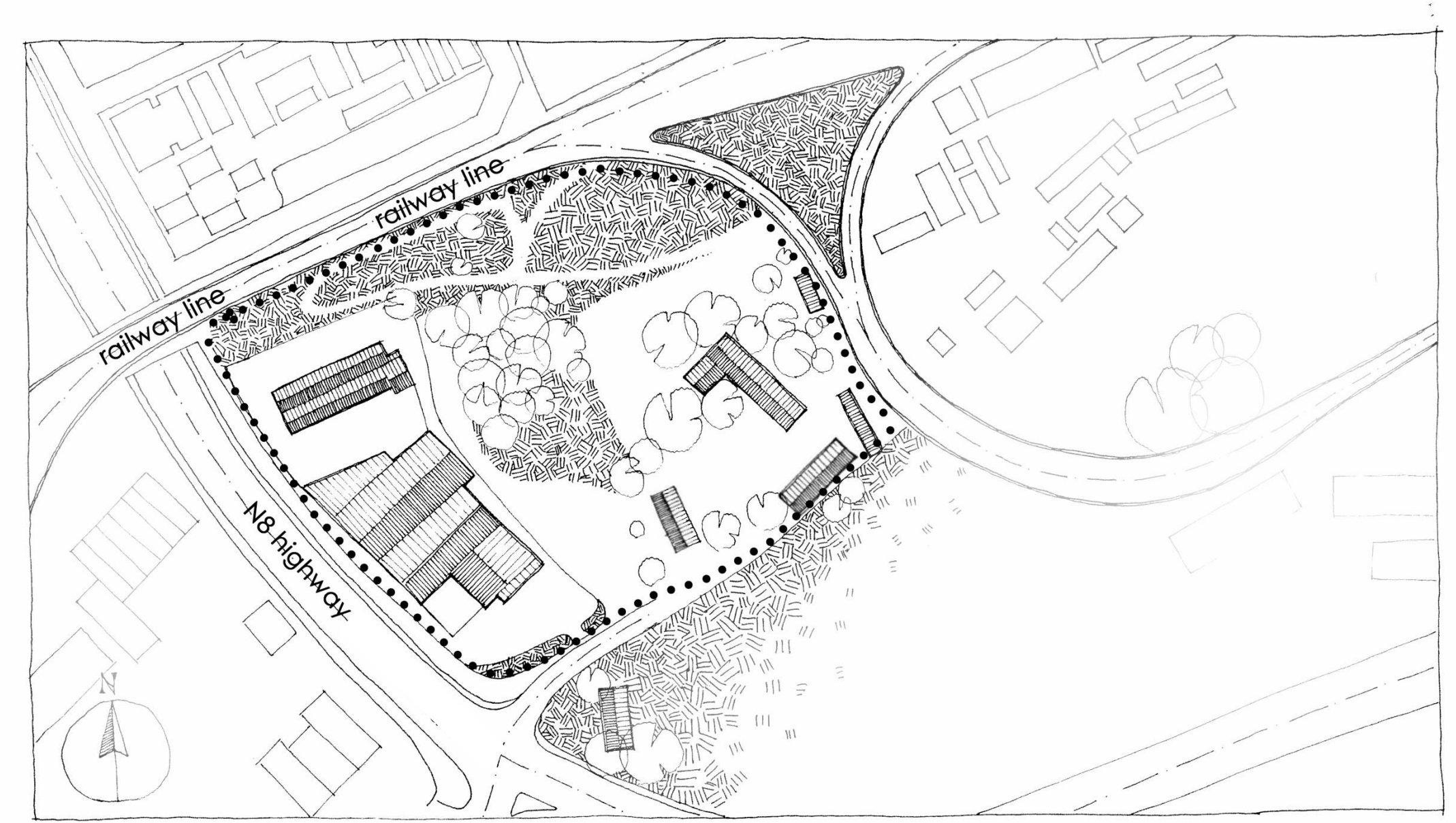


Figure 2.9: Map depicted of the site showing the site boundaries, the railway line to the north-west and the n8 highway running along the south-eastern edge. (Author, 2019).

1.Context

The site of the project needs to fit the brief in terms of achieving the outcomes of the interchange and is pivotal to the success of the project. Thus, the site needs to be carefully selected in terms of a number of factors namely:

1. The impact the structure/project will have on its existing context.
2. Its proximity from its relative landmarks or points of relevance to the project.
3. The orientation of the site.
4. The economic feasibility that the site holds for the. project.
5. Services available on site.

(Benzu, 2011; online)

1.1.The impact the structure will have on its immediate surrounding context.

Introduction

The key factor is the notion of not overlooking the neighbours or "context" of the building. Although this topic may sometimes focus primarily on visual application, it would be of value to look deeper into the problem by acknowledging functions of the buildings surrounding it (and the greater functioning of the area i.e an industrial zone around the rail network), their proportioning systems (if any) and lastly the material palette one needs to work with.

The reasoning behind looking into the greater context of the building lies in the architects ability to create architecture that not only ties in (not mimic the existing) but also contributes to a bigger scale of creating place. Especially when considering that a building of this scale can have broad effects on its surrounding context and place, either by commenting on it, revealing aspects of place or contradicting it.

The above ideas can be summed up as confrontation, contradiction and congruence(Abedi. 2015: 158). These are the broader options one has when working within a context, much like the approaches one would have to a heritage project where one would either contrast the existing structure, comment on it (separated but confronting its context) or mimic it (congruence). In this project, elements of all 3 approaches are to be appropriated on various levels in that the project ought to speak of its context but also confront it in certain ways in that this project challenges new ways of thinking in approaching design in industrial complexes.

Functioning of the context

The placement of the site is relatively liminal in that within a 400m radius of the site, one will find 4 major components of the city namely dense urban CBD to the north, residential areas to the south-east, the flow of a natural water source to the south east as well and industrial complexes to the south and west of the site. It is evident that the site has many different viewpoints from different extremes in its close proximity namely urban, residential, natural as well as industrial components.

1.2. Proximity of the site from relevant landmarks

In order to determine the sites proximity from relevant landmarks, one would first have to determine what is of relevance to the project in terms of is functionality, aesthetic qualities and material palette. This information will lie embedded in the project rationale stating the identity of the project at hand.

Firstly, the biggest component of the project lies in its relation to the railway network and how it connects to it via a loading/unloading station better known as a railway siding. Considering that the project is in good proximity of much of the train networks headquarters, Transnet, it would be of benefit to determine what parts are of relevance and (reference) to the project.

The region of concern: The site

The train station

In 1898, Bloemfontein developed its first double story railway station and served as the main link between the Transvaal and the Cape. This place served as a popular place for residents as well as enthusiastic tourists to have picnics and recreational activities. The erection of the rail way had a direct effect on the economy of Bloemfontein. As a result of the railways, prominent stores and businesses began such as Cleghorn & Harris, Hepworth and Chudleigh Brothers just to name a few (Schoeman, 1980; 115) .

Together with agriculture, public transport has been a pivotal element in Bloemfontein's rapid development to what it is today. The train station thus historically served as Bloemfontein's link to the rest of the country and in consequence served as an economic kick start for the (then) town (Bicknell, 2014; 48).

Its place in history thus serves as relevant landmark for the project as it connected Bloemfontein and it acted as an economic catalyst whilst keeping in tune with the guidelines of the project at hand. The train station is approximately 300m away from the site eastbound.

Figure 2.10: the Bloemfontein train station in the mid-20th century . (Pivnic, n.d; Online).

Figure 2.11: A train departing Bloemfontein train station in the mid 20th century. (Lewis, 1968 ; Online).

The region of concern: The site

The N8 highway entering the city from the East

This route can be seen as one of the major entrances to the city as it is one of 3 national routes linking the city to the rest of the country. Being the main connection between Bloemfontein and the Eastern Free State as well as the main link to Lesotho, it carries much traffic and serves as an important gateway into the city. The N8 is also a strategic development and has been flagged as an area for future economic growth by the planning authorities (Mangaung Metropolitan Municipality, 2019).

The N8 also houses the route from the city to the industrial development zones housing also the major train service yards and SANRAL headquarters for the region. The N8 highway has a significant procession of trees entering the city with a long distance of tall Blue gum trees framing the road. It acts as one of the major threshold one encounters as one approaches the city from the East.

The municipality in its Spatial Development Framework document has identified the N8 node as a viable area for large scale development due to its placement in terms of the eastern entrance (the busiest entrance into the city) as well as its proximity to the airport. A large scale ring road along the east of the city is planned to be built which will allow large transport vehicle to access the area with ease (Mangaung Spacial development Framework, 2005. online) .

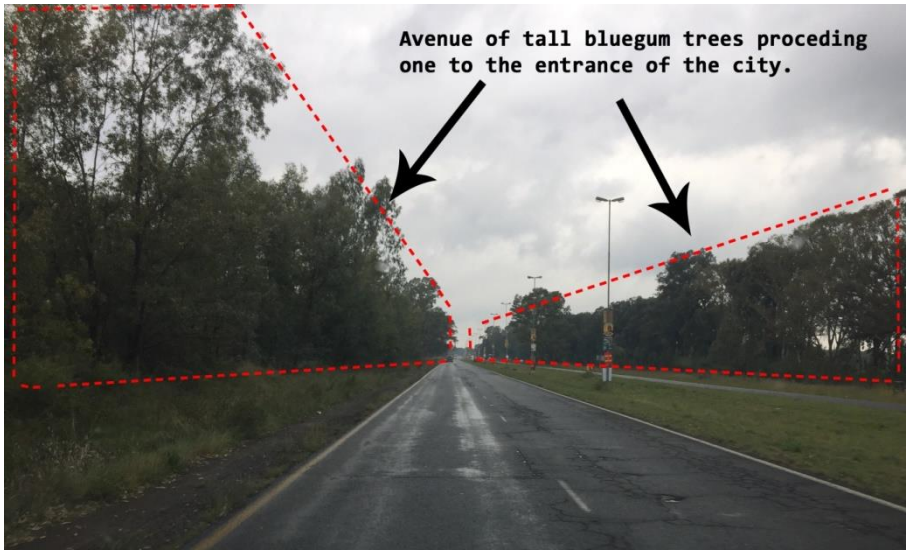


Figure 2.12: An avenue of blue gum trees creating a procession effect as one enters BFN from the east on the N8. (Author, 2019).

The region of concern: The site

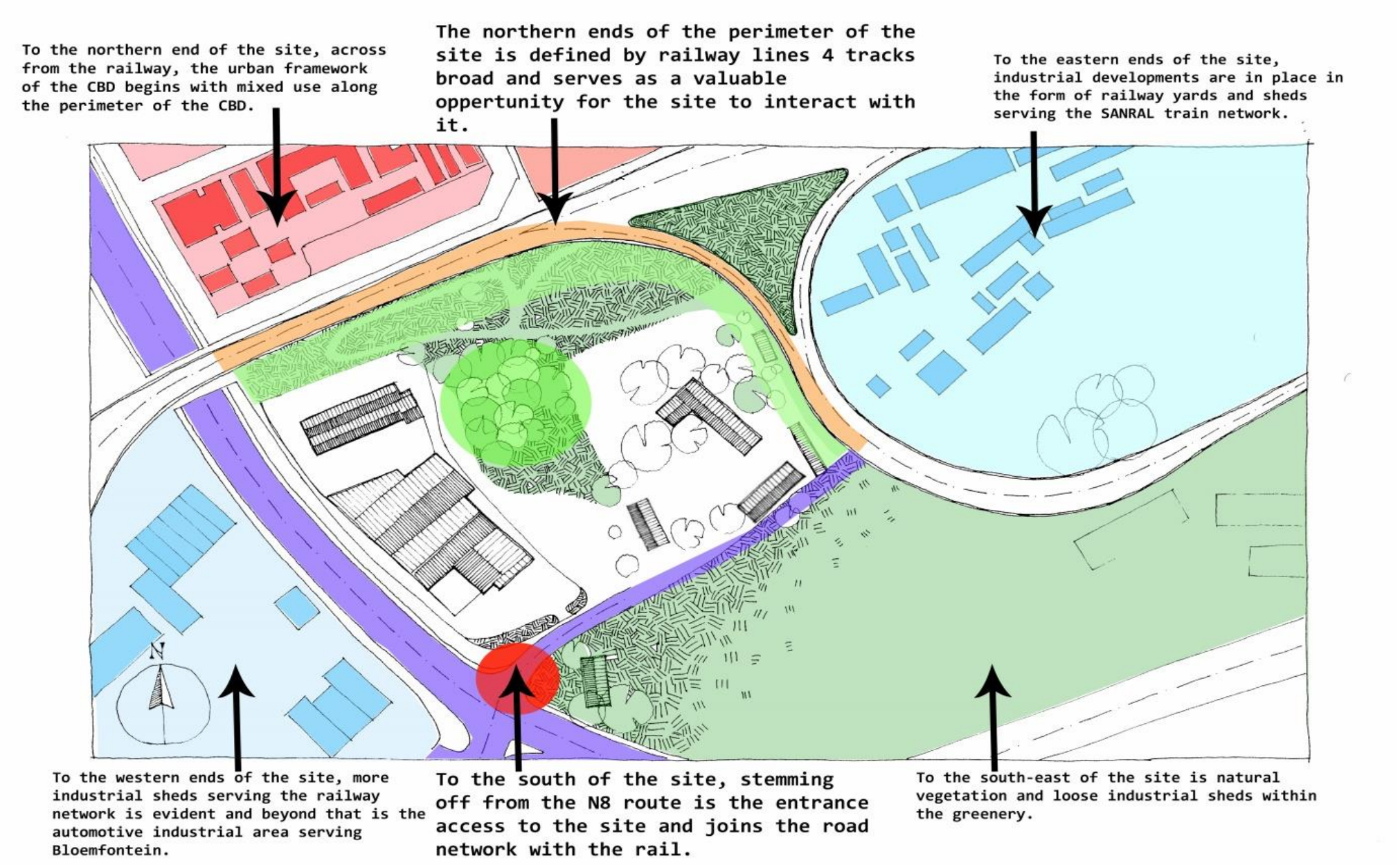


Figure 2.13: Analysis of the site's immediate boundaries and features serving the site.
Author, 2019.

1.3. The orientation of the site

Several different elements surround the site and is seen as a rather diverse site situated with two different transport networks on adjacent edges of the perimeter of the site. The rail network runs on the northern and eastern edges, and the road network being placed to the southern and western edges.

It has thus become clear that beyond the site, its immediate neighbours have various functions. On the eastern and western sides of the site, industrial sheds and individual buildings are found which form part of the Transnet complex which takes up much of the area in this context. To the west, linear sheds are found which house maintenance functions as well as multiple train lines which allow trains to be stored in close proximity of the railway station. To the east of the site, more SANRAL buildings can be found which serve the railway network.

To the south east, an important aspect of the site is evident, the entrance via the road network can be found as it veers off the N8 highway into Nathan Street. Further south, undeveloped land in its undisturbed natural state can be found. Northwards beyond the railway tracks, the urban fabric of the city CBD begins with mixed use businesses taking precedence on the first block.

1.4. Feasibility the site holds for the project and services available on site.

The site is ideally located since it may serve as contributor to the success of the project because it merges the N8 corridor, and the railway network linking the site to the rest of the country. It will be an effective connector for the transport network in terms of moving agricultural produce.

A close crossing of the two networks allows for an efficient and effective interchange of commodities on the transport network system. It could be argued that the specific site of the structure could be placed in any of the towns. However, in order to cultivate the greatest success for the project it must be placed in the most economically viable location which allows for growth which is Bloemfontein.

The second component of the sites success will lie in its placement in relation to the city. Considering the scale and heights of the project it will be visible from far and needs to be an appropriate addition the Bloemfontein skyline. Taking into account the nature of the project which is agriculturally orientated, it will also comment on the BFN economy, as agriculture is one of the main drivers.

Bloemfontein is described to have a high ability for sustainable growth in relation to other towns of the Free State. It has the ability to grow at a rapid rate and accommodate developments in the city with ease. The city is already economically established and can afford new developments much easier than in other areas. (Rural development and land reform, 2015; 66).

In conclusion, the placement of the site is important in terms of the relation the road and rail network will have with one another. In terms of the experience of arrival the site may hold for the city, it ought to act as a symbol of the identity of place within this region and metro. it will function as a memorable gateway into the city, celebrating one of the big drivers of the economy of the place.

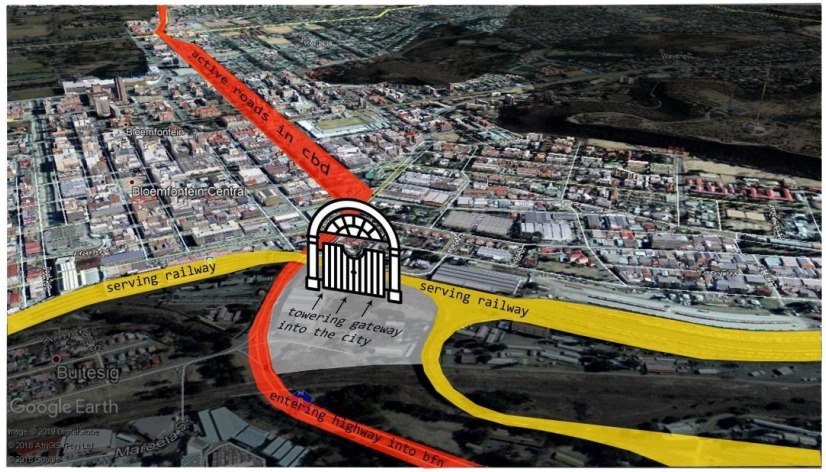


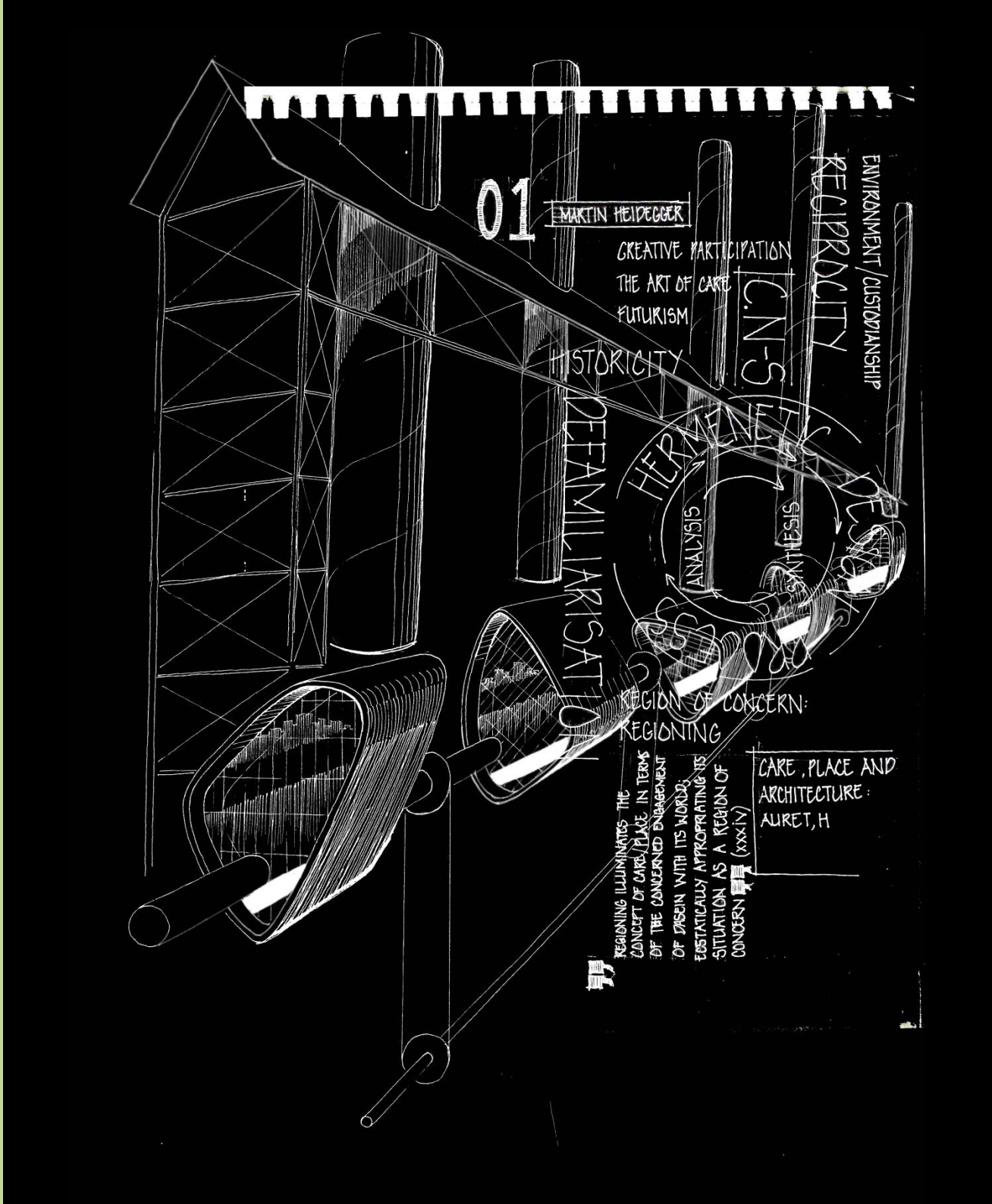
Figure 2.14: Image adapted by author. Analysis of the site's ability to house a prominent gateway into the city from the east along the N8. (Google Earth, 2019; online).

03

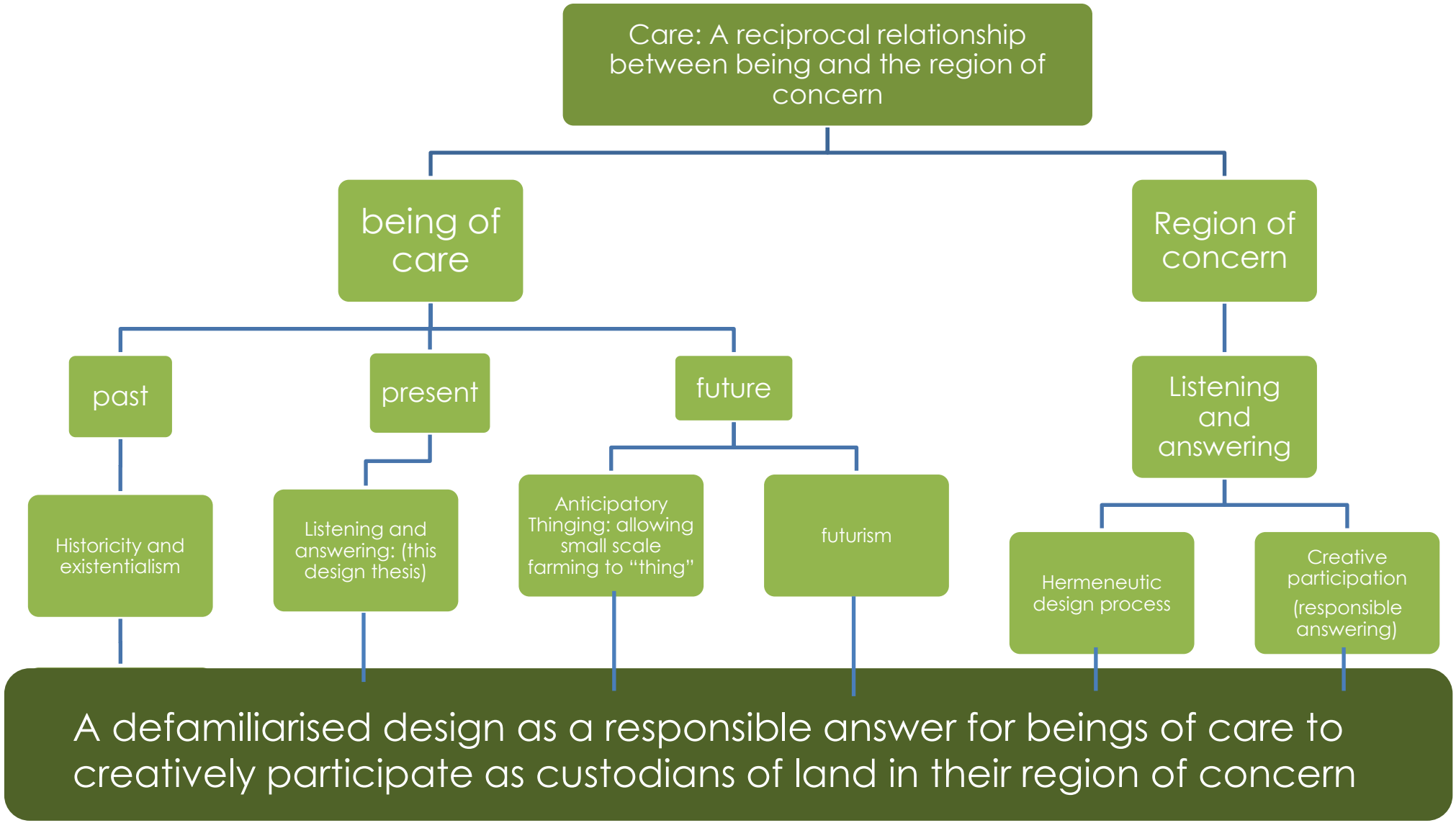
Theoretical approach

Theoretical discourse

- Care
- Existentialism
- Historicity
- Defamiliarisation
- Reciprocity
- Thinging
- Futurism



Theoretical discourse



Theoretical underpinnings: introduction

Introduction

This thesis' main theoretical underpinnings stem from the writings of Martin Heidegger, a German philosopher (1889-1976). The document will focus mainly on his concepts of care as the common denominator informing the various underpinnings of the design.

The chapter begins on the concepts of beings' care, an act of taking responsibility for something we care about. In the scope of this project, this is a description for the farmer taking care of his land and cultivating it as a custodian.

The writings of Pauline von Bonsdorff in *Agriculture, Aesthetic appreciation and the worlds of nature* (2005) will form a link between the Heideggarian concepts of care and agriculture.

The Heiddegarian concept of care can be traced back to our temporality, a state of finitude we cannot escape. Linked to our temporality is our past, present and future which are ever entangled as they recall each other continuously. Our limited timeline thus reaffirms our care as beings who aim to live a life of meaning as we take care of something, linking existentialism, time and custodianship.

As time is interpreted in an existentialist manner, the past is recalled into the present through a hermeneutic process of listening and answering. This process prescribes discerningly interpreting references of the past and responsibly answering as they are re-interpreted and adapted into the design.

The listening and answering process serves as a valid symbol of the reciprocal relationship beings of care (the farmer) and their region of concern (the land they cultivate) exercise upon each other as man shapes his land and is reciprocally shaped by his land.

Lastly, Italian futurism is analysed in an attempt to seek the working mechanisms of a functional and vibrant model which strives towards a new and upcoming cog in the workings of an economic society.

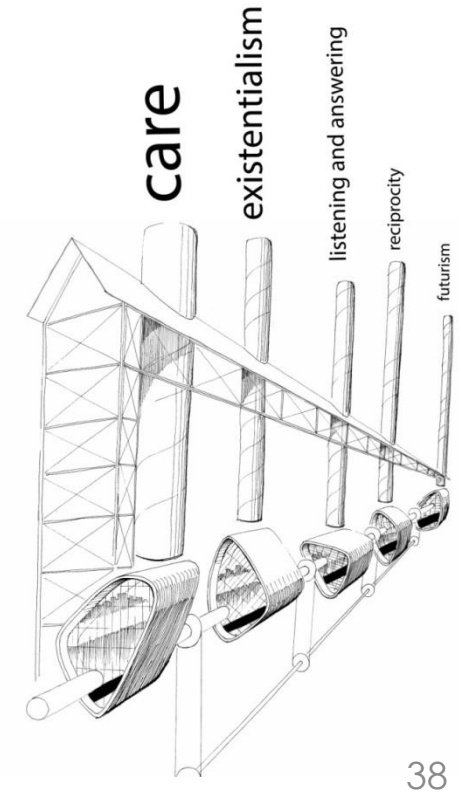


Figure 3,1: A machine drawing representing the various theoretical stances driving the dissertation (Author, 2019).

Theoretical underpinnings: Care

"The art of care aims at prescribing the lived reciprocity between place as a region of concern and the mortal existence of the being of care." (Auret, 2015; 252)

The above statement prescribes a result of "care". This is a product (i.e. a reciprocal interaction) between the mortals immediate environment (denoted as his region of concern) as well as his existence in relation to *Dasein's* region of concern as a being of care. 'Being of care' in this instance tends towards the being's custodianship of *Dasein's* region of concern. The verb 'reciprocal' aims towards a two-way interaction in which there is listening and answering, with listening tending towards a standpoint of letting-be while answering (which rests on the being of care) lies in their creative participation of their region of concern.

Care and the art of care

Care is a heavily loaded principle and element of our existence as beings in our world which we 'always already' find ourselves thrown into. It defines our 'existential meaning'

Our existence comes first but then we find meanings to attach to our existence which stems from our 'thrownness' into the world (always already) which acts as the basis for our meaningful interaction in our world. Furthermore, care stems from the mortals temporality (the influence of time) which continuously propagates from the past to the future through the present as medium. (Krell cited in Auret. 2015; xxvi)

From the above statements, beings of care can be considered as earthly mortals and different to that of the divine as they are affected by matter (the being), space (the world we find ourselves thrown into, our region of concern) and time (our temporality as mortals). All three components contribute to defining our care.

Heidegger further argued that "authentic care" stems from our temporality as beings (Auret, 2015; xxvi). This notion of our temporality is further reinforced by Pauline von Bonsdorff's article *Agriculture, Aesthetic Appreciation and the Worlds of Nature* which states: *"Existential values are found in understanding the processes of life and death, where the realization of finitude and the limitations of human and personal power may result…"* (von Bonsdorff, 2005; online).

The being's care extends from oneself to their region of concern. As he/she takes custodianship of various elements which fall within their region of concern, they take care of things as well as exercises *poiesis* which encapsulates making things with care.

Theoretical underpinnings: Existentialism

Historicity, essence and the reciprocal relationship between beings and their region of concern.

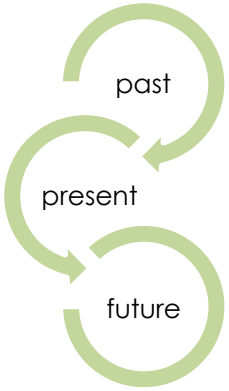
The Heideggarian notion of historicity is revealed in terms of the meanings the individual associates and uncovers in their life. Instead of seeing their life as one that passes through a linear passage of time, it should rather be seen as one of lived historicity. Historicity is a derivative of our inherent care stemming from our temporality as beings. This implies that we as beings of care are always already in a situation (present) which offers a possible outcome while recognising that which was in the past.

This does not mean that the individual constantly lives in the past in order to associate meaning to their life but rather that the future which one strives towards will acknowledge the past by that which was or contrastingly that which wasn't (how to do it or how not to do it)(Crowell, S. 2006).

Thus it tends towards the notion that any step one takes towards the future (in the present, now,) will recall certain instances of the past to associate meaning to it (considering that we are beings of care). This notion which Heidegger put forward of our historicity binds our future with the past and sees it as an authentic existentialism of the being of care. (Crowell, S. 2006).

This project aims at empowering small farmers by cultivating and acting as a responsible custodian of being's future by securing a place in the economy for grain farmers of all scales. It would follow that in order to do this meaningfully and carefully from an existentially historical viewpoint, it would be of value that the project recalls certain elements of the past for the *daseins* within the region of concern. Taking into account that the project's aim is to re-think structures and systems within the capitalist economy which the agriculture sector functions in, it would be futile to recall systems and methods of operating from the past. In the author's viewpoint, it would be more appropriate to analyse and implement historical cultural embeddedness into the layering of this hermeneutic design process as it strives towards a design intervention which anticipates needs of the future.

An investigation into the interrelationship between agriculture and culture will follow in order to determine the value culture has within this architectural-agricultural investigation.



Historicity: cultural references recalled

Agri – culture

The reciprocal relationship between man and nature as culture

Agriculture, Aesthetic Appreciation and the Worlds of Nature , Pauline von Bonsdorff, 2005.

For many people, agriculture is seen as a profession, to others it forms part of their culture. Agriculture gives existential meanings and insights into *Dasein's* life regarding our temporality, man's relation to his region of concern (place, nature) as well as seasons. It provides us with a method of thinking and perceiving the elements of our lives. The author of this article noted an interesting root of the words cultivation stemming from the word culture which has associations of growth, nurturing as well as renewing and developing. The notion of cultivation of the land implies a long and continuous relationship with the region of concern to learn from it and to gain lessons from the past in order for it to thrive and continually improve. The idea of continuity is echoed by the phrase "What was remains, yet changes." (von Bonsdorff, 2005). She further goes to say that in the case that agriculture is an activity of cultivation, a long term relationship with something to get it to thrive, it implies that it is not an activity of exploitation but one of mutual growth and development for both dasein and nature, an act of co-operation (von Bonsdorff, 2005; Online).

Architecturally, a cultural metaphor ought to be implemented which is of significance to the *Daseins* within the region of concern within the Mangaung Metropolitan Municipality.

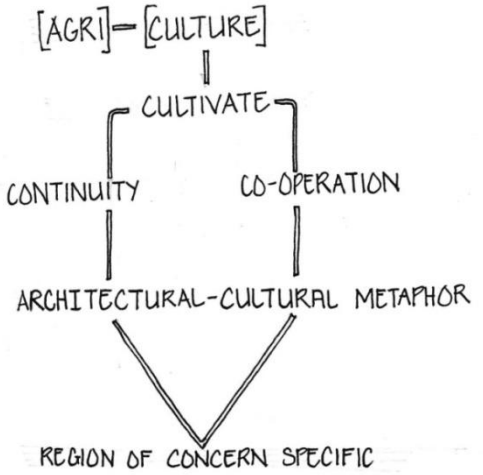


Figure 3,2: A diagram explaining the discourse discussing culture within agriculture. (Author, 2019.)

Historical references of the Basotho culture.

The *dasein* group who dwell within the Eastern Free State spanning from the city of Bloemfontein to Botshabelo are considered the region of concern for this project. The group are known as the Basotho people, an African group who form part of the Bantu migration and settled in the Eastern Free State as well as in Lesotho itself. A distinctive cultural element of the Basotho people in which they are easily identifiable (under the various tribes) is by their Basotho blankets (*Seanamarena*). The blanket is a very appropriate symbol and reference point for this project as its history dictates a merging between western and cultural parties' ideas to create something historical and significantly place specific.

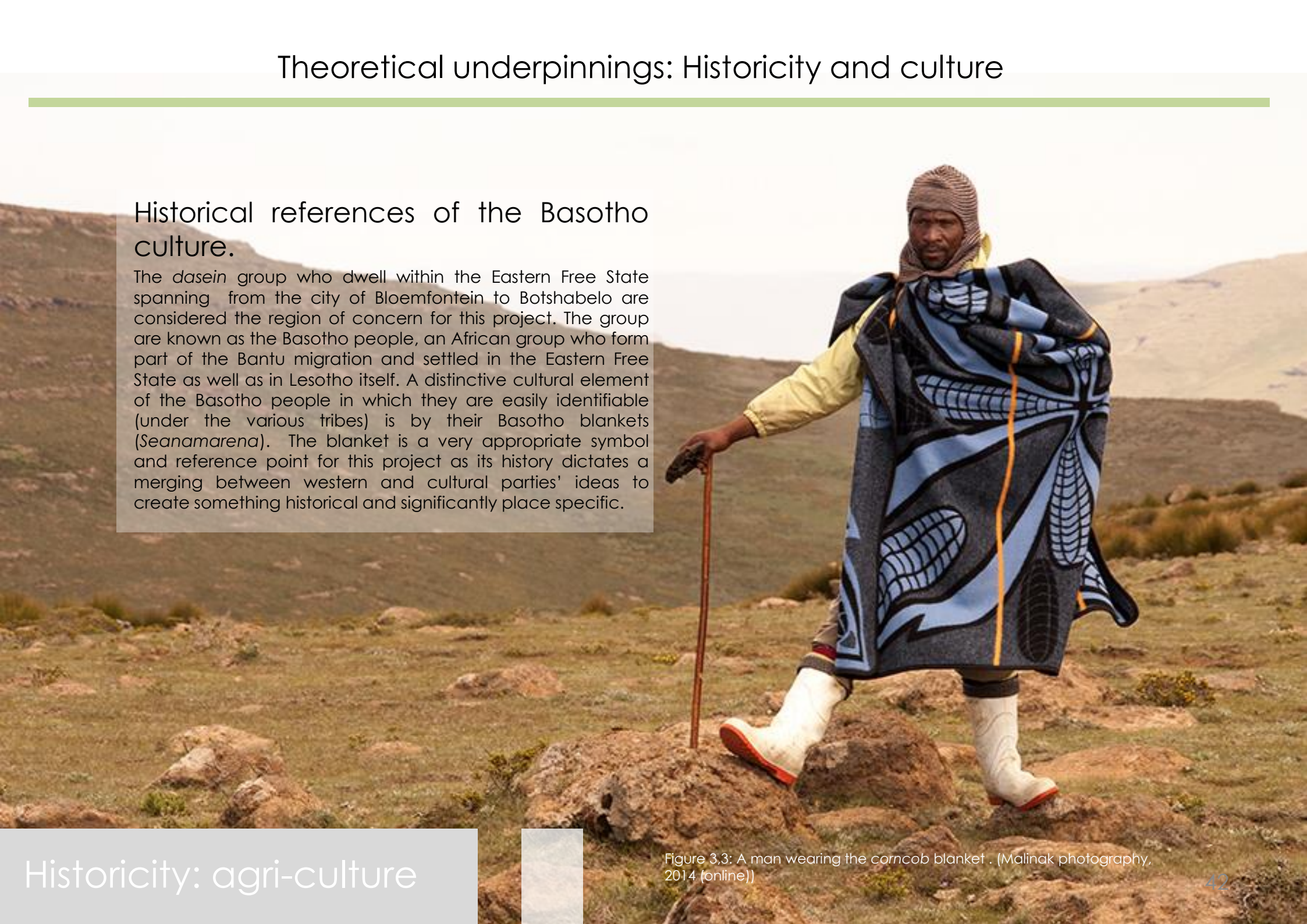


Figure 3.3: A man wearing the *corncob* blanket . (Malinak photography, 2014 (online))

Historicity: agri-culture

Theoretical underpinnings: Historicity and culture

Historical references of the Basotho culture.

The narrative of the blanket's origin dates back to the mid 19th century and is seen as an interesting conglomeration between western influences and African culture. The narrative of the inception of the blankets is quoted:

"The popularity and assimilation of the blankets by the Basotho people can be traced back to one single incident. A blanket was presented to the then King, King Moshoeshoe I in 1860 by a man by the name of Mr. Howel. The King was by all accounts quite taken with the blanket ("a handsome railway wrapper made of light blue pilot cloth, heavy and hairy") and wore the blanket in preference to his then neglected traditional leopard skin karosses. The blanket has become part of not only their everyday life but as a status symbol. To outsiders it became a mark of ethnicity and therefore a token of cultural identification" (The blanket wrap, 2010).

The blankets thus serve as a valid example of a liminal object, as they are a hybrid of cultural reference and western production.

Various blanket patterns have been developed over the years. A variety of symbols and pin-lines are appropriated to the blankets which are tribe specific. Of the more popular and common blankets is the corncob blanket which has clear references the agricultural sector. It makes reference to the corncob, better known as a *mielie* in the Free State. The corncob blanket is seen as a symbol of wealth, fertility and prosperity (Reid. 2012).

Figure 3,4: people wearing a brown derivative of the corncob blanket. (Malinak photography, 2014; online).

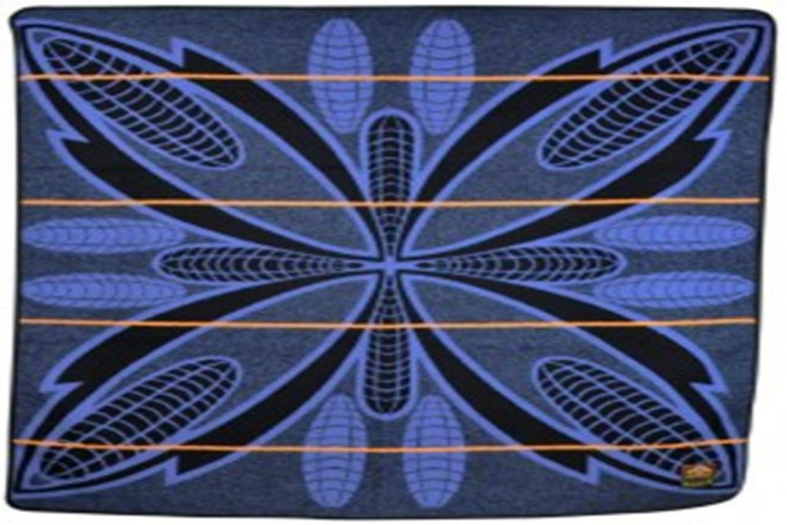


Figure 3,5: the corncob blanket design. (The Blanket Wrap, 2010; online).

Theoretical underpinnings: Historicity

Historicity: agri-culture

Figure 3.6: Basotho farmers wearing various traditional blankets . Malinak photography, 2014. (online).

Defamiliarization

The process of defamiliarization of an object refers to people's perceptions of objects or senses which they see as familiar yet at the same time peculiar. The initial idea was incepted by Victor Shklovsky (1893-1984), a Soviet critic, theorist and writer.

The field of defamiliarisation is a product of critical regionalism, an architectural type which posed pivotal problems in terms of authenticity and relevance in todays ever increasingly international and modern world. This is reinforced in "*Why Crictical Regionalism today.*" (Tzonis and Lefaivre, 1990) which critically explains some of the problems associated with the movement: "How can one be regionalist in a world that is increasingly becoming one global economically and technologically interdependent whole…" The notion of critical regionalism is thus seen as merely a harking back to a memory in a process of engaging in a visual longing for the past which thus questions its authenticity and originality.(Tzonis and Lefaivre, 1990: 484)

Defamiliarisation has been a common element in architecture which engages the subconscious minds of the viewers from the work of architecture which then begs them the question of identifying the known from the unknown. They can usually identify where the reference has been made to a certain concept (or in this case regional imagery). However the architect's means and applications of the product remains less clear and to a certain extent mysterious (Zarzar, K. 2011).

For instance, the study of Renzo Piano's Tjibaou Cultural centre which defamiliarized the Kanak hut. It was successful in that it resembled a built form of the island yet it was defamiliarised enough not to emulate a pastiche effect as comparisons are drawn between it and the Kanak huts. A more in depth study of this specific example has been included in the precedent studies in chapter 4.

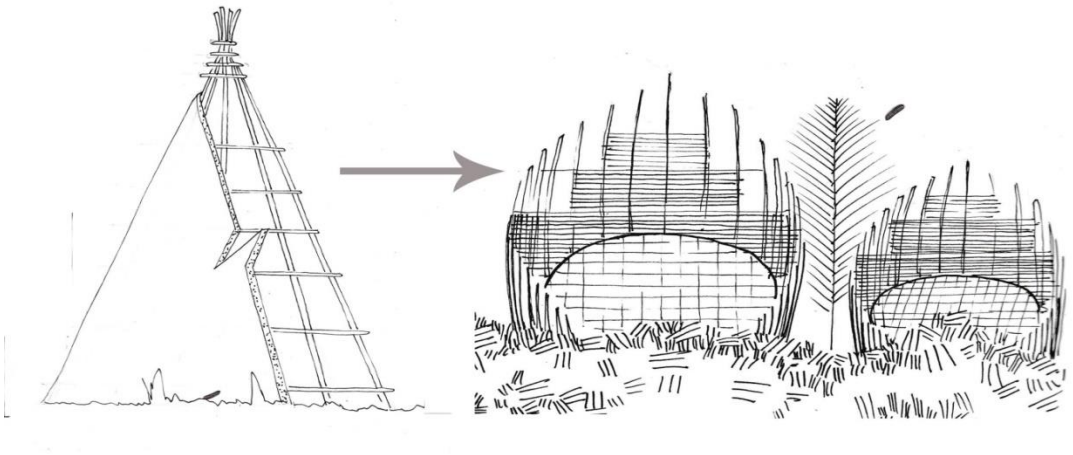


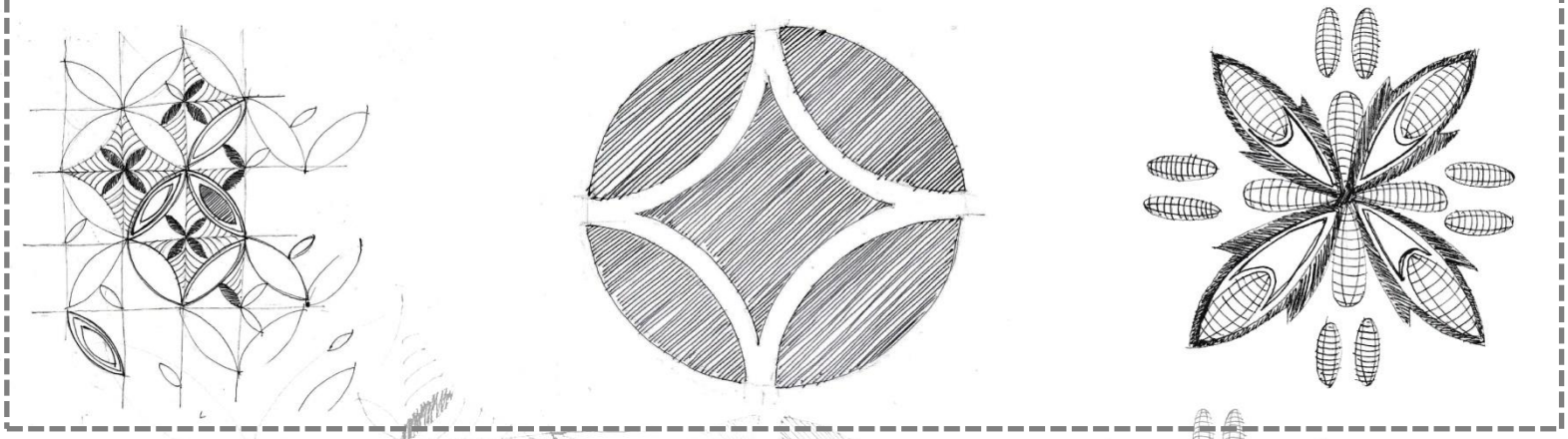
Figure 3,7: An example of the defamiliarisation process as seen in the Tjibaou cultural center by Renzo Piano. (Author, 2019).

Defamiliarization

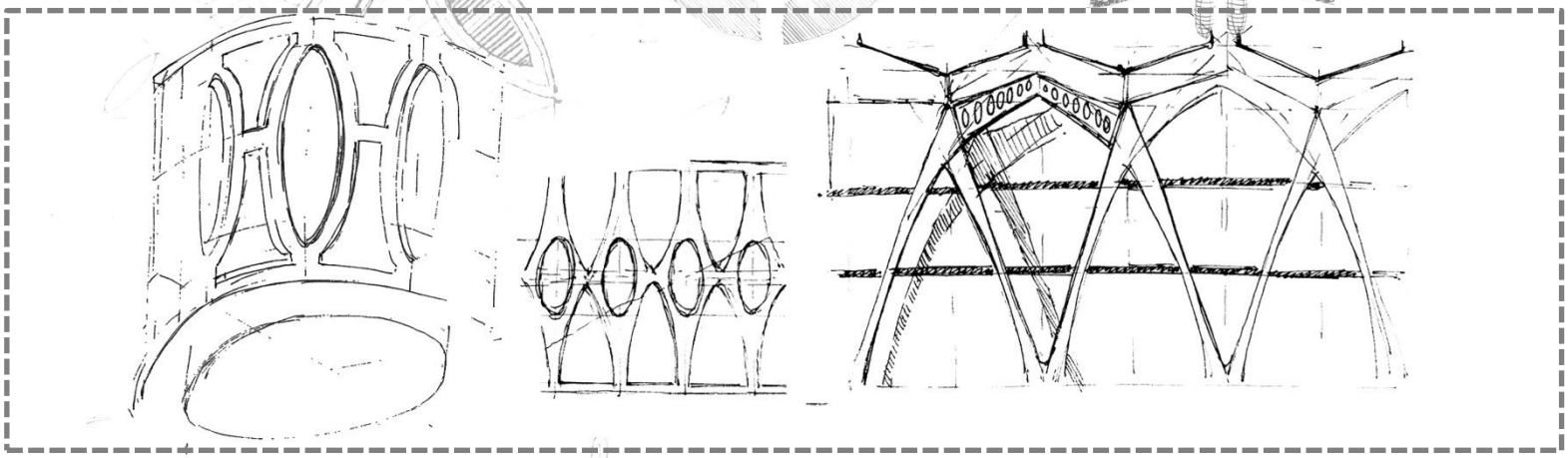
Incorporating historicity and cultural references to Basotho *Litema* and blanket patterns

In aid of the design of the building at hand, the above corncob blanket as well as *Litema* patterns have served as a valuable toolbox to work from in order to formulate a façade of the structure. It serves as an external draping of the building in which meaning and historicity is layered and embedded onto the structure. Sketches to the right show the design process of incorporating the Litema pattern motifs into the diagrid structure of the façade.

Litema patterns



A process of interpretation and defamiliarisation of the Litema patterns into a structural diagrid system.



Litema patterns integrated into structure

Figure 3,8: The defamiliarisation process starting from the Basotho blankets to arrive at a structural product. (Author. 2019).

Theoretical underpinnings: Defamiliarisation

1

generic diagrid structure as basis for the structural system of the building

2

appropriating cultural building vernacular methods (Basotho hut) as bundling of reeds (tensile and compressive forces) into a diagrid.

3

incorporating the arrangement formula of Basotho huts (hut; Sky space; wind screen) as part of of the culturally integrated facade in the experimental process.

4

appropriating cultural imagery (Litema patterns and Basotho blankets) into the design language of the diagrid as a defamiliarised form.

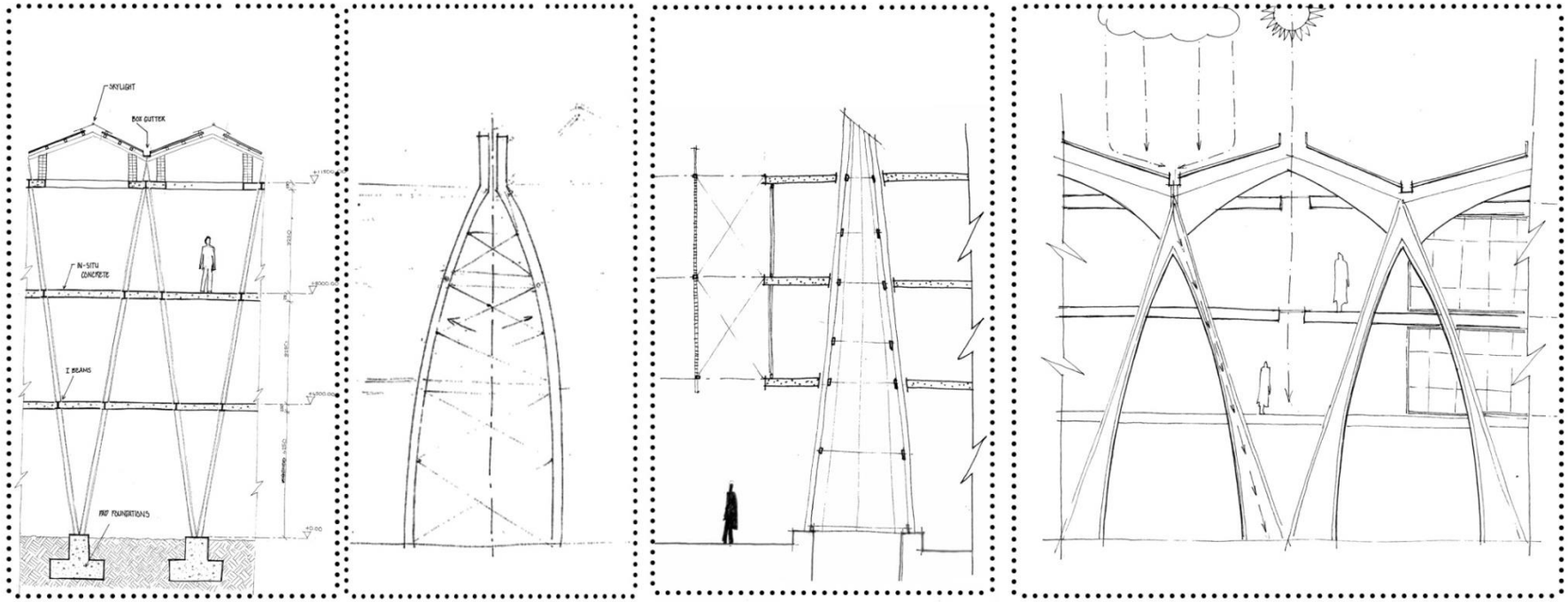


Figure 3,9: The development process of the diagrid structural system. (Author. 2019).

Theoretical underpinnings: Reciprocity

"Not only does the farmer mould the land, it also affects her body which carries memories of working on the land in the form of scars, strains, injuries or habits. Labor involves the body not just as an active agent or subject but also as itself subject to work." (von Bonsdorff. 2005)

The above statement echoes sentiments of farming in that the farmer is one 'of' the land, the *dasein* belongs to it and finds much of their existential meanings which will be associated to their life. The land on which the farmer creatively participates, thus has an existential effect on him and moulds him to a certain extent. "In relation to existential values, the role of agriculture is both to make visible and make real." (von Bonsdorff, 2005; online).

Thus *dasein's* interaction (creative participation) with their region of concern, in this case the agricultural land, concretises and confirms their existential meanings and the effects the land has on them. Reciprocally, the land is moulded and formed by the farmers hand as they exercise their creative participation in it. It seems clear that both place and the being of care have a moulding effect on each other as they reciprocate in the lived situation. This notion is reinforced by the above quote from von Bonsdorff.

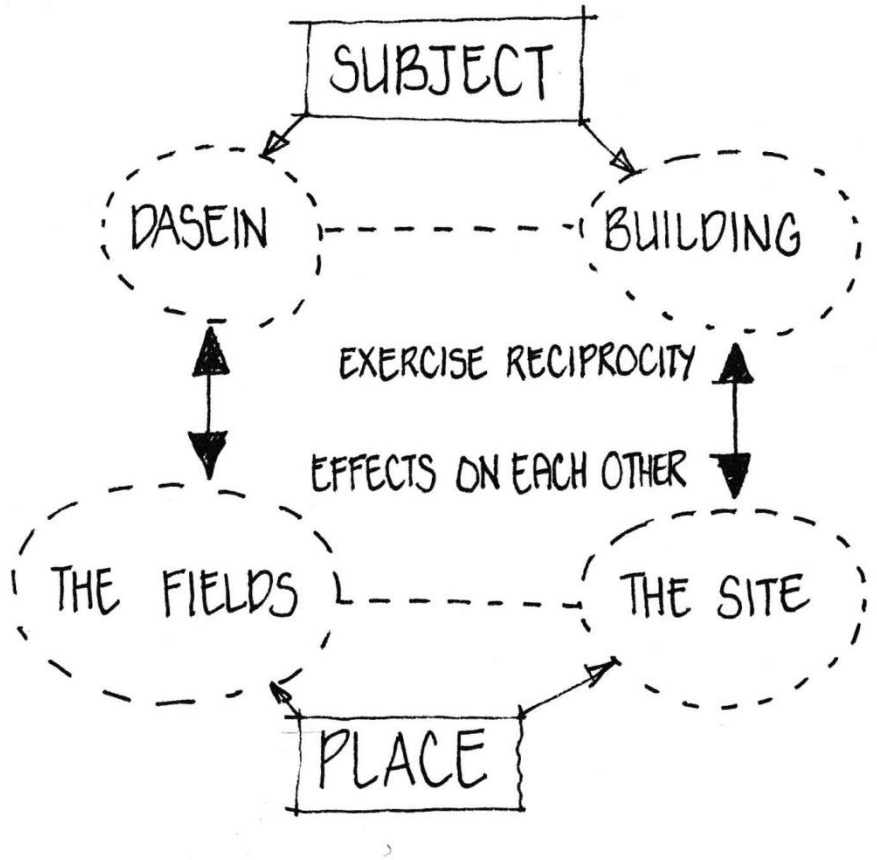


Figure 3,10: A diagram explaining the discourse of reciprocity between subject and place . (Author. 2019).

Theoretical underpinnings: Reciprocity between subject and place

Continuing on the discussion of a reciprocal relationship between *Dasein* and place, the building (*Dasein's* intervention) ought to similarly echo this reciprocal relationship with its context and place as a responsible custodian of its region of concern (the immediate site on which the structure stands). There is no linear timeline in this reciprocal relationship, rather a concurrent process of one affecting and moulding the other simultaneously.

In the design process, a very rigid and clear linear grid was placed on the site, making visual reference to the topographical patterns man ploughs into the landscape as he cultivates the landscape within the Free State. The image below illustrates the linear patterns man serrates into the earth's surface through cultivation.

Figure 3,11: Rows being ploughed into a field as a farmer cultivates it. (Author. 2019).

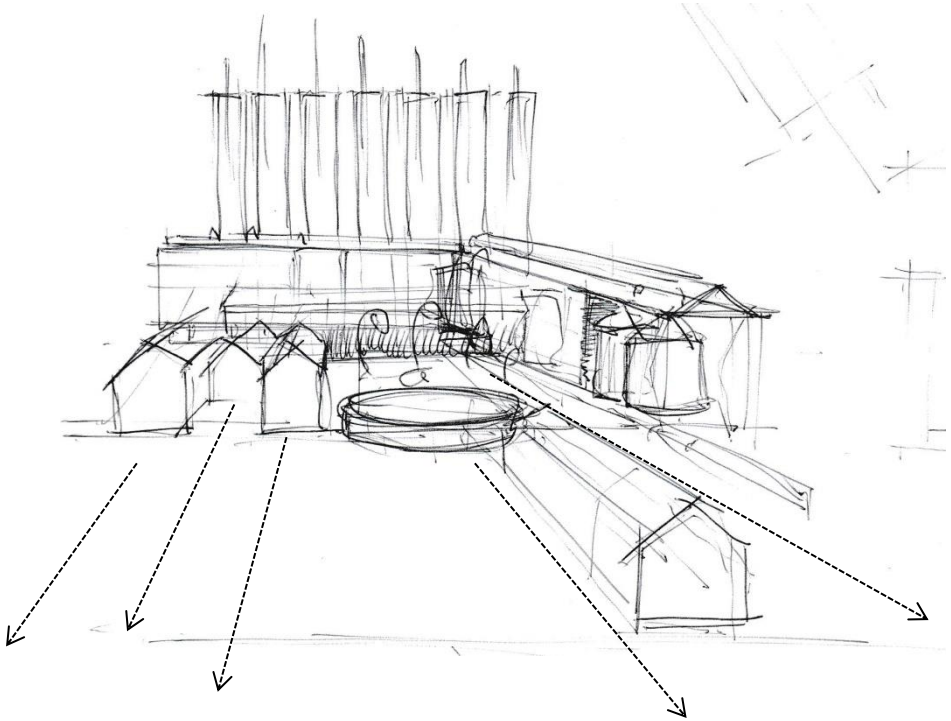


Figure 3,12: Rows which elicit a reciprocal relationship between subject (the building) and place (the site) (Author. 2019).

Listening and answering- a design approach to reciprocity

Snodgrass & Coyne (Architecture Professors at the University of Western Sydney) made an argument about the portrayal that is made of design and the design process. They deduced that it was not a logical sequence of operations but rather a 'hermeneutic dialogue', a process of interpretation and intuition which relies on instinctive feelings which is picked up from the sources of inspiration. (Timmers, 2015; online)

The above process has been labelled the hermeneutic design circle which encapsulates different components starting with analysis, a process of listening and understanding, and grouping the various components of the study at hand. Secondly, the answering part comes into action known as synthesis, where intuition and interpretation comes alive, allowing the designer to creatively answer on the information obtained in the analysis stage. This process can be repeated multiple times refining the design more and more as one spirals in the hermeneutic design process (Timmers, 2015: online).

This hermeneutic cycle has been followed in the design of the granary. The approach was applied and has various levels and different components which have been analysed, grouped and then synthesised repeatedly in order to refine the design continuously. The list is ever growing and continues to analyse components and then synthesise them in the spiralling hermeneutic cycle.

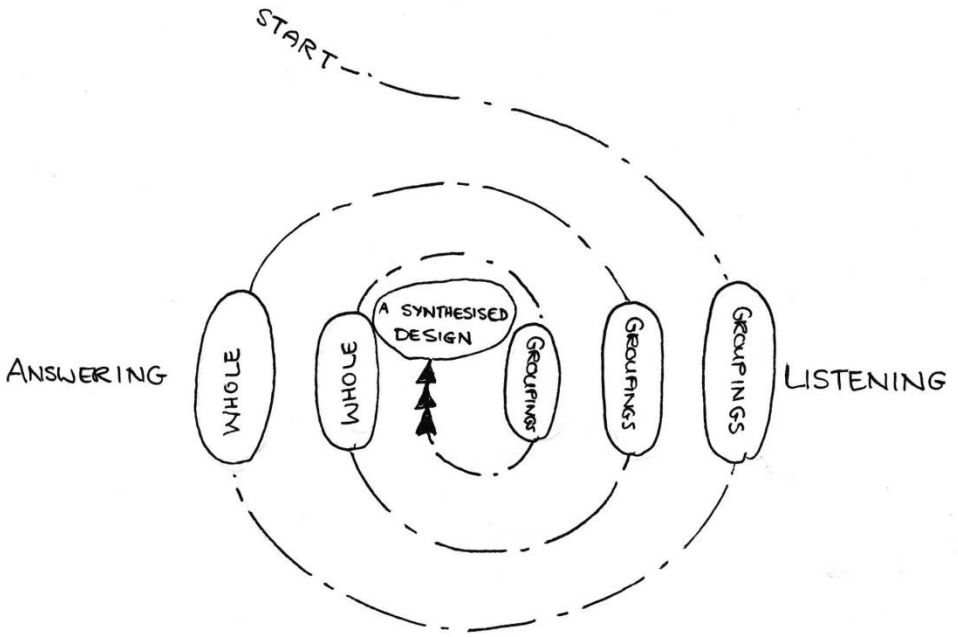
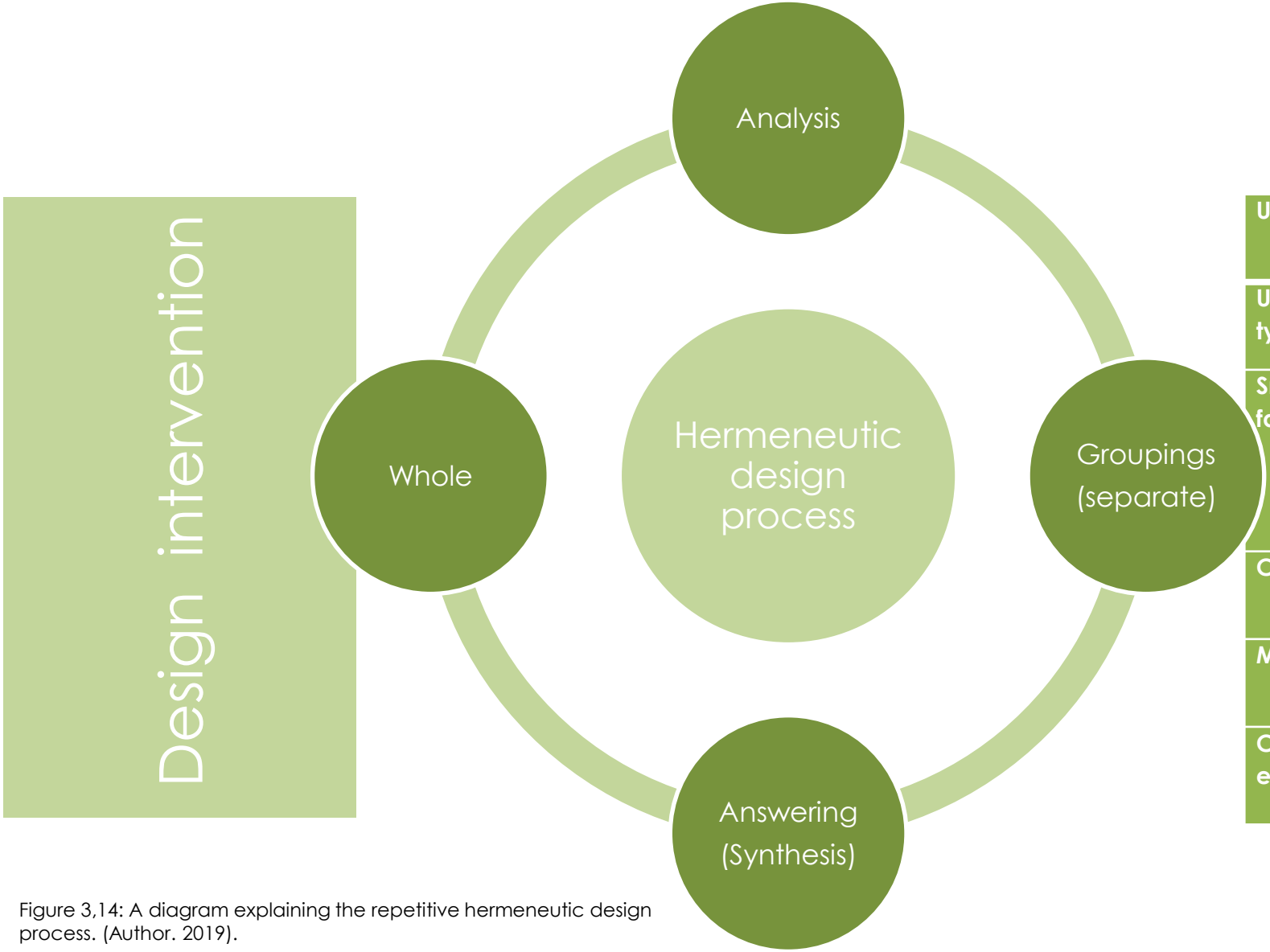


Figure 3,13: A diagram explaining the repetitive hermeneutic design process. (Author. 2019).

Theoretical underpinnings: Listening and answering



Urban scape	Landscape
Urban typologies	Agricultural typologies
Small scale farming	Growing free market (capitalist market)
Commercial	Agriculture
Man	Place
Contemporary era	Cultural influences of the past

Figure 3,14: A diagram explaining the repetitive hermeneutic design process. (Author. 2019).

Theoretical underpinnings: Thinging

The project as a catalyst to allow small-scale farming to carry on 'thinging'

Thinging

Heidegger understood the thing as something which qualifies an object and grants it its identity. It denotes to the gathering of essences of what that 'thing' is as its primary reason for existence.

He used a jug as an example; the jug offers something, a granting. The granting or gift that the jug offers lies in its pouring the liquid it stores. If it were to fail in being able to pour, would we still be able to call it a jug? Or a hammer which cannot grant the action of nailing something? Their success in executing the needed activity or being what they need to be essentially lies in their ability to thing (Auret, 2015: 109).

In regard to this investigation, it would be of value to understand the relationship between place and *Dasein* as a process of 'thinging'. Shortcomings in the agricultural economy has been identified which obscures the ability for *Dasein* to engage with place through farming. As a result, systems that used to support agriculture has begun to undermine small scale farming. This project will identify and address some of the aspects of the agricultural industry which prohibits small scale farming from 'thinging'. Its aim does not lie in revolutionising the industry but adapting the workings of it in order for it to grant access and stimulate participation for emerging farmers as an economic catalyst and place of trade. The goal is to enable the MMM to 'thing' by providing a space of possibility for the emergence of a thriving community of small scale farmers.

To fully comprehend the deep significance implied by the 'thinging' between person and place, it is also necessary to consider the writings of the Norwegian architectural theorist Christian Norberg-Schulz (1926-2000). In *Genius Loci* (1980), he aimed at understanding place in terms of the latent qualities associated with it. The goal being to uncover the "meanings potentially present in the place" (1980: 18) by means of architecture.

> "… Norberg-Schulz relied on the distinction between the natural and the manmade in order to explain the interaction (and desired correspondence) between the [latent qualities of the site] and works of architecture as manmade things." (Auret, 2015:239)

The abovementioned statement echoes the goals of the granary terminal to act as a manmade acknowledgement (and catalyst) which allows agricultural land in the MMM to 'thing' and thrive despite the tendencies of capitalism (ever increasing economies of scale). The structure ought to act as an essential element which allows small scale farming to 'thing' under new circumstances.

The work of architecture is an uncovering of meanings which are clearly not latent as small scale farms (especially those south of the Braam Fischer International Airport) are under utilised and derelict as their viability as small holdings does not hold much water within today's economy. Thus, the small scale farms are no longer 'thinging'- the work of architecture which this project proposes will act as a stepping stone for smaller farmers to once again enter the market as holds benefits such as:

- Its efficiently located design as well as the benefits that farmers can gain from it by eliminating drastic transport costs (connecting the road and rail networks).
- Increasing the market pool they are exposed to (connecting the Mangaung Metropolitan Municipality's agri-products quicker and cheaper to the rest of the country) .

Theoretical underpinnings: Futurism

An example of thought processes going into envisioning new workings within a system to allow it to achieve the desired thinging.

In order to achieve a more thorough investigation in this chapter of 'thinging' and achieving a desired outcome, it would be of value to examine and analyse an example of the thought process that went into anticipating 'thinging'. Italian futurism will be investigated in order to examine some of the systems and methods of rationalising a new approach to a system.

Futurism: An insight and overview of the visions the Italian Futurists had for the developing world.

This component has been included to gain a clearer understanding of the futurist movements employment of systems (barring the fascist visions they had of aggression). This movement is looked at to gain an elemental understanding of functional, dynamic architecture which strives towards vibrant functioning within the Metro. This review will begin with the origins of the movement and then delve into the workings and rationale of the systems envisioned originally be Antonio Sant'Elia.

Introduction: Italian futurism

Antonio Sant'Elia, an Italian architect and architectural theorist (1888-1916) is seen as the originator of a dynamic architectural movement (futurism) which was incepted on the dawn of the 20th century. He began theorising a completely new and grand vision for cities, putting aside any references of the bulky and inefficient museum ridden past which dominated the cities. He is best known for the visions he drafted up for *Citta Nuova* (Italian for New City) which aimed at a dynamic and innovative city filled with movement, mechanisation, tall skyscrapers and connecting nodes across the bustling city(McGarrigle, 2016: online).

The hearth of his visions for *Citta Nuova* aimed at the city encompassing straight lines, dynamic speed, machines and man all working together as an organism. He described the visions of futurism as one of synthesis and artistic manifestation. (McGarrigle, 2016: online).

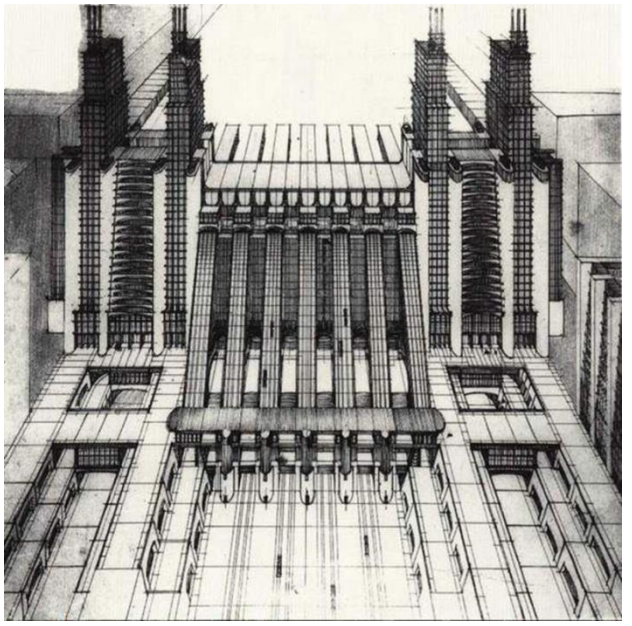


Figure 3,15: A depiction of the Citta Nouva that the futurists envisioned. (Sant'Elia, 1914: online)

Theoretical underpinnings: Futurism

It was not only Sant'elia who was at the forefront of envisioning a futurist world, but was accompanied by Italian artist and theorists, Umberto Boccioni (1882-1916) and Filippo Marinetti (1876-1944) as well as the musical theorist Francesco Balilla Pratella (1880-1955) who's futurist manifestos where released between 1910 and 1911 (Perrone, 2005: Online).

The manifestos that were released by the architectural theorists, art theorists and musical theorists all shared common ground on a number of topics namely:

1. A complete disregard and lack of admiration for the past, formalism as well as antiques. One ought to always look forward only.
2. In contrast to the disregard of the past, they admired the machine and the benefits that technology had in store for the future. The novelty of newfound speed due to mechanisation was an ideal to strive for.
3. The artistic theme which the city was governed under was one of machine aesthetic and dynamism.
4. Daring and bold moves should be encouraged as it would favour the new futurist movement as a 4 revolutionary process.

(Perrone, 2005: Online).

Sant'elia in his "Messagio" text (1914) further envisioned an architecture which placed a new emphasis on monumentality. In the past emphasis was placed on cathedrals and medieval structures, but rather now on new transport terminals, interchanges, bustling markets and large dome-like structures to name a few (Perrone. 2005: Online).

Although Sant'Elia's visions disregarded the past, his visions aligned with some of the guidelines of this dissertation in that it strives to an innovative and dynamic future in which architecture plays a pivotal role as medium. This project much like Sant'Elia's vision, strives towards a mechanised architecture which catalyses the economy of the Metro's agricultural component with man at the helm.

It strives at a new monumentality in architecture which speaks of the city's economy, one of large agricultural produce capacity which is a result of man's ability to creatively participate in his region of concern as he dwells in it. The complex ought to be a dynamic architectural machine, a connective node between:

1. Agriculture and the busy commercial activity of urbanity
2. Road and rail networks (much like Sant'Elia's train and airport station pictured above)
3. *Dasein* and machine
4. *Dasein* and place

Theoretical underpinnings: Futurism

Thus the design has continued with these integral guidelines in mind with a subtle reference to the visual material that Sant'elia produced of his futurist visions of Citta Nuova. Monolithic architectural typologies are combined and connected in order to create an efficient organism that man can participate within in order to creatively participate within his region of concern. The Granary that has been proposed entails:

- A set of monolithic vertical grain storing silos reinterpreted from the generic linearly arrangement method seen across the Free State.
- A depositing bay for produce entering the complex
- A railway siding adjacent to the depositing bay for speedy dispatching of produce.
- A hovering admin block which brings the urban commercial component in.
- Machinery stores and prominent fuel pumps that emphasises a dynamic mechanised approach.
- Dynamic lines which regulate the site and complex as a whole.

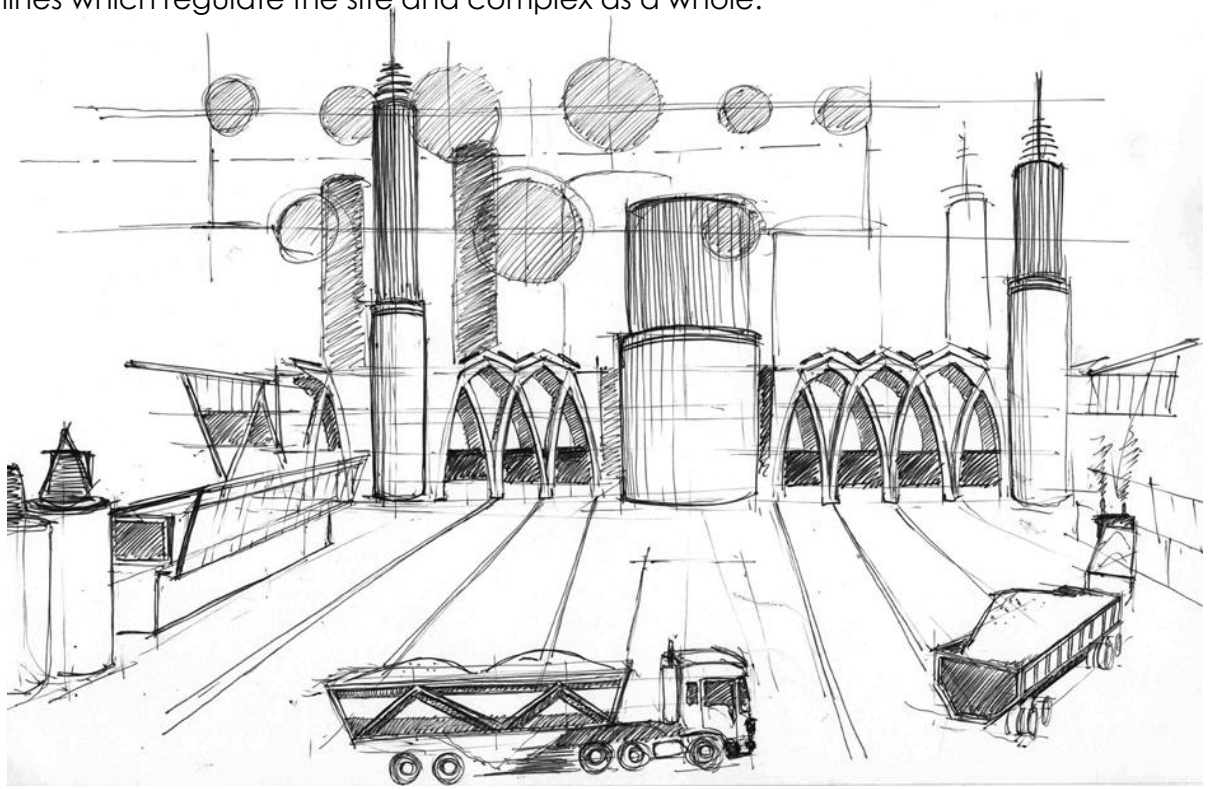


Figure 3,16: A depiction of the granary in light of the futurist manifesto.
(Author, 2019).

Conclusion

The initial approach to the theoretical underpinnings of the granary was initialised with the notions of custodianship one associates with farming. It stems from our inherent care we as *Dasein* show towards something that we have taken responsibility for. Care in terms of a Heideggarian philosophical standpoint is a product of our temporality, the finitude of our existence as we seek an existential and historical meaning to associate with our being. Considering that time is a key factor in our finitude, our historicity becomes prevalent. We always already find ourselves in the position of deciding the outcomes of the future while being presented the opportunity to acknowledge the past (how to do it or how not to do it) while being indefinitely bound in the present (an ever entanglement of tenses as they reciprocate).

Architecturally, this philosophical standpoint of our historicity has served as a metaphor to inform the design for the granary. Historicity in terms of culture (forming part of agri-culture) has been investigated respective to the region of concern (MMM). An insight into Basotho pattern-making has been explored as a metaphorical means employed into formulating a design which meaningfully employs historicity into the design. This investigation aims to serve as a contributor to the existential meanings *Dasein* will associate with the granary terminal through a process of reciprocity utilising a hermeneutic process of listening and answering. The term agri-culture was summed up by Pauline von Bonsdorff as a cultural way of life which not only benefits the participant (*Dasein*) but mutually benefits both dasein and place for both to thrive in a process of underlying reciprocity. Thus, the hermeneutic design process which echoes the notions of reciprocity (listening and answering) has been qualified as a valid method of making *(poiesis*) which echoes the methods employed in agriculture.

'Thinging', a Heideggarian phenomenology of delving into the essence of somethings being, whether it be a physical characteristic or a key function the object/subject presents was examined. 'Thinging' served as a valuable contributor into rationalising the problems this dissertation has identified that small scale farming faces in recent circumstances and more specifically, an uncovering of meanings within the *dasein*-place relationship. Futurism served as an example (excluding the fascist visions they had of aggression) where anticipatory measures are envisioned to allow a system (region of concern) to thing to a desired effect. From this investigation of anticipatory measures for 'thinging', connectivity served as one of the key systems employed.

04

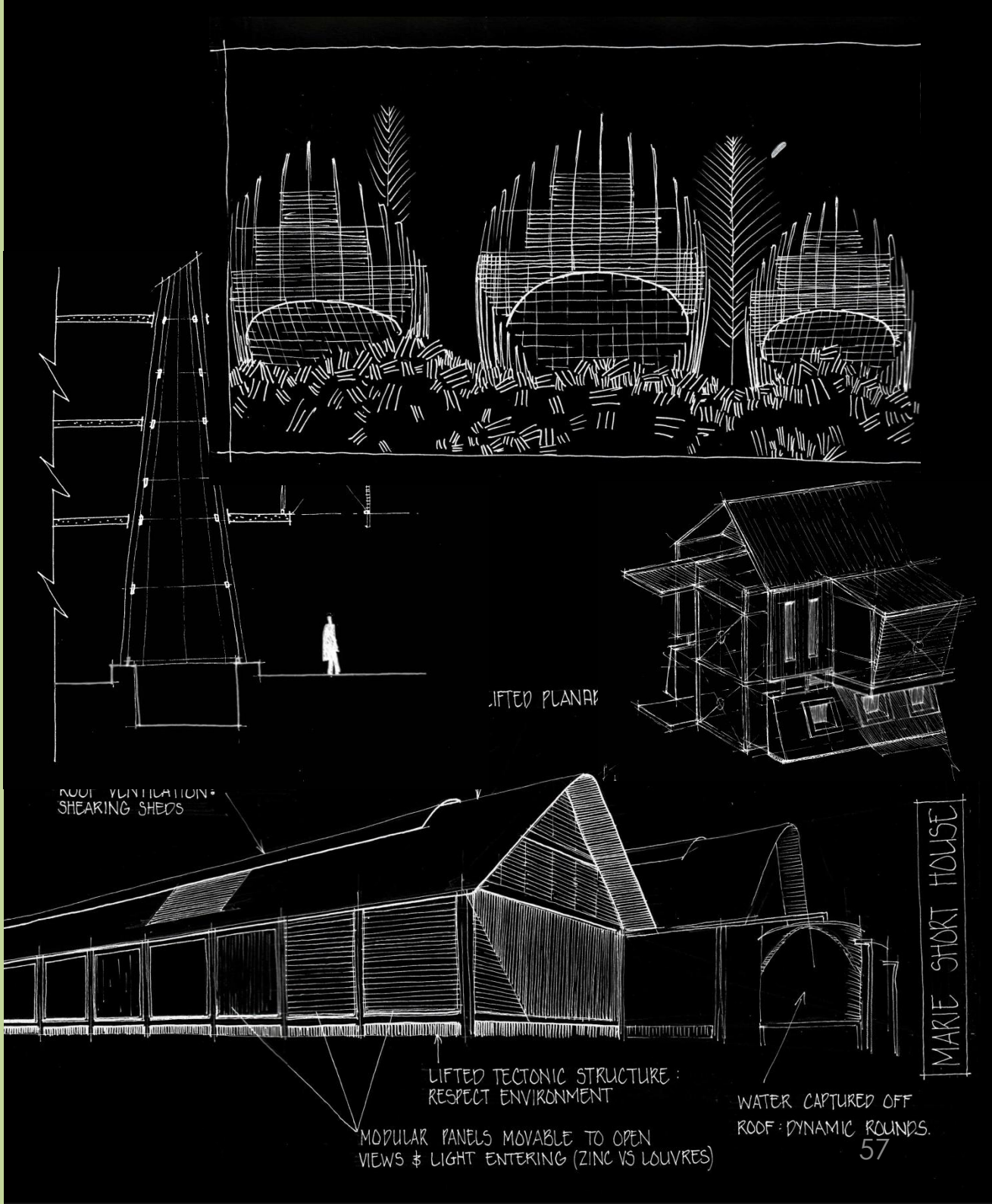
Precedent studies

introduction

4.1: Tjibaou cultural centre

4.2: Carl Bremer hospital administration block

4.3: Glenn Murcutt: An appropriate architectural response to the landscape



4.1 >>> Jean Marie Tjibaou Centre, Renzo Piano

1998

Jean Marie Tjibaou Cultural Centre

Architect: Renzo piano

New Caledonia

Figure4,1: Kanak huts with the Tjibaou Cultural centre piercing the sky in the background. (Langdon, D. 2015. (online)).

Precedent studies: Tjibaou Cultural centre

This project has been selected as a precedent as it touches on key components which are integral to the themes of the project namely:

1. Cultural appropriation and sensitive re-interpretation of vernacular architecture.
2. Creating a prominent cultural icon.
3. Socio-political effectiveness in creating a resolution to tensions amongst the population's diverse groups.

This structure has been of major success in terms of the abovementioned aspects and has attracted much attention over the years (intended or not) and has been known as having the "Bilbao effect" where a single structure vastly influences the outsiders' perception of a place and furthermore had a positive economic influence on the place (Langdon. 2015 : online)

Concept - design

The brief of the project was to create an inspiring structure which stood as a beacon for the island as a strong reference point towards the local Kanak culture. The architect, an outsider sought interpret and analyse local building vernacular as inspiration for the structure.

The Kanak chief hut became the starting point of the project and was analysed in terms of its components, their relation to each other (connections), materiality and appearance and form as well as proportioning. From this analysis, Piano defamiliarised the hut and began to tend towards a form which is clearly a derivative of the Kanak hut but now reinterpreted it into curved bowl forms with a similar construction formula.

Piano took the tectonic structural typology of the Kanak hut and broke it down, giving each component prominence in its own right. Firstly, one sees the vertical components which a bent to form the bow for the hut, as singular elements piercing into the sky at the highest point. Secondly, one becomes aware of the horizontal struts which ring around the bows of the vertical struts. Lastly, one sees the finer mesh which makes reference to the thatching which forms the curtain enclosing the Kanak hut. Together, these components have been rearranged by Piano to form a pleasing morphological form which sensitively dematerialises as it rises to the sky to end with prominent prongs which pierce the skyline. It can therefore be seen as a contemporary act of sensitive listening and responsible answering from the architect.

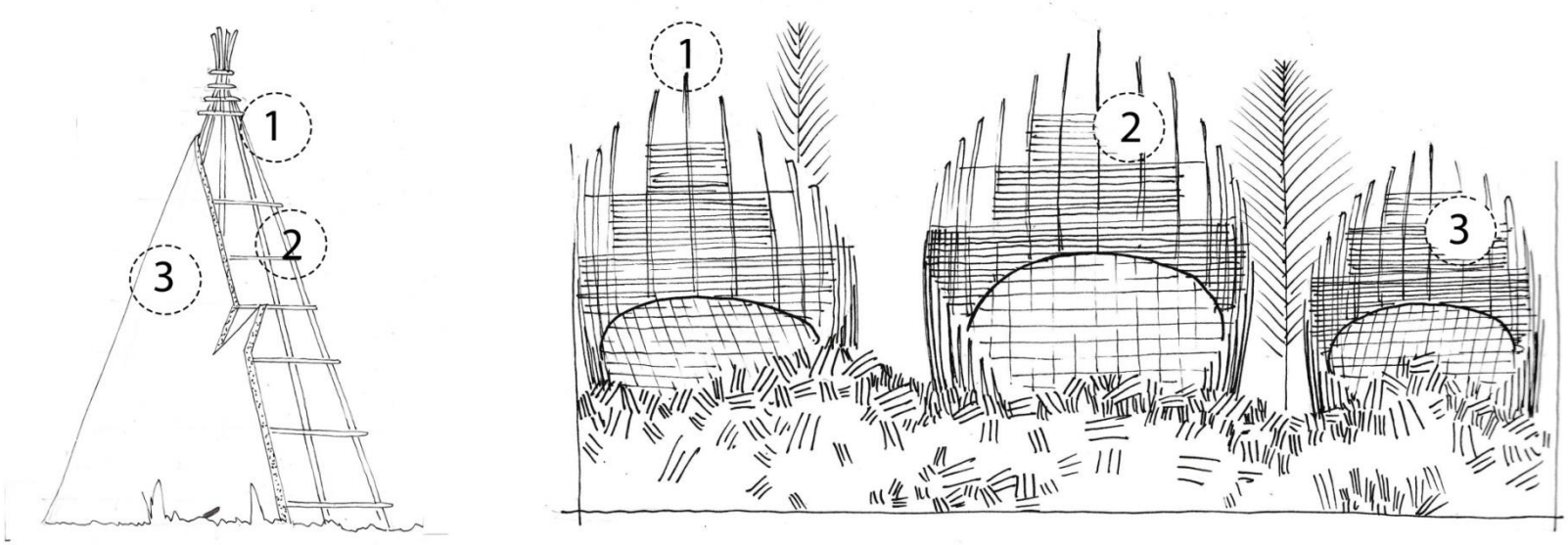


Figure 4,2: An investigation into the elements that were utilised in the defamiliarisation process. (Author, 2019)

Socio-political and economic aspects

The structure aimed not only to house cultural activities and to act as a gateway, but also had a vision in mind of smoothing over cultural tensions between the indigenous people of the islands (the Kanak) and the western influence (the French colonialists) (Langdon, 2015: Online). The structure thus received much aiding from the French government to fund its realisation and construction.

The structure is said to have made a healthy economic boost for the Caledonian islands. The structure has brought a large influx of economic activity through his significant landmark on the islands, bring much interest and investment from the rest of the world, similar to the effects that the Sydney Opera has for its respective location(Langdon, 2015: Online).

Precedent studies: design application

The wind screen

The wind screen has been integrated into the arrangement of the huts as both a practical intervention as well as a ritualistic part of the lives of the people who inhabit these spaces.

The wind screen acted as a protective threshold which circled the huts. It protected the inhabitants within the cluster of huts against cold winds penetrating the interior of the cluster of huts it surrounded. (Kammeyer, 2010. 186)

Secondly and more importantly it acted as a means of protection against intruders and attackers attempting to enter the cluster of huts. Its method of functioning entails creating entrances which are low to the ground, forcing anyone who enters to do so kneeling on their hands and knees, a position of weakness in a combat situation. This method of protection evolved into the entrance of the hut and created a foyer effect, a liminal space before entering the hut. The image below shows both of the protective measures, with the later more evolved method in the form of a snout over the entrance. (Kammeyer, 2010. 187)

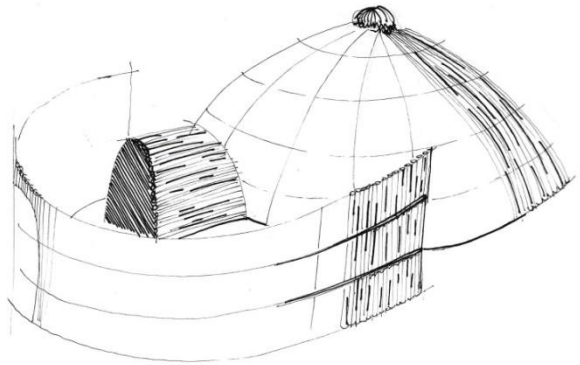


Figure 4,3: A depiction of the Basotho hut(Author, 2019).

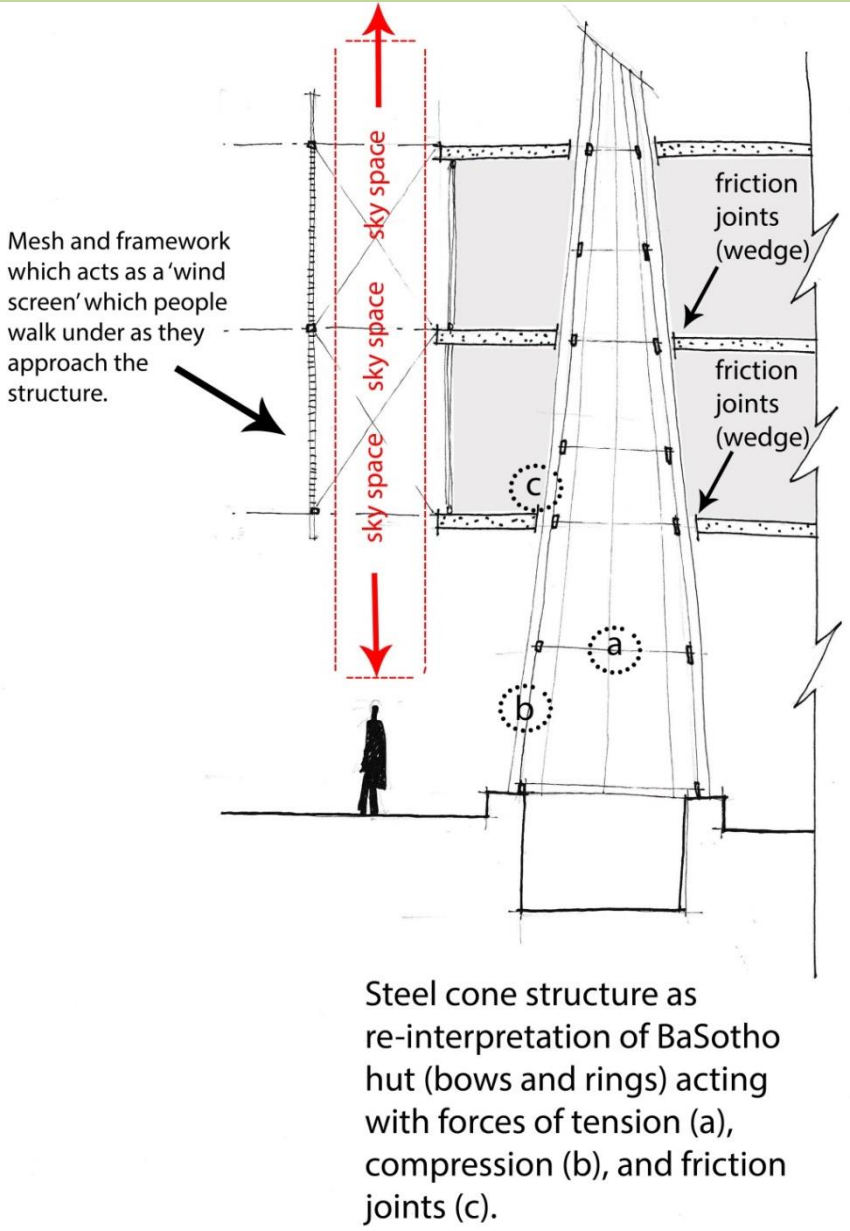


Figure 4,4: An investigation into defamiliarising elements of the Basotho hut and incorporating them into the design (Author, 2019).

Precedential studies: design application

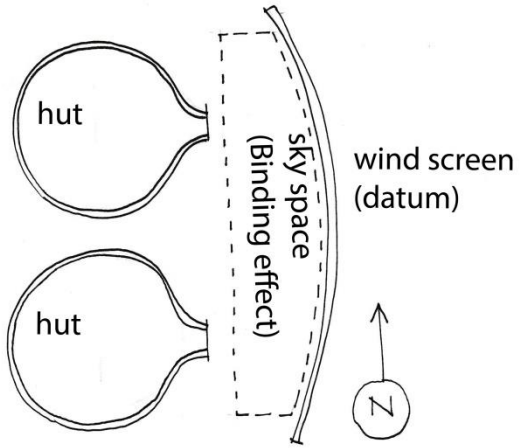


Figure 4,5: An investigation into the topographical arrangements of Basotho huts(Author, 2019).

The datum effect

The screen creates a sense of community among the huts acting as a means of datum, an element common to all huts it protects. This principle will aid the design of the structures façade as it will bind the structural cones visually in terms of the elevation of the structure. This screen which front the façade of the structure will give the ensemble a more sedate lightweight appearance and give the silos more prominence as heavy dominant structures.

Elevation effect of screen

sedate lightweight screen which gives prominence to heavy silos and binds the structural cones

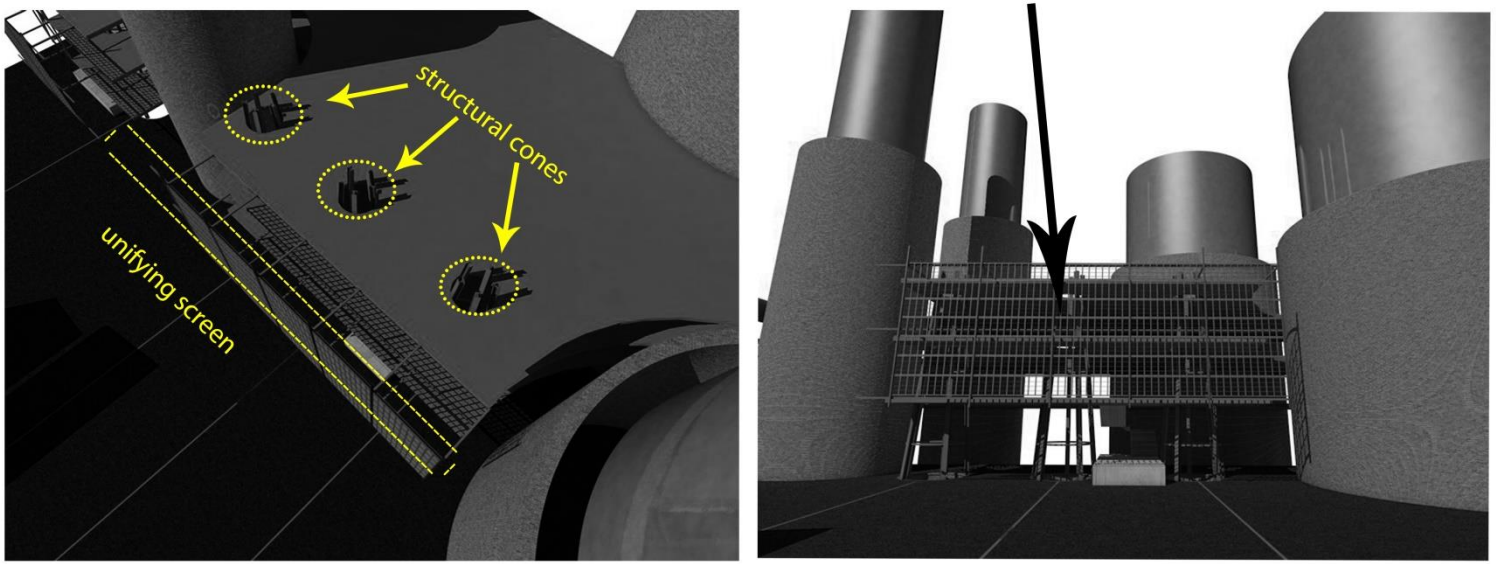


Figure 4,6: Attempts at incorporating the Basotho arrangement methods into the design as a defamiliarised culturally embedded entity(Author, 2019).

4.2 >>> Carl Bremer hospital admin block

2016

Carl Bremer Hospital admin block

Architect: Jacobs Parker architects

Bellville, **Cape Town**

Figure 4,8; Carl Bremer Hospital Admin Block.(Letch, 2017: online)

Introduction: precedent choice: Administrative block typology

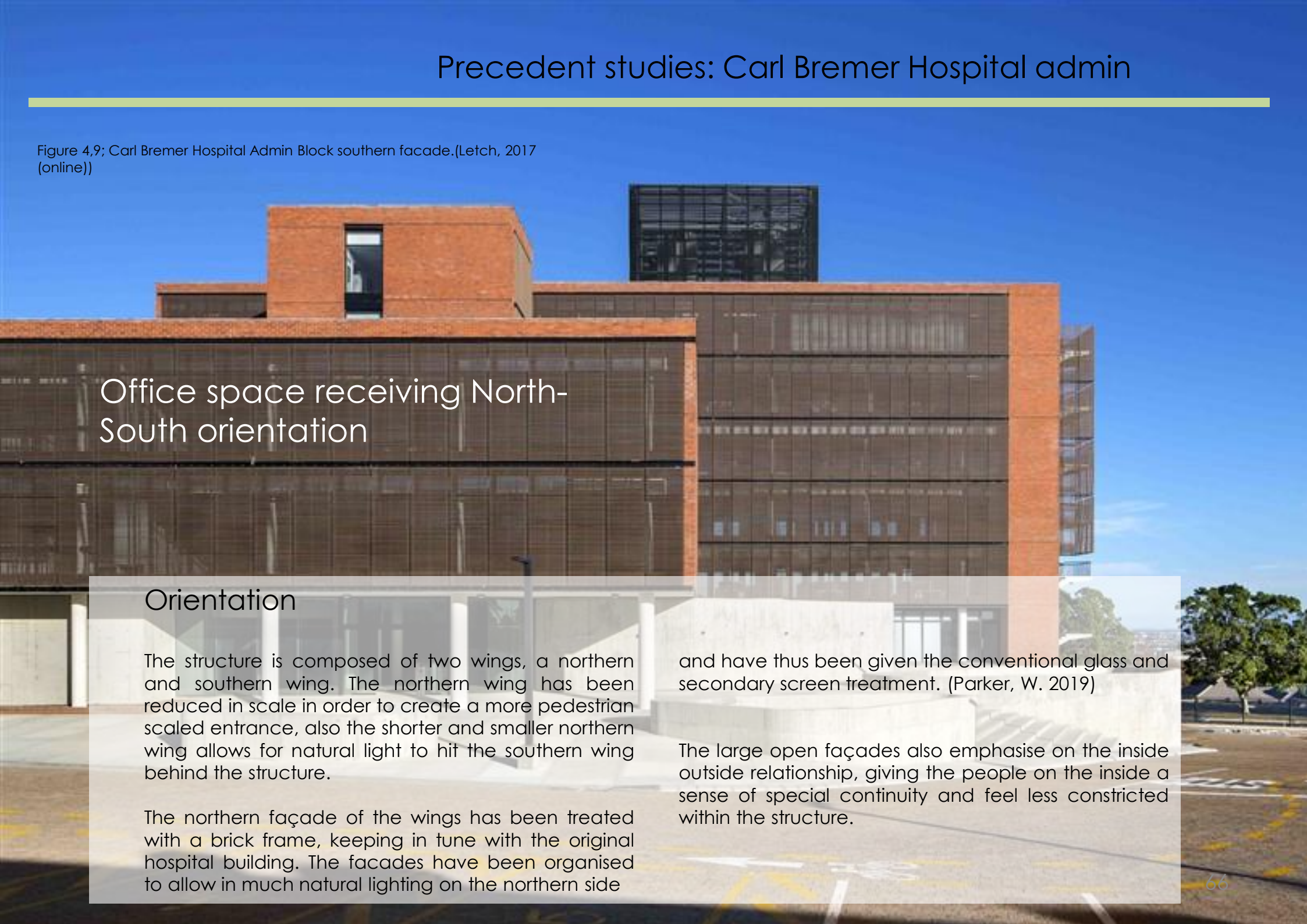
This precedent has been selected as an early starting point in formulating the administrative block which will form the bulk of this thesis. Elements which are sought in this analysis lies in the overall composition of the structure in terms of orientation of office floors in relation to other elements such as vertical circulation as well as binding spaces such as foyers, libraries and less formal spaces which link office floors to the rest of the structure

This structure had two big goals or driving factors in mind when faced with the brief of this administration building: environmental and social sustainability. The structure was determined to be one which will give back to the community through its construction. The structure was prescribed to consist of a red face brick skin which not only tied in with the existing architecture of the hospital building adjacent to it but would be an economic benefit to the community in which the building stood (Letch, 2017: Online).

The red bricks, Corobrik's Constantia Travertine face bricks, would fulfil the economic aspect of the project as it would employ a large number of skilled brick layers for the duration of the project and the bricks would all be locally sourced, giving back to the community by supporting local businesses. The Constantia Travertine bricks were also locally manufactured in the Western Cape in the Phesantekraal Factory, further emphasising the efforts to support the local community. The face bricks are also known to encompass minimal maintenance over the years making it a viable contender for a public building (Letch, 2017: Online).

Precedent studies: Carl Bremer Hospital admin

Figure 4,9; Carl Bremer Hospital Admin Block southern facade.(Letch, 2017 (online))



Office space receiving North-South orientation

Orientation

The structure is composed of two wings, a northern and southern wing. The northern wing has been reduced in scale in order to create a more pedestrian scaled entrance, also the shorter and smaller northern wing allows for natural light to hit the southern wing behind the structure.

The northern façade of the wings has been treated with a brick frame, keeping in tune with the original hospital building. The facades have been organised to allow in much natural lighting on the northern side and have thus been given the conventional glass and secondary screen treatment. (Parker, W. 2019)

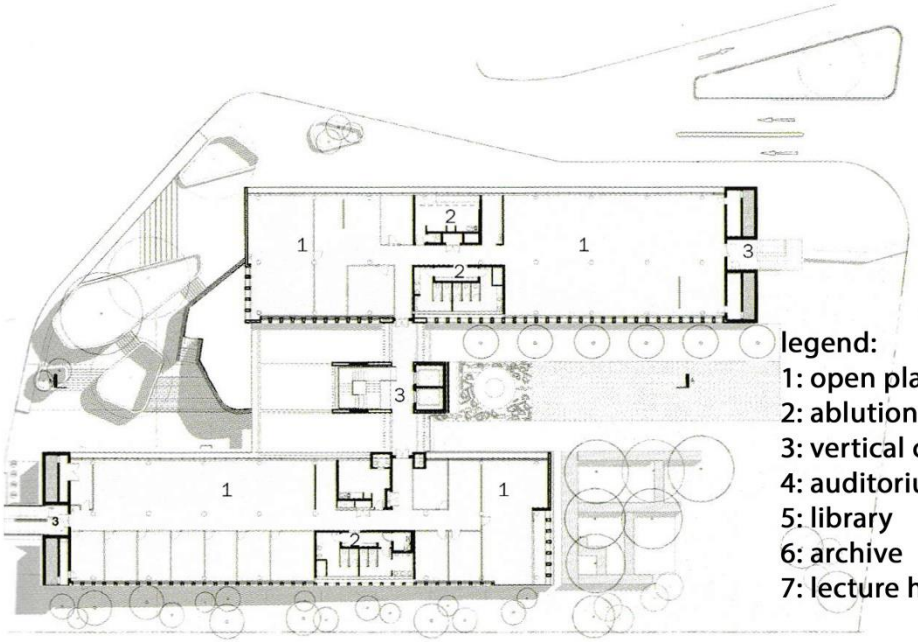
The large open façades also emphasise on the inside outside relationship, giving the people on the inside a sense of special continuity and feel less constricted within the structure.

Precedent studies: Carl Bremer Hospital admin

Programme

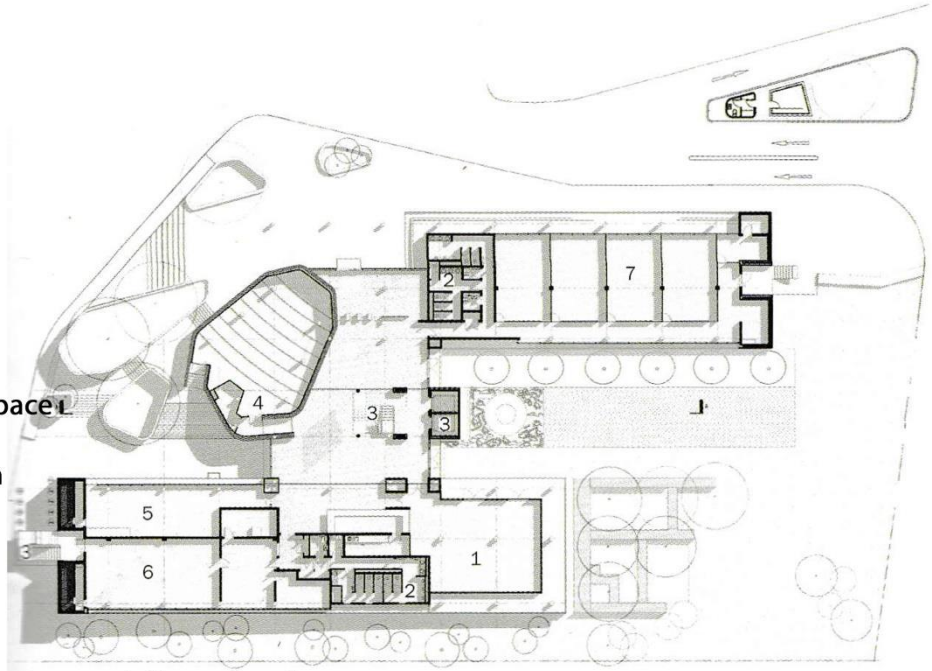
The two wings are connected via a central atrium space which houses a couple of public functions namely a foyer space, central vertical circulation space as well as an organically shaped auditorium which all contribute to this connecting central space. This central connective space connects the various functions of the building namely the office spaces, ablutions which are in close proximity to the central circulation, an auditorium as well as lecture rooms and archives. The east and west of the structure have been strategically utilised as additional vertical circulation space to eliminate the unwanted sunlight from those angles. (Parker, W. 2019)

Each of the masses of office spaces have been placed in order to receive optimal northern sunlight with prominence being given to the higher floors with better views. The lower floors have been given the more introverted functions with lesser views outwards such as lecture rooms, the library, archive and auditorium.



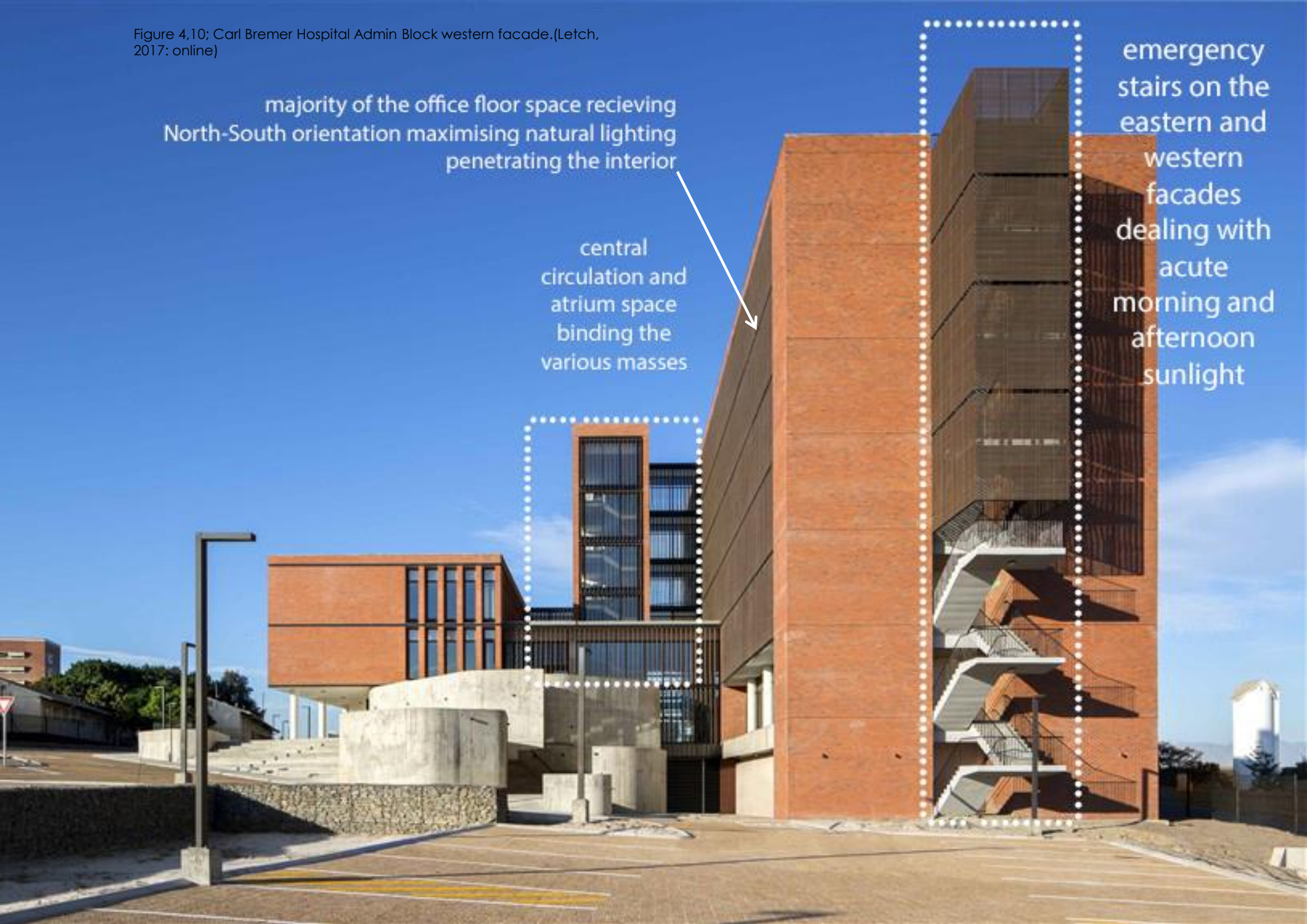
upper floors n.t.s

legend:
1: open plan office space
2: ablutions
3: vertical circulation
4: auditorium
5: library
6: archive
7: lecture halls

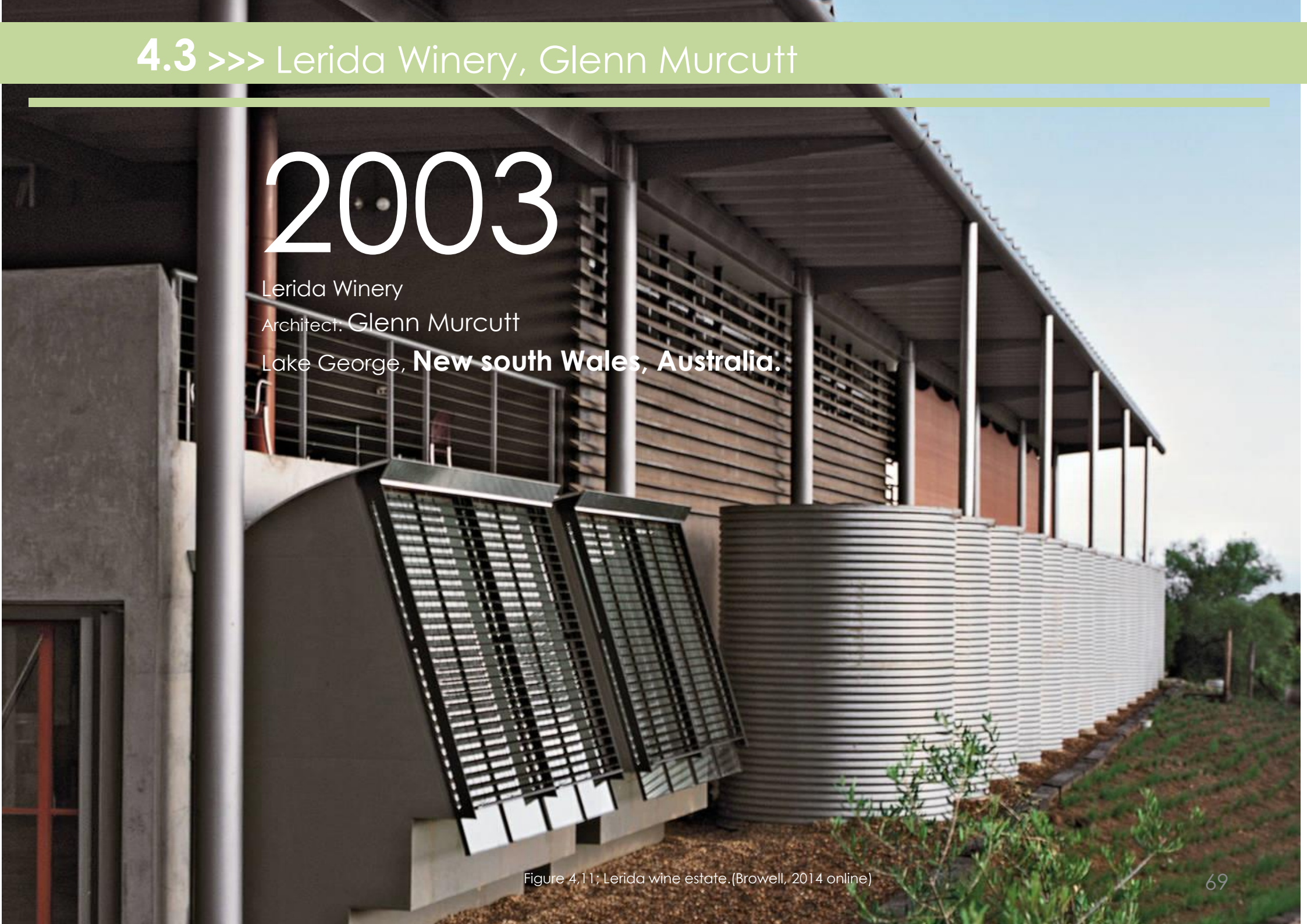


ground floors n.t.s

Figure 4,10; Carl Bremer Hospital Admin Block western facade.(Letch, 2017: online)



4.3 >>> Lerida Winery, Glenn Murcutt



2003

Lerida Winery

Architect: Glenn Murcutt

Lake George, **New south Wales, Australia.**

Figure 4.11; Lerida wine estate.(Browell, 2014 online)

An appropriate architectural response to the landscape: Free State.

A typology which is of the landscape and speaks of the rural farming community needs to be appropriated as one of the forms which terminate the ensemble of buildings as it reaches the landscape end.

Glenn Murcutt's work makes reference to the agricultural sheds of the rural scape of Australia. The structures are lightweight tectonic structures with regular grid patterns which is evident through exposed structure. The lightness of the structure is further emphasised by including a shadow line just before the building touches the ground giving it a floating effect.

The structure has a modular rhythm and fits in a variety of textures and profiles within the modules to create a pleasing elevation which has a balance between variety and regularity.

The buildings touch the sky with a lightweight planar roof which almost seems as if it were hovering above the structure. The material palette consists of concrete, steel profiles, zinc panels, stone, glass and louvers.

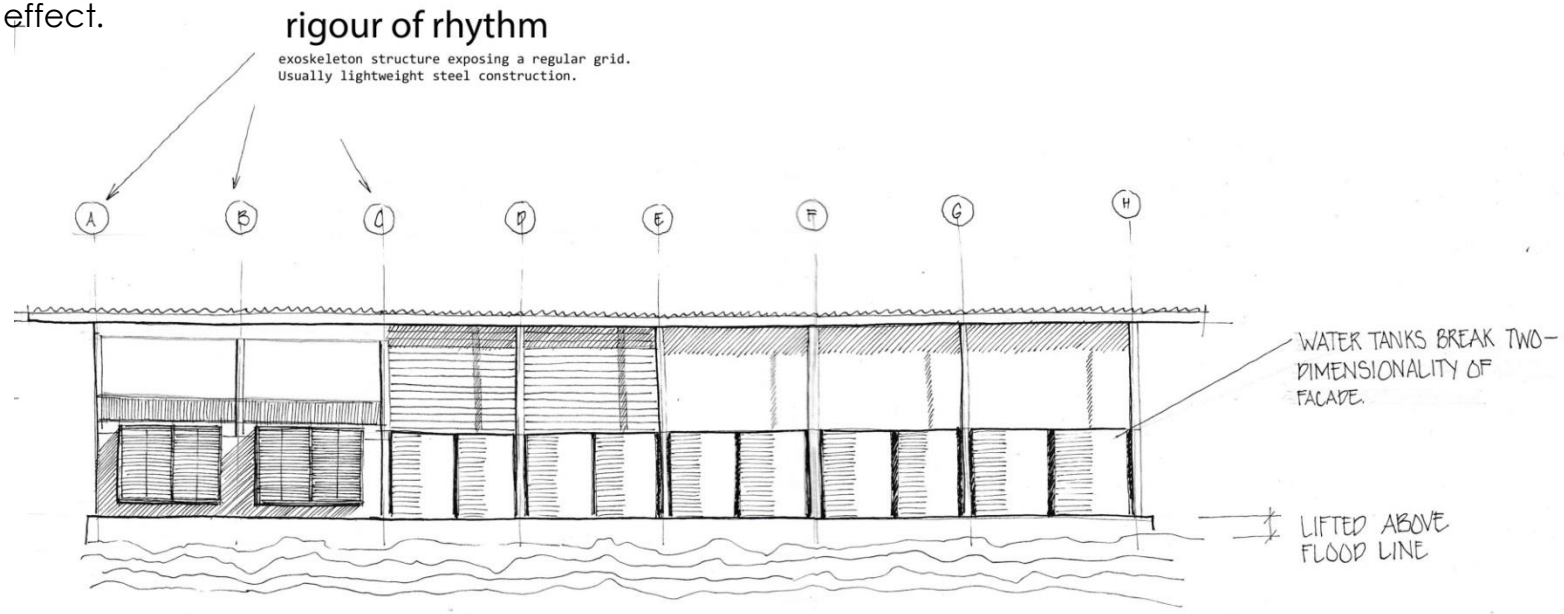


Figure 4,12: Analysis of the Lerida wine estate façade system(Author, 2019).

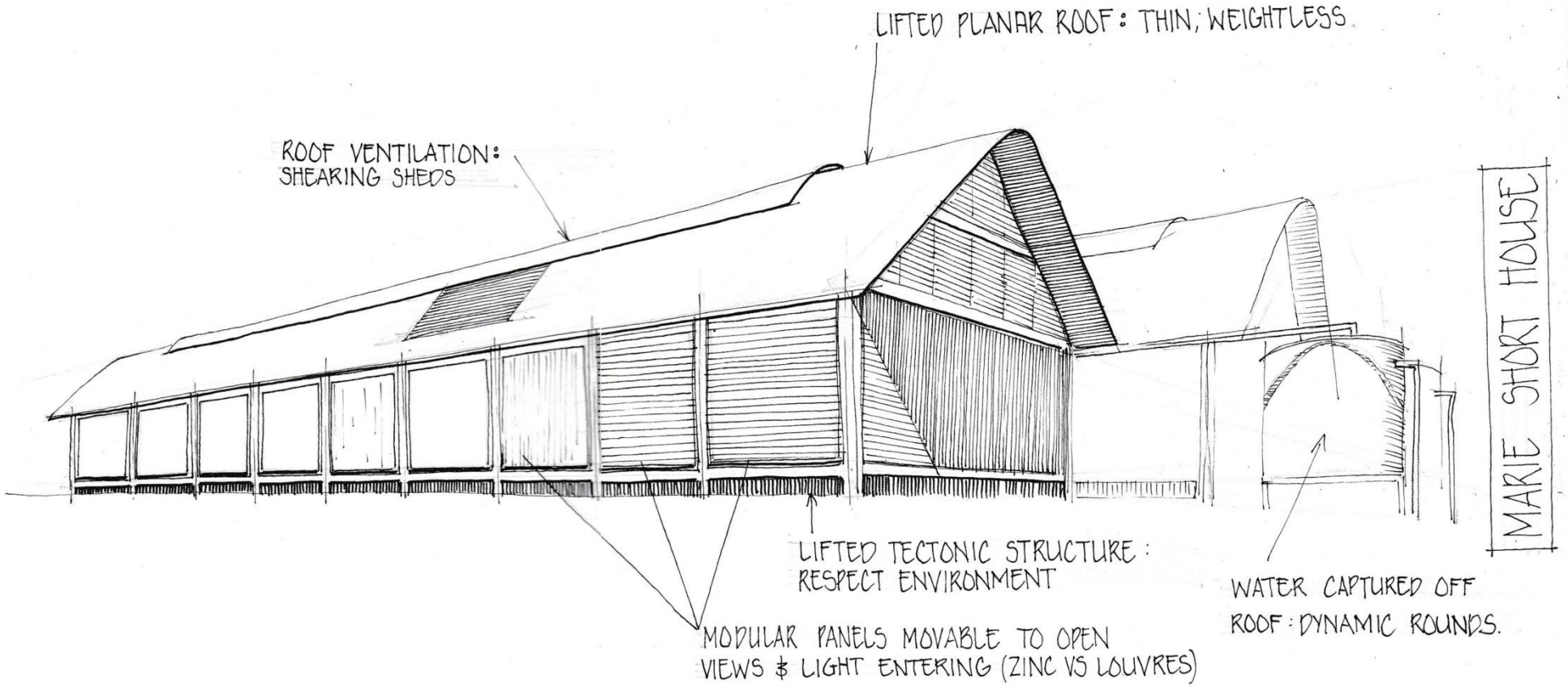


Figure 4,13: Analysis of the Marie Short house (Author, 2019).

Precedent studies: an architecture of the landscape into design application

The works of Glenn Murcutt has influenced the design of the stores below the terminal. His shed-like architecture speaks of an architecture that harks back to the rural scape of the Free State. Rigour of rhythm, lightweight planar roofs, water tanks embedded into the façade as well as shadow lines were all incorporated into the design.

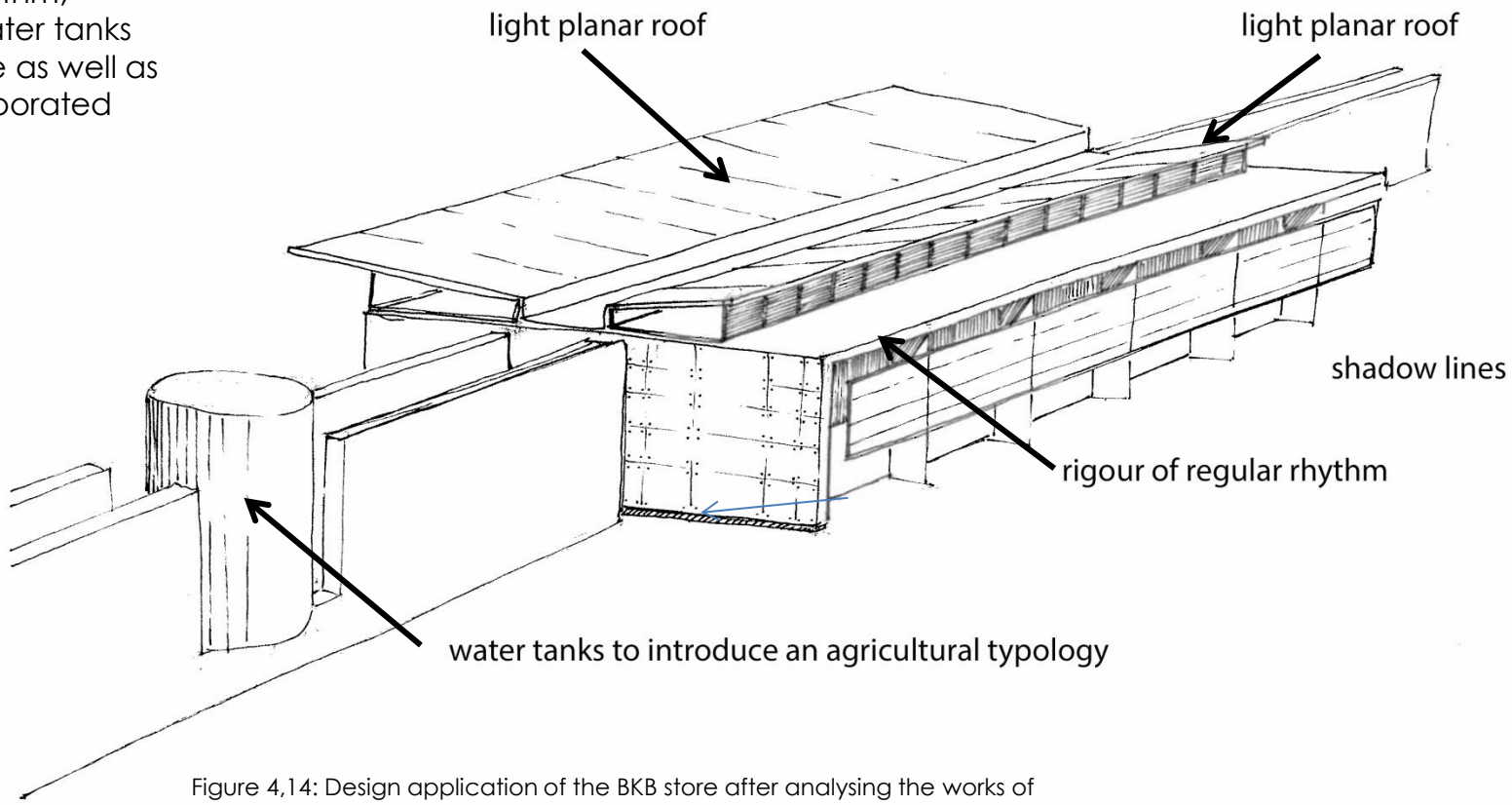


Figure 4,14: Design application of the BKB store after analysing the works of Glenn Murcutt (Author, 2019).

>>Design application

05

Technical report

introduction

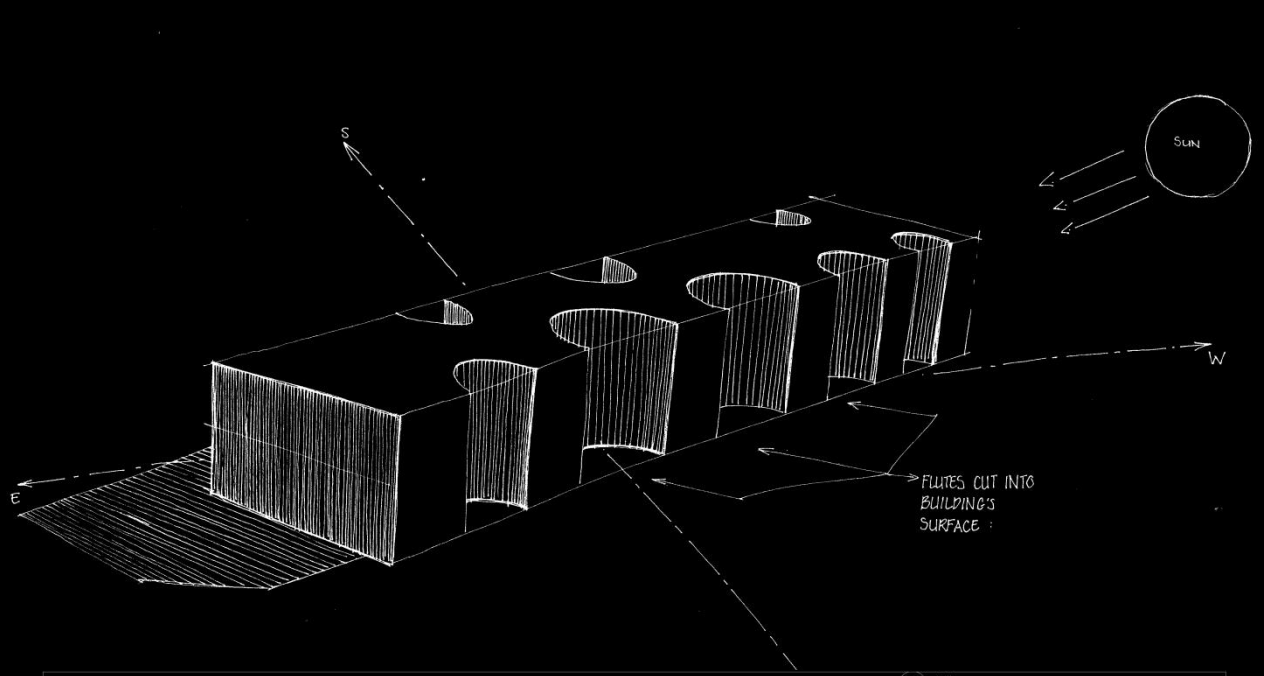
5.1: Sustainability

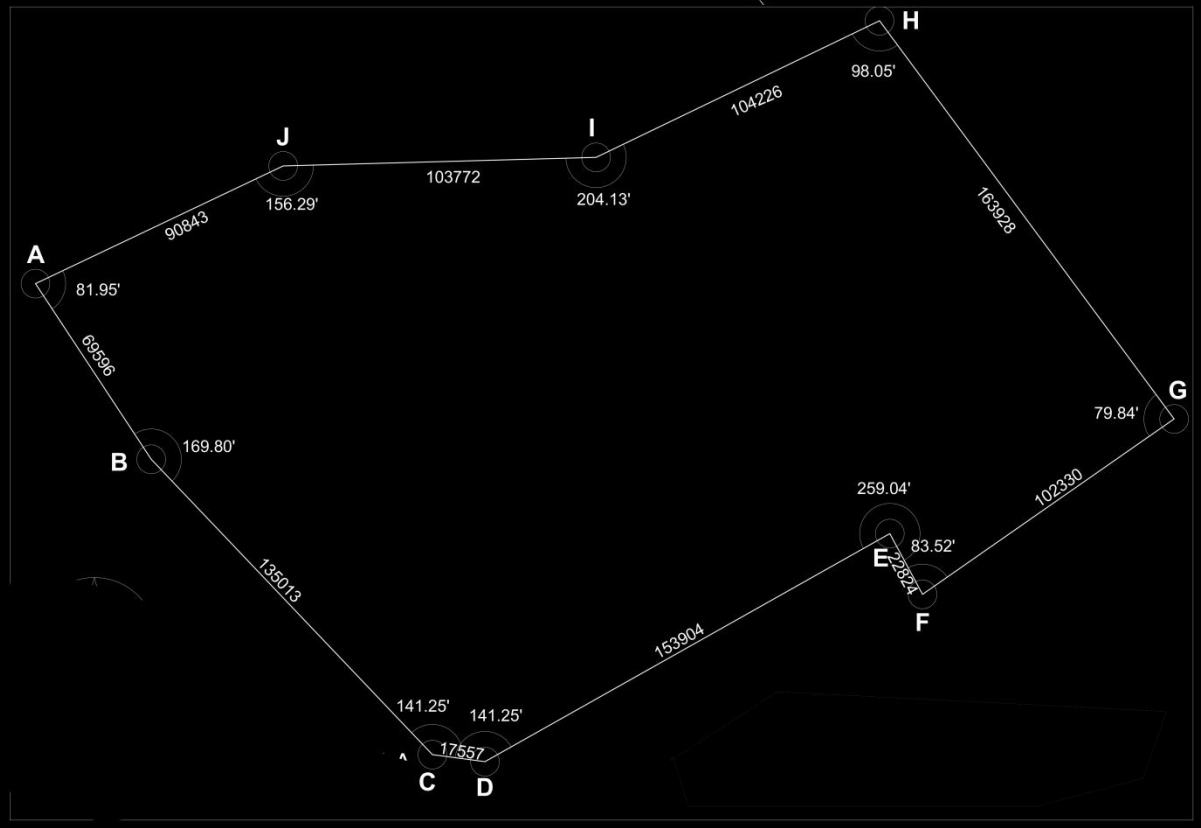
5.2: Site usage

5.3: Shape factor

5.4: Envelope development

5.5: Cadastral information





Sustainability principles in design

Introduction

The catalyst initialising this chapter began with a viewing and analysis of a Tedx talk by Ben Bronsema looking into passive design strategies in sustainable design of structures. His talk encapsulated passive thermal control within buildings through the use of natural elements, namely sun, wind as well as water. His concept entailed the following:

1. Bringing pleasant moist outside air into the structure which would then be cooled by a shower of water.
2. The cooled air would then be allowed to circulate through the various floors of the structures where occupants would be able to enjoy the naturally conditioned air.
3. The air is then exhausted to the other side where (in our case, the northern façade) the sun shines on the face, heating the air once again in order for it to rise.
4. The air is expelled out of the building via the wing on top of the building which is in a state of negative air pressure.
5. The wing on top of the structure makes use of the *Venturi effect*: it funnels the air which increases the velocity and in turn lowers the air pressure, creating a suction effect, thus exhausting the air out and allowing the cycle of passive cooling to be repeated in the building.

What can be extracted out of this example and learned from is utilising what is already there for your careful use, in the above example, they had wind, sunlight as well as water to their disposal in order to think out a smart system which they can use to their benefit.

It would then be important to look into the local context of the project (Bloemfontein and the Free State) to create bespoke solutions for the specific site, and not a general idea which would not work as efficiently here as it would where it was intended for. Efficient solutions which are most appropriate to the site and context with maximum achievement are of the bigger goals of this project.

Also, it will be to the projects benefit to come down to the core of sustainable development and what it exactly stands for, how it works and what its effects are now as well as in the future in order to make informed decisions based on the core principles of the topic.

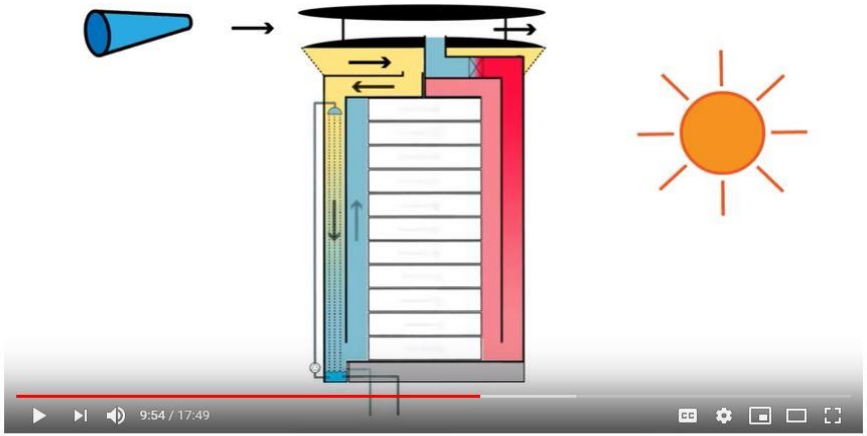


Figure 5,1: Principles of sustainable design (Youtube video screenshot taken at 9'54" into the video). (Bronsema, 2013.)

Initial thoughts on sustainability in the granary

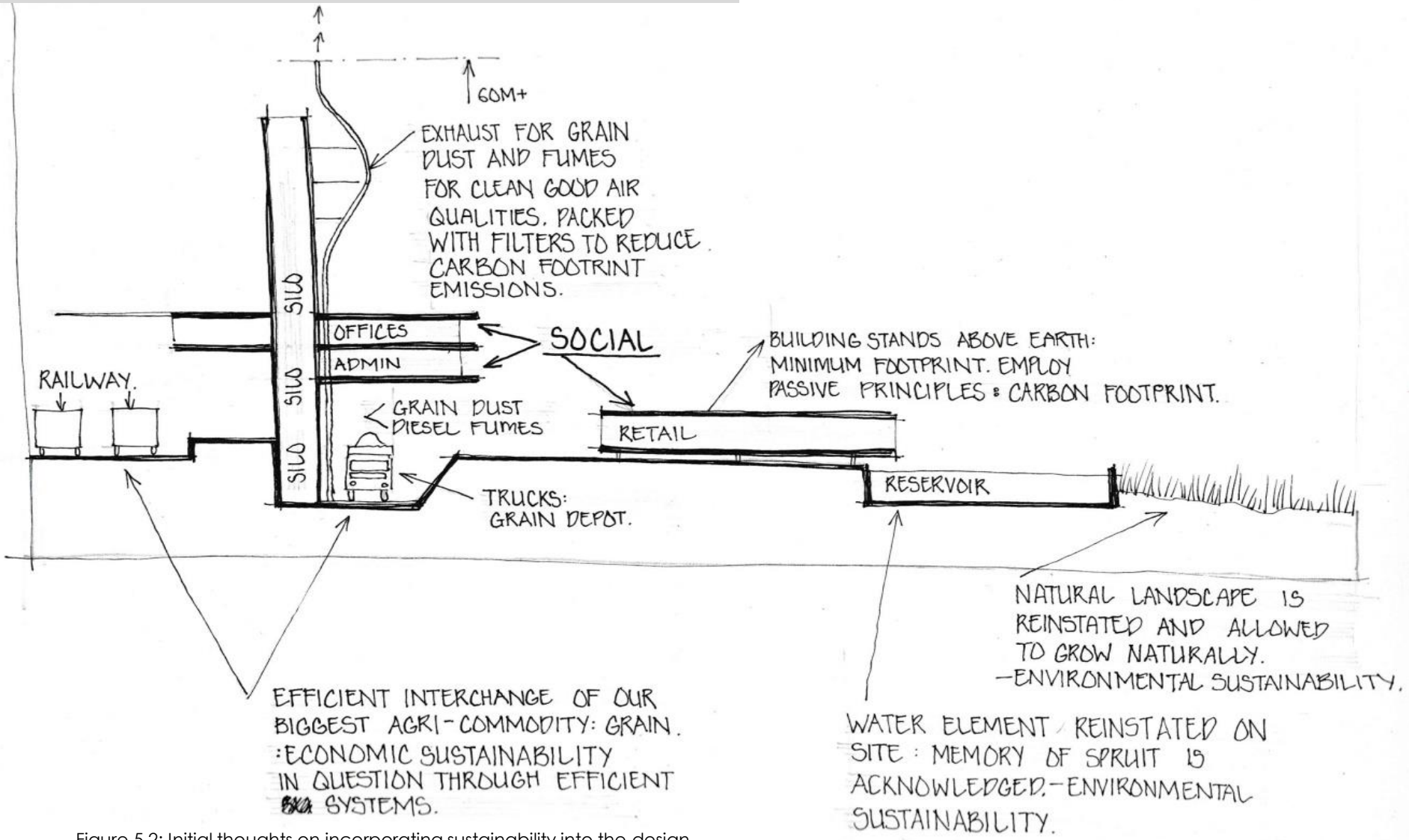


Figure 5,2: Initial thoughts on incorporating sustainability into the design (Author, 2019).

Sustainable development- an insight into what it really entails

Although sustainable development is primarily focussed on the conservation of our world and environment for future generations, it goes deeper than that because, in our current world, we need not only preserve the natural environment, but also our social environment as well as our economic environment. All three components are preconditions for our healthy living and functioning in our environments.
(Emas. 2015: 2)

Considering that there are three components, a tri-pod stand comes to mind in that there needs to be all three components evident to fully achieve sustainable development, one cannot have one without the others. It is said that long term sustainability is only achieved when all three components are designed to interweave with one another and co-exist strongly. (Emas. 2015: 2)

Long term sustainability has thus been defined as a state where all three components are present in contributing to the cause, but this could be achieved in varying degrees of success. What then, could be seen as strong sustainability? This occurs when, after a deep understanding of place has been achieved, one can now identify natural resources to one's disposal which cannot be duplicated or mimicked through man made processes. However, from an environmental perspective, one must handle this topic with sensitive care in utilising natural resources with the goal of not depleting resources and causing irreparable damage for future generations.

Overview of the project as a whole: how can it contribute to the three sustainability components:

Social component:

The structures emissions in terms of grain dust which will be in full force as well as diesel trucks making noise - these things need to be taken into account in order to ensure pleasant and healthy air for the people working on site as well people living in surrounding areas such as *Buitesig.* The unpleasant noise and air conditions that the site will encapsulate should not negatively influence the conditions for the people in the context.

Economic component:

The structure aims to be an economic catalyst, bring road and rail networks together, speeding up and fine-tuning the transport and interchange of agricultural commodities. It most importantly aims at allowing people from all spheres of life to be able to participate in the economy and contribute to it.

Environmental component:

The structures aim to be as green as possible, not relying on artificial air conditioning, lighting, and energy usage of the structures as much as little as possible. An efficient building shape and envelope will be investigated and developed in this chapter keeping in line with sustainability. Much of the site will also be given back to nature to reclaim it back to natural vegetation limiting heat radiation (a product of too much paving) as well as water run off.

Appropriate and careful usage of natural resources which cannot be replicated by man made processes in the local context:

Two elements have been identified that are very applicable to be used, manipulated and studied in order to maximise the goals of passive design in this projects bid at sustainability. A study into solar elements as well as the tactical use of hydro elements will take place. A more in depth study will take place on solar elements considering that Bloemfontein is known for its abundance of sunlight. However, the first step towards a more sustainable design will be taken at a macro scale rather than zooming into the workings of the structure first.

The process of passive design does not start at a detailed façade section or a smart air ventilation system in a building but it begins with understanding the site and doing every effort to utilize, adapt and manipulate micro climates on the site. (Jordamonic. 2014.179). For example, the N8 adjacent to the site will radiate much heat stored and accumulated throughout the day, while the vegetated area towards the centre of the site will be cooler as the trees cast permanent shade on the ground around them and is thus always a few degrees cooler than other places on the site. See the image on the right: the centre of the site is deemed cooler than the perimeter as paved areas are much hotter than vegetated areas.

Also, south facing slopes will always be cooler than north-west facing slopes which will radiate heat throughout the afternoon and well into the evening. It is also said that putting artificial water surfaces/features on site also have a big impact on micro climates on site, especially for cooling. (Jordamonic. 2014: 179)

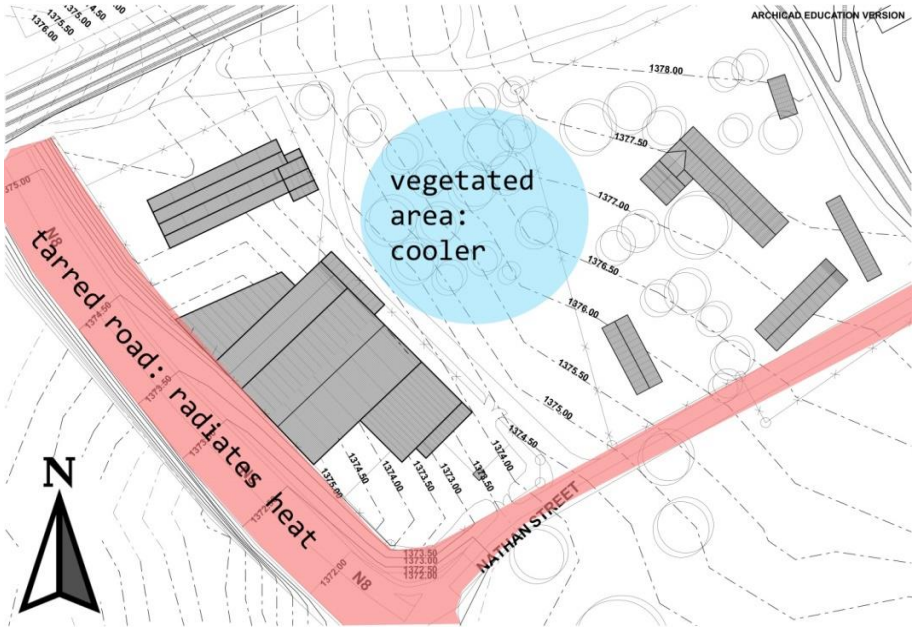


Figure 5,3: Utilising the site in a more sustainable manner identifying coller and warmer spaces (Author, 2019).

The use of water on sites of industrial nature is beneficial to the notion of passive design in a couple of ways. strategically used water can be beneficial in pre-cooling air about to enter the ventilation systems within double facades. Tactically placed pools can also be utilized in order to benefit from secondary sunlight penetrating the structure which is desirable in most cases. (Jordamonic,M. 2014;179)

This concept of strategically using water can also be used to its maximum effect, creating water channels along the footings of facades on the structure where ventilation valves are present (usually at the lower end, where cooler air can enter). Water vapour sprays will also be beneficial to minimising grain dust in the air when deposits are taking place on ground floor.

Building shape and orientation to maximise passive design effectiveness

Shape factor

After exploring some of the many aspects one can look at while analysing the site in terms of passive design and utilising micro climates to ones advantage, a look into the overall building shape needs to be investigating in terms of maximising maximum passive design strategies. Shape factor is a concept of comparing the volume of a shape to its energy efficiency to determine its effectiveness. (Lylykangas. 2009: 2)

The aims of studying shape factor otherwise known as A/V ratio, (where (A) is the area of the external envelope and (V) is the volume of the interior that needs to be heated) is to determine the energy demand of a structure (level of need for intervention/energy to keep a building thermally comfortable). Studies in Kimmo Lylykangas's document "Shape Factor as an Indicator of Heating Energy Demand" found that the shape which was most conducive to passive design was the elongated rectangle, with the longer edges orientated on the North-South Axis. This also allows the building maximum manipulation of the sun in both summer and winter months, with the shorter ends building getting as little interaction on the East-west axis.

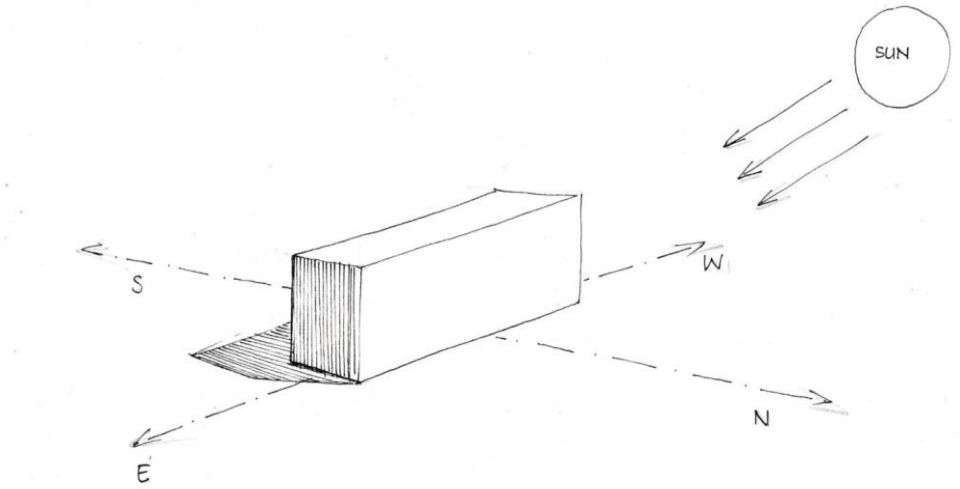
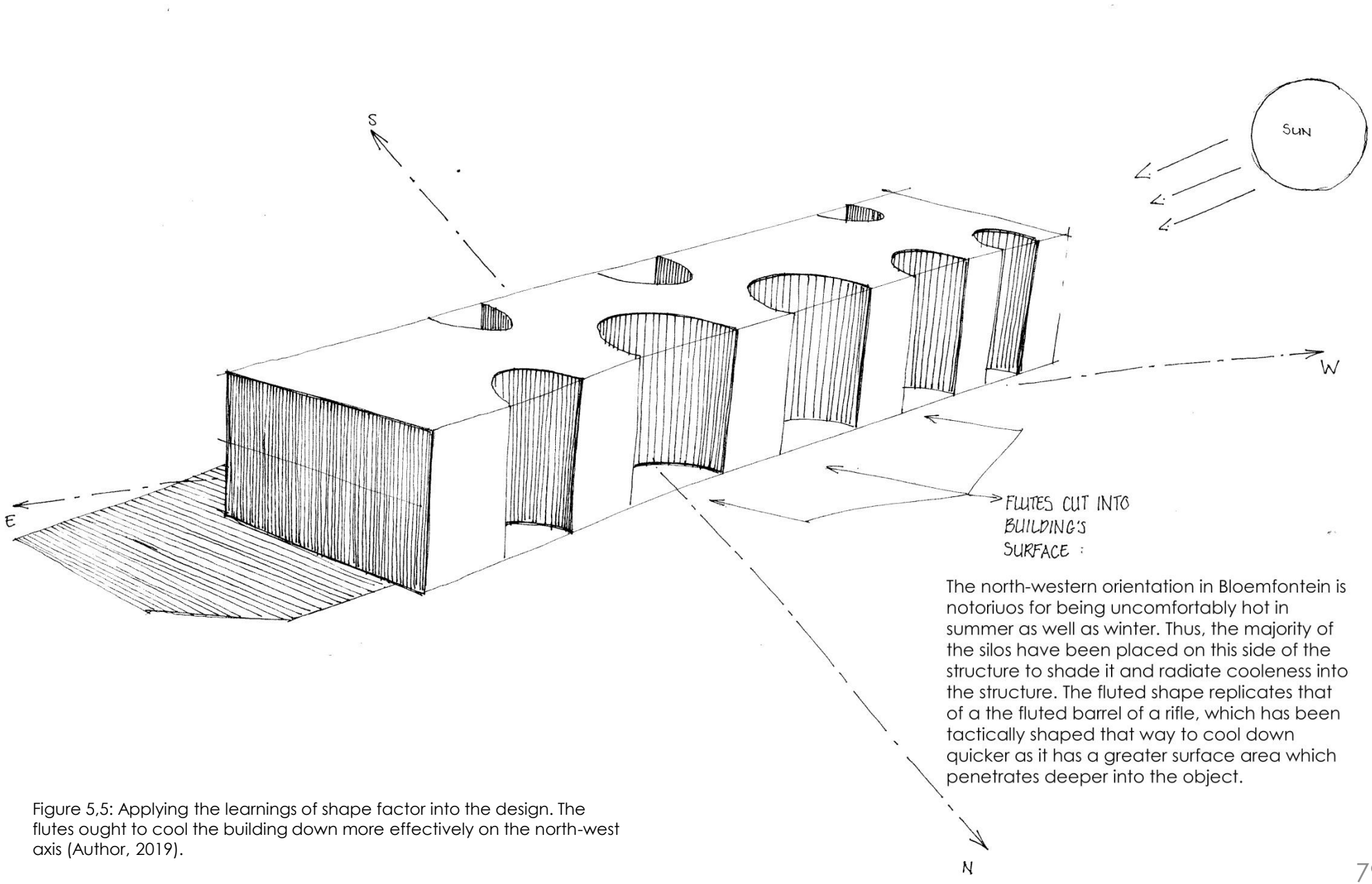


Figure 5,4: Diagram explaining the best orientation and shape for a sustainable structure (Author, 2019).



The north-western orientation in Bloemfontein is notoriuos for being uncomfortably hot in summer as well as winter. Thus, the majority of the silos have been placed on this side of the structure to shade it and radiate cooleness into the structure. The fluted shape replicates that of a the fluted barrel of a rifle, which has been tactically shaped that way to cool down quicker as it has a greater surface area which penetrates deeper into the object.

Figure 5,5: Applying the learnings of shape factor into the design. The flutes ought to cool the building down more effectively on the north-west axis (Author, 2019).

Construction of building envelope

The final component to be investigated will be the envelope of the structure, which will require the most thought and development. The envelope needs to be carefully designed and must take into consideration its orientation, prevailing wind, views and apertures, materials, light, adaptability between seasons, roof shape as well as ventilation to name a few.

The goals that the envelope need to achieve

Firstly, maximising natural lighting within the structure ties in with sustainable design, minimising electricity usage and must be addressed when designing the envelope. This however needs to be able to be controlled and varied between direct sunlight entering (most favourable in winter months) and secondary light entering (most favourable in summer months). Large overhangs are beneficial in this regard as they cut off direct sunlight penetrating the structure in summer but allow the acute sun rays to enter in winter months, which is desirable. Second to this, adjustable louvres work well and can be seen in the diagram below which can cut off sunlight and allow it to enter when needed.

Secondly, thermal mass needs to be addressed in terms of thermal gain and loss of the materials used and how they could contribute to the system or be to its detriment. for example, using a material of a low thermal mass where it needs to radiate heat later at night during winter months will not aid the passive design strategy of the building.

Thus, for the context of the project in the extreme conditions of Bloemfontein, it is proposed to place materials of lower thermal mass closer to the perimeter or outermost edge which comes into contact the extremes rays of summer sun while materials of higher thermal mass (e.g. a stone or brick wall) can lie in the shade and stay cool deeper inwards towards the inside of the building. In winter, the rays of the low lying sun will reach the materials of higher thermal mass warming the material up and allowing it to radiate heat for long periods of time. See the below diagram of the concept:

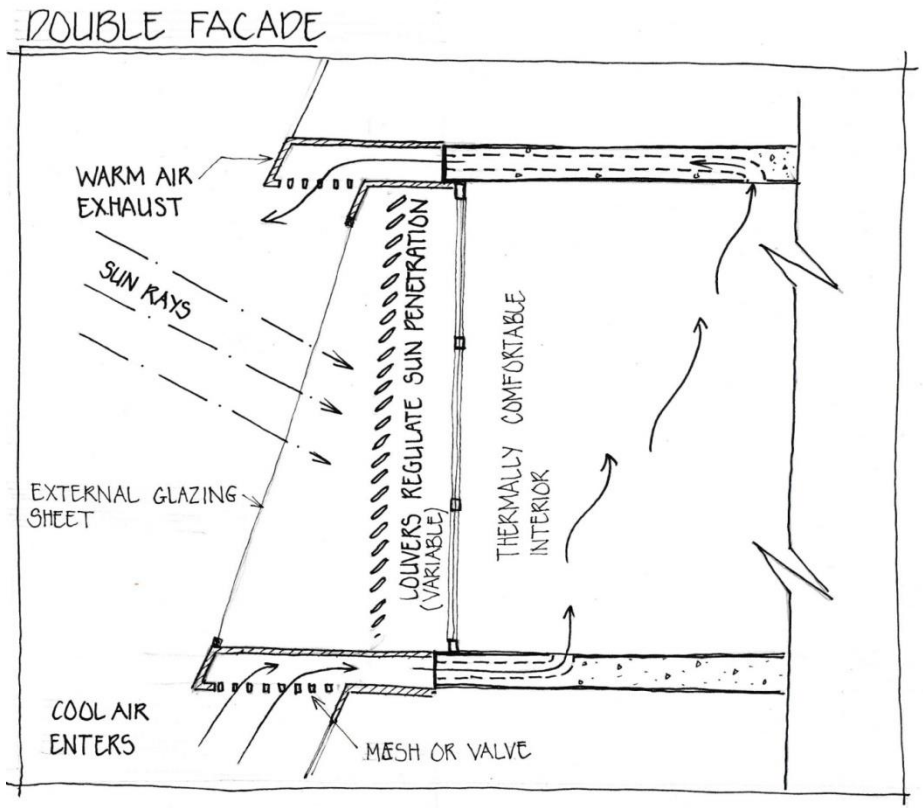


Figure 5,6:Investigating the possibilities of a more thermally comfortable building through a skin section (Author, 2019).

Further experimentation and development of the building envelope

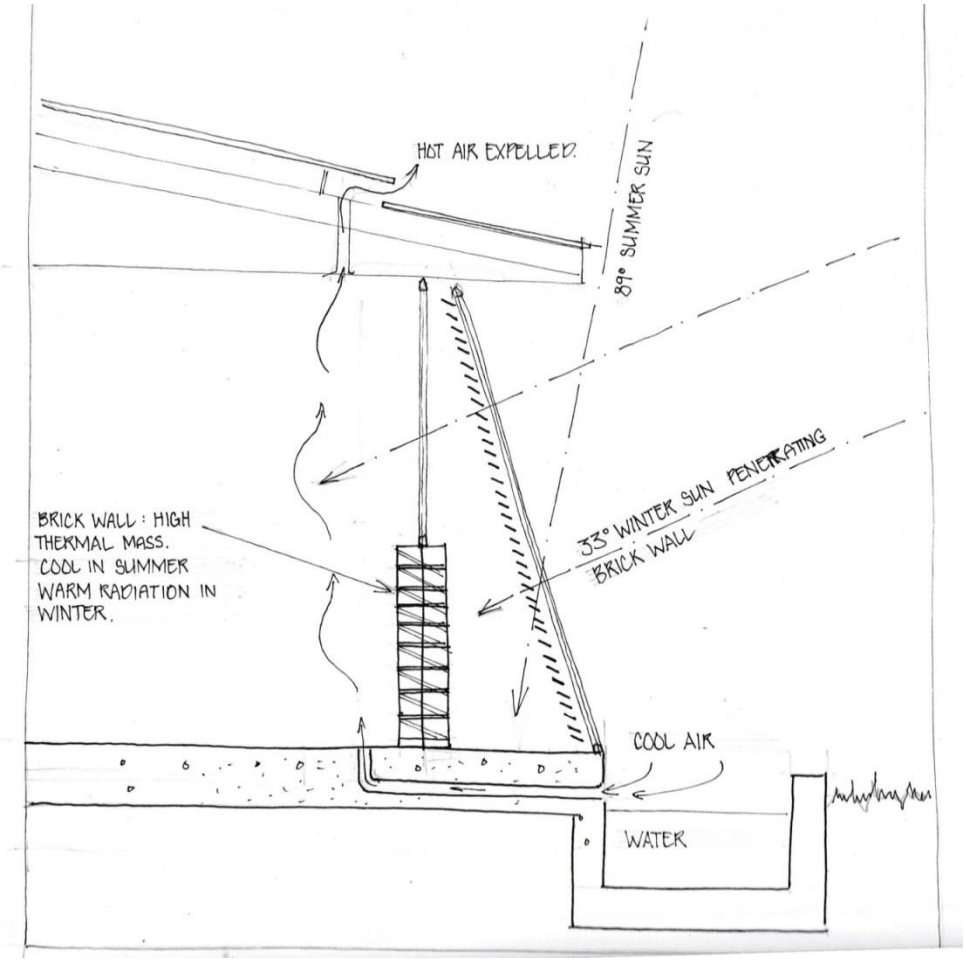


Figure 5,7:Investigating the possibilities of a more thermally comfortable building through a skin section. (Author, 2019).

Precedent study:

Brick Passive designed University

TAISEI DESIGN Planners Architects & Engineers. 2017

This project clearly shows the importance of an approach towards availability of materials and workmanship, for looking at extremely high tech solutions which cost large amounts of money and a high level of skill to install. It would thus be beneficial to a project in our local context to look at smart low tech solutions which are possible, fits within a reasonable budget and makes use of materials that are actually available to our disposal. This way of thinking will tie in with the concepts of sustainability which include making use of what we already have (clever material selection) and also supporting our local work force (social sustainability), instead of hiring engineers from a foreign country to install smart materials which do not empower our economy.

The architects of the building achieved an environmentally and economically sustainable design through the careful design of brick facades. The facades allow varying levels of interaction with the exterior ranging from solid walls, porous walls with a pattern of openings and then full exposure with glazed panels.

The porous walls are the element in question considering that these elements allow a level of interior-exterior interaction while creating an effective sun shading device. The staggered bricks in their formation catch direct summer sunlight but allow secondary light to deflect into the interior which is desirable. (Taisei Design, 2017: online)

Figure 5,8; A façade which improves thermal comfort through perforated brick walls (Taisei design, 2017: Online).

Passive cooling shafts have been included at tactical points along the exterior envelope. The shafts make use of the same porous brick pattern makes way for cool exterior air to enter the shafts and filter into the interior of the structure (TAISEI DESIGN Planners Architects & Engineers. 2017. online).

The design strategy is practical in its application of passive cooling with a low tech approach, and gives the building a pleasing aesthetic effect of a contrast between heavy solid walls and lighter porous panels of bricking. (TAISEI DESIGN Planners Architects & Engineers. 2017. online)

A concentration into the air-duct system has been investigated in order to implement this precedent into the design. This system serves as a valuable contributor to the green systems of the granary administrative building because:

1. It minimises the need for air conditioners in the building therefore minimising pollution in that regard.
2. It utilises the outside air to create a pleasant air quality within the building which will aid productivity inside. More oxygen constantly being cycled into the structure will be beneficial.
3. It is a simple yet effective system aligning with agricultural solution methodology.

See the developed section for the final product.

Figure 5,9; Air inlets incorporated into the building. (Taisei design planner architects and engineers, 2017: Online).

Structural report

The structural development of the granary administration component developed from morphological methodology. The prime description of the morphology of a structure lies in its ability to mediate tensions between Earth and sky, thus a vertical axis of interplay between the two elements begins to rise. Considering the words (interplay, mediation) one cannot avoid the dynamic association embedded within the words.

The formulation of an appropriate method in which the structure rises from the ground upwards gained inspiration from an agricultural activity: cultivating fields. The process of cultivating fields is a cyclic one: firstly ploughing downwards sowing the seeds into the ground. (a swift downward dynamic action). Secondly, growth out the ground upwards follows when the seeds grow. Thus, two main components form the cycle: ploughing (dynamic action downwards) and growth (steady rising out the ground).

From this, a structural formulation follows, one that comments on the cyclic action of cultivating the fields. Firstly, a morphological method of embodying the downwards action must be identified: the diagrid structural system. It is based on the mainstream idea of the 20th century modern architecture system of placing multiple floor on top of each other. It encapsulates a structure with a vertical component(s) supporting it, disengaged weather curtain, and its most identifiable component being a dynamic rectilinear structural system. Buckminster Fuller incepted this movement of triangulation in structural exoskeleton design which has taken flame in the 21st century (Volner, 2011: online). Contrastingly, the silos grow upwards as a stereotomic morphological form embodying the growth component of the cycle.

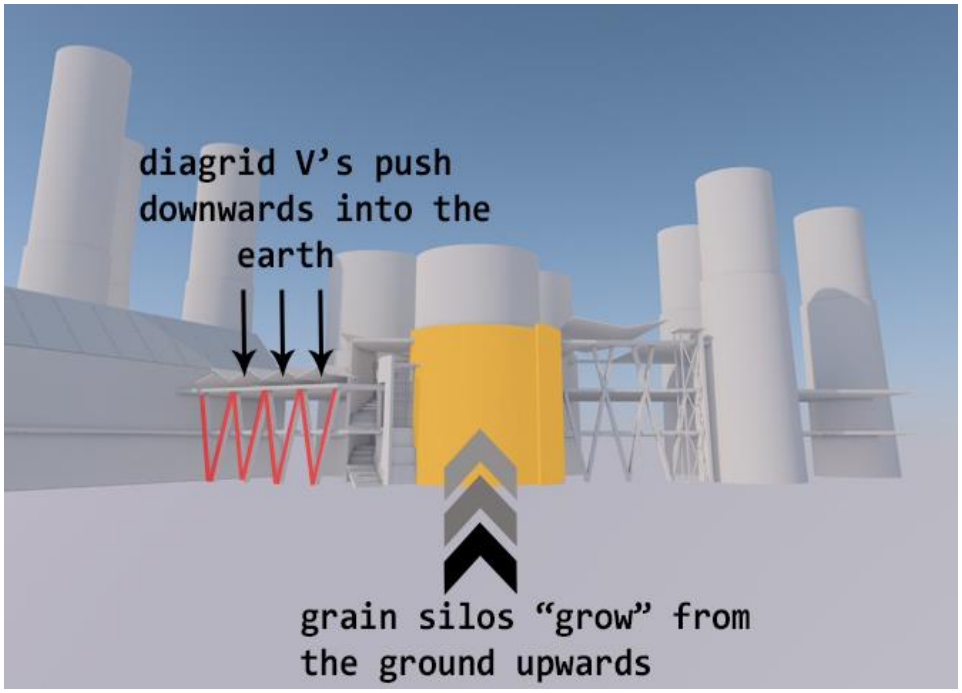


Figure 5,10: A structural investigation through a morphological frame (Author, 2019).

Structural development if the silo: A morphological approach with an agricultural shed as inspiration.

The Free State shed has been investigated structurally as a reference point and inspiration for the construction and configuration of the silos. Considering the main kinds of silos seen in the Free State (concrete tectonic structures and tectonic steel compound structures) it would be of value to investigate the tectonics of a relevant agricultural typology in order to calculate its composition in terms of how it rises up from the ground to the sky with a similar material usage.

The original Free State shed typology consists of a sandstone base of stereotomic nature walled up to approximately eye level in order to obtain a robustness to withstand animals as well as tightly packed commodities. From this walled up base, a lightweight tectonic structure rises. A set of wooden roof trusses form the basis for a lightweight zinc envelope to rest lightly above the heavy sandstone base. Lastly, a clerestory of louvers rest on the apex of the roof structure, dematerialising the last component between earth and sky as the wooden slats of the louvers begin to allow penetrable space to creep in (the sky)

This composition thus encapsulates a poetic mediation between earth and sky, where the earthen base grows out the earth and forms a basis for a lightweight zinc structure to meet the sky.

It also encapsulates the earth-sky relationship in agriculture commenting on the link between the two where the grounds dependency on the sky is shown by the earth (represented by the stereotomic sandstone base rising up to meet the sky where water and sunlight come from).

Figure 5,11: The agricultural shed as a morphological precedent (Author, 2019).

Silo formulation from the morphological precedent: the agricultural shed.

Conical steel silo.

These silos comprise of a "stiffened bin" system where the silo comprises of a rounded steel container with a tectonic steel grid framework wrapping around to add rigidity to the structure. The material set includes zinc sheeting, profiled steel for the frame wrapping around the bin as well as mild steel profiles to form a platform for the structure to lie on. These structures generally have conical ends either on top or at the bottom or on both ends to ensure the grain is all fed to the chute at the bottom and nothing gets left in corners (GSI, 2019: online).

Concrete tower silos and concrete stave silos

The most common and generic type of silo seen in the Free State is the concrete tower silo. The silos are heavily reinforced with steel within the concrete in order to combat the weak tensile strength of concrete. When one looks the forces pressing outwards within a cylinder, it becomes clear that a big amount of tensile stress is placed on the silo on a horizontal axis. Concrete stave silos are built from precast cement panels and will also need strong steel ring beams to resist the outward forces exerted from within (GSI, 2019: online).

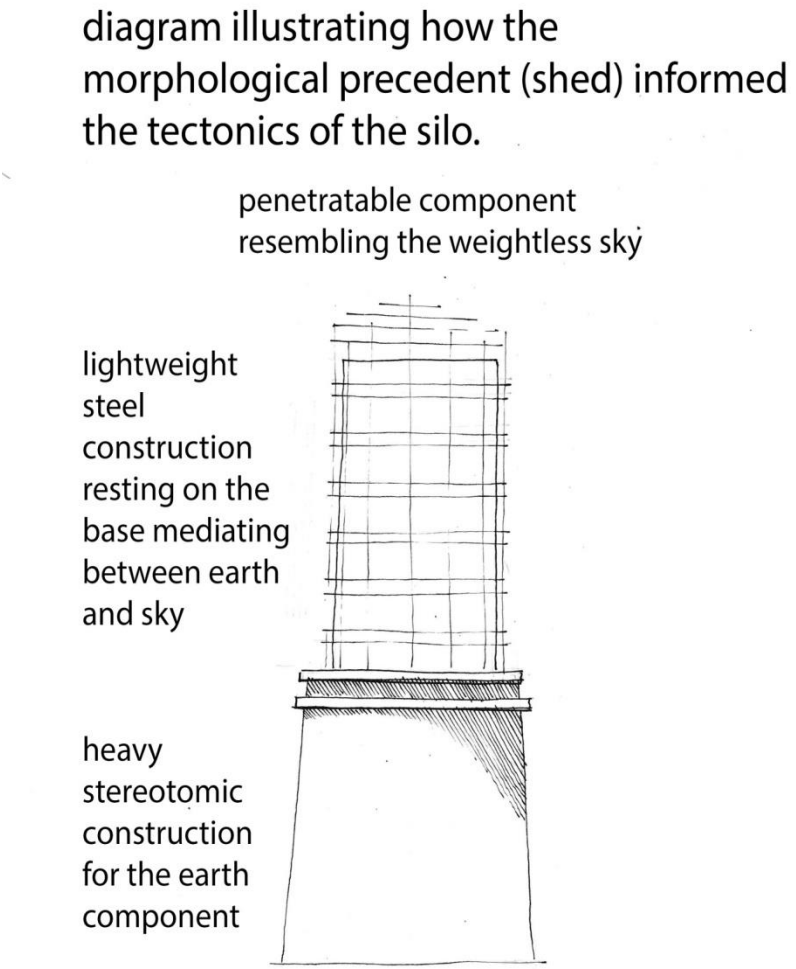
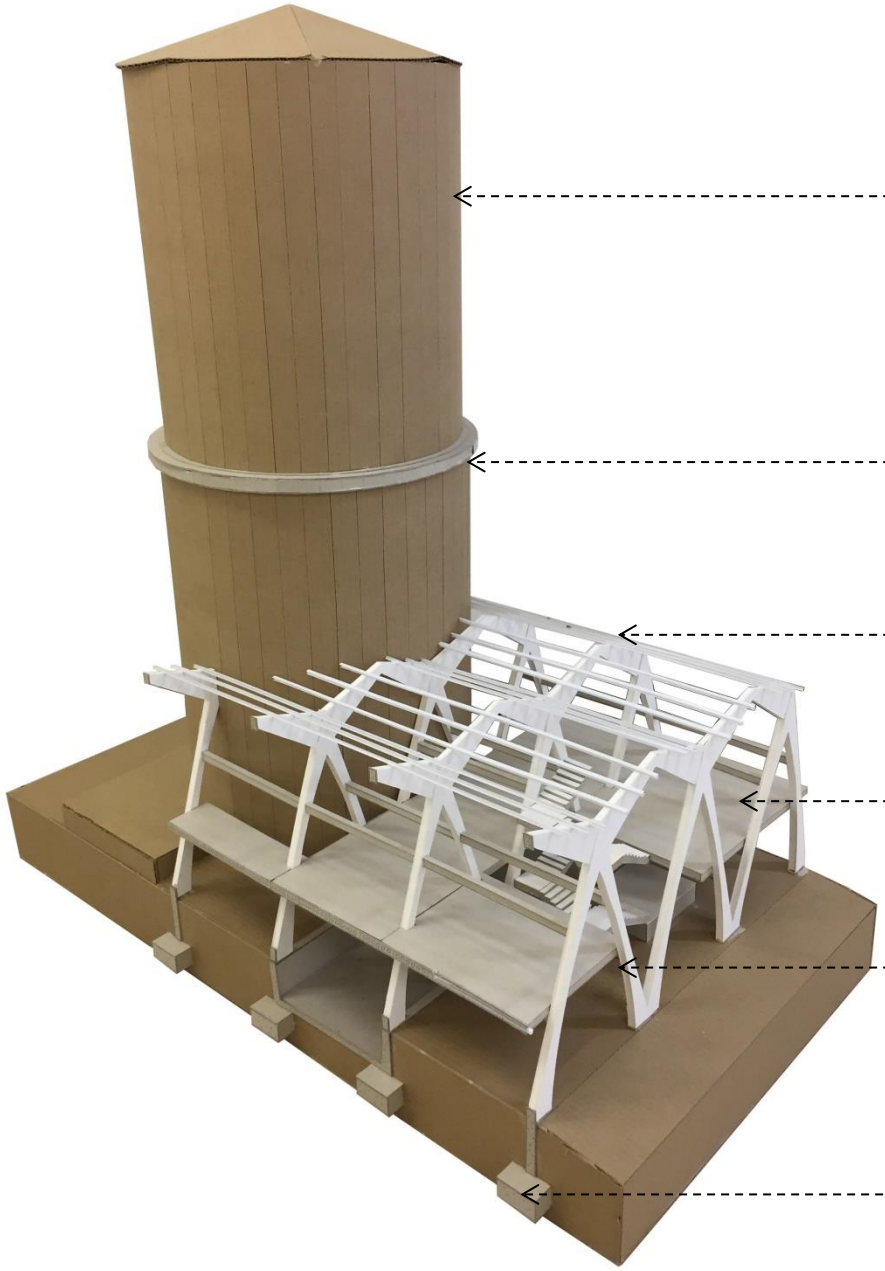


Figure 5,13: The composition of a silo after studying the agricultural shed as a morphological precedent. (Author, 2019).



Lightweight steel silo: resting on ring beam of concrete silo below. Unfinished zinc.

Stereotomic concrete silo: shuttered concrete finish: 300mm Wall resting on 1200mm x 600mm deep foundations .

Butterfly roof structure.

In-situ concrete floor slab with cast in air channels for air ventilation.

Diagrid structure. In-situ concrete with concrete beams spanning horizontally.

1000X1000X400 concrete pad foundations

Figure 5,14: A structural model exploring the synthesis of the diagrid, flooring system as well as silo into a harmonious design. (Author, 2019).

Technical report:

Area:	**Bloemfontein East, N8 node to city.**
Zoning allowance	**MIXED USE, industrial and commercial and res.**
Coverage allowance (Mixed use)	**70% (originally to municipal satisfaction)**
Bulk allowance (Mixed use)	**2.1 (originally to municipal satisfaction)**
Height restrictions	**15m (originally to municipal satisfaction**
Noise levels (Mixed use)	**65**
Erf number:	**1964/A. (Originally municipal ground, TRANSNET)**
Suburb:	**Buitesig, Bloemfontein East.**
Site area:	**50638577.00m²**
Adjoining transport networks:	**N8 highway and railway network.**

ABC	**169.80°**
BCD	141.25°
CDE	141.25°
DEF	259.04°
EFG	83.52°
FGH	79.84°
GHI	98.05°
HIJ	204.13°
IJA	156.29°
JAB	81.95°

AB	**69596m**
BC	135013m
CD	17557m
DE	153904m
EF	22824m
FG	102330m
GH	163928m
HI	104226m
IJ	130722m
JA	90843m

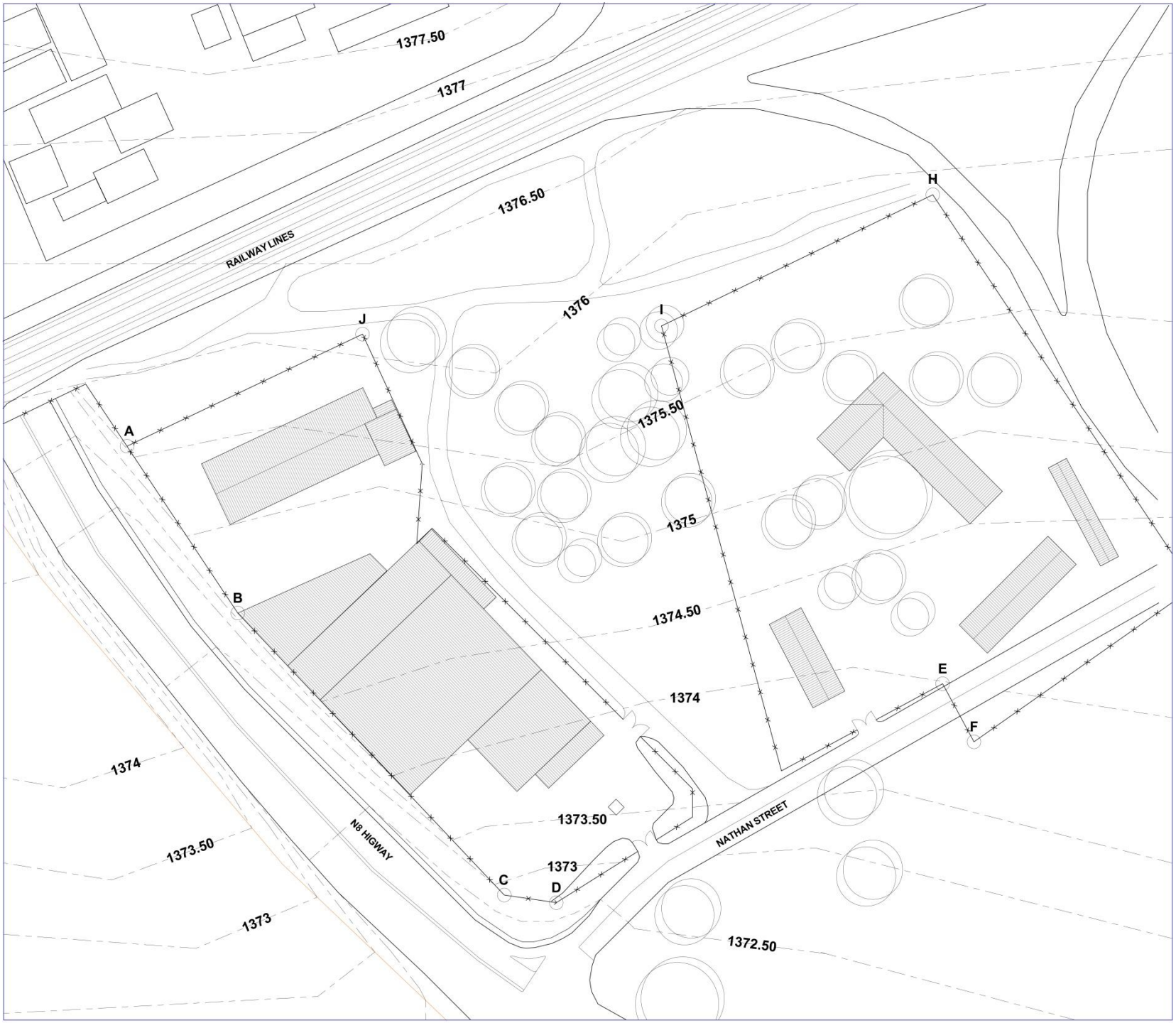


Figure 5,15: Site plan. (Author, 2019).

Technical report: site boundaries

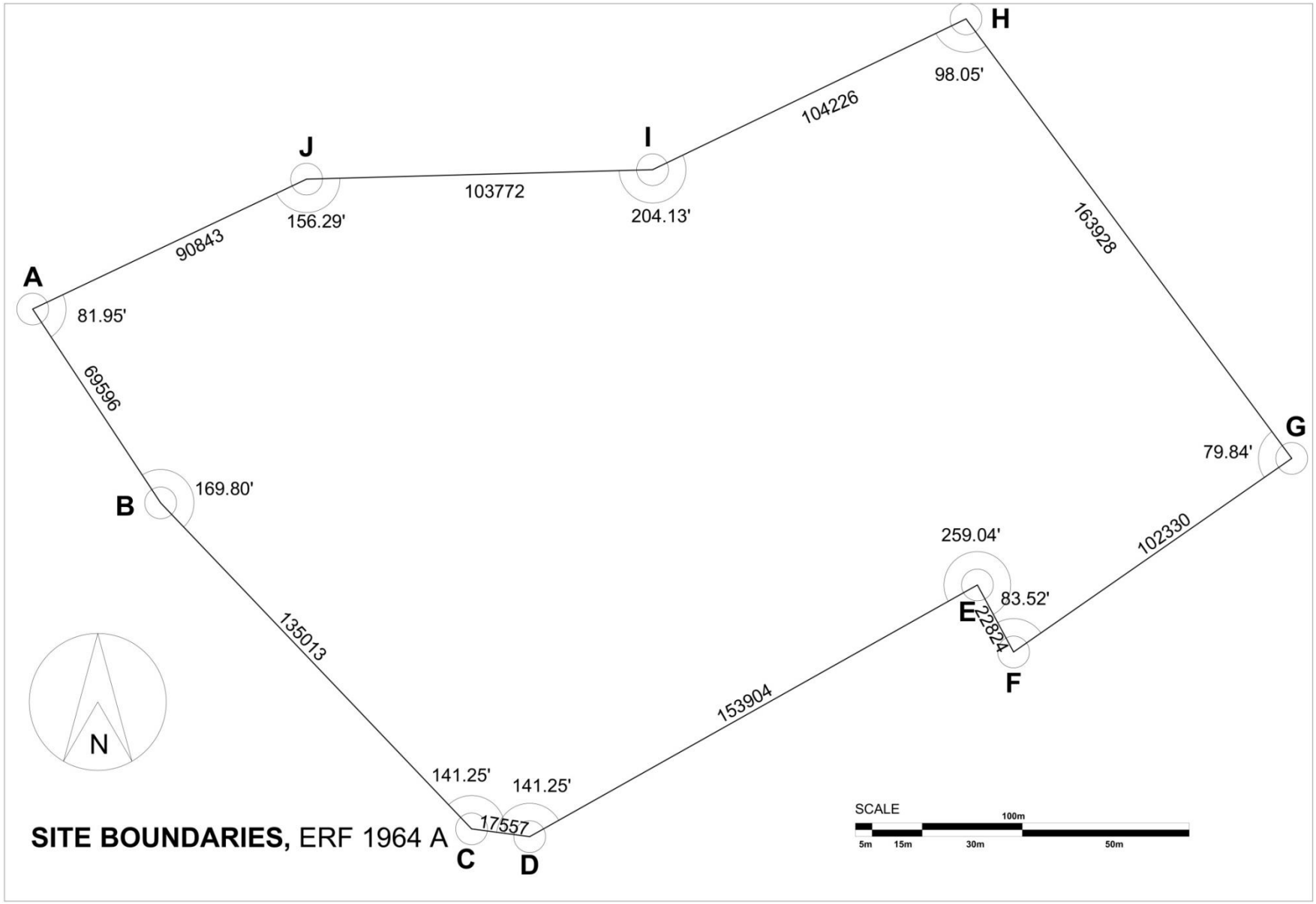


Figure 5,16: Site boundaries. (Author, 2019).

06

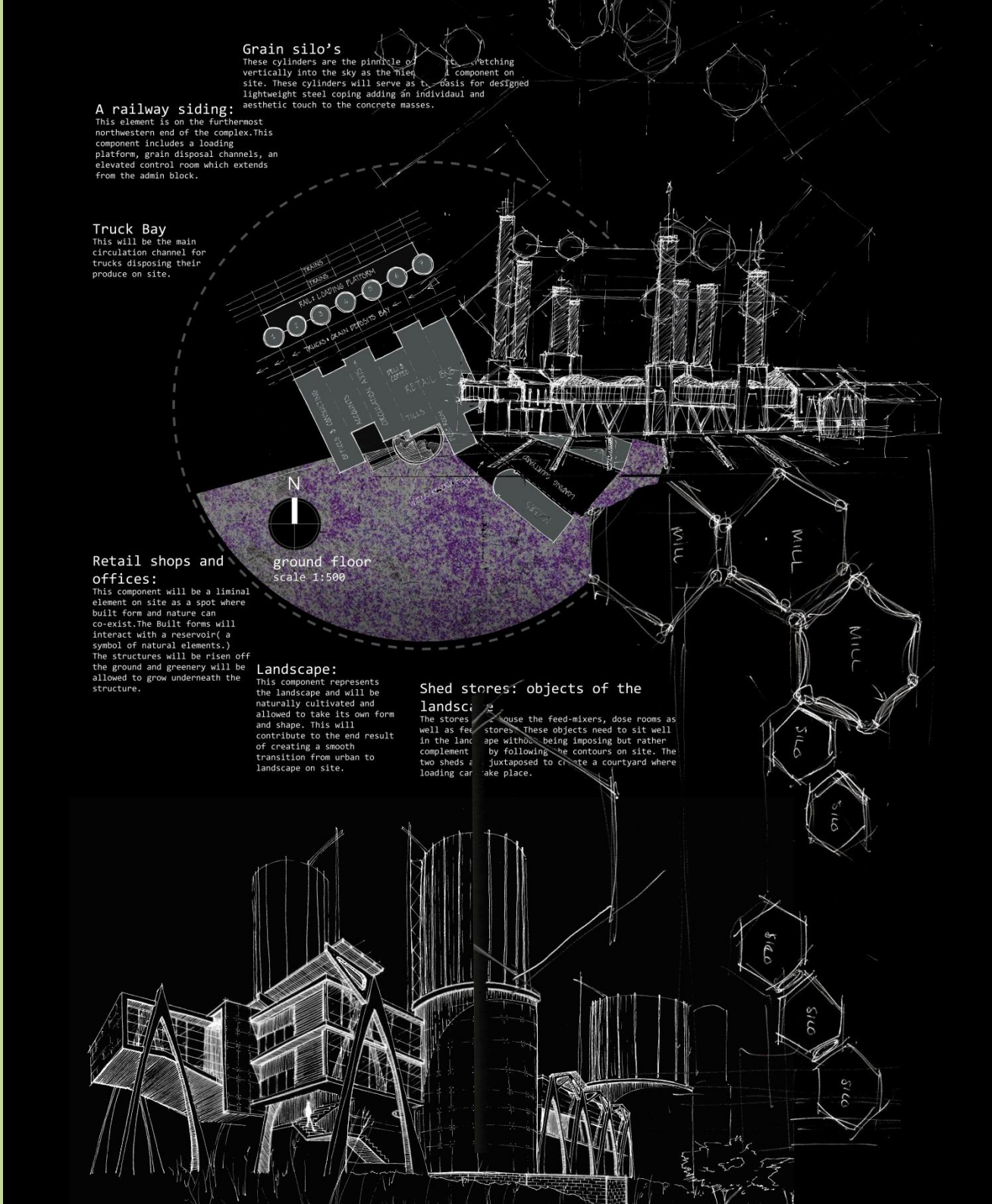
Design synthesis

6.1: initial design reactions to site

6.2: Phase 1: Site organisation

6.3: Phase 2: Rearranging silos

6.4: Phase 3: Creating a silhouette.



Initial reactions to the site

In line with agricultural reciprocity, the site was engaged with in a way which commented on how beings engaged with agricultural land. the process at first would seem destructive but will prevail to be most appropriate in terms of reaping the most crop or success form the site. Firstly, an appropriate direction in which to plough is determined . On the site, the side adjacent to the railway was deemed an edge of importance and was thus designated as the starting point from which regulating lines would be "ploughed" into the site.

This method has been appropriated as a specific engagement with the site as it speaks of *poiesis*, care in the making of. It takes into account the 'methods of making' from an agricultural perspective into 'cultivating' the site. It aims at interpreting the way in which agricultural space is made and then re-appropriating these methods into architectural space making on site.

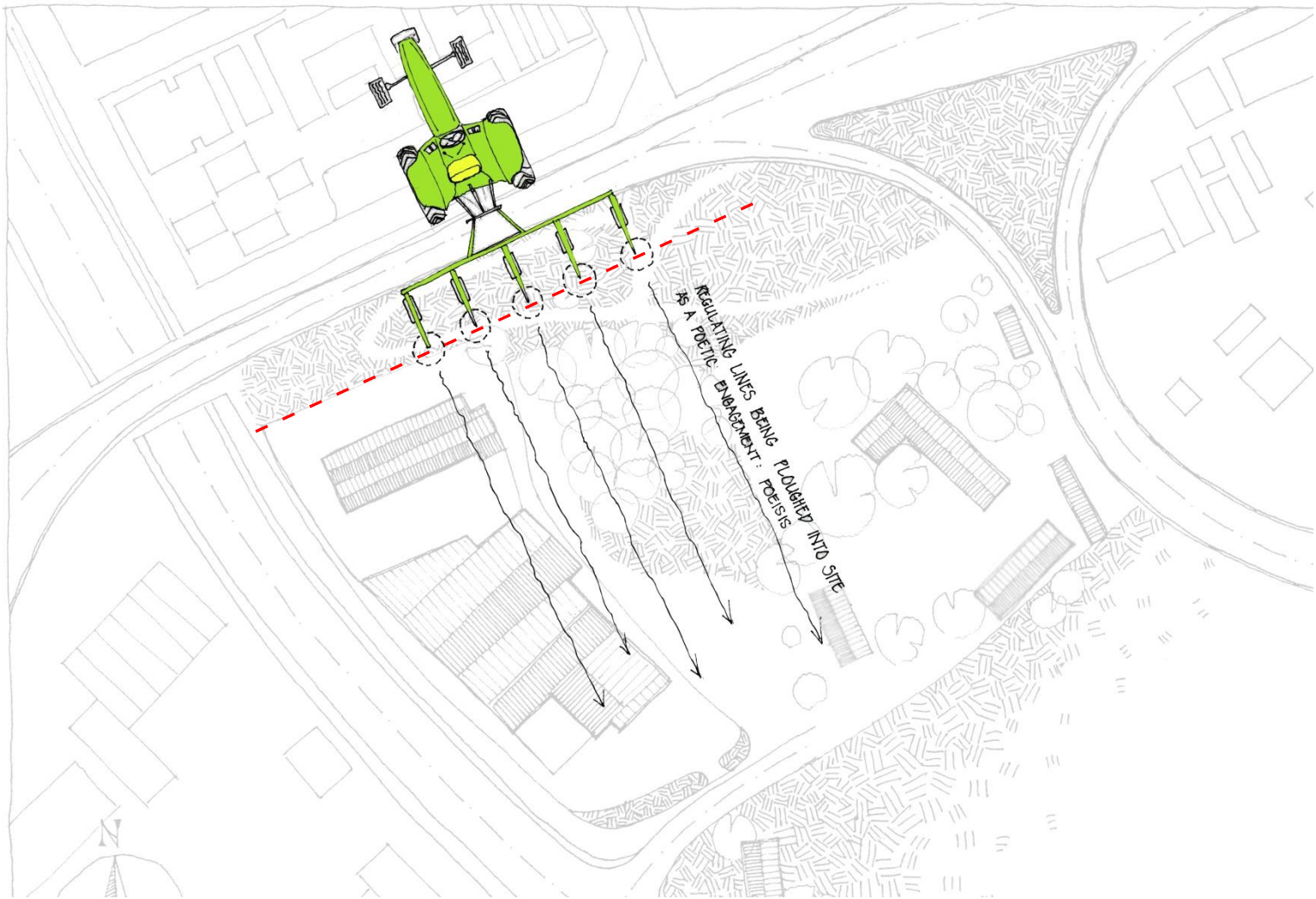


Figure 6,1: A tractor ploughing as metaphor for the site (Author, 2019).

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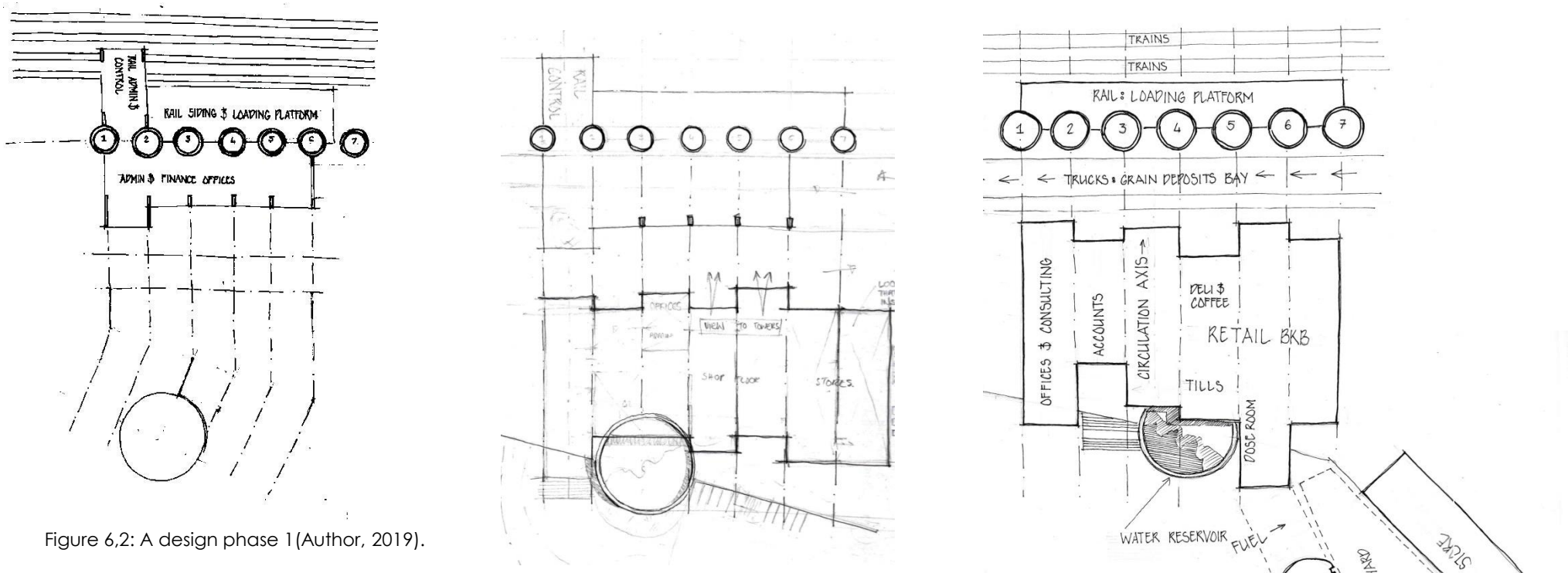


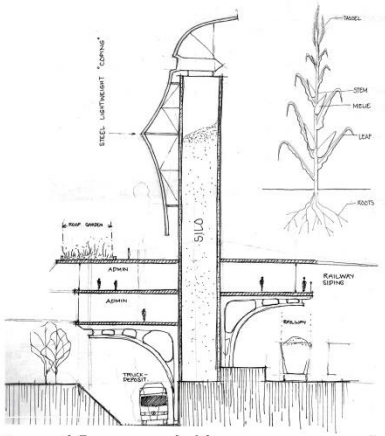
Figure 6,2: A design phase 1(Author, 2019).

Design phase 1: establishing an order on the site

The first phase of the design process focussed on exercising a linear order on the site imposed by a row of generic rounded silos. This phase was purely organisational, denoting the various components on the site namely:

1. The silos and terminal adjacent to the railway for loading and offloading to be in close proximity.
2. The administration block situated in and around the silos for a poetic interaction between urban and agricultural typologies.
3. Stores and retail following the grid lines imposed by the silos, dispersing into the landscape.

Design synthesis: **phase 1: site organisation**

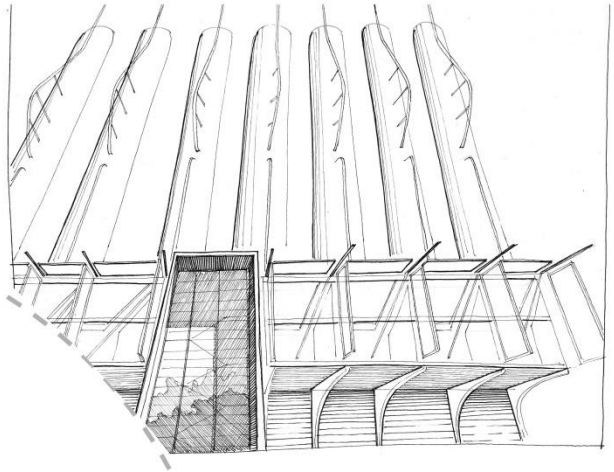


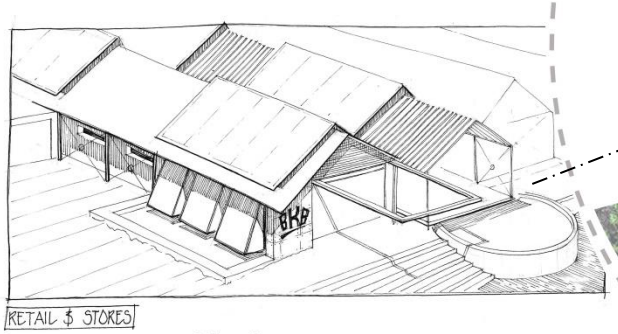
A railway siding:

This element is on the furthermost northwestern end of the complex.This component includes a loading platform, grain disposal channels, an elevated control room which extends from the admin block.

Grain silo's

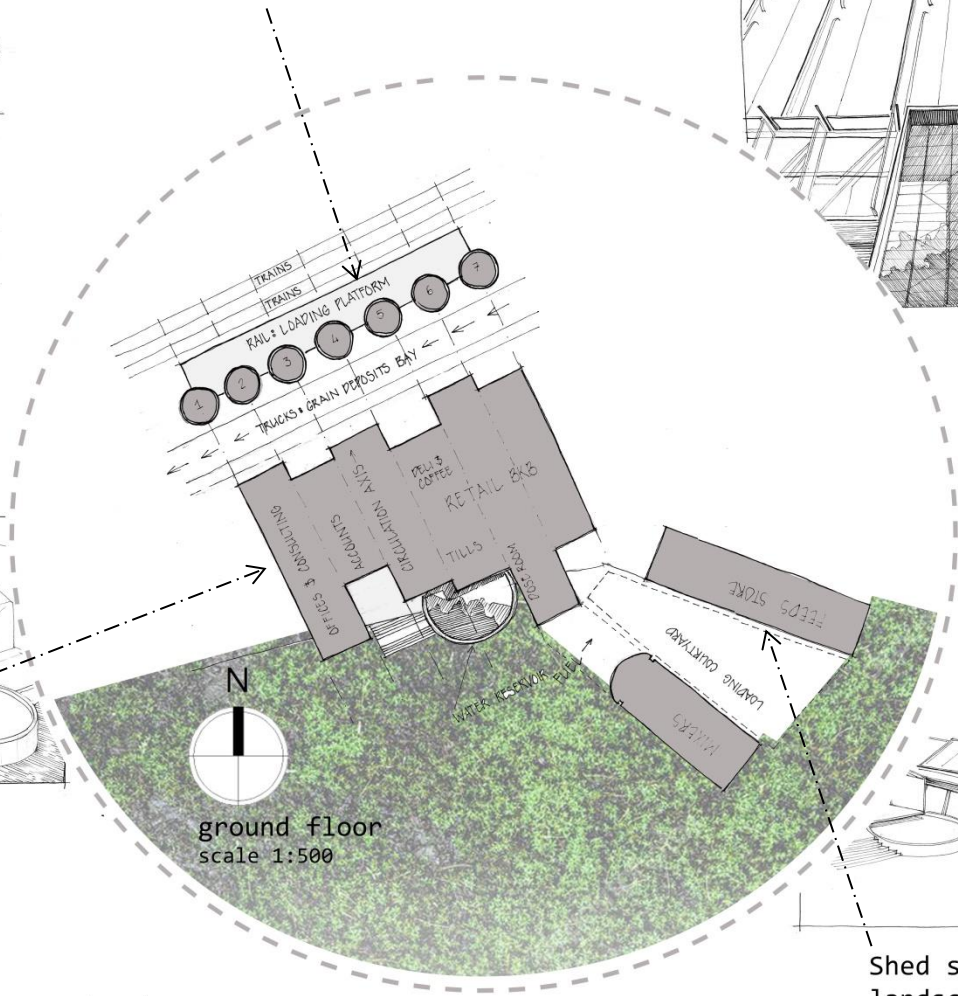
These cylinders are the pinnicle of the site stretching vertically into the sky as the hierarchial component on site. These cylinders will serve as the basis for designed lightweight steel coping adding an individaul and aesthetic touch to the concrete masses.





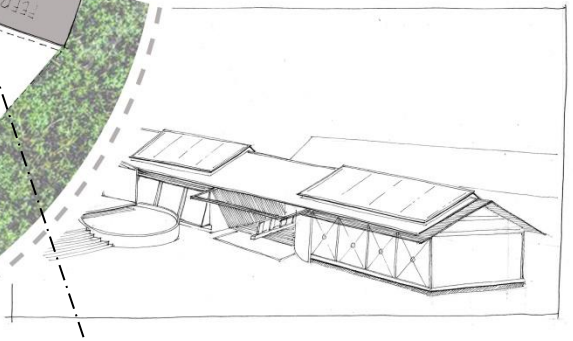
Retail shops and offices:

This component will be a liminal element on site as a spot where built form and nature can co-exist.The Built forms will interact with a reservoir(a symbol of natural elements.) The structures will be risen off the ground and greenery will be allowed to grow underneath the structure.



Landscape:

This component represents the landscape and will be naturally cultivated and allowed to take its own form and shape. This will contribute to the end result of creating a smooth transition from urban to landscape on site.



Shed stores: objects of the landscape

The stores will house the feed-mixers, dose rooms as well as feed stores. These objects need to sit well in the landscape without being imposing but rather complement it by following the contours on site. The two sheds are juxtaposed to create a courtyard where loading can take place.

Figure 6,3: A design phase 1 map(Author, 2019).

Design synthesis: **phase 1: site organisation**

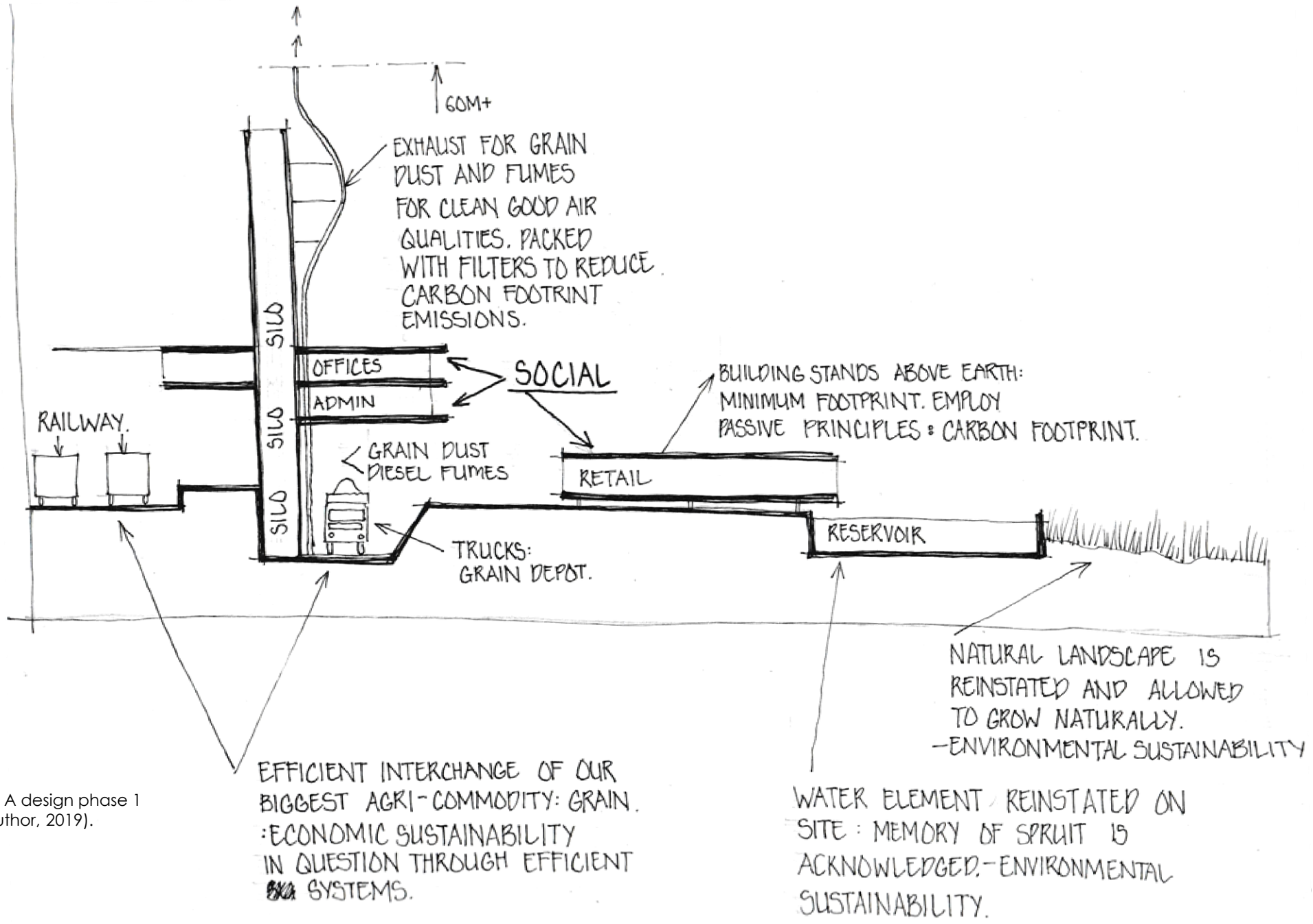


Figure 6,4: A design phase 1 section(Author, 2019).

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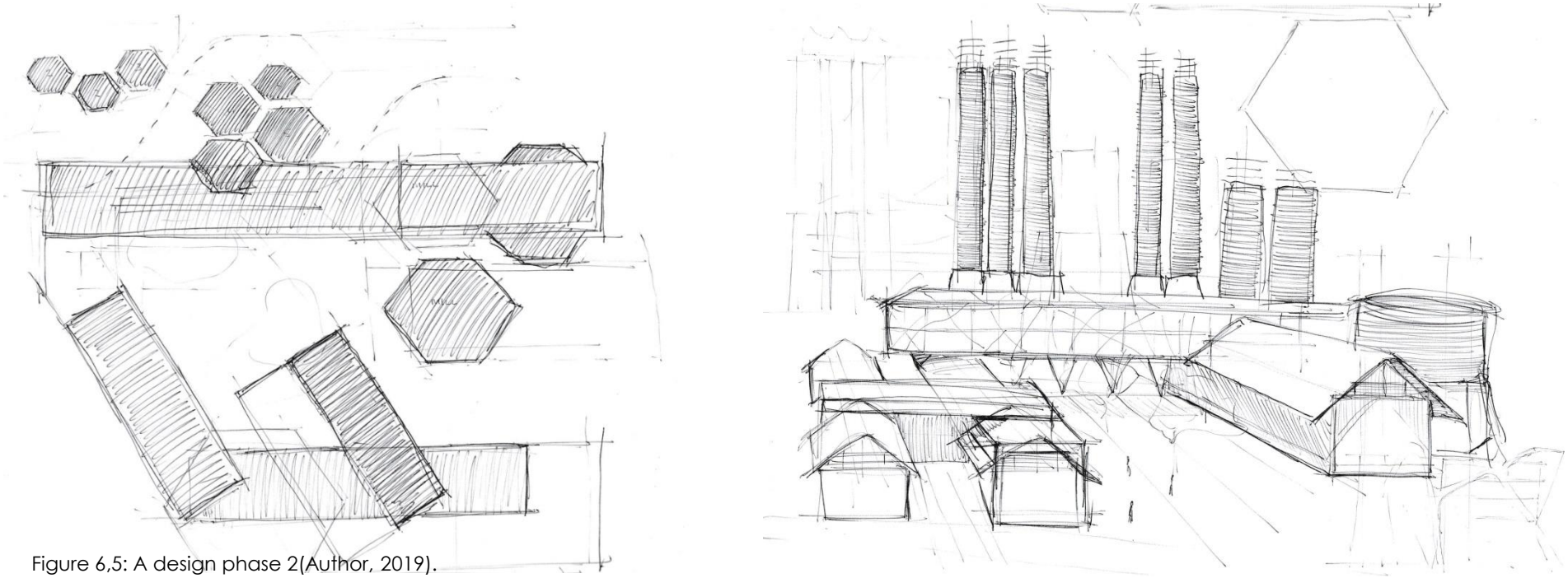

Figure 6,5: A design phase 2(Author, 2019).

Design phase 2: developing a unique silo ensemble

This phase's main goals were to defamiliarise the generic arrangement of silos known in the Free State. The generic linear arrangement of silos needed to be rethought in a poetic ensemble. Firstly, a variation in silo size needed to be established, varying silo height and width. Secondly, the silos needed to be dispersed in a less predictable arrangement along a datum point(the admin block) to form a new and unique approach, different from the linear approach generally used.

Re-arranging the silos

The generic linear arrangement of silos came into question. A new fragmented composition has been proposed into a more articulated arrangement. The composition begins to open spaces between the silos allowing the office building to weave between the silos.

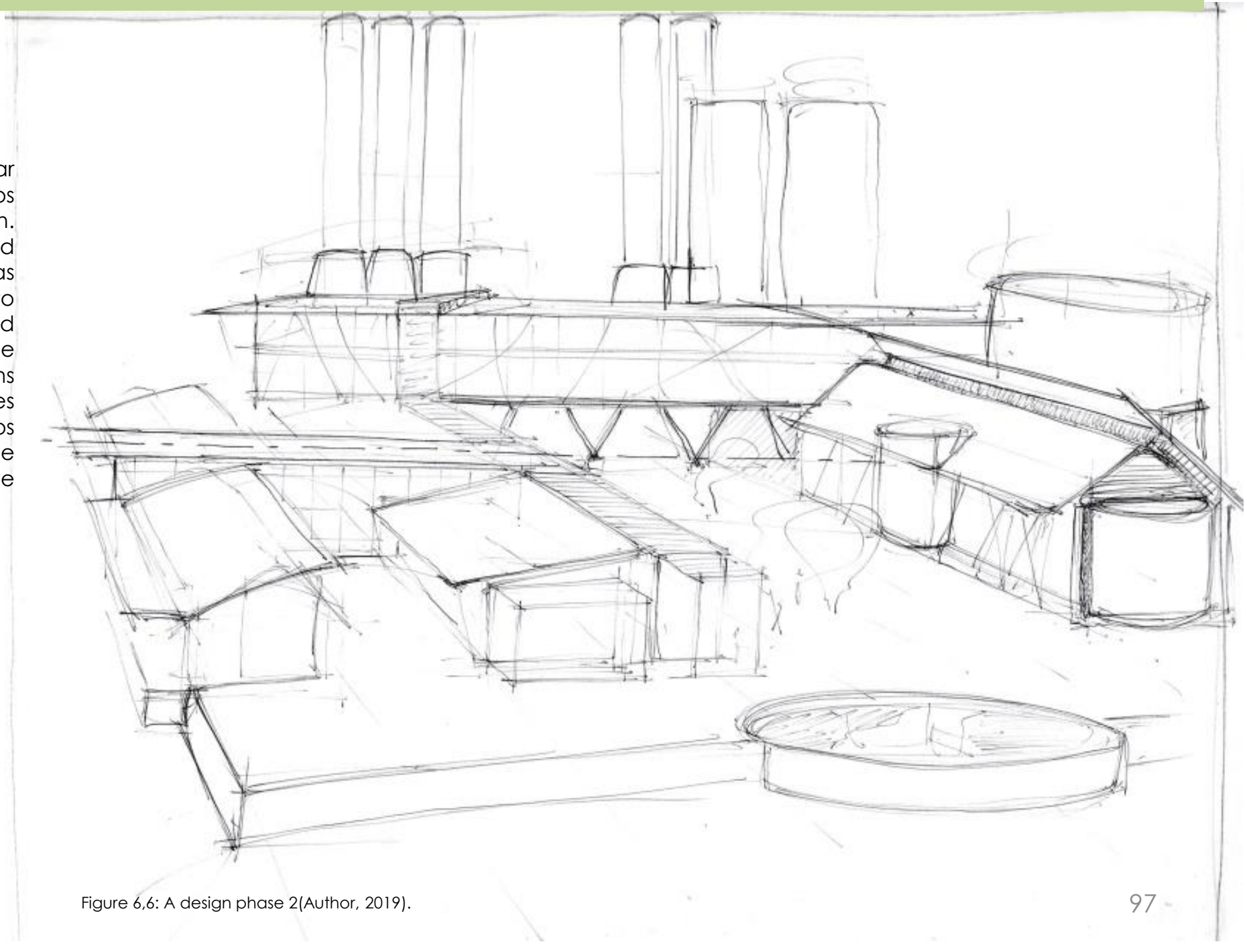

Figure 6,6: A design phase 2(Author, 2019).

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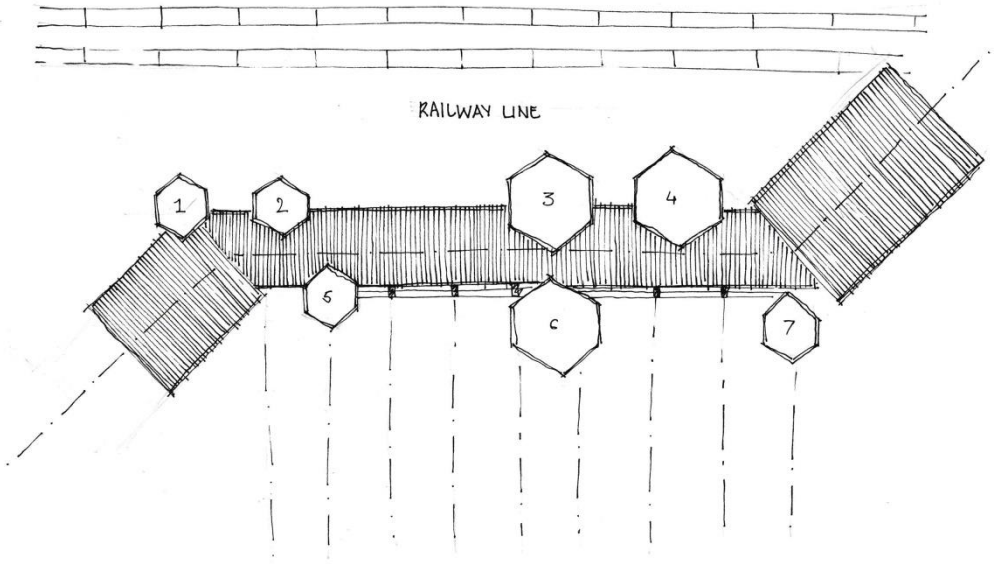


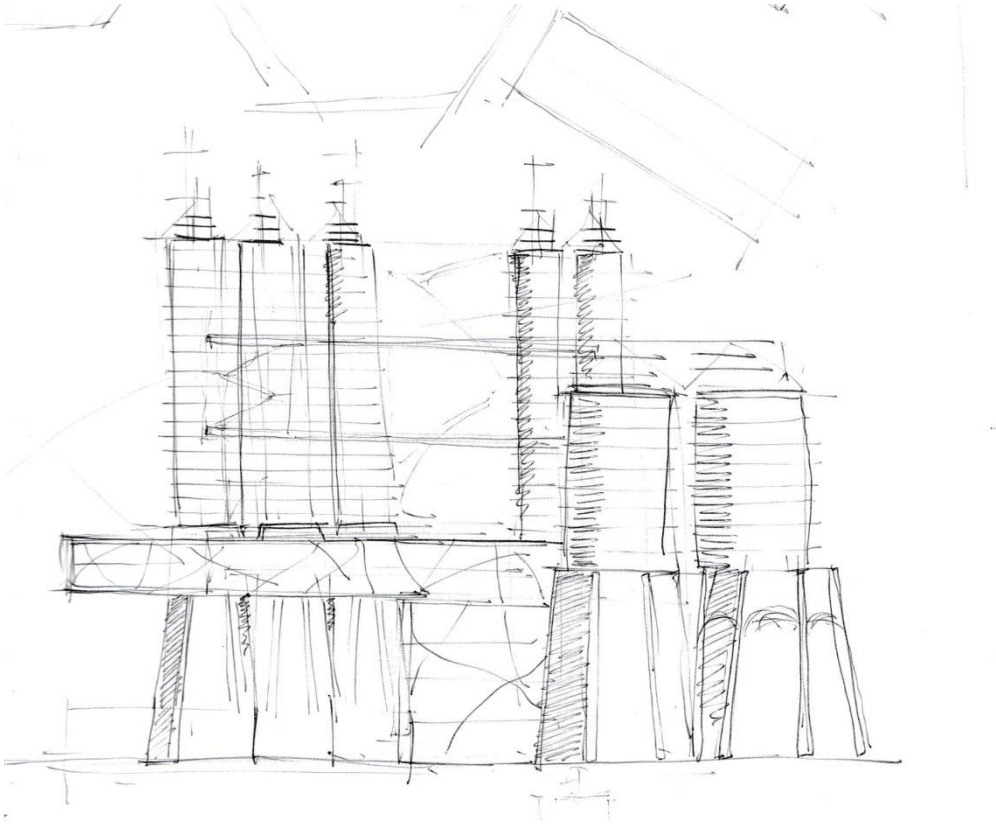


Figure 6,7: A design phase 2(Author, 2019).

Design phase 2: developing a unique silo ensemble- incorporating urbanity

The silo's unique arrangement gave way for new office space to be implemented into the arrangement. The offices became necessary as the project evolved in that it needed an administrative component as a driving factor that promotes the emergence of small scale farming. The randomised placement of the silos received a form of datum with the offices binding them all together with a purer form. This arrangement begins to speak of a poetic engagement between the commercial urbanity (the offices) and agricultural typologies (the silo).

Creating a silhouette

Now that the silos have been defamiliarised in their arrangement, the assemblage in terms of radius as well as height is randomized to create an undulating silhouette.

The structure begins to merge the silo typology with the office block . The silos appear to be carrying the office building which gives it the appearance to be floating over the landscape.

The typology of the shed is carried over onto the office building with various steel portal structures clad in zinc sheeting. The overall product begins nudging towards a pleasing meeting of the sky as the silhouette is continuously refined.

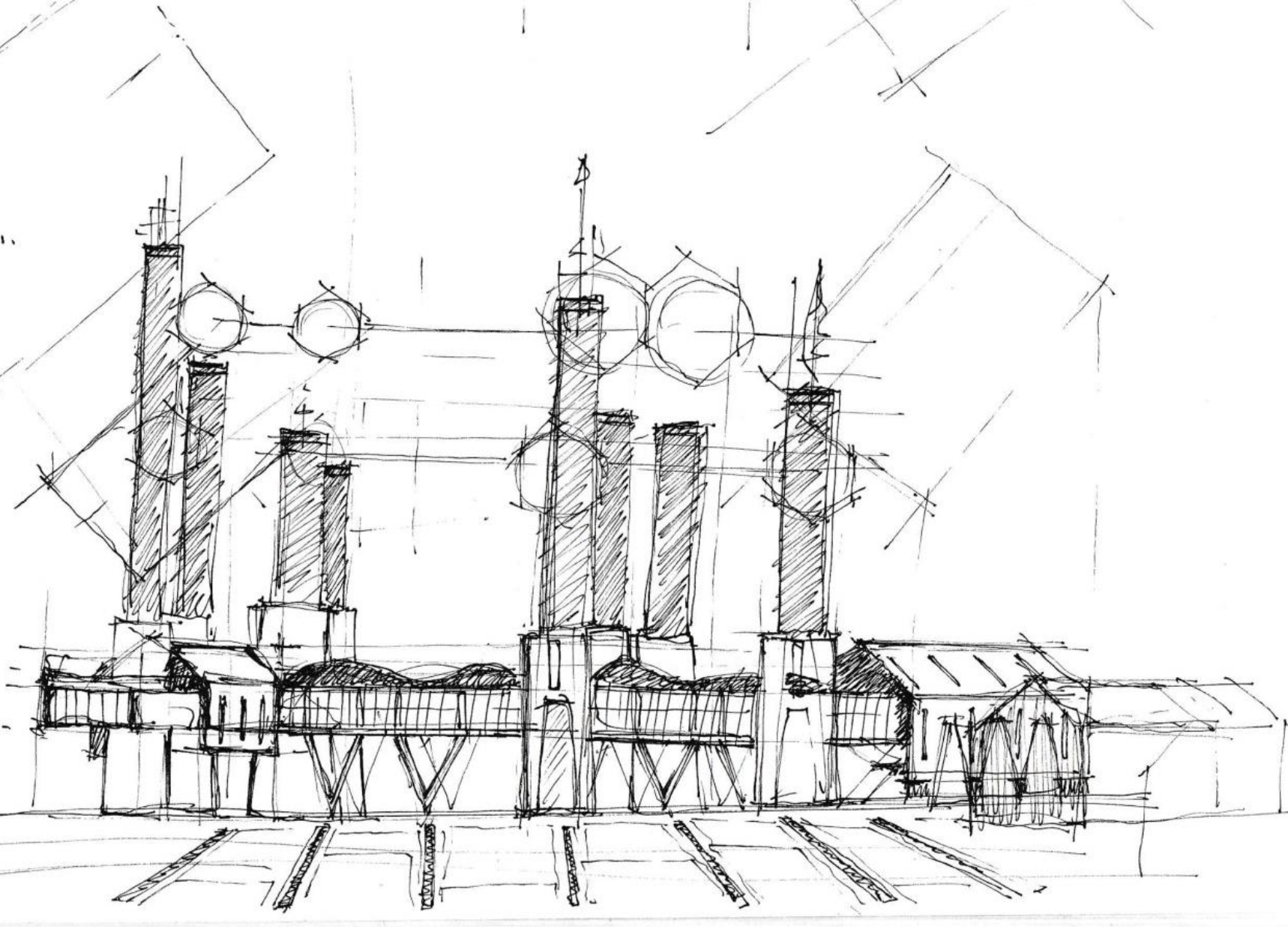


Figure 6,8: A design phase 3(Author, 2019).

6

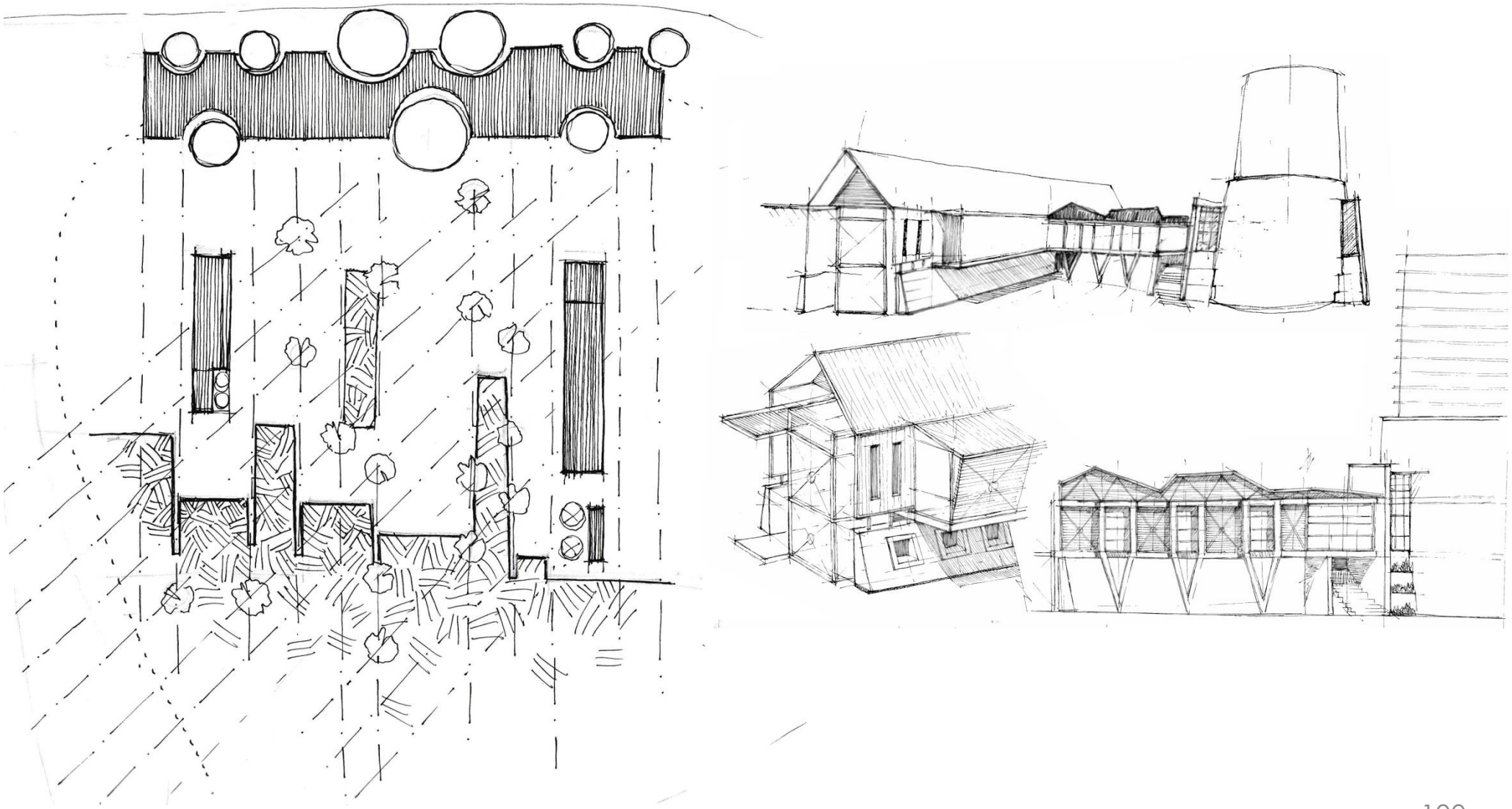


Figure 6,9: A design phase 3(Author, 2019).

Design synthesis: **phase 3: creating a binding order: a structural façade system**

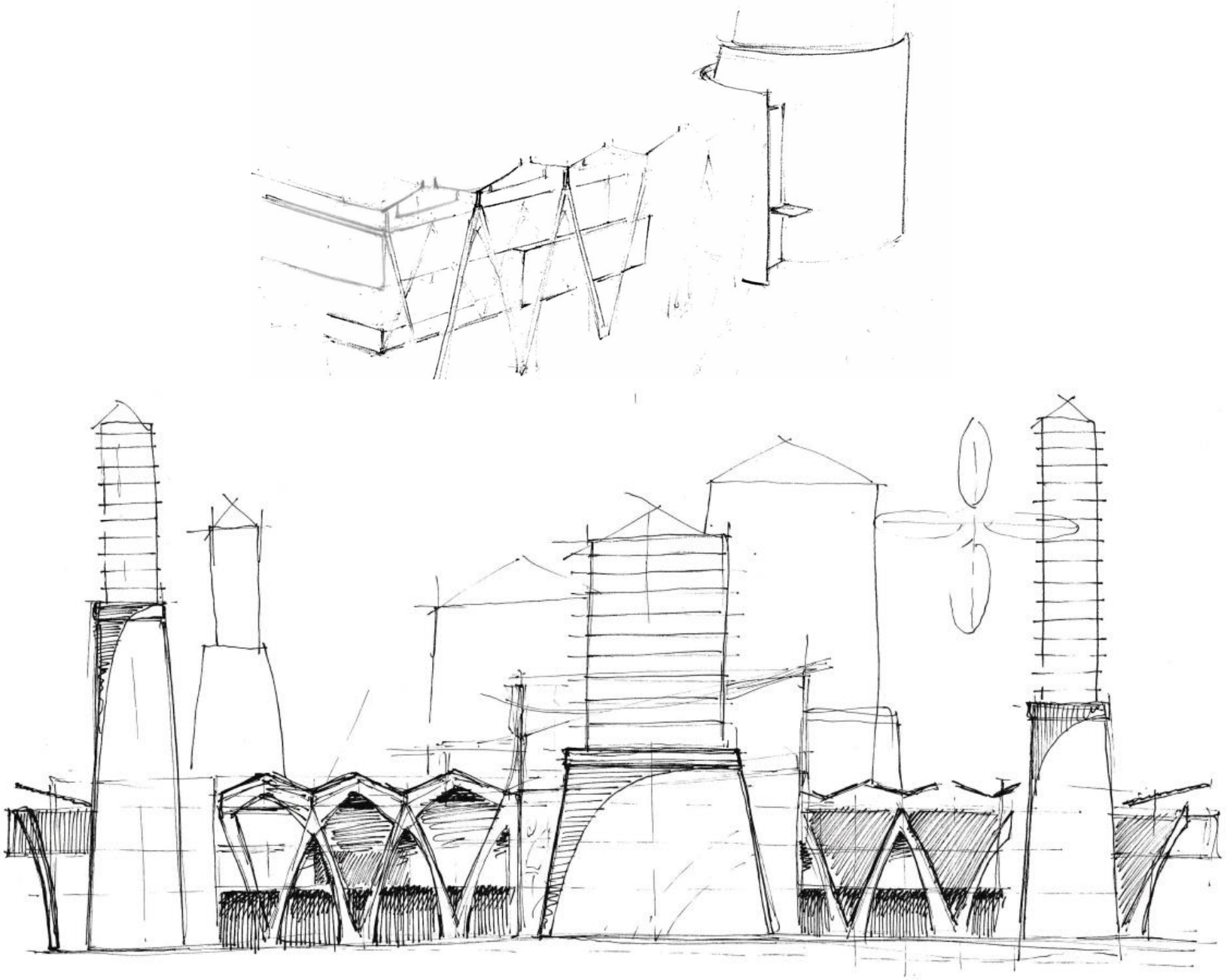
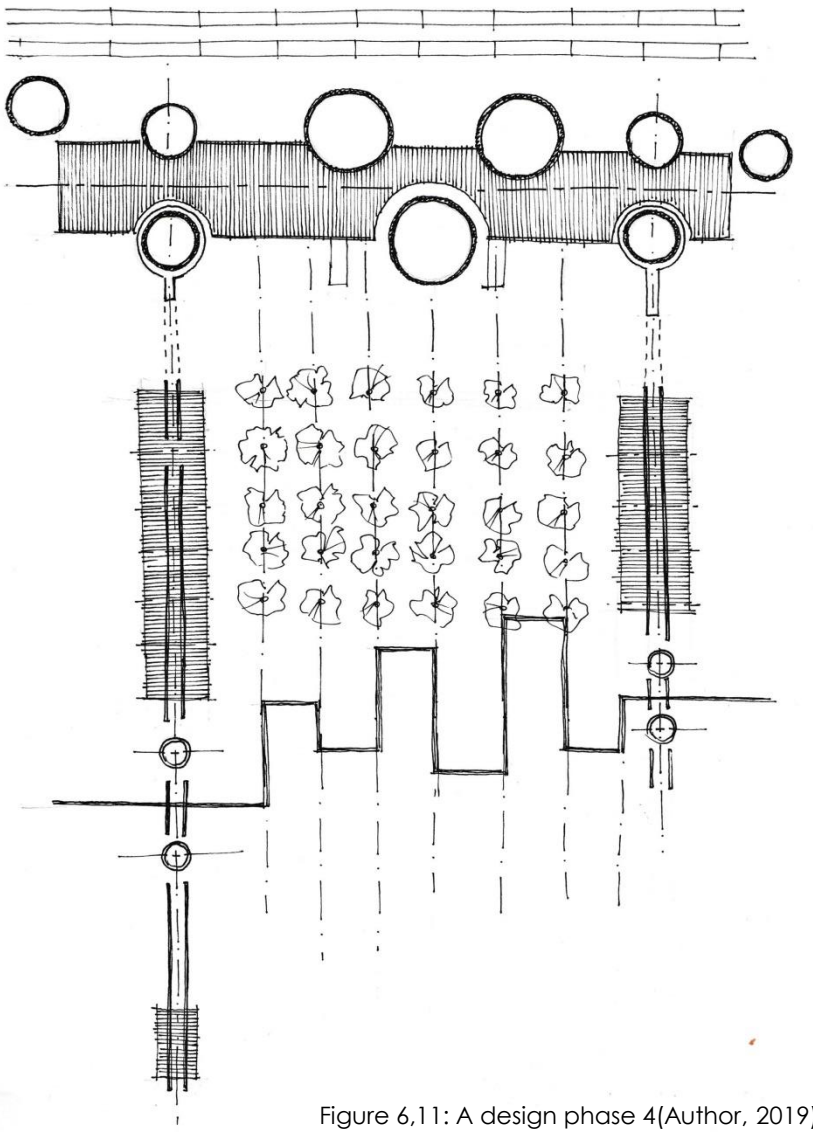


Figure 6,10: A design phase 3(Author, 2019).

7



Extending into the landscape: a merging between landscape and urbanity

On a metaphorical level the structure needs to mediate tensions between the urban city scape and the landscape as it is situated on the brink of both. It begins to extend nodes outwards with walls which regulate the site and dematerialise. Water tanks and smaller structures are pinned within this wall as it gradually terminates in the grass on site.

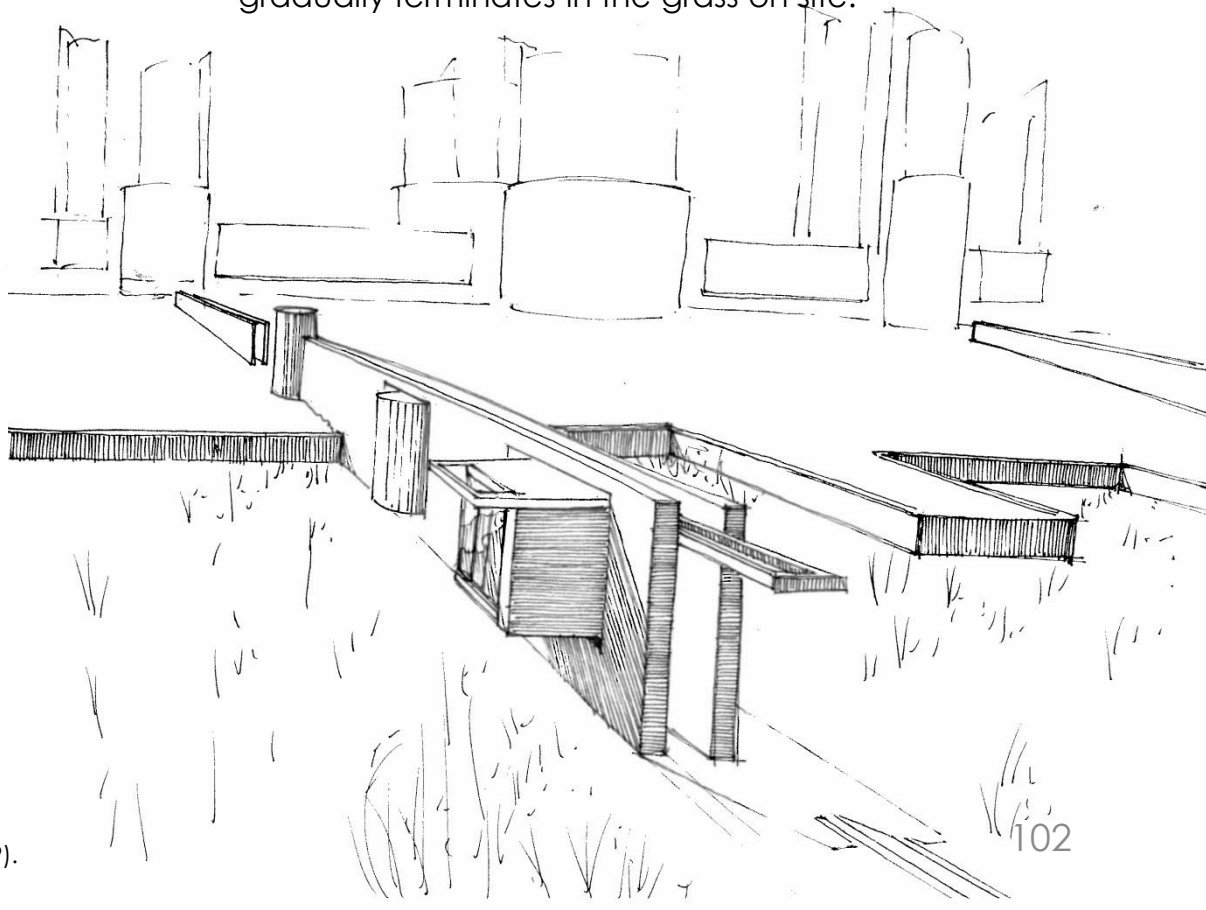


Figure 6,11: A design phase 4(Author, 2019).

Design phase 4: terminating the structure

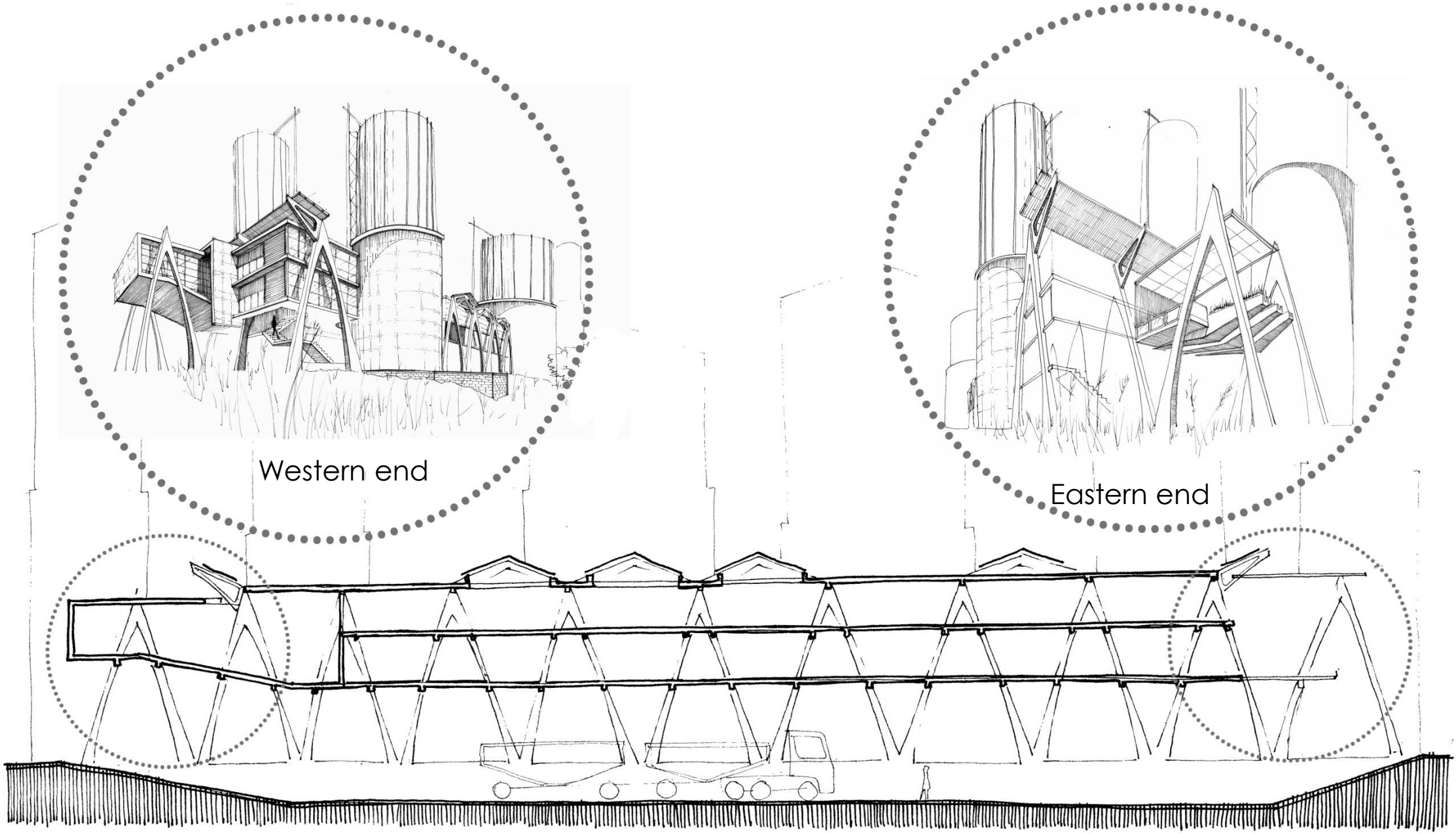
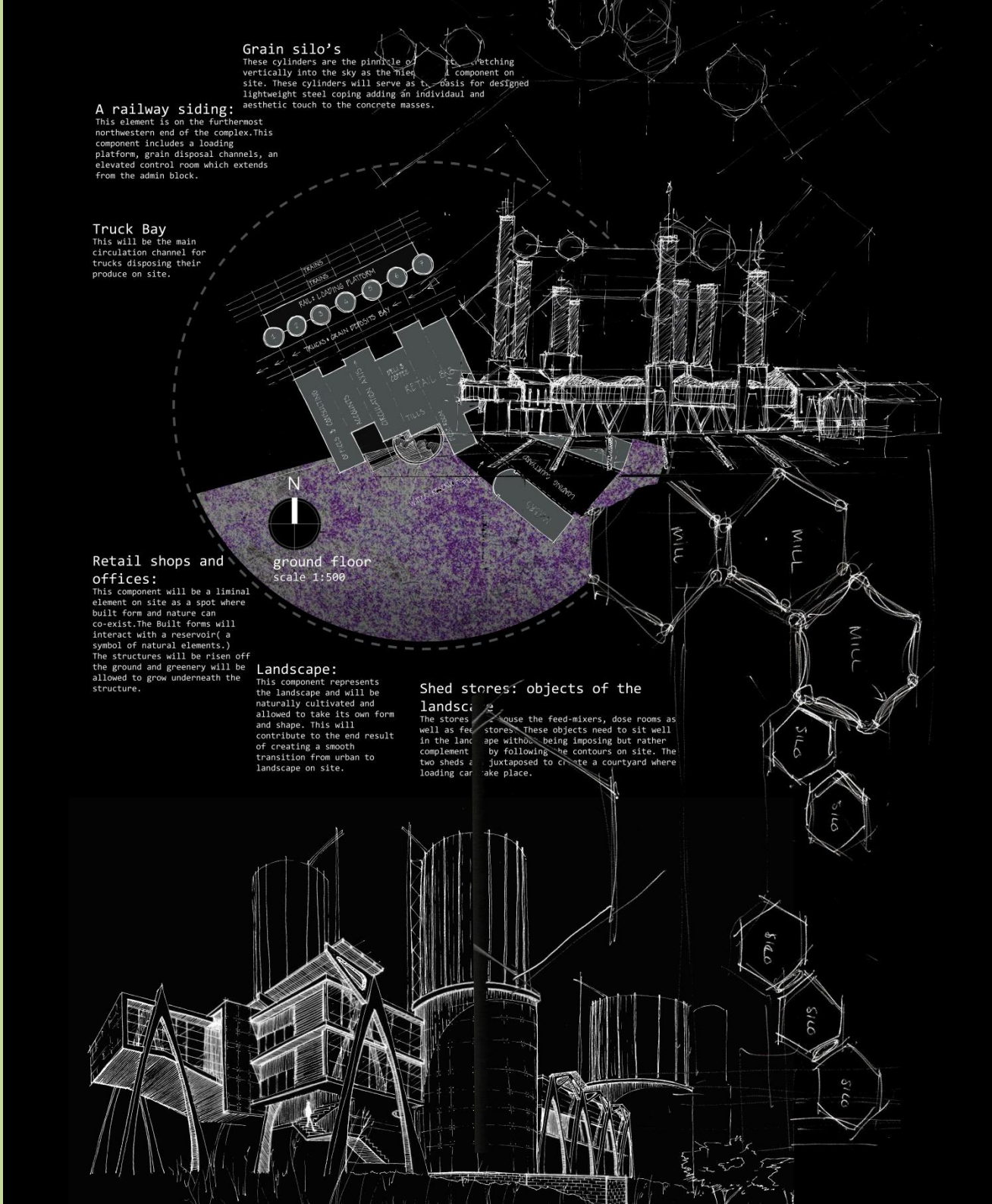


Figure 6,11: A design phase 4 section(Author, 2019).

07

Design response

7.1: Location plan
7.2: Plans
7.3: Sections
7.4: Elevations
7.5: Visual impressions



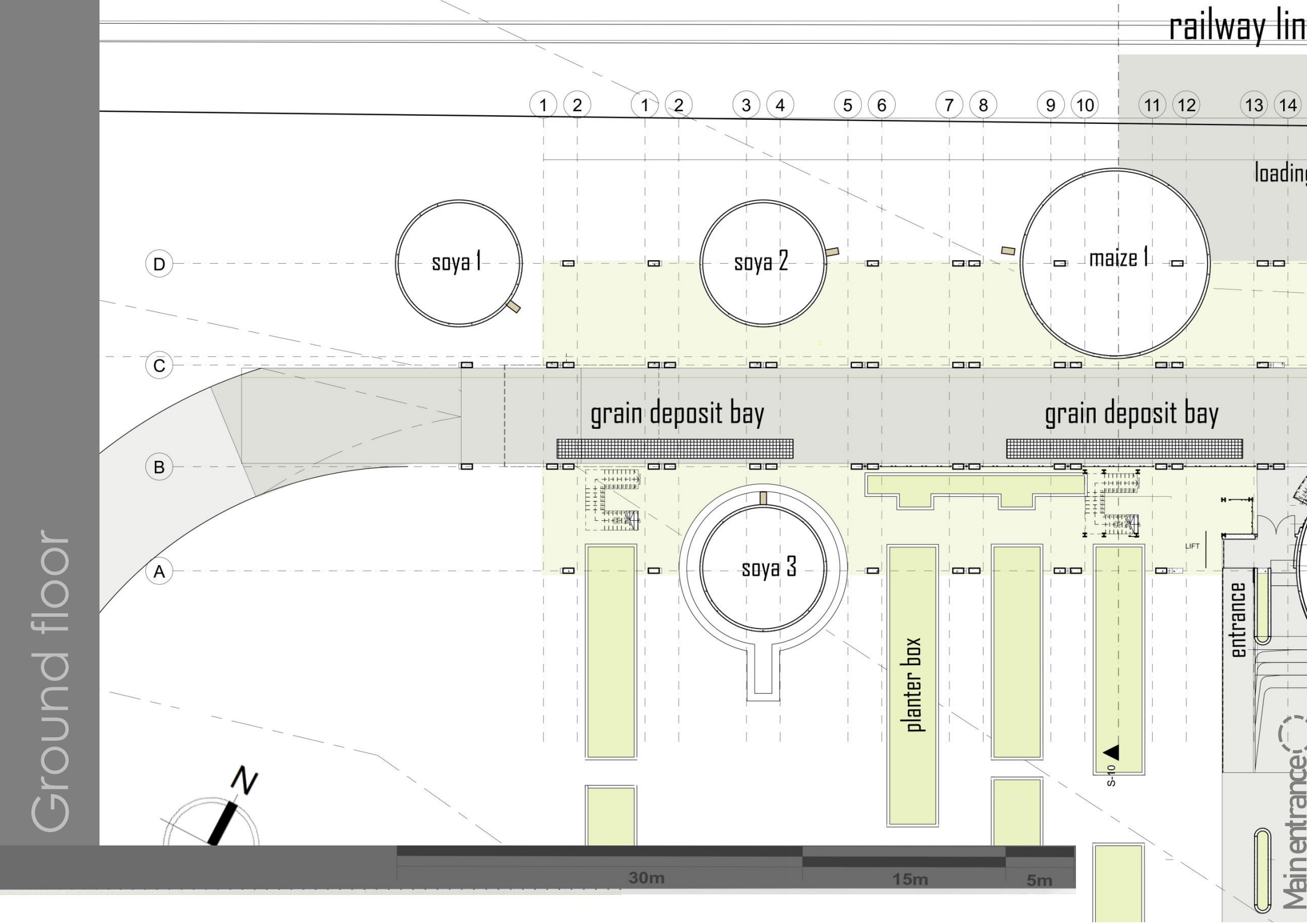
7.1

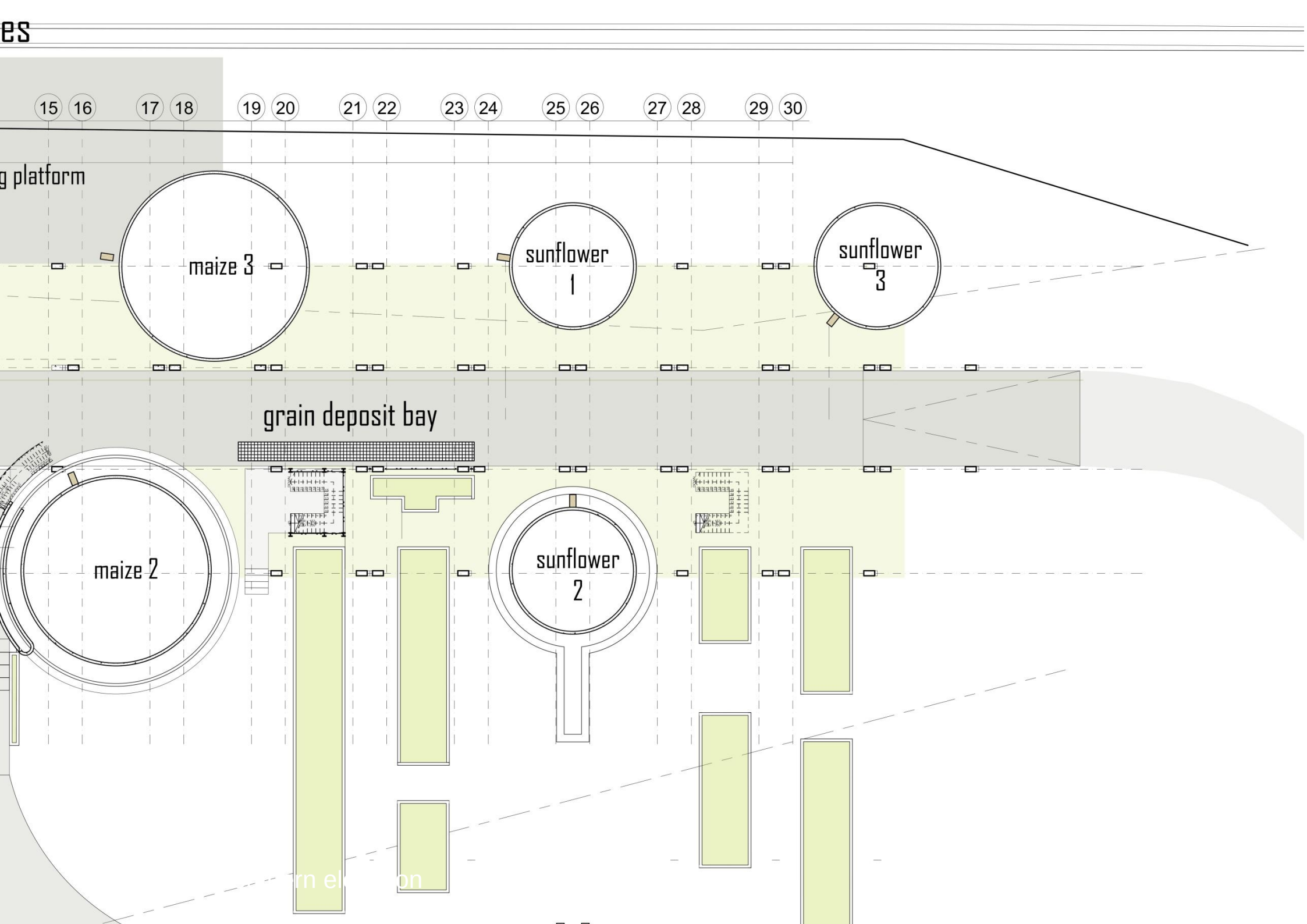
Plans

Location plan

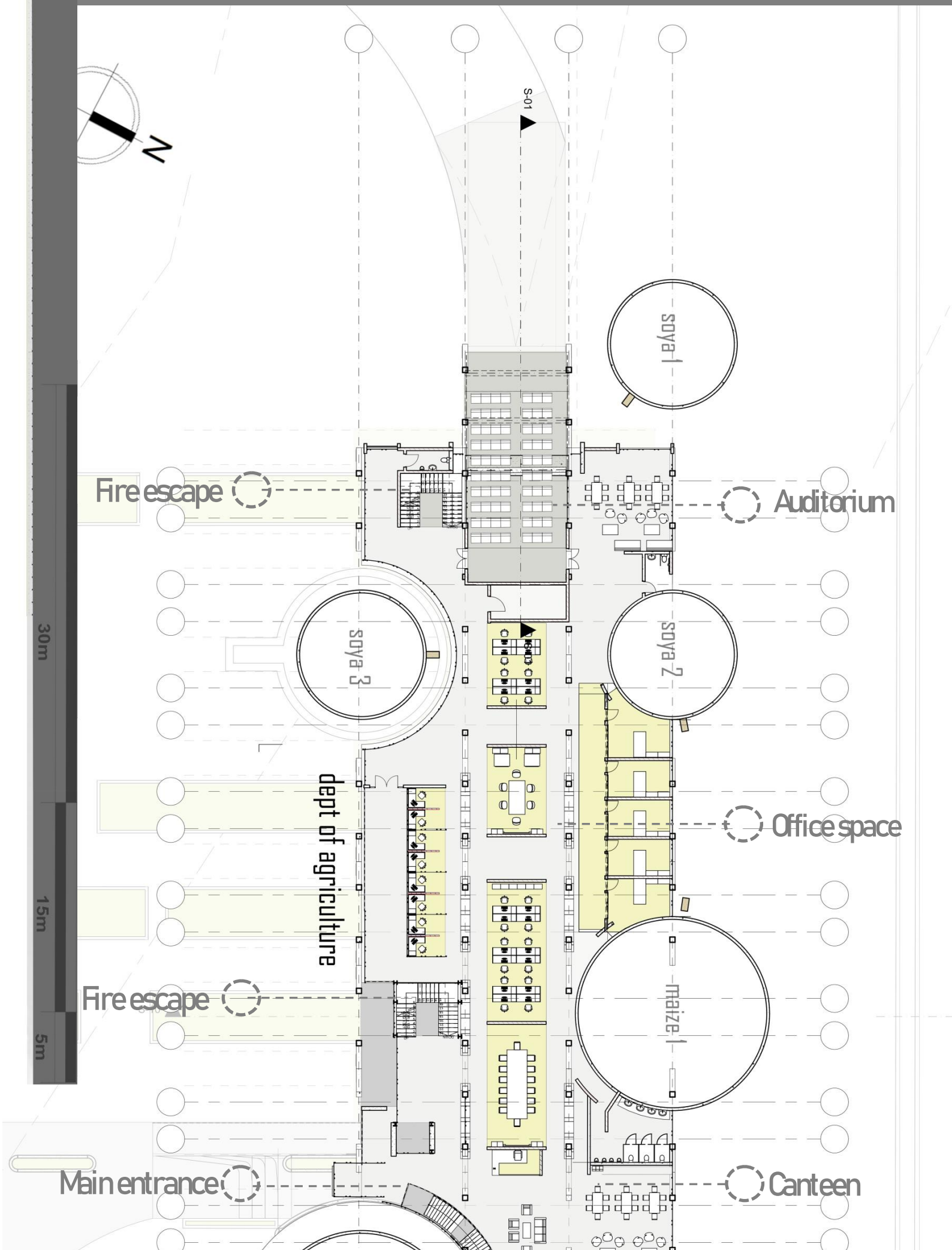

n8 highway
RAILWAY LINE
GRAIN DEPOSIT BAY
TRACTOR STORE
E-06
BKB RETAIL
admin building vehicles lane
heavy vehicles lane (ENTRANCE)
Nnathan street
heavy vehicles lane (EXIT)
N

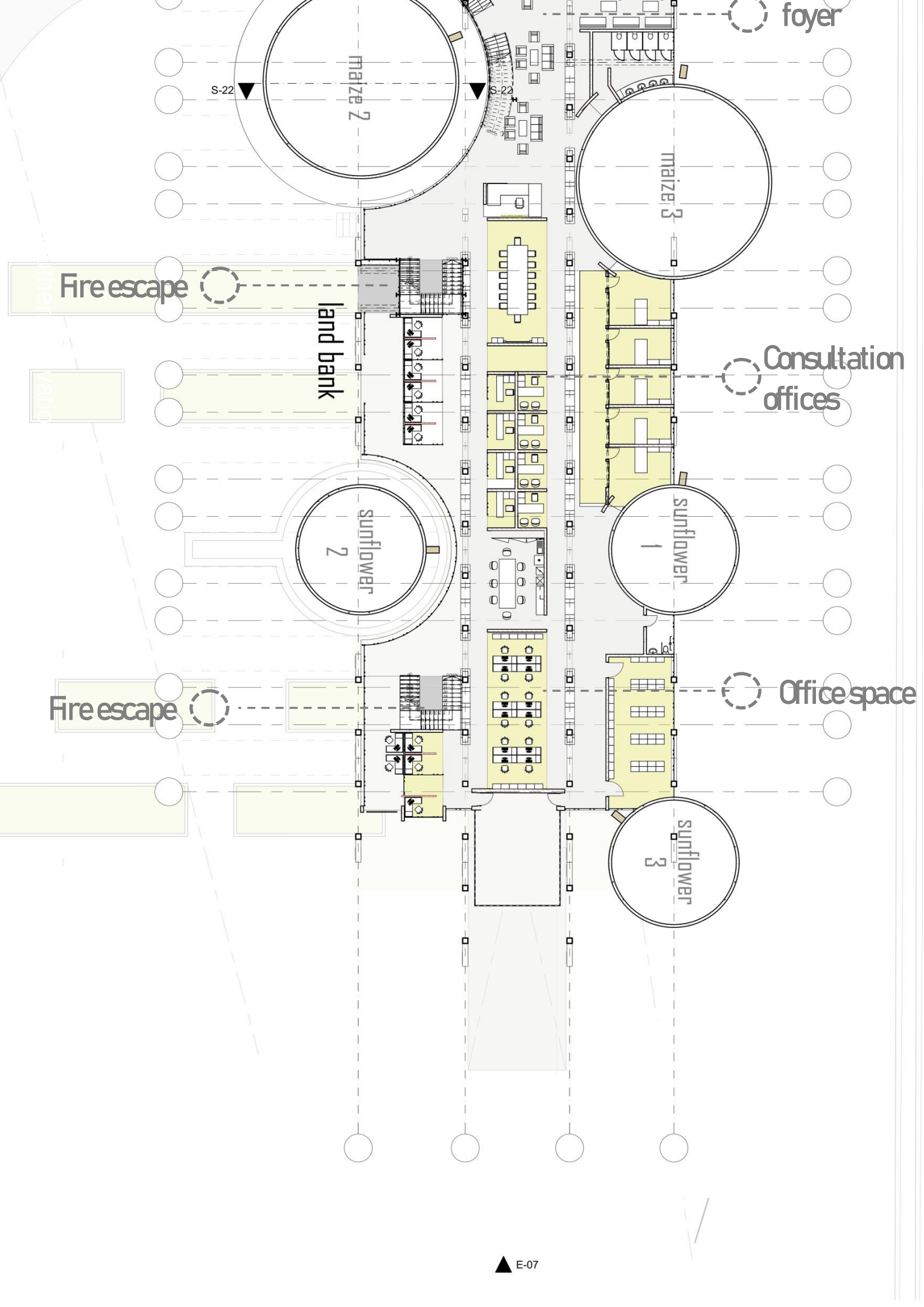
Site plan


railway lin
loading
1 2 1 2 3 4 5 6 7 8 9 10 11 12 13 14
D
C
B
A
soya 1
soya 2
maize 1
soya 3
grain deposit bay
grain deposit bay
planter box
entrance
LIFT
S-10
N
30m
15m
5m
Main entrance
Ground floor

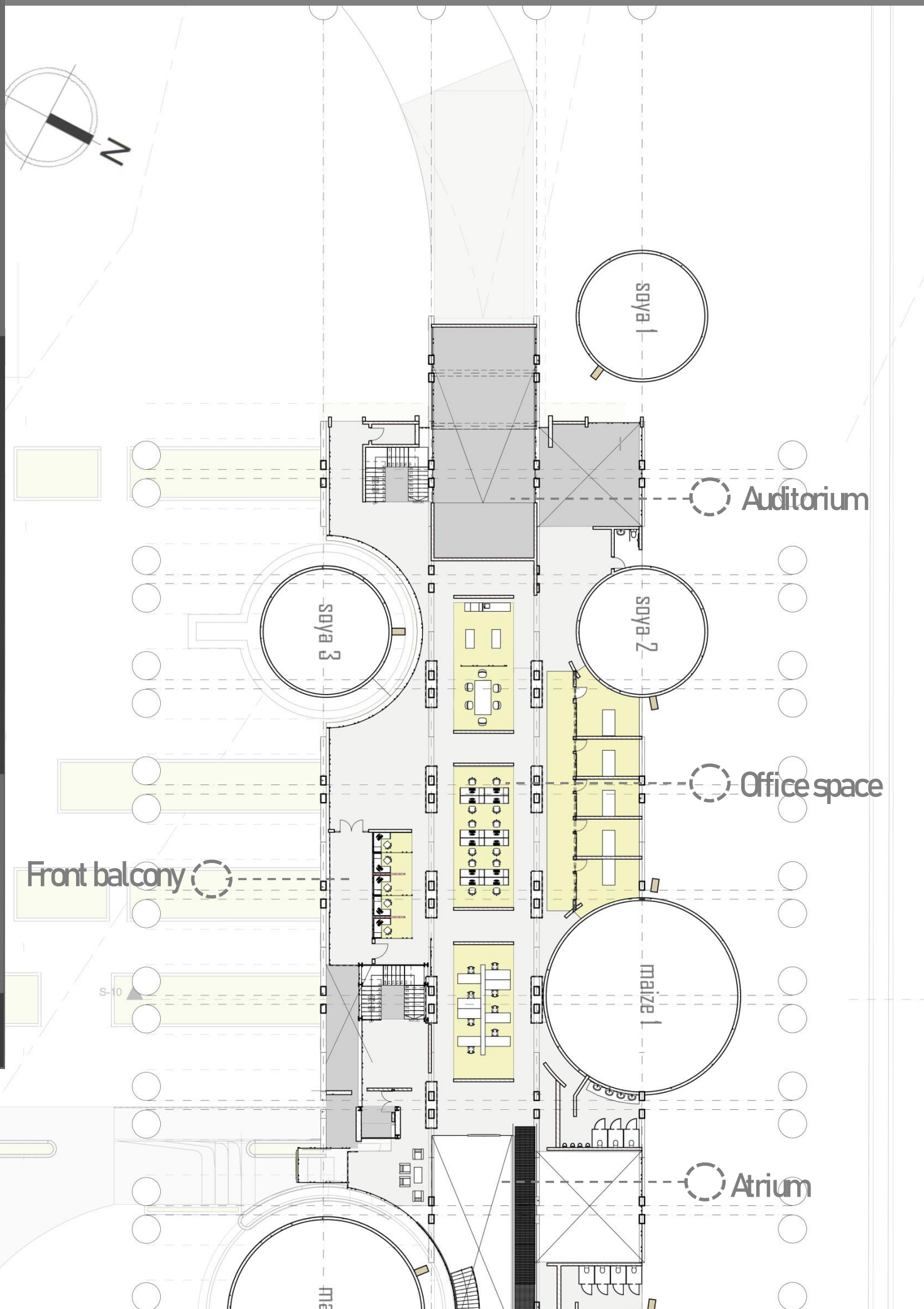

15 16
17 18
19 20
21 22
23 24
25 26
27 28
29 30
g platform
maize 3
sunflower 1
sunflower 3
grain deposit bay
maize 2
sunflower 2

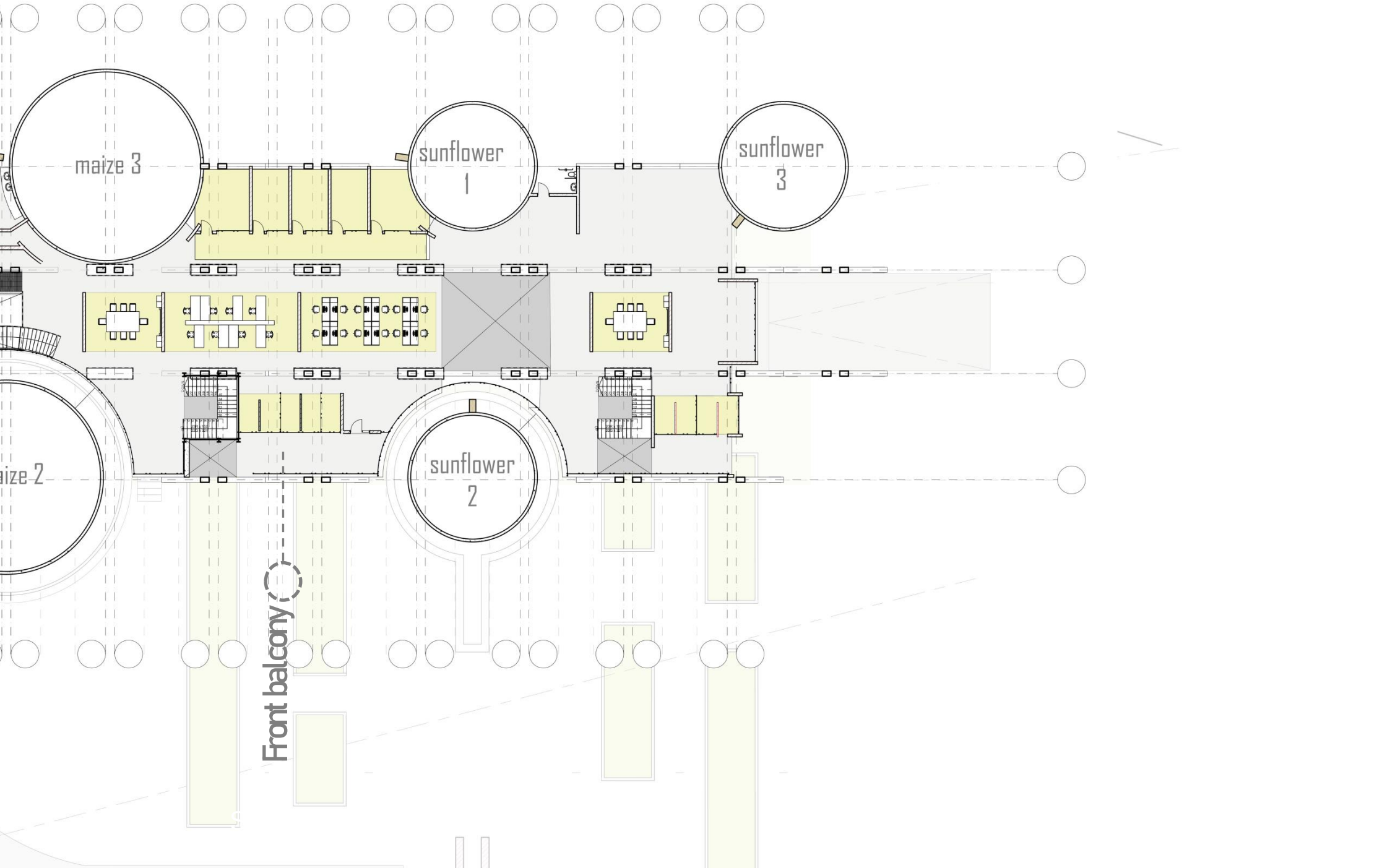
First floor


N
S-01
soya 1
soya 2
soya 3
maize 1
dept of agriculture
Fire escape
Auditorium
Office space
Fire escape
Main entrance
Canteen
30m
15m
5m


foyer
S-22
S-22
maize 2
maize 3
Fire escape
land bank
Consultation offices
sunflower 2
sunflower 1
Office space
Fire escape
sunflower 3

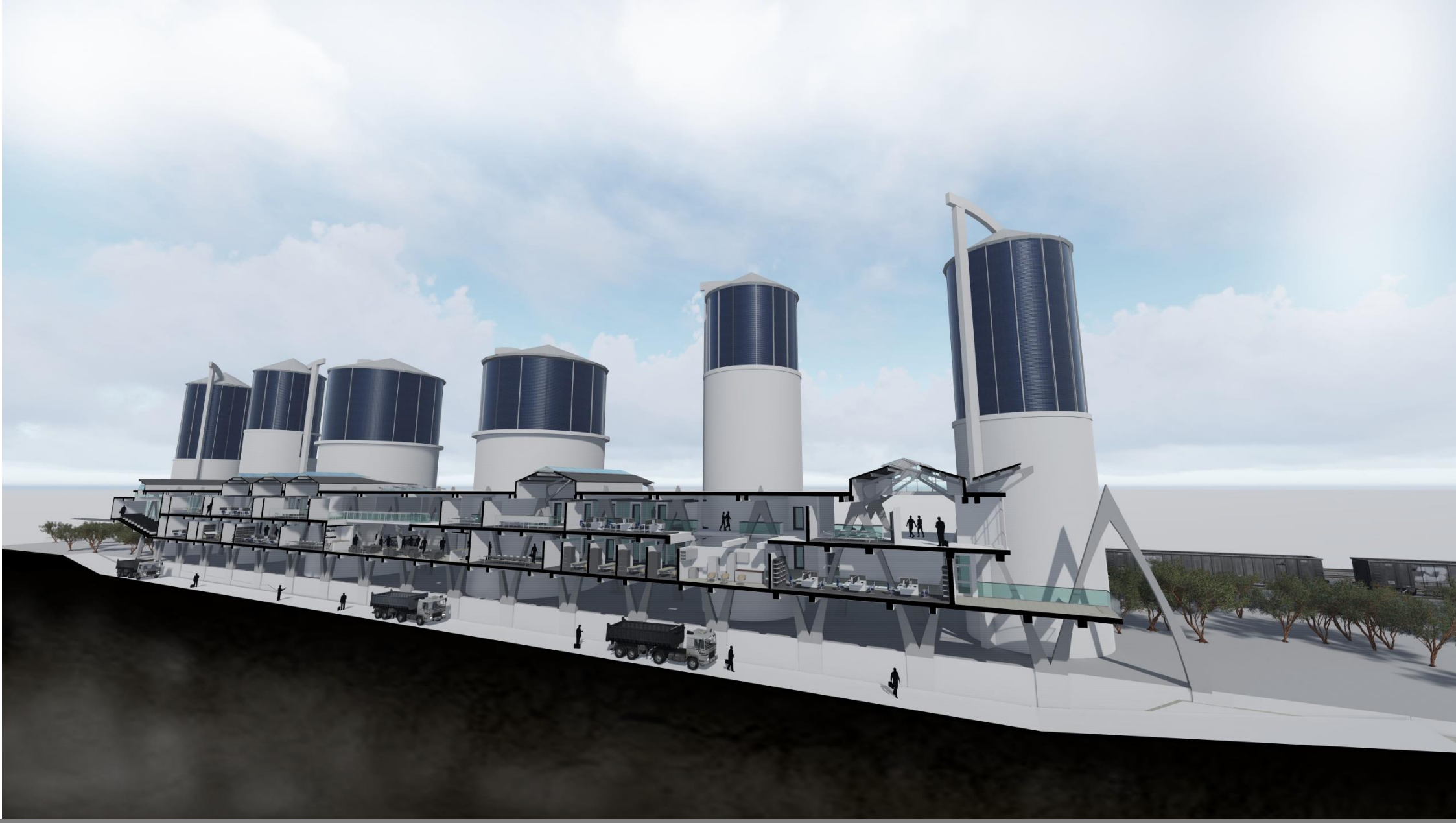
Second floor




maize 3
sunflower 1
sunflower 3
aize 2
sunflower 2
Front balcony

7.2

Sections



Longitudinal section

Longitudinal section

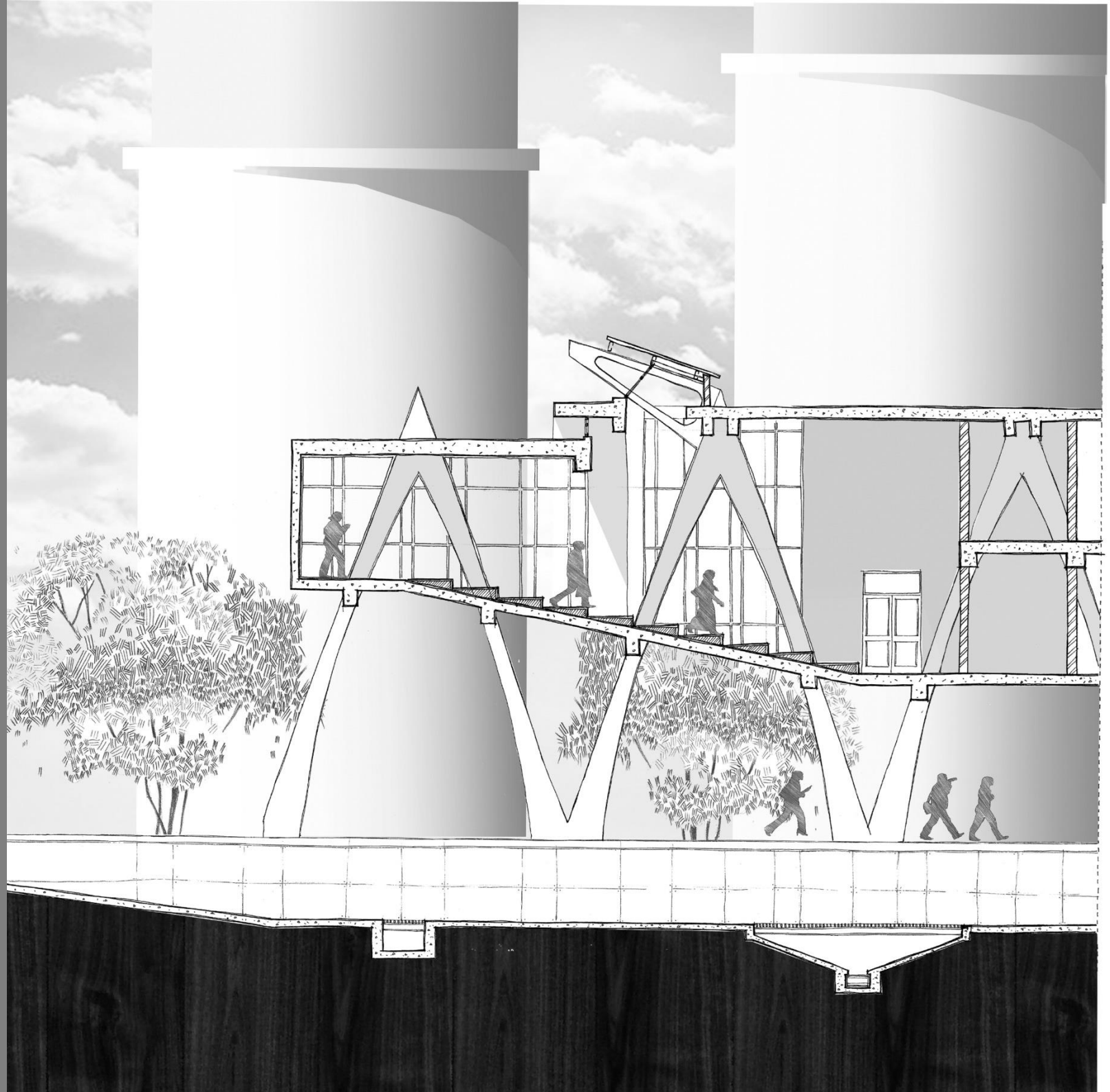
atrium

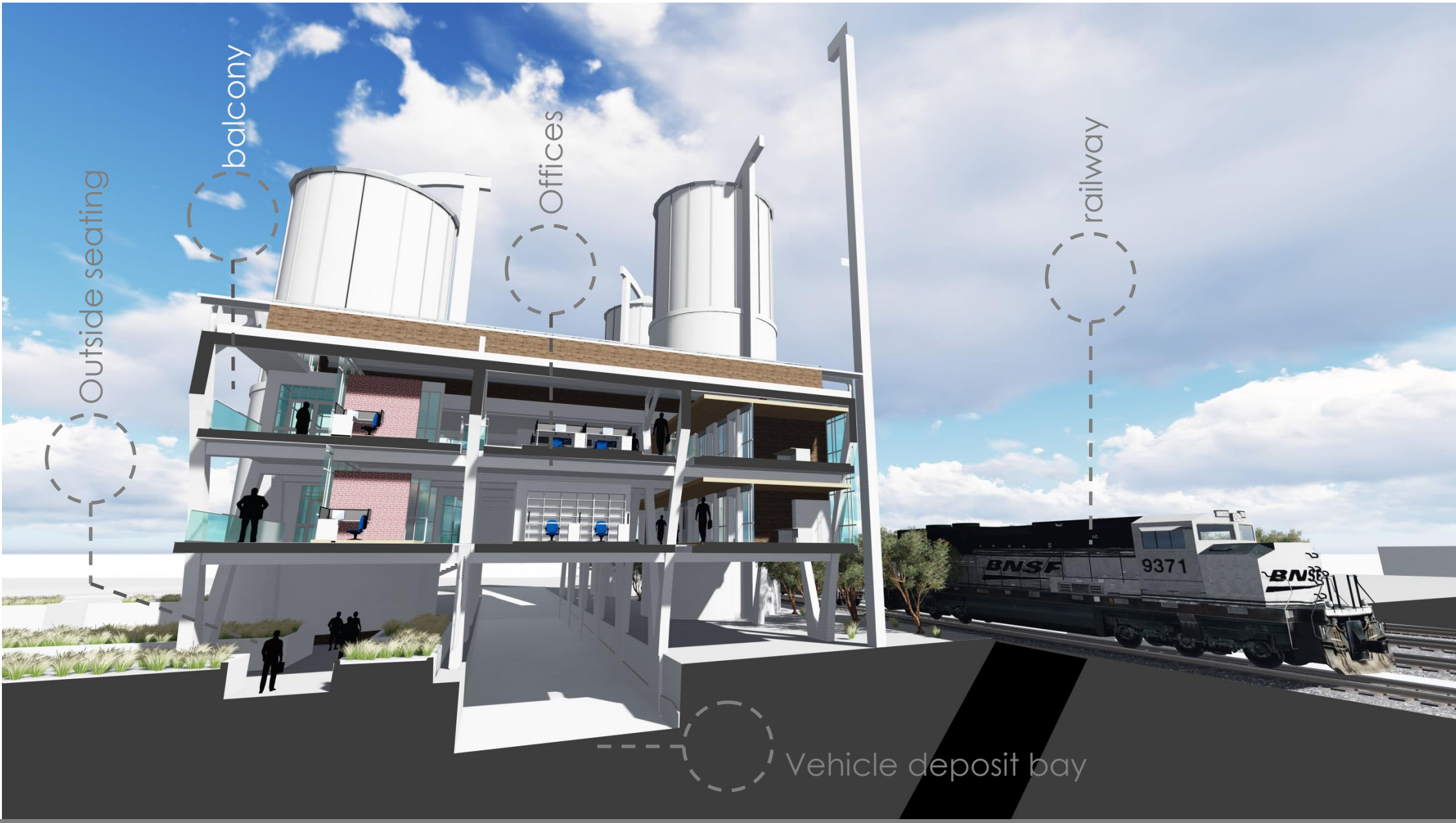
BKB

Land Bank

Deposit
Bay exit

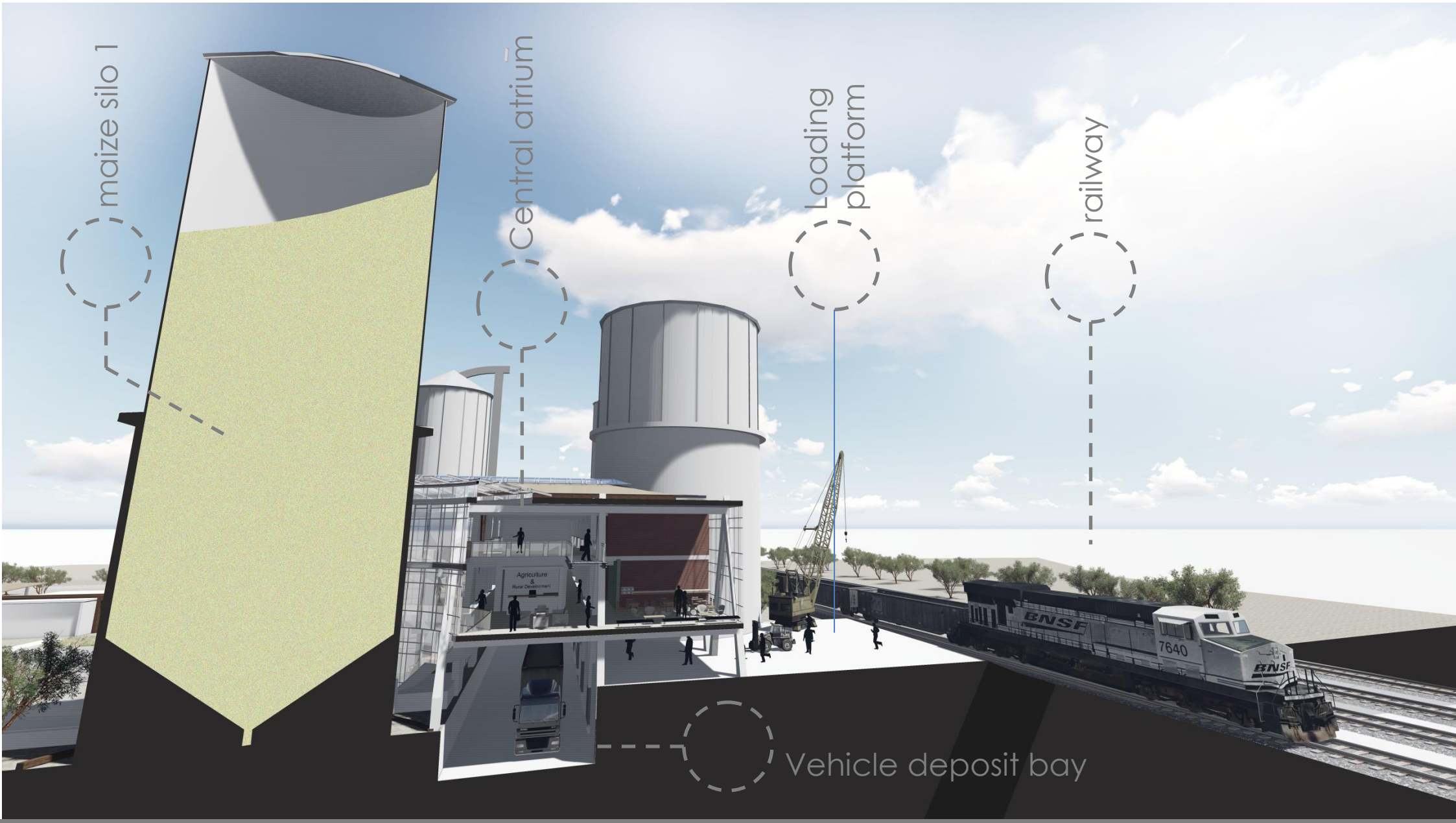
Longitudinal west end section





Cross section

Cutting plane through Department of agriculture office space



Cross section

Cutting plane through central atrium

7.3

Elevations

Southern elevation


30m
15m
5m

Western elevation

Western elevation

7.4

Visual impressions

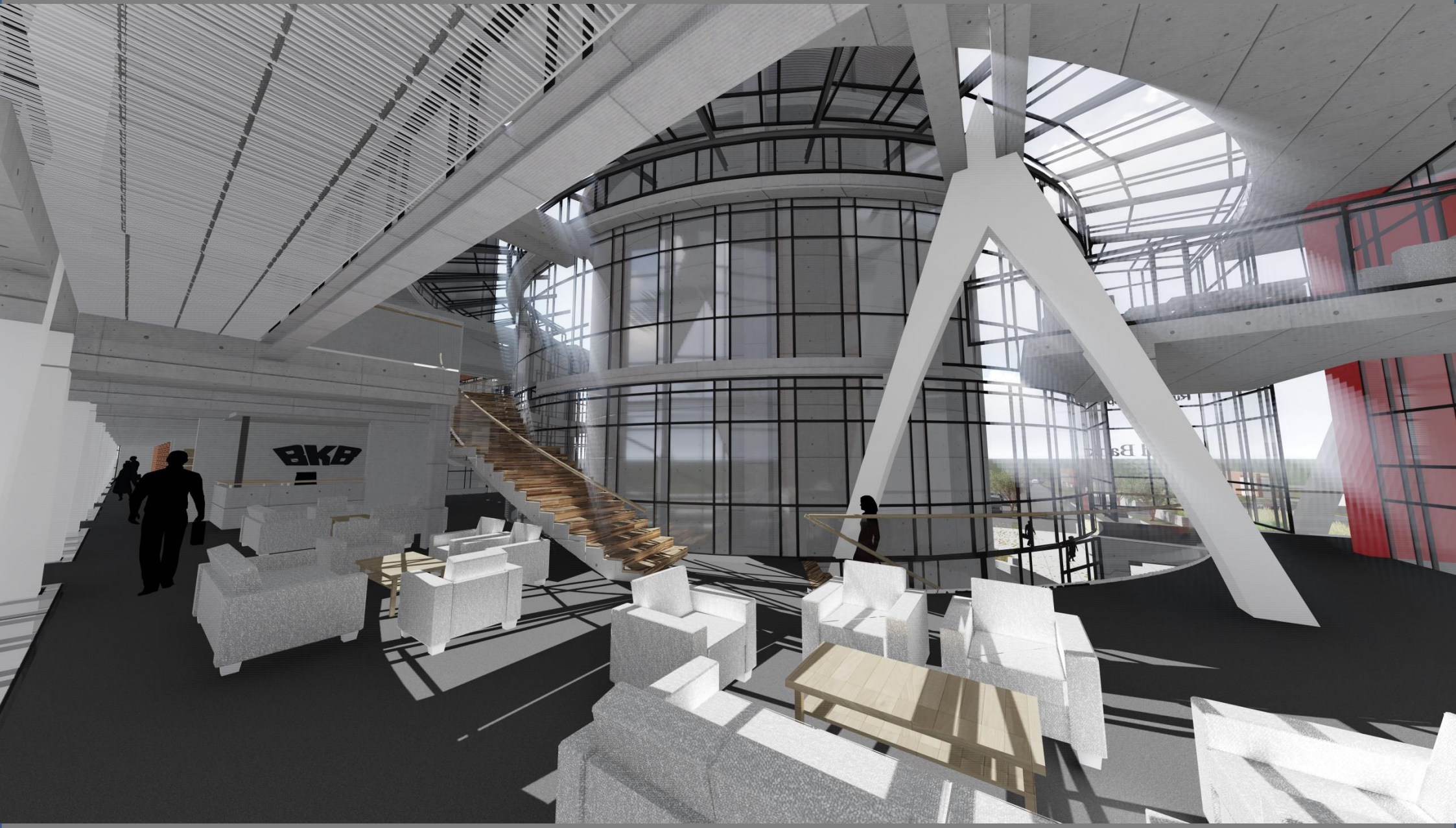
Mangaung Granary

The planter boxes with field grass allows the granary to be integrated with its site following the theme of reciprocity. The field grass aims to recall the effects of the golden rolling fields of the Free State while planter boxes take the form of linear cultivated lands.

Entrance

The entrance of the structure aims to a element which fits in harmoniously with the rest of the structure while obtaining subtle prominence of its own. The entrance wraps around the central silo allowing the visitor to engage with the typological form which dominates the site.

Central atrium and reception

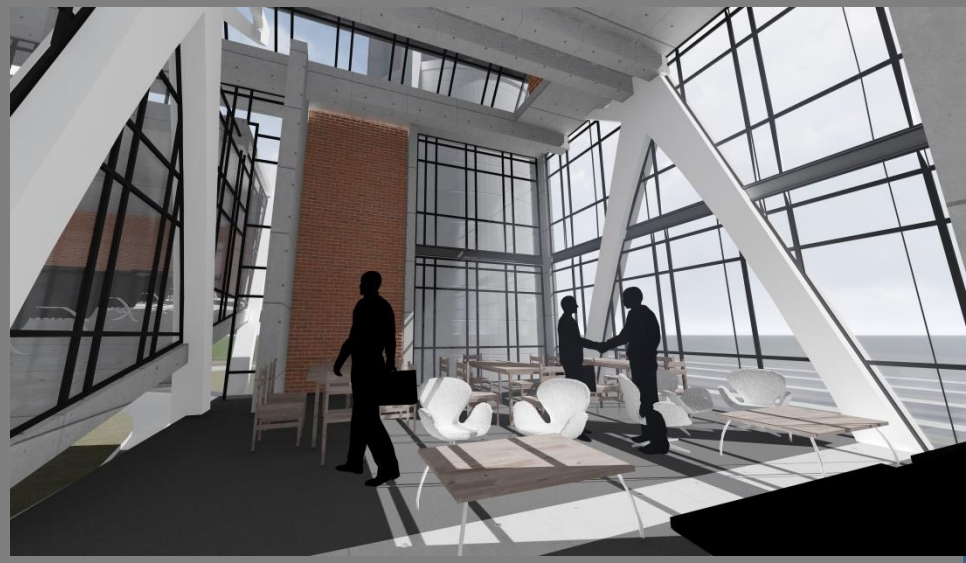


The visitor is received into the hearth of the granary by a central atrium which wraps around the central silo. Reception for the Department of Agriculture as well as BKB are located opposite each other with the central atrium binding the separate entities.

Administration Office floor

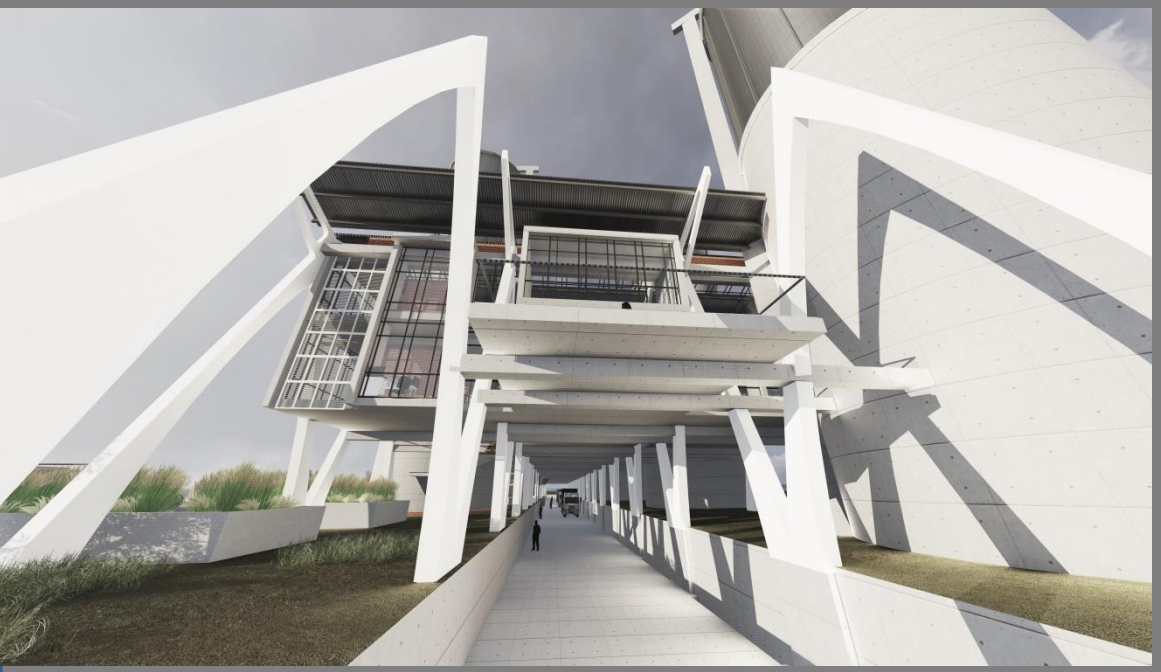
The structure allows for much natural light to enter the office space, increasing energy usage efficiency of the granary. The curvilinear diagrid structure which runs along the length of the building gives the office space a dynamic interior space. Varying office types are laid out across the floors in horisontal bands reinforcing the linear qualities of the building.

Auditorium end



The western end of the structure serves as the entrance for the depositing vehicles on ground floor level. The Audiitorium's wedge shape has served as an articulating element to terminate the end of the structure. The Audidtorium as well as canteen adjacent to it provide views out over the railway terminal, silos and front of site.

Eastern end, deposit vehicles exit side



The structure serves as a mean of terminating the buildings eastern end. It extends beyond the skin and dematerialises in a sensitive manner allowing the structure alone to extend further with empty arches.

Ground floor level

On ground floor level, the landscaping elements extend from underneath the building's footprint. This acts as a mediator between the building and the site. The planter boxes under the structure act as gathering and outside seating space.

Evening lighting

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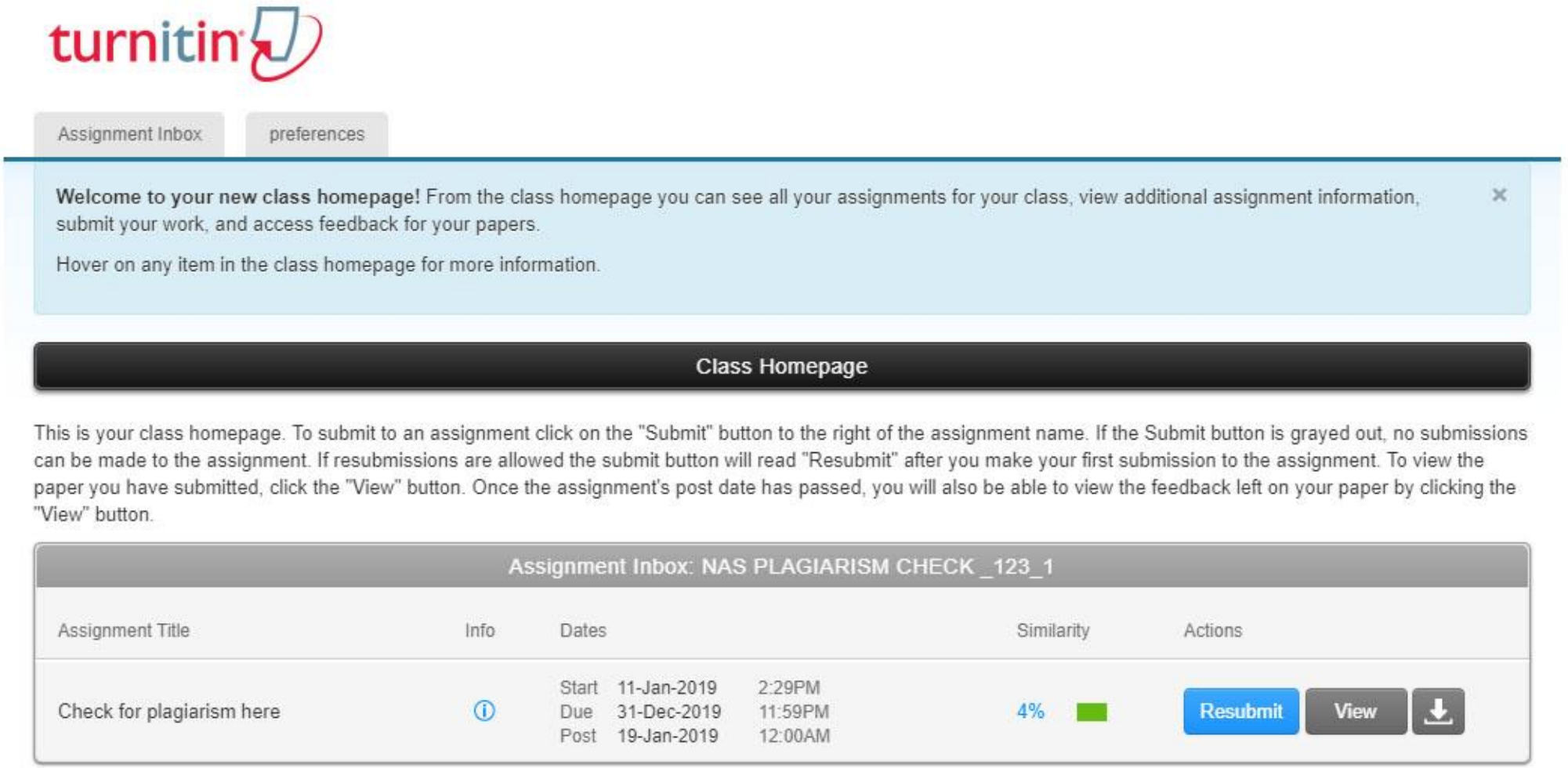

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