Still **Breath**ing

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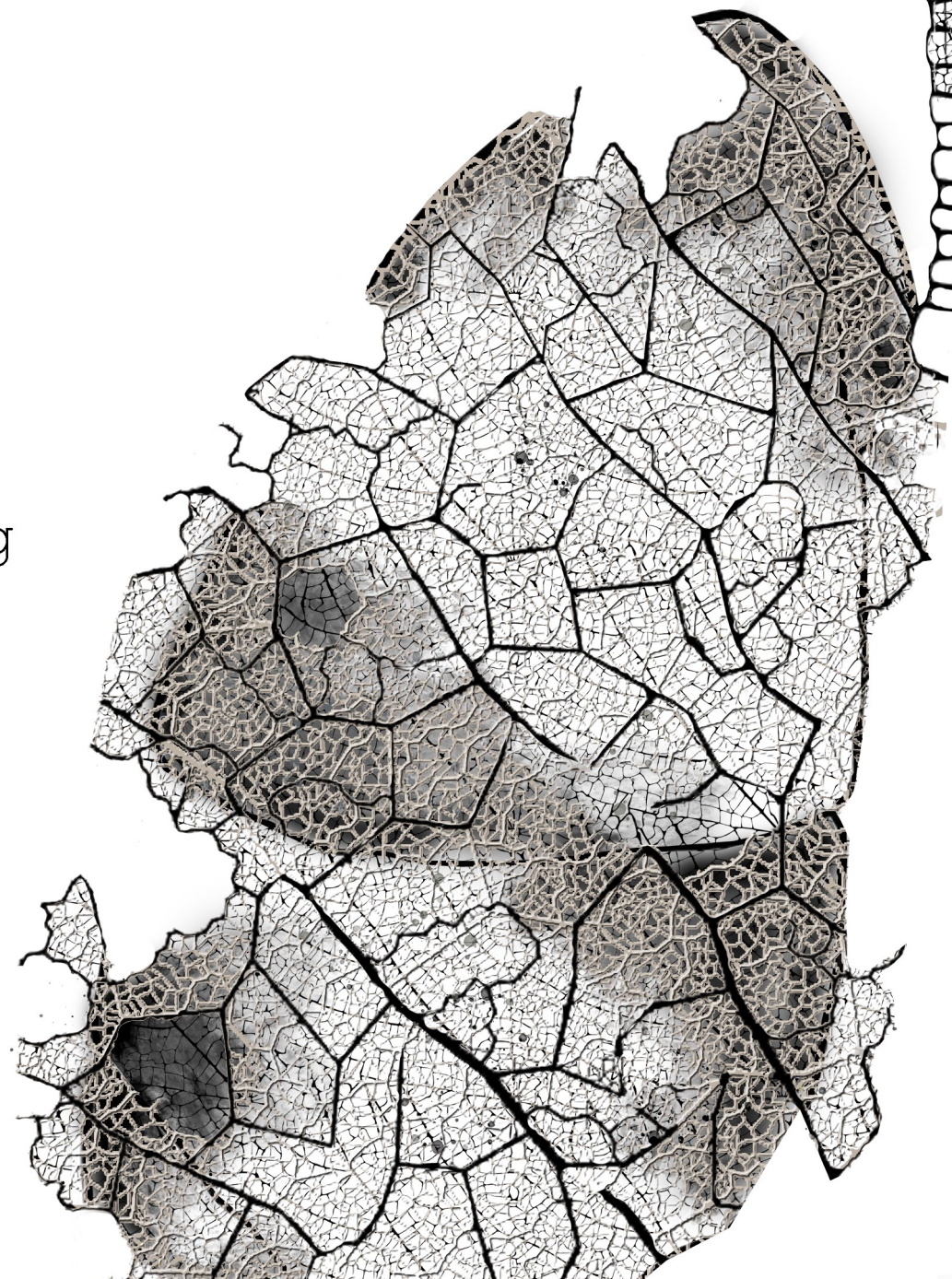
Lielie Fourie | 2018135356



Still Breathig

The reinvention of [Green]market Square for the year 2100 into a pneumatic capsule and oxygen production plant in the Cape of Good Hope.

Lielie Fourie
2018135356

FIGURE 001: In the waiting room I wonder, when will it all be over (Author).

Still Breathing

The reinvention of [Green]market Square for the year 2100
into a pneumatic capsule and oxygen production plant in the Cape of Good Hope.

This dissertation is submitted in partial fulfilment
of the requirements for the degree M.Arch (Prof).

Department of Architecture, Faculty of Natural and Agricultural Sciences
University of the Free State.

2023

Supervisors
Prof. J. Noble

Declaration of original authorship

The work contained in this dissertation has not been previously submitted to meet the requirements for a qualification at this or any institution of higher education.

To the best of my knowledge, this dissertation contains no material previously published or written by any other person except where due reference is made.

Abstract

This dissertation reinvents the famous Greenmarket Square in Cape Town, to adapt to a dystopian future ridden with pollution in the year 2100. It is in essence an urban ‘green lung’ that provides a sanctuary to users through the architectural practice of escapism. It is due to mankind’s need for overconsumption and unsustainable environmental practices that this future bares many troubles, most importantly, the cloud of pollution that has engulfed the city and stripped the immediate atmosphere of oxygen and safe breathable air. This dire situation calls upon architecture to respond empathetically to unexplored spatial experiences to resemble mankind’s basic constituent of care. The aim of this dissertation begs the question of whether architecture can act as a catalyst for escapism in a future juxtaposed by the present, to create a warning against environmental injustices? Furthermore, can existing architectural techniques and materials be translated into a futuristic urban green lung? It is challenging to conceptualize what the future might be, however, this future may not be too far-fetched. It is thus paramount that architecture can identify current issues that will have future consequences to create proactive solutions and not reactive ones. I therefore believe that my dissertation adds value to the world of architecture as it challenges existing architectural techniques to adapt to a dystopian future. This intervention is further supported through theoretical concepts of escapism, satire, the relevance of memory, the uncanny and the relationship between technology and temporality. As this building is the first of its kind, similar precedent studies are not available, however, the precedents analysed, contains ideas that are similar to that of the oasis at greenmarket square in 2100. A new architectural typology rooted in present practices is developed to solve future problem. This building ensures the continuity of mankind and restores dignity to the beloved Greenmarket Square.

Content

Document Framework

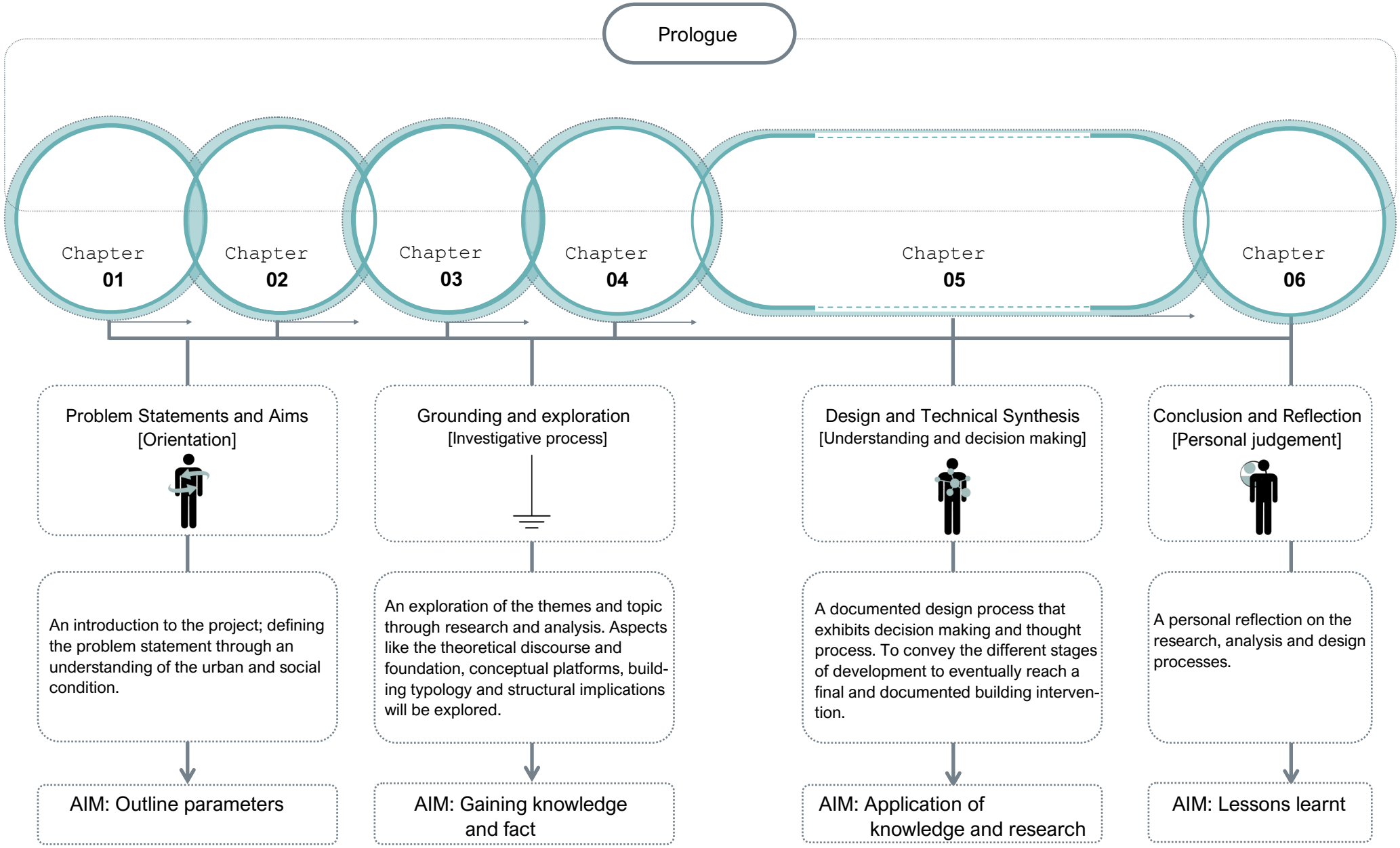
This dissertation explores the socio-spatial requirements of an oxygen production plant and urban lung, where visitors can enjoy the commodities of an artificial oasis while occurring an endless supply of clean air as they escape from the discomfort of the outside world. The golden thread to be investigated is the concept of escapism as a requirement for meaningful space making in a futuristic world. This should encourage critical reflection on our human impact on environmental sustainability. It further explores a new architectural typology inspired by iconographies of the cathedral. Despite the scheme being staged within a hypothetical reimagining of Cape Town in the year 2100, its foundations are based on current facts and effects of over -consumption and air pollution.

This dissertation is divided into six chapters. **Chapter 1 and chapter 2** outlines the project parameters and provides a brief overview of the project background and site location to establish the problem statement and aim of the dissertation. The environmental conditions and the causes that led to the degeneration of Cape Town are made clear to validate the nature and positioning of the project in terms of factual knowledge.

Chapter 3 is the theoretical discourse that supports and guides many of the design decisions and themes of the dissertation. The discourse is important as it grounds the dissertation in a phenomenology of care and meaningful space-making within a future unknown.

Chapter 4 involves the exploration of conceptual ideas and research to gain knowledge and understanding of the project requirements to ensure an empathetic response to the urban fabric. The building typology becomes an important investigation as it creates an extension of the intervention, expressing the conceptual platforms and themes upon which the project is based. **Chapter 5** of the dissertation explains the synthesis of the design project and its evolution through research and conceptual exploration in **Chapters 1-4**.

Chapter 6 concludes and reflects on the dissertation, focussing on the challenges and victories, and whether the initial aims of the project were achieved through the layered process of design and documentation.


Prologue
Chapter 01
Chapter 02
Chapter 03
Chapter 04
Chapter 05
Chapter 06
Problem Statements and Aims
[Orientation]
An introduction to the project; defining the problem statement through an understanding of the urban and social condition.
AIM: Outline parameters
Grounding and exploration
[Investigative process]
An exploration of the themes and topic through research and analysis. Aspects like the theoretical discourse and foundation, conceptual platforms, building typology and structural implications will be explored.
AIM: Gaining knowledge and fact
Design and Technical Synthesis
[Understanding and decision making]
A documented design process that exhibits decision making and thought process. To convey the different stages of development to eventually reach a final and documented building intervention.
AIM: Application of knowledge and research
Conclusion and Reflection
[Personal judgement]
A personal reflection on the research, analysis and design processes.
AIM: Lessons learnt

Prologue

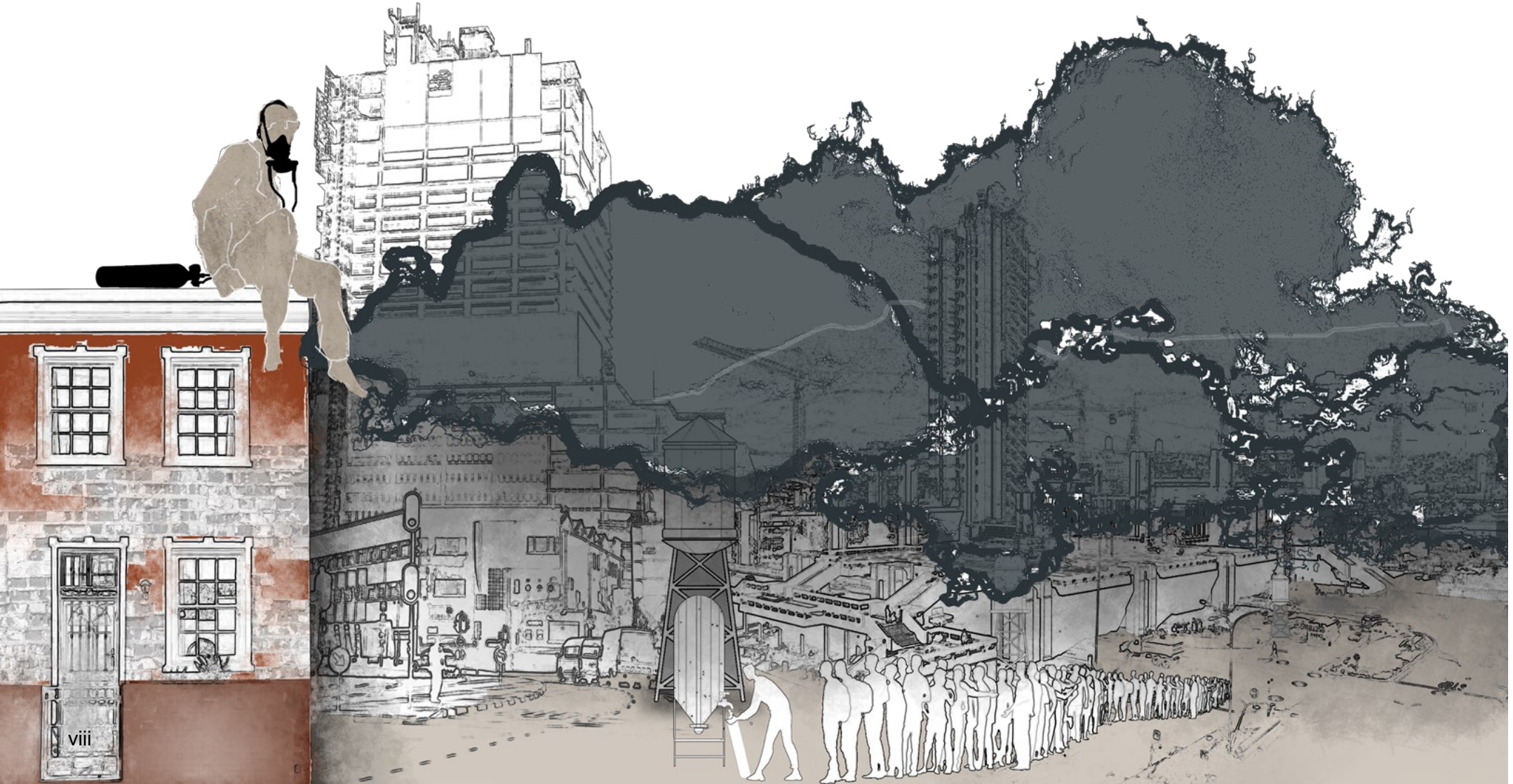
Earth barely breathing

Do you think mankind can destroy our planet? In the words of Michael Crichton:" What intoxicating vanity. Let me tell you about it..." (Crichton, 1990: Online). Our earth is four-and-half billion years old. Most of that time, 3.8 billion years to be exact life has existed on it. It has seen mountains rise, skies cry, rivers run and continents shift. It is a place where animals and plants once lived free until it paved the roads for humans to take their first stroll. Our planet has seen fires and floods. It has seen wars and famines. It has seen nuclear power and devastating pandemics. Yet it has survived all these onslaughts and is still standing. The Earth is still breathing. However, I fear that this time around there is little hope for it to metabolise the pollution we have bombarded it with.

It was the year 2023 when global conglomerates started fighting for market share, acquiring more and more land for mining and tree felling, insofar destroying most of the earth's natural resources for profit. They coerced, robbed and left our planet to starve all in the name of economic greed and the pursuit of money. Their reasoning was for it to restore the global economy which was destroyed by a pandemic they called COVID 19, which left our economies in pieces. Competition began to run rampant between companies as they fought for more wealth, ownership and power. It was the start of the global consumer race, a survival of the fittest, biggest and most profitable consumer. To their dismay, this lifestyle was unsustainable. The earth could no longer keep up with their high demands. By the year 2030, most of our natural resources were depleted and air pollution striped the atmosphere of breathable air. All that is left is broken cities covered in clouds of brown, like a warden guarding his prisoner, we are punished for our sins of gluttony.

My story takes place in Cape Town. Hi, I am Ettan. I live with my younger brother, Tariq, my grandmother, Isra, and grandfather, Nadim. My grandfather and grandmother grew up in a place they called the Bo Kaap. They tell us about it sometimes, how it was before the time of the Great Cloud. They describe a community washed in vibrant colours and scented with aromas of spices, buttery dough and Malaysian curries.

According to them, children ran around freely in the outdoors and slept in warm and soft beds, wrapped in blankets of cotton and fleece. It was a loud and happy community, neighbourly conversations echoed on the streets, yelling across porches to share stories about events that took place during the day. Tourists flocked from all over the world and smiled with wonder as they entered the rainbow district. They were quick to click wildly with their cameras to flood the world with images of this delightful scene. I can't even begin to imagine such a place, as my senses have never had the opportunity to absorb such imagery.



They related their first meeting to us. They were almost teenagers when their families decided to set up a stall on Greenmarket Square where they would sell Malaysian spices and cuisine. Later when they left, they took their abundant knowledge of spice and flavour, all their belongings from years of cultural settlement and their colourful memories of community and friendship, to settle with their families in communal apartments with fellow aspirants of the consumer class, in Long Street.

My grandparents lived in the apartments across from each other. They spent their days running errands for their families and trading with fellow marketeers for the best deals on clothes, vegetables and other necessities. They no longer went to school but read together every day from whatever books they could find, while the world of trade, produce and services passed them by in exponential speed, ignorant of the effects that the consumer race would soon condense to form the Great Cloud.

Suddenly we find ourselves in 2090. A new world has immersed, with change beyond belief. We have been engulfed by a haze, a huge brown impenetrable cloud, unable to breathe the air surrounding us. We do not dare to leave our homes without our oxygen masks nearby. Our windows and doors are sealed tight so that the precious few oxygen particle's available cannot escape. We no longer trade outdoors like in the good old days, but rather spend our days scavenging for canned foods and peace jobs. Payment methods have changed too, we no longer trade with money. The use of so-called O-points enables us to buy oxygen for our tanks and for our homes as this resource has become the most important fuel for our existence. My grandparents are old and frail and their spice stall has no meaning in this new life. All of these happenings led to me and my brother's application for a new job. A massive new oxygen production plant is going to be built on Greenmarket Square and we to be employed as contractors for the construction.

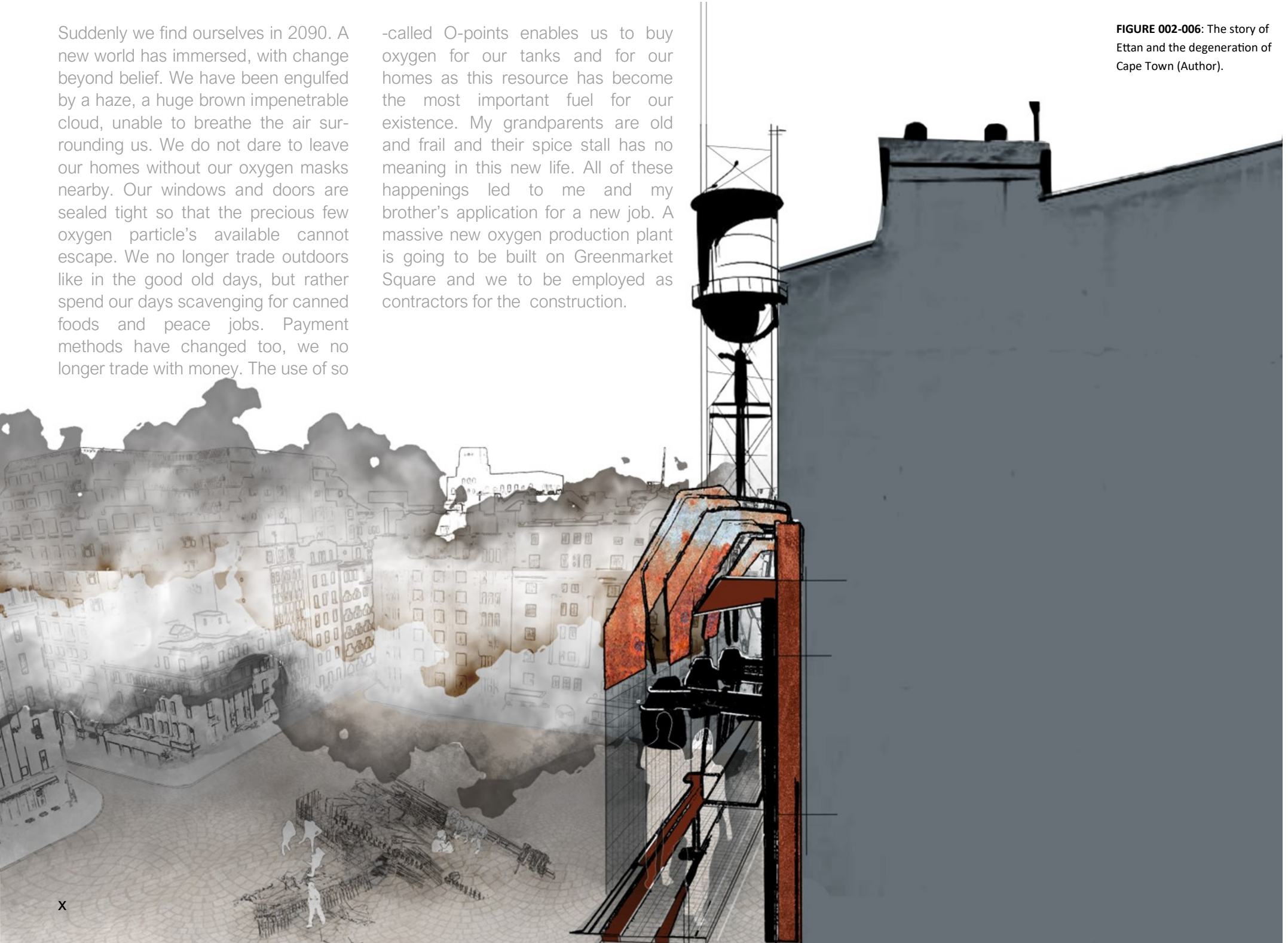


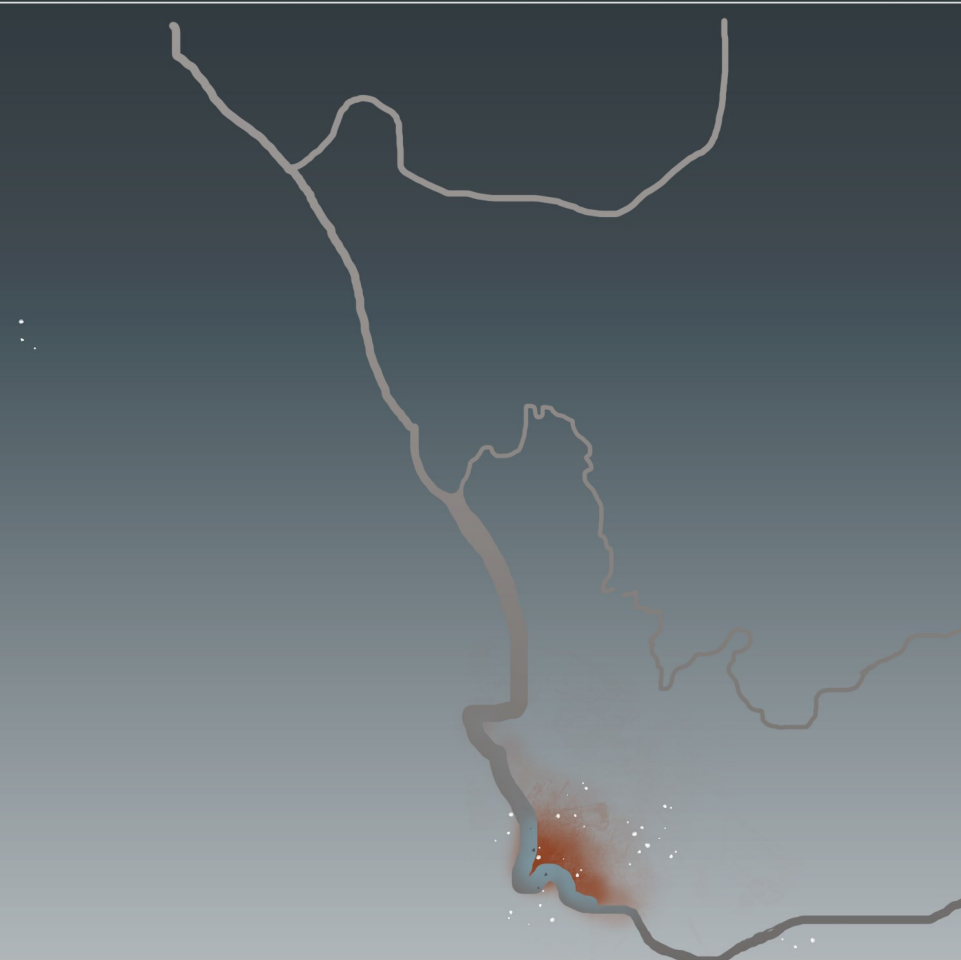
FIGURE 002-006: The story of Ettan and the degeneration of Cape Town (Author).

Hi, this is me, Ettan. I will be your narrator throughout the duration of this dissertation. I hope you'll take with you a part of my story and learn from it to look after your environment and to never stop caring. Look out for the grey text to hear from me again.

FIGURE 007: A drawing of Ettan, the narrator of the dissertation (Author).

Chapter 01

Introduction



1.1.

What's that brown haze over Cape Town?

Jonah Harbinger, a local journalist at the Cape Times, reports on the nature of the brown haze that now permanently hangs over areas of Cape Town.

Cape Town is home to just over 5,8 million people. Along with other cites in South Africa, such as South Durban, Johannesburg and the Vaal Triangle, Cape Town has also become a priority for environmental attention because of the persistent high levels of anthropogenic (caused by people) air pollution. This is alarming and a cause for urgent public concern as readings show that it is exceeding levels stipulated for human health, putting everyone at risk. Smog and air quality problems are not new to Cape Town. Years ago, in the 1960's, it suffered thick smog from extensive use of coals for trains and coal powered stations and was successfully reduce by the City Council by closing down all its sources. Now (in 2055) a new form of smog has emerged and it is called, brown haze. The effects of the Mother City's air pollution extend beyond the obvious ugly visual aesthetic and is starting to bring forth regional climate change and many of our people are suffering from respiratory diseases.

Major conglomerate, Buy 'n Large, along with the City Council have put forward a revised and comprehensive, multidisciplinary Air Quality Management Plan to try and improve the air quality, yet again. If not effective and the quality continues to decline, the company's engineers and scientists have come up with ingenious oxygenated bubble technologies to help keep the bad air out of our lungs while traveling through the city.

FIGURE 008: Left: The city of Cape Town drowning in air pollution (Bghekaya, 2011)(Altered by author).

FIGURE 009: Left, bottom: Illustration of the Buy 'n Large 0_2 Bubble. Order now, before its too late (Author).

1.2. Background and project rationale

On 30 January 2020, the World Health Organisation declared the outbreak of the Coronavirus pandemic (COVID-19). The world fell into hibernation, with almost half of its population under some form of national lockdown. Around the world, all social and economic activities were forced to a standstill and a severe negative shock to our economies was immanent. This resulted in the disruption of production and supply and an immediate loss of economic activity followed, suspending and reducing the demand on business operations. Despite the economic complications of Covid-19, the social, cultural and emotional damage was much more.

As a daughter of two medical practitioners, who were constantly kept informed on all the devastating activities taking place in the hospitals and medical world during this time, there was no escape from the daily notification of the lives taken by this unforgiving pandemic. This dissertation developed from an empathetic standpoint for all families and friends who lost somebody special during this time. The Coronavirus stole from mankind their most instinctive and imperative skill: to breathe on their own. Introspect was taken on what it would feel like if I too could no longer breathe.

"Between two lungs it was released, the breath that carried me, the sigh that blew me forward. Cause it was trapped, trapped between two lungs. And my running feet could fly, each breath screaming, we are all too young to die" .

In 2021, during the final year of my B.Arch degree, the idea of an Oxygen Café as a design intervention to remedy the neglect of air pollution within the inner cities found me . The design proposal comprised of breathing rooms in which people could come together in the company of friends and family while breathing in clean air, washing their lungs from the harmful particles of the air outside. This project set the foundation on which this thesis is built. I became fascinated with the idea of what architecture would look like if oxygen was no longer available directly from the air in the atmosphere, but only in artificial oxygenated landscapes, or bubbles, that serves as urban lungs and oases in an urban context overrun by toxins and air pollution.

Throughout the research it became clear, that the major reason for the world to succumb to such a fate, would be due to the rise of the consumer class and our greediness of consuming beyond our basic needs. If mankind continues down the spiral of irresponsible consumption, **mass production** and wastefulness of natural resources, the onus of rectifying the destruction and pollution it causes, will be on us. The thing about human nature is that we only realize the importance of something once we are faced with the prospect of losing it.

Within the dissertation, sub themes are used to help ground the design and the design process, theoretically and poetically within the main theme: architectural empathy. These themes include memory as a constituent of care, escapisms as a form of self-expansion and satire to promote critical reflection. Their significance will be discussed further in chapter three.

Only once there is nothing left to consume, will mankind realize the system's flaw. The fact that more people can enjoy the benefits of buying goods and services beyond their basic needs should essentially be positive, however, the dissertation is a representation of the tipping point when over consumption has led to the exploitation of natural recourses and the pollution of the built environment. Within this thesis these dire effects of consumerism on the quality of life is told through the narrative of a young boy living in a fictional future Cape Town, who's most basic necessity of life has been stolen from him… Oxygen.


Table Bay
Tanker basin
Signal Hill
Long Street
Greenmarket Square
N1
Castle of Good Hope
Entrance into Cape Town from N1
N1
N1
Table Mountain
N
1 km

06



1.3. Location: Greenmarket Square, Cape Town City Centre

Greenmarket Square is known to many as the heart of cape town and has played host to a vibrant open air gathering space for tourists and locals to enjoy for many years. It is situated in the city bowl area of Cape Town between St George's Mall to the south east and Long Street to the square's north west. The area in front of the of the Old Town House is regarded as the historical centre of Cape Town. Shortmarket Street and Longmarket Street border the square on either side, with Burg Street running through the middle of the square. A thorough site analysis will follow in chapter four.

I chose to locate my project within the economic powerhouse of the City Centre of Cape Town for two reasons. Firstly, to support the project's narrative through a technique of storytelling known as situational irony. *Situational irony* is an event or occasion in which the outcome is significantly different from what was expected or considered appropriate. One can also call it *irony of fate or irony of circumstance (Nordquist, 2018).* This creates suspense and a link with the thematic ability to lay waste to the world. Irony is a literary device in which the outcome of the situation ends up being the opposite of what we would expect. Therefore, the choice of site is ironic, as its status of an economic hotspot for culture and production should suggest prosperity, but in fact, it has led to its downfall.

Secondly, Greenmarket Square is loved by visitors from all over the world. Locals also enjoy this space of celebrated culture and community as a source of economic stability and social exchange. Many are bound to this magnificent oasis by years of memories from holiday trips or casual rendezvous through this vibrant location. Many have grown up alongside the development of the square and have witnessed the changes time has brought upon it, yet, still enjoying everything it always had to offer. For this reason, Greenmarket Square lends itself, empathetically, to this scheme, by celebrating the memories and traces of a place that is special to all.

unconventional architectural ways of thinking and understanding in order to revitalise Greenmarket Square and restore it to its former and even better glory, within this fictional depiction of Cape Town, in the year 2100.

FIGURE 010: Left: Location of Greenmarket Square (Author).

Figure 011-013: Top: Luscious greenery in Greenmarket in 2023 (Author).

1.4. Client and user

1.4.1. Introduction to the clients

Buy N Large Corporation is a company of the Wall-E universe created by Pixar. It started as a frozen yogurt producer and by the year 2057 the conglomerate became a worldwide leader in the fields of aerospace, agriculture, construction, consumer goods, earth transport, energy, engineering, infrastructures and inventions, to name a few. The company continued to expand its effort for control so much so that by 2105, Buy N Large had over two million wholly owned subsidiaries, governmental bodies, and health care centres. It had finally become a world leader in every conceivable field including world leadership (Pixar Wiki, 2007). Their headquarters is in Buckingham Palace, London, from which they run their businesses worldwide.

FIGURE 014: Buy N Large, a leader in worldwide affairs (Pixar fandom, 2008).

2

City of Cape Town is the local government of Cape Town and surrounding areas. The City of Cape Town's Air Quality Management Plan clarifies the vision and mission for air quality management and the principles underpins future actions.

The plan supports the vision of the Environmental Strategy, which seeks to enhance, protect, and manage Cape Town's natural and cultural resources for long-term prosperity, in a way that optimises economic opportunities and promotes access and social wellbeing. In the long-term, the City will strive for an environment where there is excellent air quality in all areas of Cape Town, and lung irritation and disease due to poor air quality will be mitigated (City of Cape Town, 2023).

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Vision & Mission

Vision: "TO BE A CITY THAT ENSURES CLEAN AIR FOR ALL" (City of Cape Town, 2023).

Mission: "TO REDUCE THE HEALTH EFFECTS OF POOR AIR QUALITY FOR ALL IN CAPE TOWN" (City of Cape Town, 2023)

Goals

Goal 1: Reduce harmful greenhouse gas emissions through supporting air quality and climate change response programmes.

Goal 2: Ensure effective and consistent air quality management, linked to climate change.

Goal 3: Raise awareness with respect to air quality management and climate change response.

Goal 4: Ensure effective and consistent air quality compliance monitoring and enforcement.

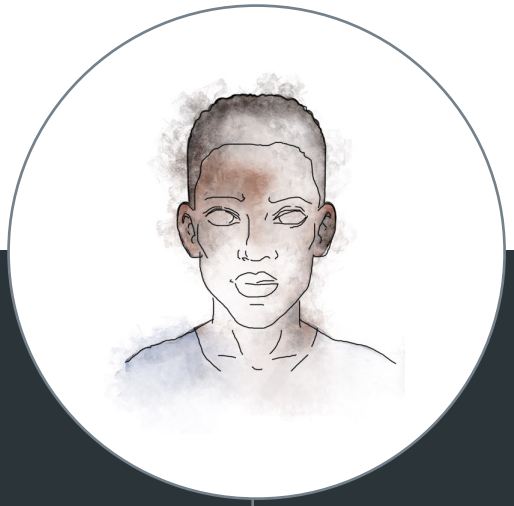
Objectives

+To improve air quality in dense low-income settlements.
+To support sustainable transport planning initiatives.
+To support climate friendly procurement in the City.
+To maintain and enhance the Air Quality Management System for the City of Cape Town.
+To expand upon existing education and awareness activities and to provide a comprehensive and sustainable awareness and communication programme for Air Quality Management.

1.4.2. Introduction to the users

The intention of the intervention is to create a sanctuary where people can come together and enjoy an artificial environment filled with greenery and clean air as neither of these longer exist beyond the building's boundary. Its purpose is for the recreational fulfilment of visitors, preservation of local biomes and the production and supply of oxygen to the city.

The propose building will therefore mainly be used by pedestrians seeking entertainment or solace, by engineers and specialized staff who run and manage the oxygen production plant and nitrogen battery station and by botanists and scientists who regulate, cultivate and tend to the gardens in the oasis.

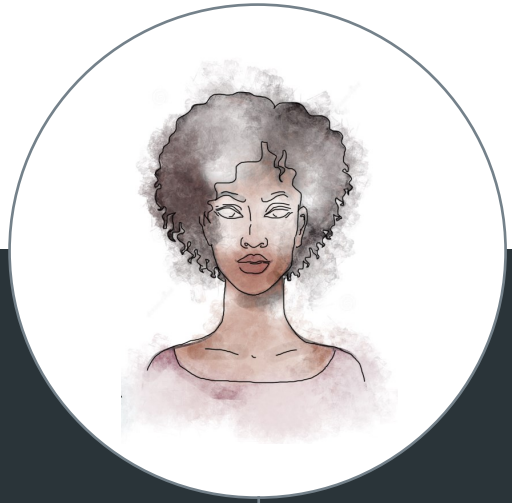


Specialised mechanical staff

We have the necessary skills to service, repair and to run the oxygen generation and power plant. When we need an extra employee, we train them and teach them everything they need to know about the systems and mechanical components.

Engineers

The development of the building took many years. However, we are confident that we have successfully achieved the means to supply oxygen to our city and our people. We have made a huge amount of structural progress with the minimum available materials and believe that Greenmarket Square will breathe on.



Botanists and biologists

We have lost most of the plant and animal species in the past 50 years. The redevelopment of Greenmarket Square provides a place with optimal conditions for plants to grow again. The observatory ensures repopulation of these species for the future and aids in research and knowledge about our lost biomes.

Stall owners

We have only heard stories about the vibrant Cape markets, but have unfortunately never been able to experience them ourselves. When we heard about the new development on Greenmarket Square, we were elated and could not wait to get our stalls up and running to sell bespoke gadgets, clothing, tank accessories, new masks and many more. Making the necessities of today available to all.

Pedestrians

We have been walking around in a dark and lifeless city for far too long. The new Greenmarket Square provides us with a place where we can feel normal again, where we can escape from the day's harsh reality, recharge with friends and immerse ourselves in nature, that no longer exists in the outside world.

1.5. Project brief

The Green Lung and Oxygen production Plant serves as an extension of the clients' goals as its focus is on providing a place of refuge for its users and contribute to the restoration of climate change and reduction of air pollution. It is important to keep in mind that this intervention is set in a series of hypothetical scenarios and that the brief positions itself imitatively to fulfil the unique requirements and lifestyles presented by this made-up world. Three ordering vessels are recognised in which the different spatial requirements and building functions are divided into order to establish the project brief and program. These vessels include the **past, present** and **future.**

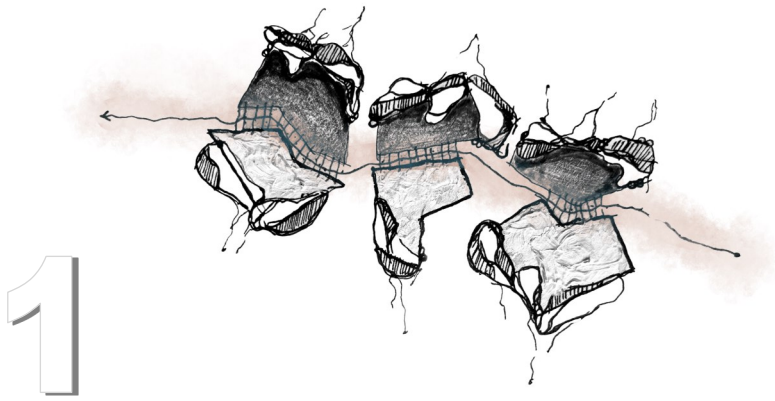


FIGURE 015:
Past: Spaces in which traces of memories and the past are celebrated and acknowledged.

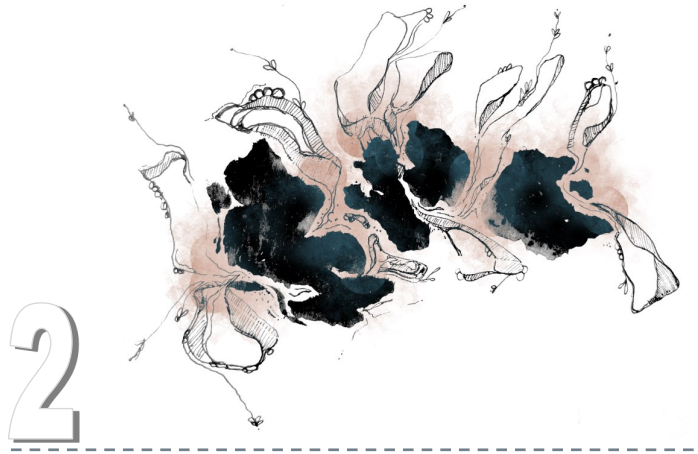


FIGURE 016:
Present: Systems and structures to help combat current architectural and environmental issues and provide solutions thereto.

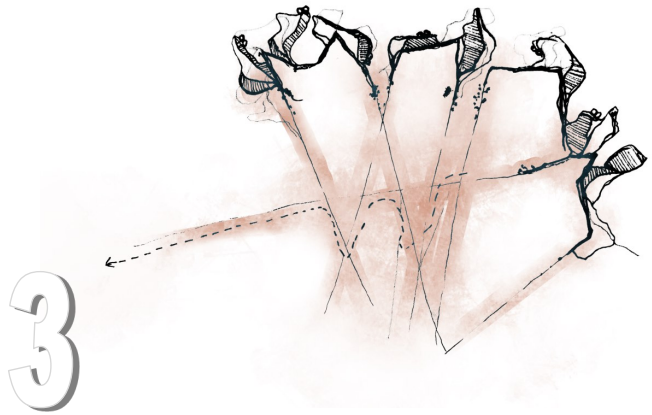


FIGURE 017:
Future: Spaces that ensure and promote longevity of humanity and nature.

1.6. Problem statements and aims

In order to define specific challenges and problems, an investigation was carried out into the negative effects that consumerism has on our natural environment and what the long-term extremities will be if we continue down the path of over-consumption and irresponsible exploitation of natural resources. One such outcome was air pollution and its augmentation into a permanent cloud of smog that fogged up the urban atmosphere. It was made clear that the most immediate challenge facing the researcher was the conception of a green lung and oxygen production plant typology that would counteract these conditions as it has not yet been explored architecturally. The typology in question is that of a cathedral and investigates how its iconographies can be integrated meaningfully into this futuristic intervention to contribute to the unique, yet uncanny spirit of the place.

The research questions how architecture should respond to the environmental conditions of the hypothetical scenario that is narrated and presented throughout the document. It further questions how the spatial composition of such a building can be approached through both a physical and cognitive understanding of space-making. This means, that the building must support the functional needs and structural requirements of such an intervention and adhere to the site parameters and contextual cues of the urban fabric, while meaningfully integrating the overall scheme within the theoretical platforms that contribute subconsciously to the experience of the space.

In terms of morphology, a unique approach was required because the nature of the brief contrasts greatly with the utilities, principles and functions of buildings in 2023. It would be impossible to create a building using the infrastructure, materials and machinery used in current times as most are not available and new methods also arise. Standard design approaches and methodologies were thus challenged to find a unique approach to develop the morphology of the intervention to contrast with conventional methods of the present. Along with the morphology, the function and program of the proposed building become important translators of the theme of escapism through this contrast with reality.

FIGURE 018: A pragmatic setup of a large scale, industrial oxygen production plant suggestive of an industrial typology. This is a model for Air Liquide's lastestproject. They recently started on the world's largest oxygen production unit for Sasol, an international integrated energy and chemicals company. It is located in Sasol's Secunda site (around 140 km East of Johannesburg), the new ASU supplies Sasol with large quantities of oxygen used for production of fuels and chemicals (Air Liqide, 2018).

The aim of the proposal is to develop a suitable design solution and accommodation list for the clients by exploring the cathedral typology, relative academic literature and existing buildings with similar sets of ideas based on morphology and spatial organisation principles. This process will propose an approach to the unexplored typology of the Green Lung and 02 production plant in the year 2100. In parallel, the design seeks to raise awareness of air pollution and its effect on our environment. The intervention therefore questions whether architecture can be used as a vessel of protest and to design spaces that can combat and escape environmental neglect.

FIGURE 019: Left: Conceptual illustration of the interior oasis of the Green Lung (Author).

The typological aim will seek to question whether an architectural interpretation of escapism can be created by merging tangible and intangible space (physical urban environment with memory and empathy respectively) to contribute to meaningful space-making, no matter the form of hypothetical scenario the future might find itself in.

The duplicity and parallel nature of my dissertation seeks to question whether this project is really intended for the future or rather for current times. The research question to follow combines these problems, aims and questions to form a summary that exposes the true intention of my dissertation

1.7. Research Question

Can architecture act as a catalyst for escapism in a future juxtaposed by the present to create a warning for mankind's' unsustainable practices? Additionally, can existing architectural techniques and materials be translated into a future urban green lung?

Chapter 02

Cape Town 2100

This chapter explores the events that led to the environmental downfall of Cape Town in the year 2100. Its effects on the social, cultural, natural and urban environment is discussed and a better understanding of daily life within this despondent fantasy is gained. This chapter is written from the point of view of someone Ettan spoke to currently living within this future, and follows as they recall their understanding of how is all happened.

2.1.
Introduction: The launch of the consumer race

2.2.
State of the environment [2023-2100]
2.2.1. The greenhouse effect
2.2.1. Disruption in the natural production of oxygen

2.3.
Other air pollutants

2.4.
Photo Gallery

2.1. Introduction: The launch of the consumer race

To make sense of what caused the total degradation and decay of the city of Cape Town, a study into the chronological order of events leading up to the situation and how they affected the once beloved mother city was conducted. A large part of what occurred in the city can be related to the novel by George Orwell, *1984.* The novel accurately and uncannily depicts a fictional future routed in groupthink[1] and governmental rule, that came true to a certain degree 100 years later.

The world had become somewhat brainwashed into thinking that the ideas of flashiness, money and material possession was the route of all happiness and success. This compelled people to believe that they needed the newest and most expensive designer clothes, cars and even houses. This behavior grew exponentially over the years and marked the beginning of the consumer race. Four major conglomerates saw this as an opportunity and began to exploit the population who were already on the brink of groupthink and self-destruction. The Cape Town group was called the Wolves of Longstreet. They started to implement various ingenious advertising techniques by using digital algorithms, powered by AI, to entice expenditure by the people. The use of big data became the powerhouse behind this new commercialistic revolution. People's data, like their buying habits and lifestyle, became the new currency for the conglomerates. They did not make deals on trade and products, but rather on the transfer of people's information. Whichever company had the most data, controlled the masses. This eventually led to the four conglomerates becoming the new world superpowers, ending the time of government rule, worldwide. Due to the immense asset ownership and land that the Wolves managed to gain, they became the new ruling party. By inciting brainwash techniques and groupthink, the population was manipulated to think that consumption resulted in happiness and the spending of money created fulfillment. This resulted in an overworked and immensely poor population who were desperate for the owning and possession of things. A lot of what Orwell predicted came true, but what he did not see coming was the catastrophic impact that this method of governance would have on the Earth's environment. Due to the increase of production to satisfy the need for material possession, air pollution was abundant and the burning of fossil fuels and carbon dioxide emissions increased beyond controllable amounts.

From factories, working day and night to meet the consumer demands, large doses of a toxic chemical known as nitrogen oxide were emitted into the atmosphere. When sunlight reacts with nitrogen oxide particles it forms a fog-like cloud, known as smog. This smog plagued the Cape like a blanket and eventually it rose from ground level up to the skies, covering cities in a layer of pollution, **almost two kilometers high**. Unfortunately, the production rate did not decrease as the idea of 'more' continued to run ramped amongst the general population. The continuation of air pollution created an even thicker cloud which in turn created an uninhabitable environment for the plant populace. The smog dubbed "The Great Cloud", reflected the sunlight from the Earth, acting as a second Ozone layer, had catastrophic consequences as it cooled the Earth down rapidly. The plant population also suffered, and the natural environment began to die out, which led to the depletion of the Earth's natural oxygen supply.

[1] Groupthink is a phenomenon that occurs when a group of individuals reaches a consensus without critical reasoning or evaluation of the consequences or alternatives.

Plants create oxygen in a process called photosynthesis and for photosynthesis to work and oxygen to be produced the plants need sunlight. The smog hindered the plants from receiving the necessary sunlight required, therefore the process of photosynthesis could not be completed. This created a world where masks, oxygen tanks and people suffering from serious lung diseases due to the pollution and lack of clean air were the norm. Animals, plants, and humans could not cope with the lack of oxygen and the extreme cold, leading to the loss of half of the total population, fauna, and flora of the Earth by the year 2070.

In Cape Town, this was luckily the final straw for many as rebel groups began to form. They spoke at rallies and underground meetings, where poems and stories of the blue skies and the abundant fynbos were shared around campfires. Stories that the newer generation struggled to believe, as all they knew was the Great Cloud and the oppression it brought with it. A hatred for the Wolves developed and the rebels started to fight back, abolishing the act of groupthink and activating a civil war between the population of Cape Town and the multinational conglomerate. The rebel groups were victorious and a new government was elected by the people, for the people. However, the real battle was not yet over and the planet was still dying. The need for a total reset was vital as the planet itself was on the verge of becoming completely inhabitable from the extreme cold and lack of oxygen. The rainfall eventually became contaminated and contained toxic chemicals creating acid rain. The severity of the acid rain would fluctuate, from not being noticeable (only noticeable through ingestion) to being extremely toxic, even burning the skin of people.

People lived in extremely pressing and tough conditions. Large blocks of grey flats flooded most of the center of Cape Town. Thes flats we built for function and not for aesthetics as they were easy and quick to erect. The need for immersive and creative architecture was apparent now more than ever. Life was still hard and nothing was even close to becoming normal again. To walk anywhere, one cannot leave the house without a mask and a spare oxygen tank. The water tasted burnt and was filled with chemicals used in the filtration process as water had to be cleaned and recycled numerous times due to decreasing amounts of fresh water from the toxic rainfall. Coffee shops transformed overnight to oxygen cafes, restaurants turned to food banks and banks turned into oxygen dispensaries as oxygen became the new currency.

Being the resilient beings that we are, humans started to prosper again. The environment became more and more livable. A new type of architecture was now needed to keep up with the slightly better conditions and to instill a sense of pride in the city again. Now, 30 years later in the year 2100, the toxic rain has subsided, and it is safe for people to walk outside. Water is somewhat drinkable, but the need for reservoirs and water recycling systems is still at the forefront of the new town planers' agenda.

The mental health of the population took a massive hit as moist and overcast days were spent inside a dull and colorless tin flat. Something needed to be done, this forced the newly elected government to come up with a plan to allow the people of Cape Town to get a taste of the 21st century. And the development at greenmarket square began.

FIGURE 20: What will the Earth be like in 2100? (Tollefson, 2020)

2.2. State of the environment [2023 to 2100]:

To understand exactly what created this state of environmental disaster, it is important to study the science and facts which directly support the fiction. This includes what caused the smog, how acid rain is formed, what the air content is and how many cities have been affected by the Cloud.

2.2.1. The greenhouse effect:

Before diving into the specifics of how the atmosphere deteriorated, we need to understand how the Earth's atmosphere works. The Earth is the only planet in the solar system that can sustain life. For the Earth to be able to do this, conditions need to be perfect. A major component that contributes to the optimal conditions of the Earth is the temperature. Earth has an average temperature of 15 Degrees Celsius (Sharp and Stein, 2022) with the greenhouse effect and greenhouse gases playing a key role in temperature regulation. The Earth is in essence a giant greenhouse. When the sun's rays bounce off the Earth's surface, some are trapped within our atmosphere with the help of greenhouse gases (National Geographic, 2022). The three major greenhouse gasses are: Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O)

These gases work together and form a layer that traps the heat when the sun's says bounce off the Earth's surface, allowing the Earth to maintain a comfortable and affect living temperature (National Geographic, 2022). As one can imagine, if the volume of these gases increase, it will cause heat to be trapped in the Earth which in turn raises the temperature of the planet above desired amounts, to cause global warming (National Geographic, 2022). The volume of greenhouse gases rise by 1,3% on average per year (Lindsey, 2022) which would see an increase of around 40% from 2023 to 2100. However, due to the consumer race, this number doubled and there was close to an 85% in Carbon Dioxide levels, which became deadly for humans and raised the average temperature of the Earth considerably from 15 degrees Celsius to 25 degrees Celsius, a temperature that could simply not maintain life.

However, the issue the Earth faces is not so much global warming, but rather a sudden and abrupt global cooling (Calgary Herold, 2014). And this is exactly what happened sharply after the year 2050. A smog cloud is what plagued the Earth leading to the near demise of our beloved planet. More accurately, photochemical smog. Photochemical smog forms when nitrogen oxide from car exhausts, coal stations and factories are emitted into the air and reacts with volatile organic compounds (VOC's) from gasoline and cleaning agents (National Geographic, 2022). The sun heats the combination of these gases and a chemical reaction takes place, creating a photochemical smog which resembles a cloud (National Geographic, 2022). However, from the year 2020 to 2055, the amount of these gases being emitted was tremendously high and uncontrollable. The holes in the ozone layer did not reflect the sun effectively and this created a super reaction. A huge smog cloud plagued the Earth, growing by distance and thickness until it was almost 2km thick and about 1.5km from the Earth's surface (the 'Great Cloud'). The cloud acted as a second Ozone layer which reflected the sun's rays even more, creating an abrupt global cooling. From 2050 to 2070 the Earth's temperature dropped from 20 degrees Celsius to 9 degrees Celsius, and a great global cooling was in effect.

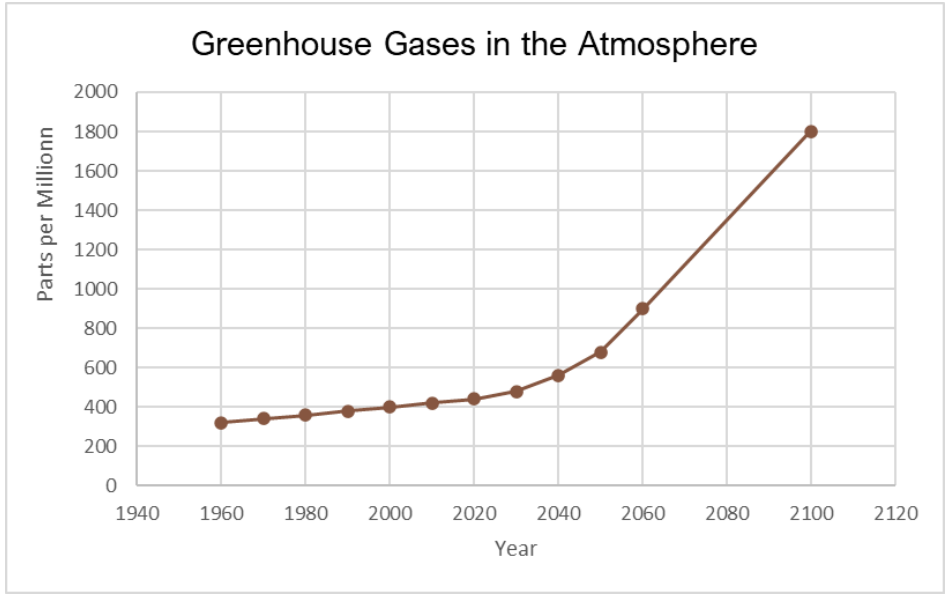


FIGURE 021: Fictional graph showing the amount of greenhouse gases in the atmosphere from the year 1960-2100 (Author).

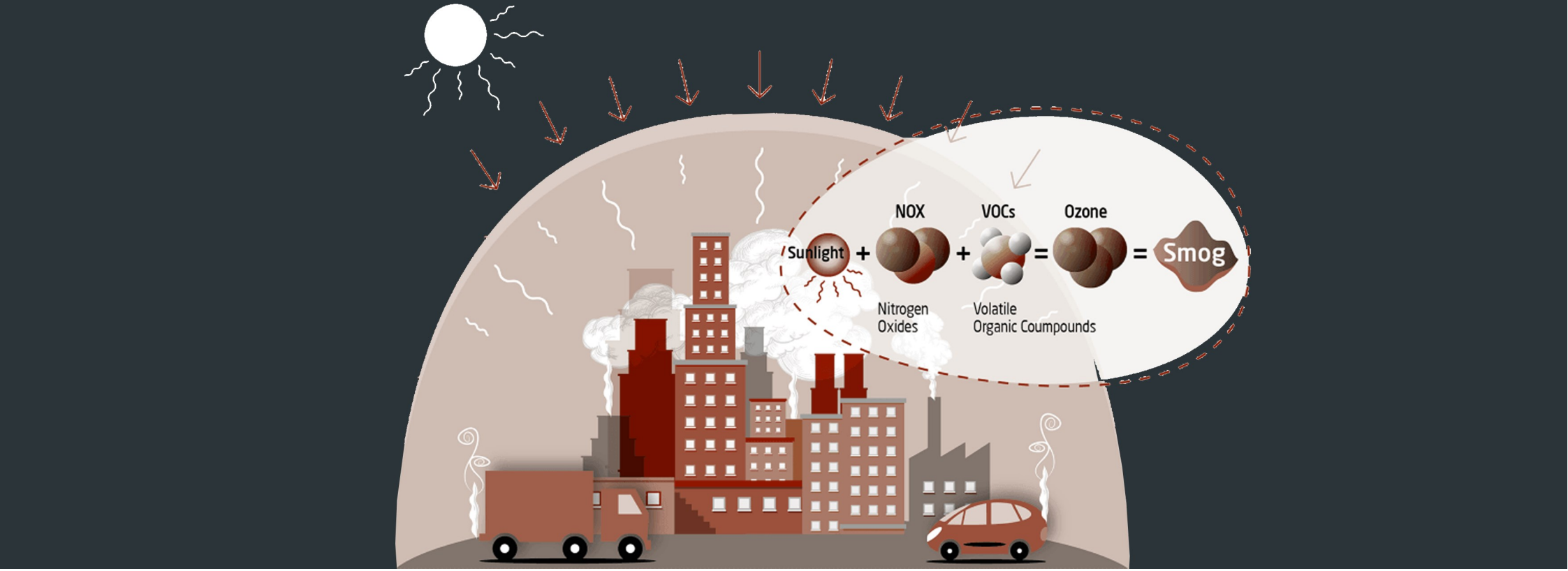
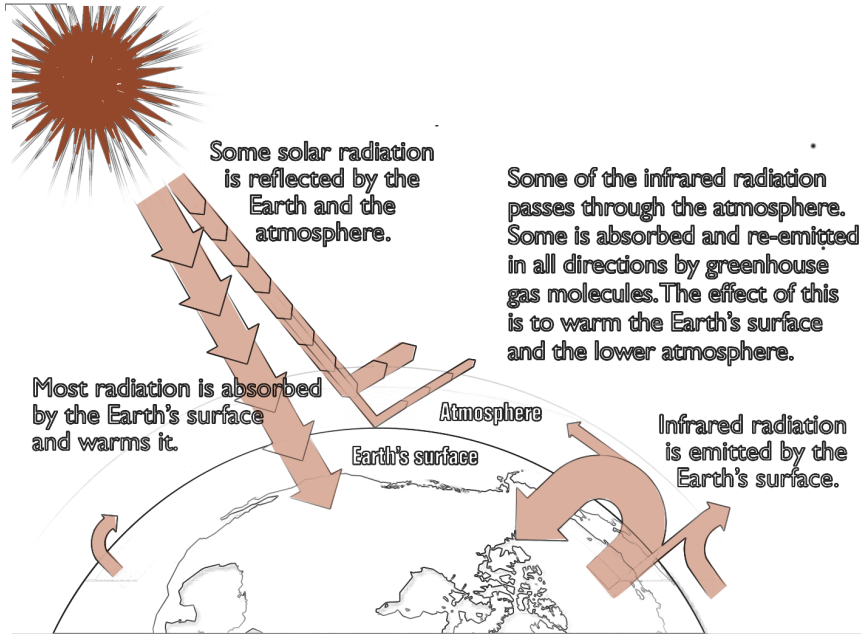


FIGURE 022: Top: Air pollution: the temperature factor (Teqoya, 2023)(Altered by author).

FIGURE 023: **Right:** Diagram showing how the greenhouse effect works on Earth (Energy Education, 2023)(Altered by author).



2.2.2. Disruption in the natural production of oxygen:

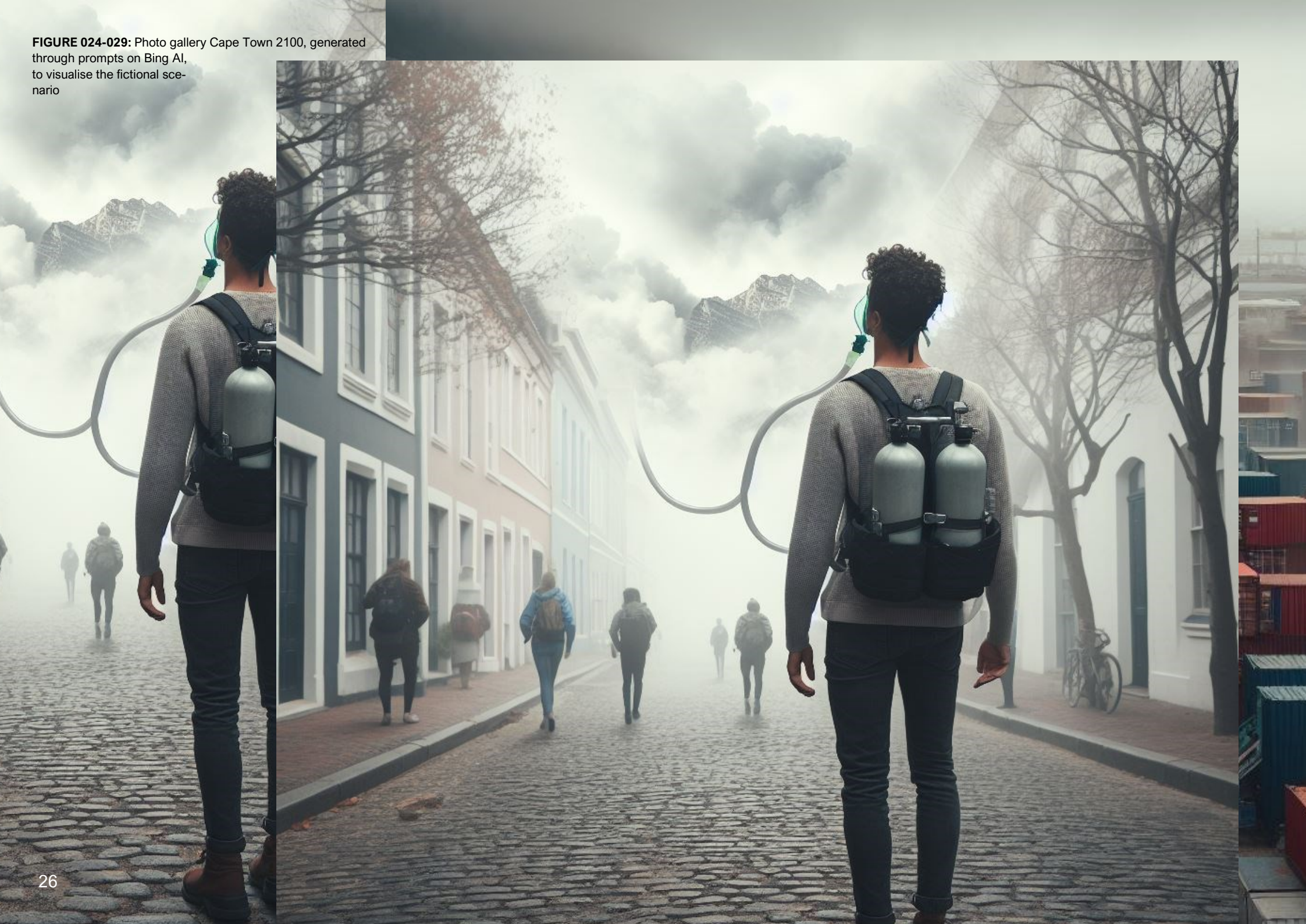
Plants are the powerhouses of the planet and produce oxygen through a process called photosynthesis in which plants use carbon dioxide and sunlight to create chlorophyl which enables them to absorb energy from the sun. A by-product of photosynthesis is Oxygen (National Geographic, 2022). Without plants, humans can simply not exist. The Great Cloud was now reflecting 30% of the Sun's rays out into space which left plants unable to undergo the process of photo-synthesis. This resulted in more than 70% of the plant population to deplete, leaving the earth without a means to produce oxygen through natural processes. Not having enough plants to absorb carbon dioxide from the air left the atmosphere with dangerous amounts, causing lung disease and cancers.

2.3. Other air pollutants

Pollutant	Description	Sources	Health effects
PM 2.5 and PM10	**Particulate matter** consists of small solid particles and liquid droplets suspended in air. It can be made up of a variety of components including nitrates, sulphates, organic chemicals, metals, soil or dust particles, and allergens (NSW Health, 2020).	Motor vehicles, wood burning heaters and industry, bushfires and dust storms (NSW Health, 2020).	PM2.5 particles are so small they can get deep into the lungs and into the bloodstream, while PM10 particles are small enough to pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects (NSW Health, 2020). Short-term exposure (NSW Health, 2020): Irritated eyes, nose and throat. Worsening asthma and lung diseases such as chronic bronchitis. Heart attacks and arrhythmias. Diseases of the respiratory and cardiovascular systems. Long-term exposure: reduced lung function development of cardiovascular and respiratory diseases increased rate of disease progression reduction in life expectancy.
SO2	**Sulphur dioxide** is highly reactive gas with a pungent irritating smell (NSW Health, 2013).	It is formed by fossil fuel combustion at power plants and other industrial facilities. Natural processes that release sulphur gases include decomposition and combustion of organic matter, spray from the sea, and volcanic eruptions. It also contributes to the formation of particulate matter pollution (NSW Health, 2013).	Health effects from exposure to sulphur dioxide (NSW Health, 2013): Narrowing of the airways leading to wheezing, chest tightness and shortness of breath. More frequent asthma attacks in people with asthma. Exacerbation of cardiovascular diseases.
O3	**Ozone** is composed of three oxygen atoms joined together. Two oxygen atoms joined together form the basic oxygen molecule O2. The additional third atom makes ozone an unstable, highly reactive gas. Ground level ozone is the main component of smog (NSW Health, 2013).	Ozone is the product of the interaction between sunlight and emissions from sources such as motor vehicles and industry (NSW Health, 2013).	Potential health effects include (NSW Health, 2013): Irritation and inflammation of eyes, nose, throat and lower airways: coughing, sore and scratchy throat or uncomfortable feeling in chest. Reduced lung function: not able to breathe as deeply or vigorously. Exacerbation of asthma and chronic respiratory diseases such as chronic bronchitis. Increased susceptibility to respiratory infections.
NO2	**Nitrogen dioxide** is a highly reactive gas (NSW Health, 2023).	NO2 is formed by emissions from motor vehicles, industry, gas-heaters and gas stove tops. Other indoor sources can be from cigarette smoke or from cooking with gas. Outdoors, nitrogen dioxide contributes to the formation of ground-level ozone (O3) as well as particulate matter pollution (NSW Health, 2023).	Health effects include (NSW Health, 2023): Increased susceptibility to lung infections in people with asthma Increased susceptibility to asthma triggers like pollen and exercise Worsened symptoms of asthma – more frequent asthma attacks Airway inflammation in healthy people
CO	**Carbon monoxide** is a poisonous gas that you can't see, taste or smell (NSW Health, 2023).	CO is produced from burning fuels like gas, wood and charcoal (NSW Health, 2023).	Effects of carbon monoxide poisoning include (NSW Health, 2023): Headaches, nausea and stomach pain, vomiting, dizziness, weakness, fainting, confusion, tiredness.

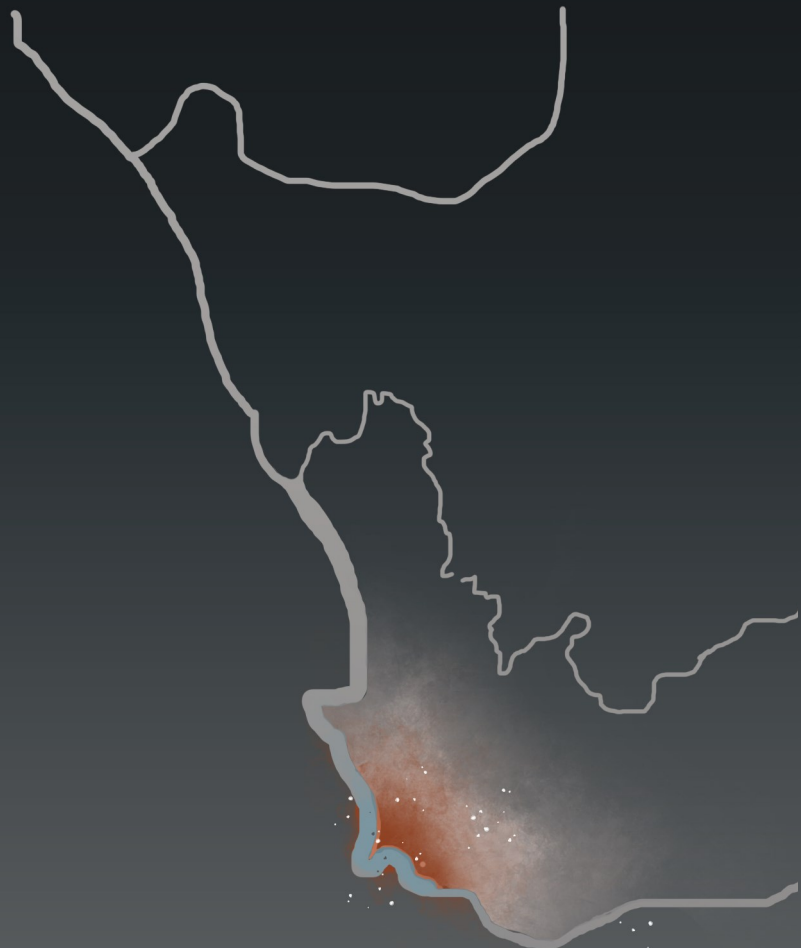
2.4. Photo Gallery

FIGURE 024-029: Photo gallery Cape Town 2100, generated through prompts on Bing AI, to visualise the fictional scenario



Chapter 03

A new way of [being] human



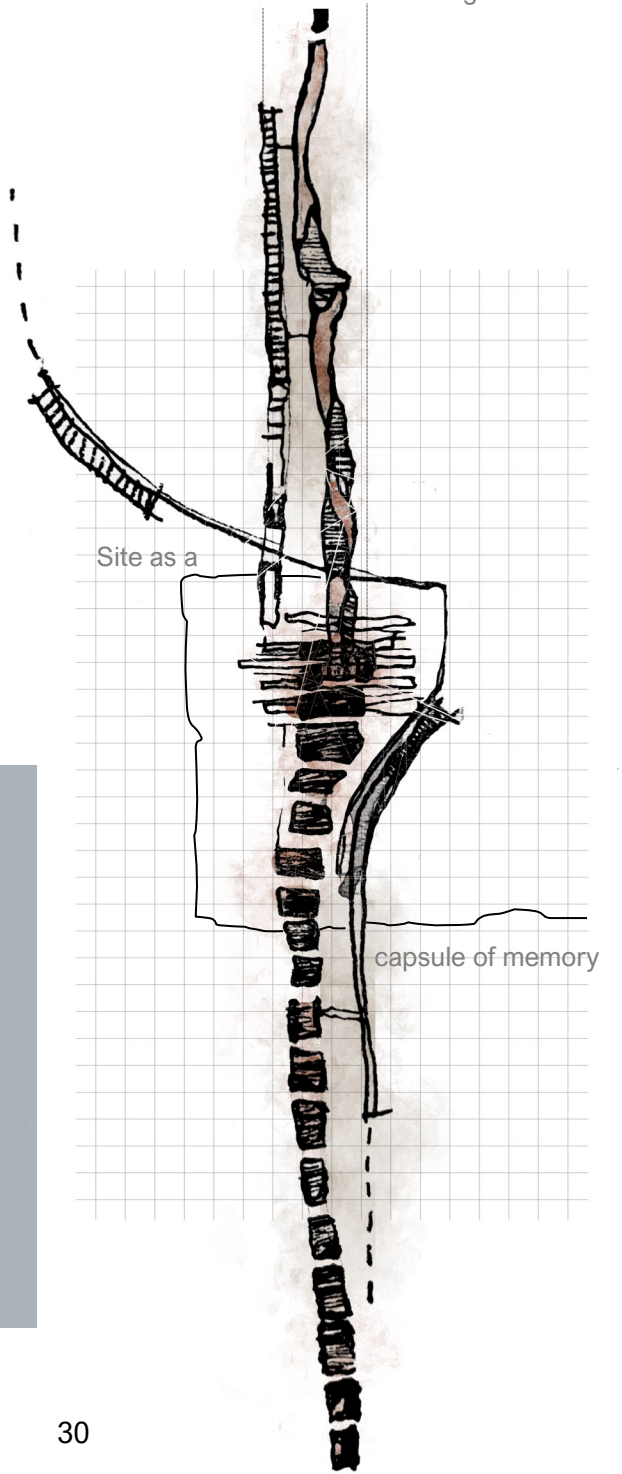


FIGURE 030: Left: Alignment of architecture and ethics (Author).

"Architecture has always held an intrinsic connection to the ethics, attitudes and beliefs of its creators and its time, and so it must be asked: do our buildings continue to align with our values and do they do what we need them to do?"

(O'Byrne, 2020, p. 01).

3.1. Introduction

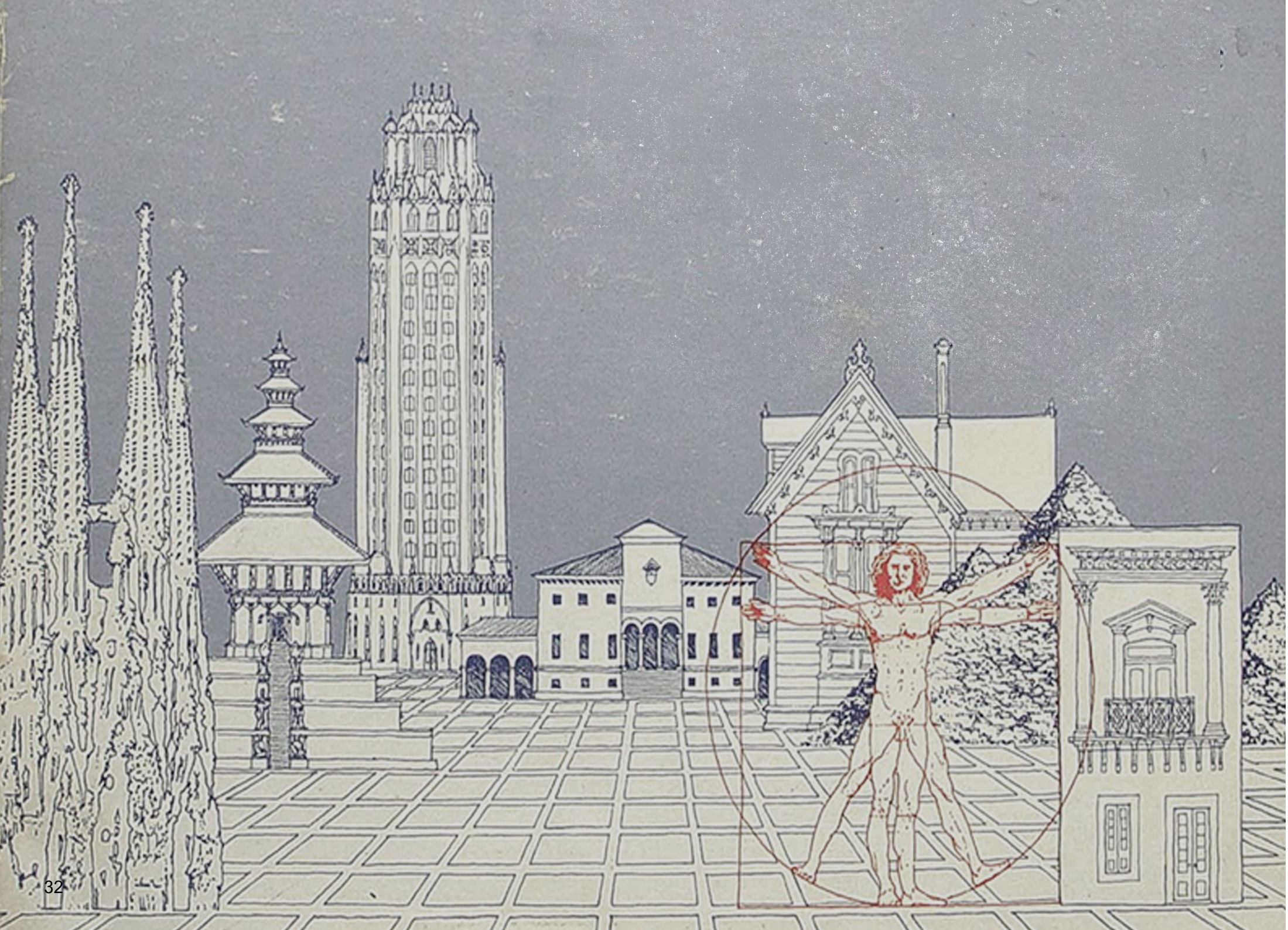
Within the design discourse, empathetic design is presented as a toolbox to support new environmental orders and to reintroduce the ethics of humanity into social and architectural form. When confronted by war or hardships it is often our humanity who draws the short straw and is put away as a means of a coping mechanism to survive within the discomfort. Within the days that followed the emergence of the 'Great Cloud' a new way of living and surviving, was established. However, the aim of architecture and design was to ensure that the foundation of care as a basic human condition would not succumb to this state of environmental disaster.

This chapter explores the discourse of empathy firstly by addressing the site as time capsule of memories that must be reserved. Secondly, the use of satire as a tool for critical reflection is discussed to inspire the urgency of rectifying irresponsible environmental behaviour. The concept of escapism is a major theme that cannot by overlooked within this context. It is evaluated as a mode of self-expansion to promote a new way of creating positive engagement and experience within a broken future. A building within this environment will not be possible without the use of technology and therefore the relationship between technology and temporality to sustain human life is addressed hereafter. The last form of architectural empathy will be explored by examining the role of architectural metaphors in the form of cathedral iconography to create a refuge of hope for the future of humanity.

FIGURE 031: Right: The clock tower as a proud witness to continuity and change (Author).

3.2. Greenmarket Square: A time capsule of lived memory

Greenmarket Square is now known as the Lung of Cape Town. It breathes life into its users and creates a space in which social exchange can take place without the worries of the outside world. While it serves as an oasis of hope for the present, its users are nonetheless bound to the square through memories of a past that now seems irrelevant as it reveals unsettling traces of man left behind. One might ask why this abandoned acropolis of architecture and failed humanity would still matter within the outlined scenario that is the year 2100. Why are the traces of the past and of memory still important in a future that is rooted in the fallibility of mankind? The answer is simple, care.

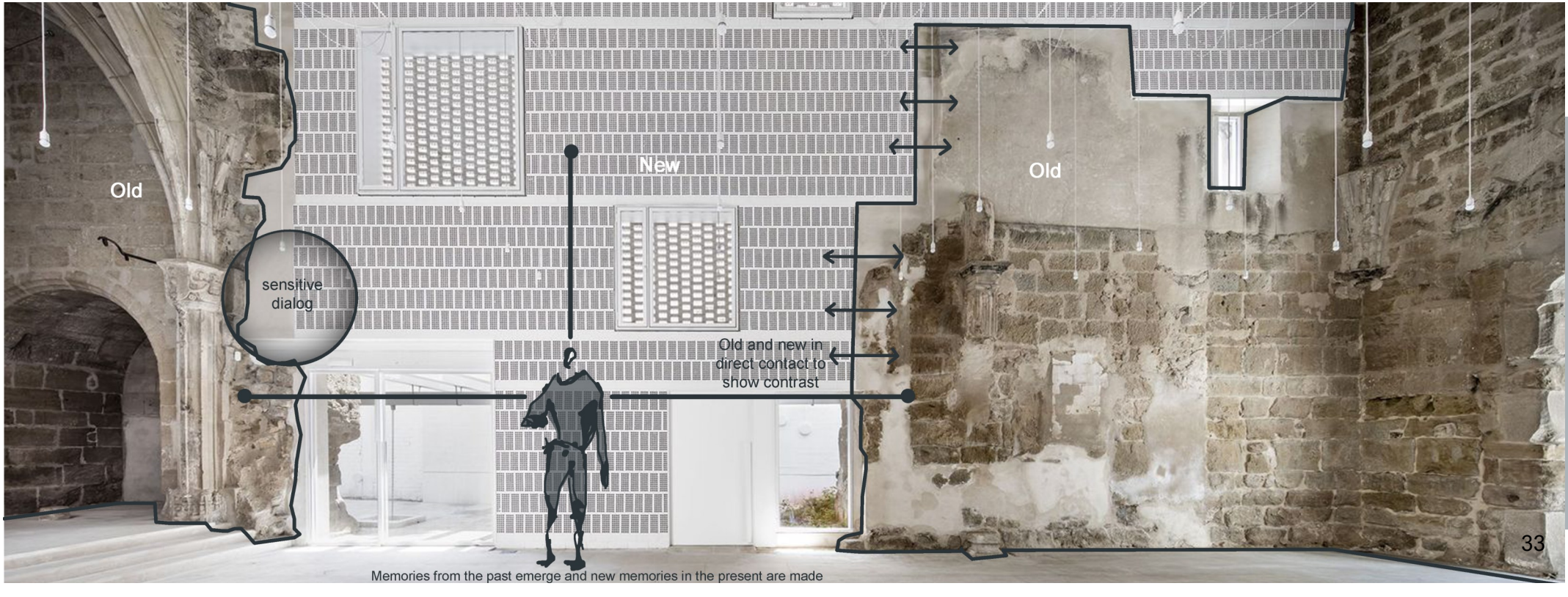


Care is the fundamental constituent of human existence (Yazıcıoğlu, 2020). It is an act in itself towards moral principle, through exploiting selfhood and responsibility, as means of restoring our Being-in-the-word. Our mere existence is an event of care, and so, if we no longer care, then our humanity will be forever lost. Care is thus the tool to remedy the devastating environmental collapse caused by our fallible disposition. In the Ancient Greek understanding, the ultimate meaning of life and care manifests itself in the immortal capsule of memory (Yazıcıoğlu, 2020). Memory, therefore, ensures the continuity of care and humanity through encapsulating spatial imagery and traces of the past as a way to inspire empathetic, appropriate and creative architectural design for the present and future in terms of past awareness.

The memories of buildings are captured within their ruins. Buildings leave behind traces of former ways of being and accumulate into a cache of narratives written onto the membranes that enclose their endoskeletons. Buildings, while inanimate, live through time and it is in recognition of their materiality that their memories can be recollected. This is once again important as recollection of the past and memories activates care and sustains humanity. The landscapes of memory therefore become the place to reference nostalgically and to react on. Greenmarket square as a time capsule preserves the memories of the past while creating room for the memories for the future. A meaningful connection with the site of Greenmarket Square can then be manifested through spatial proximity of past and present memory through the acknowledgment that history is made of continuity and that the present and the future is dependent on change. With the use of satirical exaggeration, mankind's vices are exposed and challenged as a means of bringing about this change to ensure a better future.

FIGURE 032: Left: Body, memory and architecture (Bloomer, 1977)

FIGURE 033: Bottom: Giving light without touching is the rehabilitation of the Gothic church of the thirteenth century Santa Maria de Vilanova de la Barca. Ruins of the old church are illumined and celebrated by a bright interior space, filled with light. The project has achieved a great deal of sensitivity and beauty as it acknowledges the passage of time. A new space with quiet dialogs between the existing remains and the new architecture allows for the memories of the past to live forever and for new ones to be made (Metalocus, 2023) (Altered by author) .



3.3. The inflatable moment: Satire as a tool for critical reflection

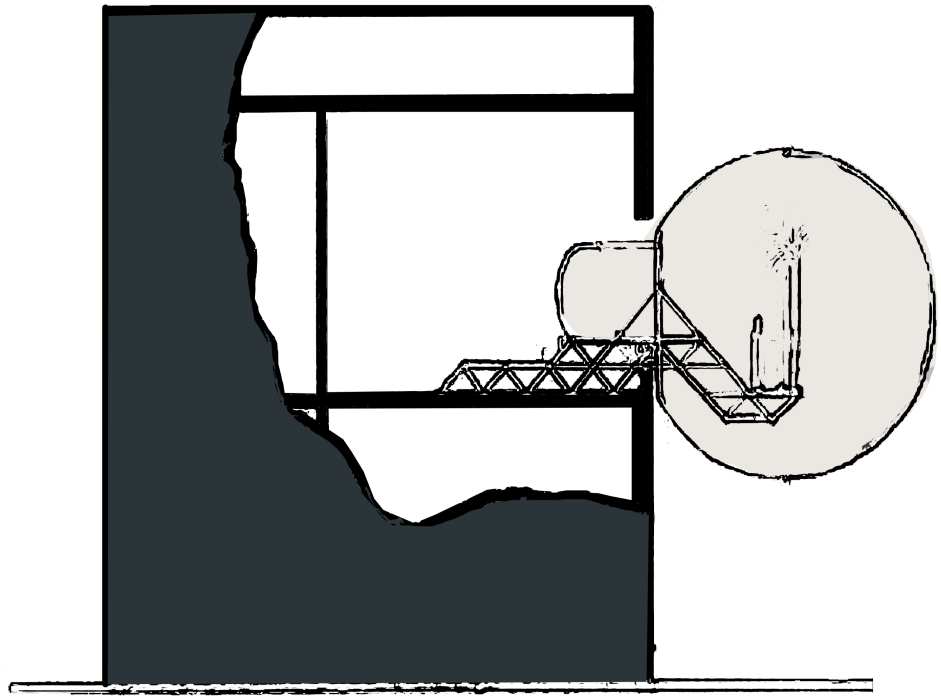
The aim of architectural satire, within this thesis, is to encourage the moral reform of harmful habits to aid in environmental sustainability. Satire thus strives for criticism that has the ability to create joy while simultaneously provoking people to question the social and economic shortcomings of our built environment to inspire change or to rectify what has been done wrong. In this case, how economic greed and over-consumption has led to the tragedy of cities being overrun by pollution and decay. By exaggerating the environmental conditions of such a scenario, a satirical dramatization is created to instil a sense of urgency against the protection of the natural environment.

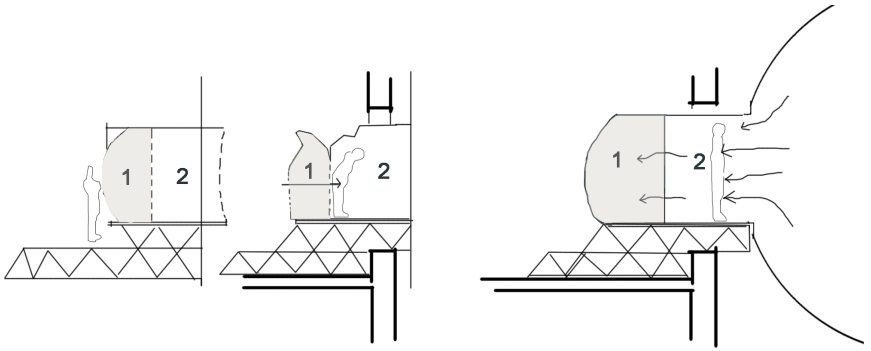
Oasis no. 7 was an experimental project by Haus-Rucker-Co in 1972 that made use of satire as means of critical reflection on modern architecture and societal norms in the 1970's. It is a transparent, inflatable sphere attached to the main façade of the Friedericianum building in Kassel, Germany. A catwalk made of steel sections is projected through the window into the inflated sphere with a hammock and palm trees attached to the end. When fears regarding environmental pollution were at a height during this time, Haus-Rucker-Co set out to develop this new concept of experimental architecture by using air-filled structures and prosthetic devices to alter perceptions of urban space and bring to light how people can negatively impact their own environment. Zamp Kelp, a designer of the project and member of the Haus-Rucker-Co group, comments that the installation creates a satirical interpretation of our desperate desire for nature within the urban environment (Oasis No.7 designer Zamp Kelp/ Haus-Rucker-Co, 2011). Hereafter he concludes with a coy and witty giggle, and one cannot help but also find it humorous while the reality of the situation is embedded in a dark and knowing undertone of environmental tragedy. This project served as a form of critique of human behaviour and provided possibilities of design for technically mediated experimental environments and utopian cities (The radical project, 2023: Online).

FIGURE 034: Top: The sphere attached to the existing building like a parasite (Author).

FIGURE 035: Bottom: How does the sphere remain inflated? (Author)

Figure 036: Right: A strange and satirical composition between sphere and existing building that evokes wonder and questioning (Architectuul, 2023).

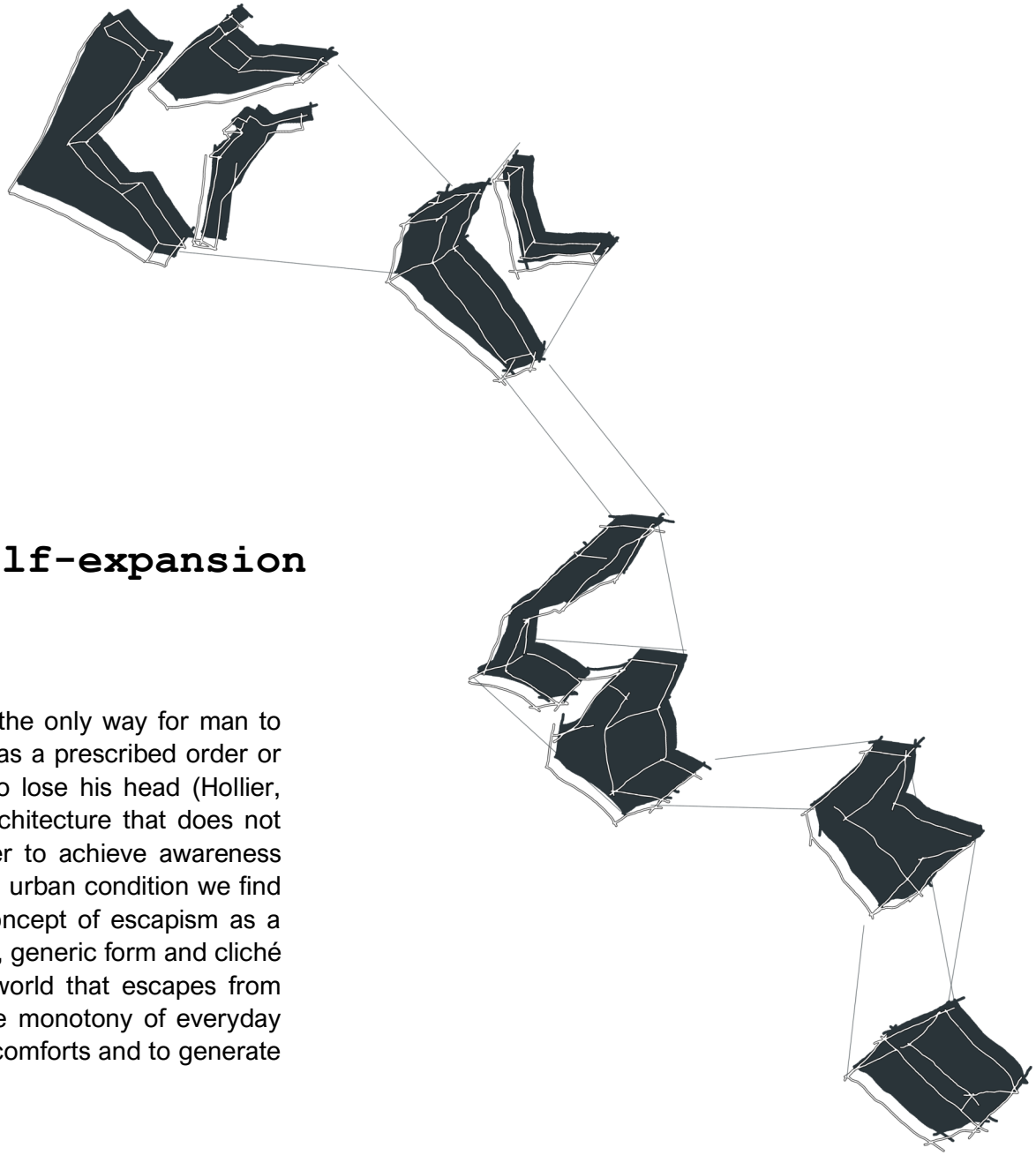




Two entrance compartments.

Zip separating the two first enter through the first, close it then enter into the second.

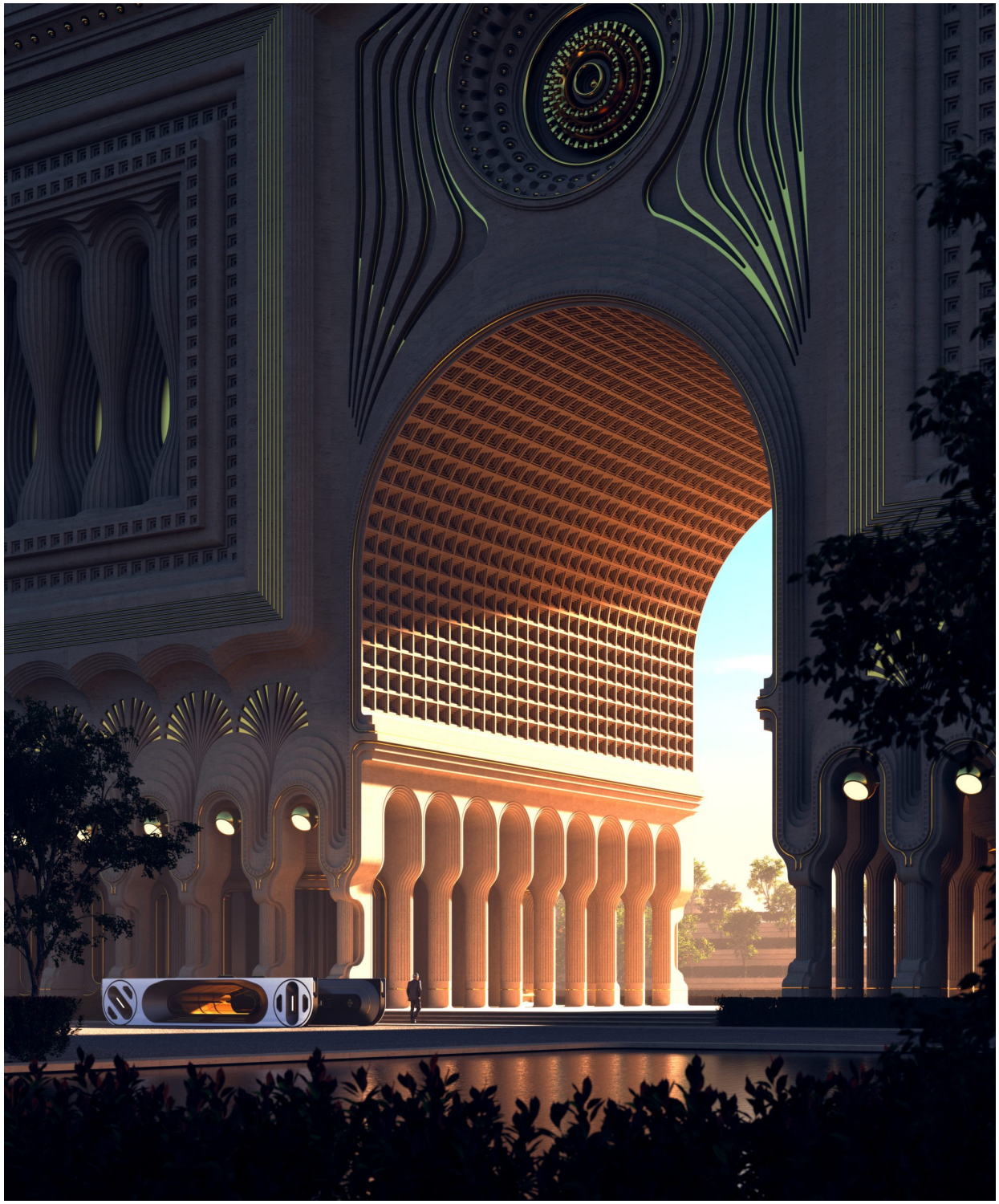
Prevents air in to escape the sphere therfore staying inflated.



3.4. Escapism: A mode of self-expansion

French philosopher George Baitalle believes that the only way for man to escape the architectural chain gang (architecture as a prescribed order or set of social hierarchies) is to escape his form, to lose his head (Hollier, 1993, p. xii). In other words, it is to create an architecture that does not force semantics and subjective thought but rather to achieve awareness and flow of space based on the environmental and urban condition we find ourselves in. This is achieved by adopting the concept of escapism as a form of expansion of the self and human behaviour, generic form and cliché architypes. This dissertation is set in a fictional world that escapes from reality through interrupting social routines and the monotony of everyday life (Musil, 2020) to raise awareness of present discomforts and to generate a model of site-specific spatial flow.

FIGURE 037: Escaping reality and exploring new spatial scenarios (Author)



While escapism is considered by most as a negative activity which prevents critical evaluation of events and draws back from important demands by averting from unwanted thoughts or emotions or any other state idiosyncratically causing discomfort (Musil, 2020), this dissertation depends on it for its positive contribution in the form of self-expansion. Self-expansion represents an extension of the individual self to exploit current discomforts and produce a positive desired experiential outcome for the future. Through adoption of this discourse within the context of this fabricated scenario, architectural experiences become enriched by fully dedicating and immersing ourselves, cognitively, into this scenario of acknowledged continuity. Such an immersion plays an important mediator of intrinsic motivation (Musil, 2020) allowing us to gain the necessary skills or information required to take part in such an event. Upon this immersion, the state of flow (optimal psychological experience) is achieved (Musil, 2020) and becomes the mediator of positive effect. In other words, to establish a state of flow (within any given environmental circumstance), persisting mindfulness and accepting awareness of an unforeseen negative situation is required to create pleasurable and fantastical spatial flow for a positive future. Therefore, escapism as a form of self-expansion, exploits present discomforts through fully immersing ourselves, cognitively, into activities and events that take place within this made-up scenario in order to create a state of flow, the optimal psychological experience specifically developed for the chosen site, to ensure a positive future for engagement and experience of the urban environment.

FIGURE 038: A dreamlike vision with an idyllic setting, a fascinating paradox and a dream-like scene, that highlights the fantastical possibilities of bold utopic environments and pushes the boundaries of what an architectural spaces can be- a chance to escape reality. (Bamarni, 2023)

3.5. The breathing machine: A symbiotic relationship between temporality and technology

The human lineage is not only evolving through its adjustments and adaptations to the natural environment, but to its dependence on the never-ending technological advances people come up with. We can never escape the organic nature of existence that is birth, life and death. However, the quality and quantity of the time we experience during our lifetime is inextricably determined by the inevitable technological realm we are continually creating.

As already discussed, care is the basic constituent of human existence. However, it can also be used anthropomorphically as a characteristic that the machine possesses. According to Bernard Stiegler, technology can produce care as a product of human ontology (the study of being) (Lightfoot and Liley, 2022: Online). Humanity, because it is ontologically incomplete and fallible, must depend on its technologies to exist. Mankind, thus creates, maintains and protects his own existence within the time-space continuum, whereby technology is the incubator of lived time. In other words, man makes his existence in time with the help of technology. As a result, temporality comes into question as it is a constitute of technology. Temporality, as identified by Heidegger, is the ontological reason for care, as it unites the three essential characteristics of being-in-the-world; past present and future (Cartlidge: Online). Technology lends itself as a tool of prolongment and we live in its borrowed time. The breathing machine as the architectural embodiment of this dissertation must not only ensure the continuation of mankind, but due to its ability to care, must also bear the responsibility of empathy and awareness to the built and natural environment in which it lives.

Le Corbusier's well-known phrase, 'The house is a machine for living in' starts to fester as the relationship between temporality and technology or rather, the relationship between Dasein and the machine are put into question. There is some criticism that exists behind this idea as it tends to dehumanize and assumes that humas have the same basic needs that can be standardized like the machine. The discourse attempts to expand Le Corbusier's idea from a set of basic standards to the use of anthropomorphised machines in which technology depict spatial qualities and influences design decisions to fulfil the functional purpose of human and environmental wellbeing based on the standards of care. While this approach warrants the utilitarian concerns of construction, aesthetic and representation, the edifice of the dissertation is explored through the architectural metaphor of the cathedral and the refuge it provides.

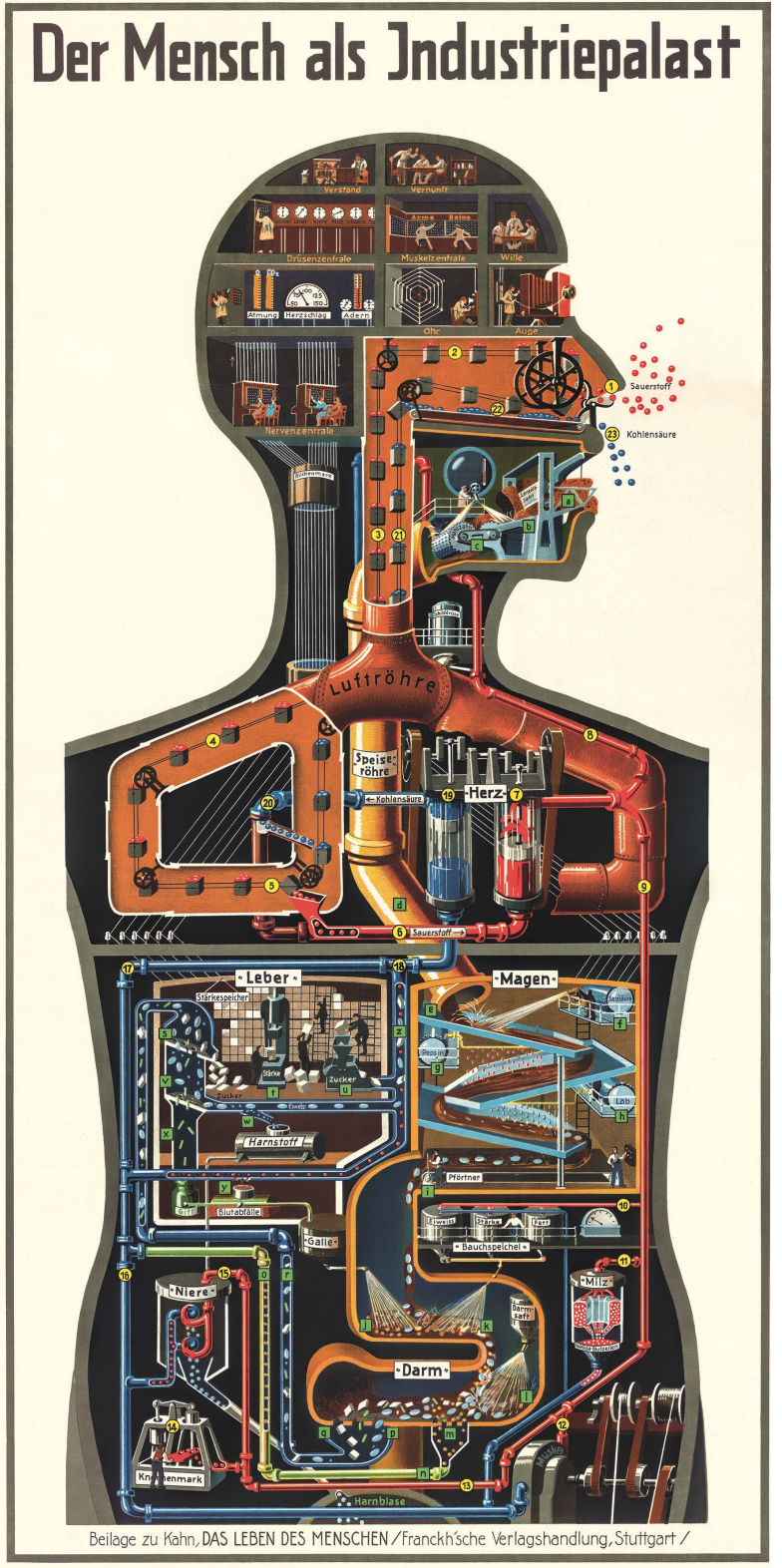


FIGURE 039: Man as Industrial Palace, by Fritz Kahn (Kane, 2014)

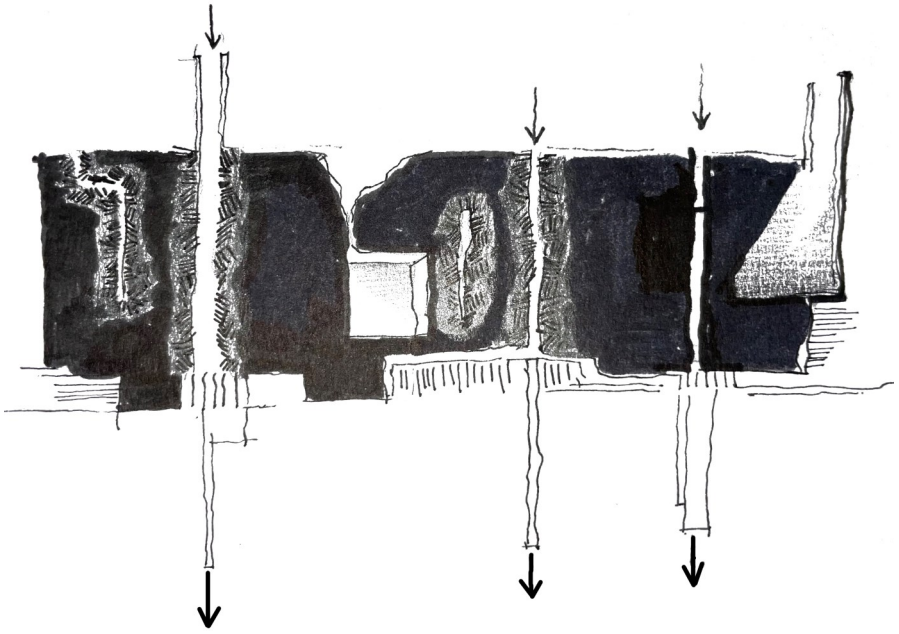
3.6. Architectural metaphor and the cathedral

"What had previously been an unconscious experience now became consciously exploited by rulers and officials anxious to use all instruments to maintain or modify the social order. Yet it was the unconscious and instinctive nature of people's response to architectural forms which continued to guarantee their power... At one level unconscious reactions were formally recognized and brought to the level of consciousness (Farmer and Louw, 1993)."

The escapism into paradise is washed in natural light infiltrating structure and breathes life into shadows who can now walk in colour and reside in optimism. Architecture is identical to the space of representation, and once metaphor is introduced it is overcome by something other than itself that distinguishes it from mere building (Hollier, 1993). Architecture represents a religion that it brings alive and an event that it commemorates, while its metaphors, through either structural elements or use of material, is a way of using architecture to link tangible form with subconscious understanding.

FIGUTE 040: Left: A little light has the most power (Author)

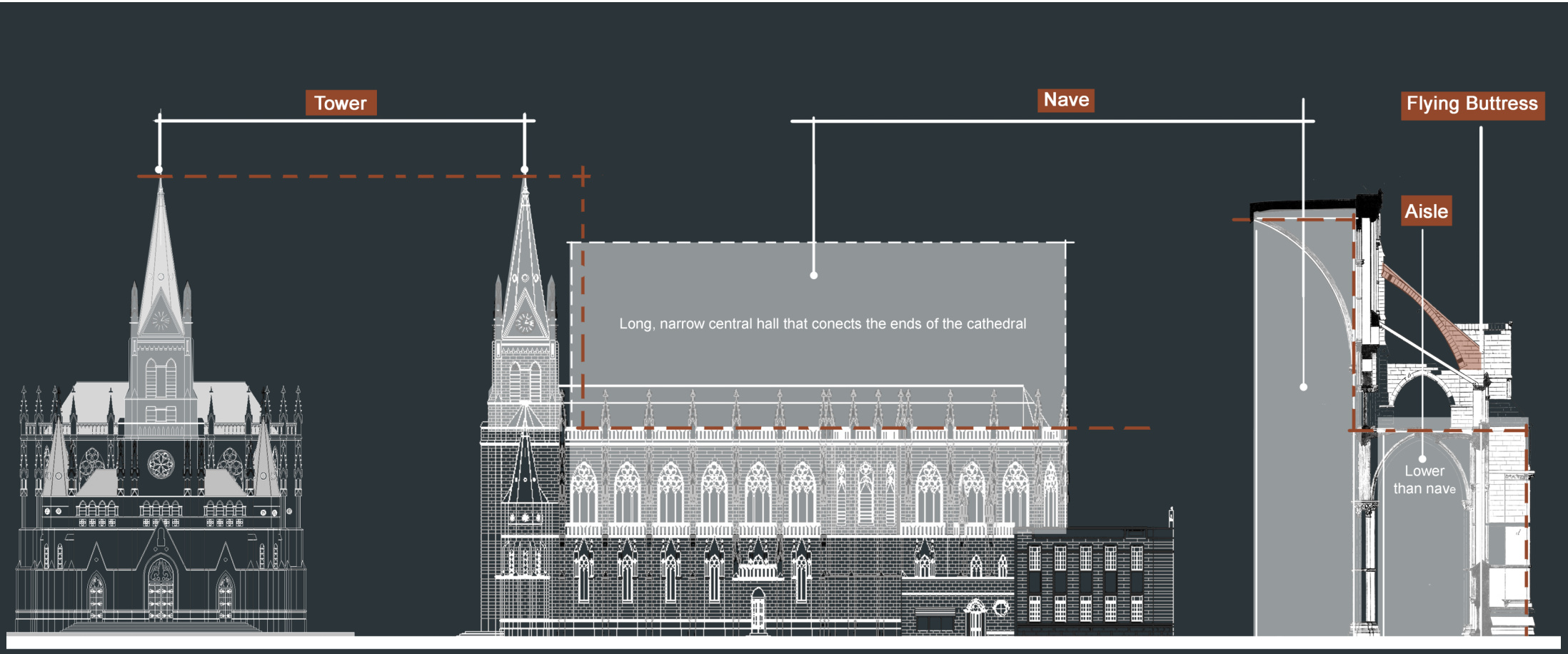
FIGURE 041 :Right: Perspective of a Cathedral (Author)



Architectural metaphors within cathedrals become a very common tool for the representation of refuge through symbolism and iconography of its structural elements. There is the façade, the portal that conceals what lies beyond its doors. It is a metaphor for the entrance into to the presence of the divine and refuge. The portal is the door which opens not into space but into time: from the time of the old to that of the new. It is a metaphor for the threshold which divides history from eternity. The pillars are not all literally pillars of the church, but a metaphor of support and strength. The spire and tower is the *axis mundi* that connects the earth to a higher power. it creates hierarchy and a beacon of hope to direct people to its sanctuary.

These metaphors seem too inevitable and stereotypical to be seen as a sough- after and meaningful tool in creating this form of architecture. However, it is in fact their cliché nature and anonymity that serves as an indication that they are far from innocent, but rather unobtrusively accomplishing the ideological task for which they are the instruments. What is essential is that it fulfils its duty of symbolism. No metaphor is innocent and the less it is deliberate the less it is innocent (Hollier, 1993).

FIGURE 042: **Bottom:** Symbols of a cathedral (DesignsCad, 2023) (Altered by author)



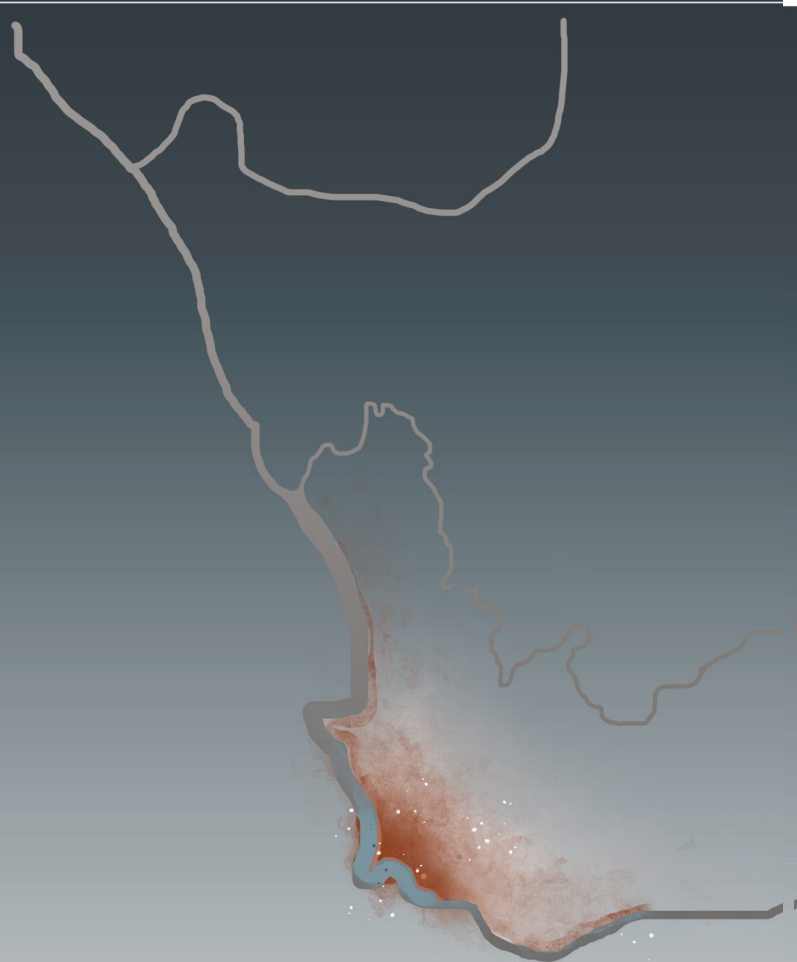
3.7. Conclusion

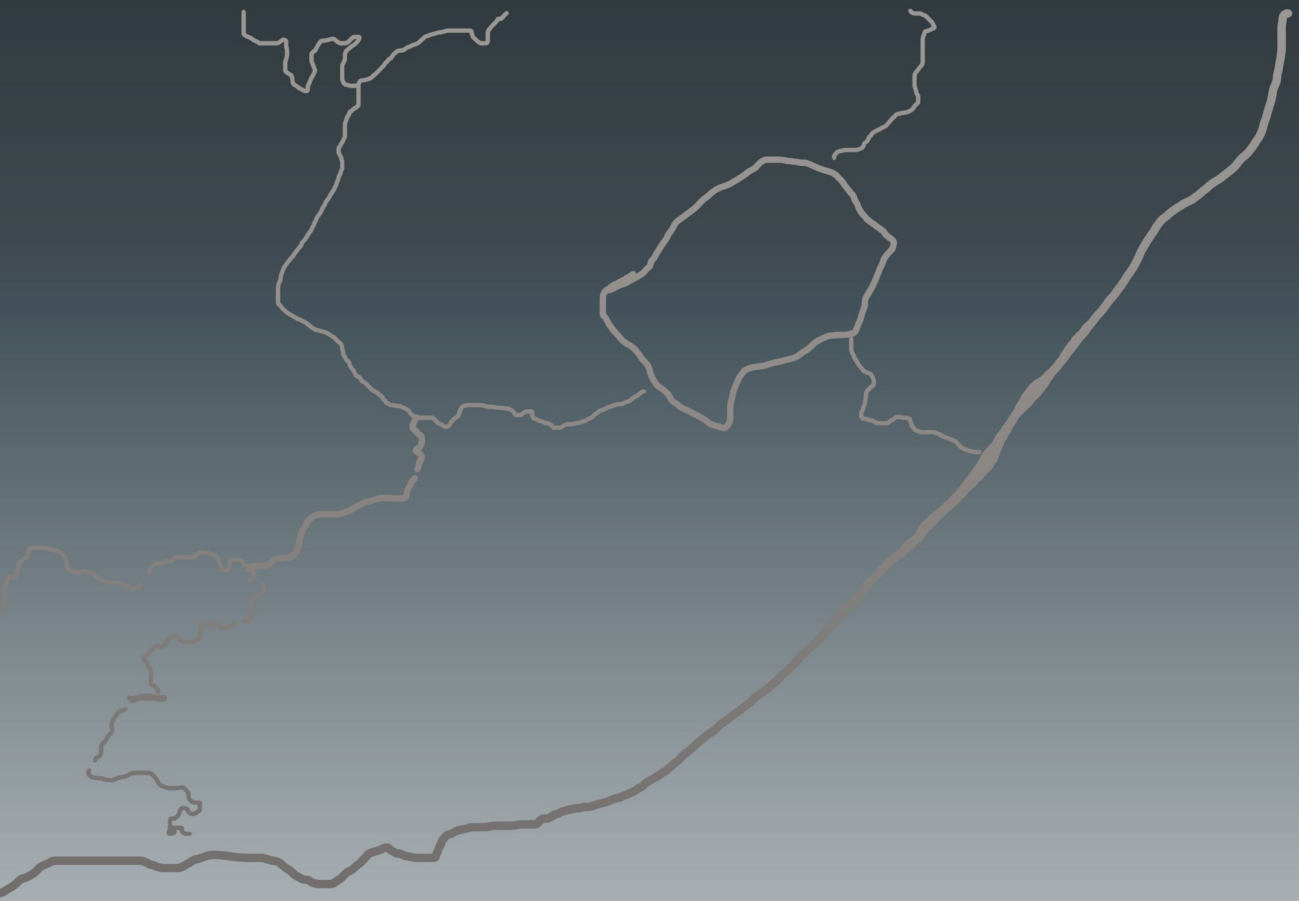
Still Breathing' is a project aimed at the preservation of human life, both physical and our embodied nature. It does this by employing tools of empathy to create spatial experiences that mimic a previous 'good life' while celebrating new orders that have developed through adaptation to the urban and natural environment of the year 2100. The project also raises awareness of mankind's irresponsibility towards the environment with dramatic gesture and satire through representation of a scenario overcome by the extremities of pollution. Escapism exploits these conditions by allowing full cognitive immersion into the activities and events of the time, so that the state of flow can be achieved to enable appropriate and constructive engagement with the urban context. Technology plays the role of the incubator and respirator for human life as it breathes oxygen into our lungs and supports our utilitarian needs of survival and the continuation of human lineage into unforeseen futures. While physical shelter is important, subconscious stability and reassurance thereof further resembles empathy through architectural metaphors of hope and security. The discourse thus explores theoretical ways to design empathetically and provide suggestions of architectural motifs and iconographies to construct a new archetype to support this new way of being.

Chapter 04

Grounding and Exploration

This chapter is an investigation that seeks to determine a set of design informants to achieve a design methodology routed in research and exploration. The content of the chapter includes the conceptual approach towards the design of which the touchstone and three concepts are discussed. A deeper exploration and investigation into the topology, typology program and technical requirements is conducted to provide morphological clues to develop a design methodology.





Between two lungs, by Florence and the Machine:

Between two lungs it was released
The breath that carried me
The sigh that blew me forward

'Cause it was trapped
Trapped between two lungs, it was
Trapped between two lungs, it was
Trapped between two lungs

And my running feet could fly
Each breath screaming, "we are all too young to die"

Between two lungs it was released
The breath that passed from you to me
It flew between us as we slept
That slipped from your mouth into mine, it crept
Between two lungs it was released
The breath that passed from you to me
It flew between us as we slept
That slipped from your mouth into mine, it crept

'Cause it was trapped
Trapped between two lungs, it was
Trapped between two lungs

Gone are the days of begging, the days of theft
No more gasping for a breath
The air has filled me head to toe
And I can see the ground far below
I have this breath and I hold it tight

And I keep it in my chest with all my might
I pray to God this breath will last
As it pushes past my lips, as I
Gasp, gasp
Hah, ah, ah, ah (Welch and Summers, 2009)

FIGURE 043: Yearning for air (Author)

4.1. Conceptual development

4.1.1. Touchstone: Stop holding your breath.

The purpose:

The touchstone can be understood as an abstraction of the essence of the project and aims to give the reader an introduction into the intention of the proposed intervention. The most important catalytic idea of the touchstone is to show how the theme of escapism can cause a sense of release and freedom from a claustrophobic situation. The touchstone captures in a tangible object the feeling of relief after one has held their breath for a long time. It becomes an expression of how intangible experience can be made into a physical reality with meaningful spatial quality. This idea places direct focus on the threshold and relationship between memory and experience and the urban environment.

FIGURE 044: A breathing machine. Photograph of the touchstone (Author)

How it works:

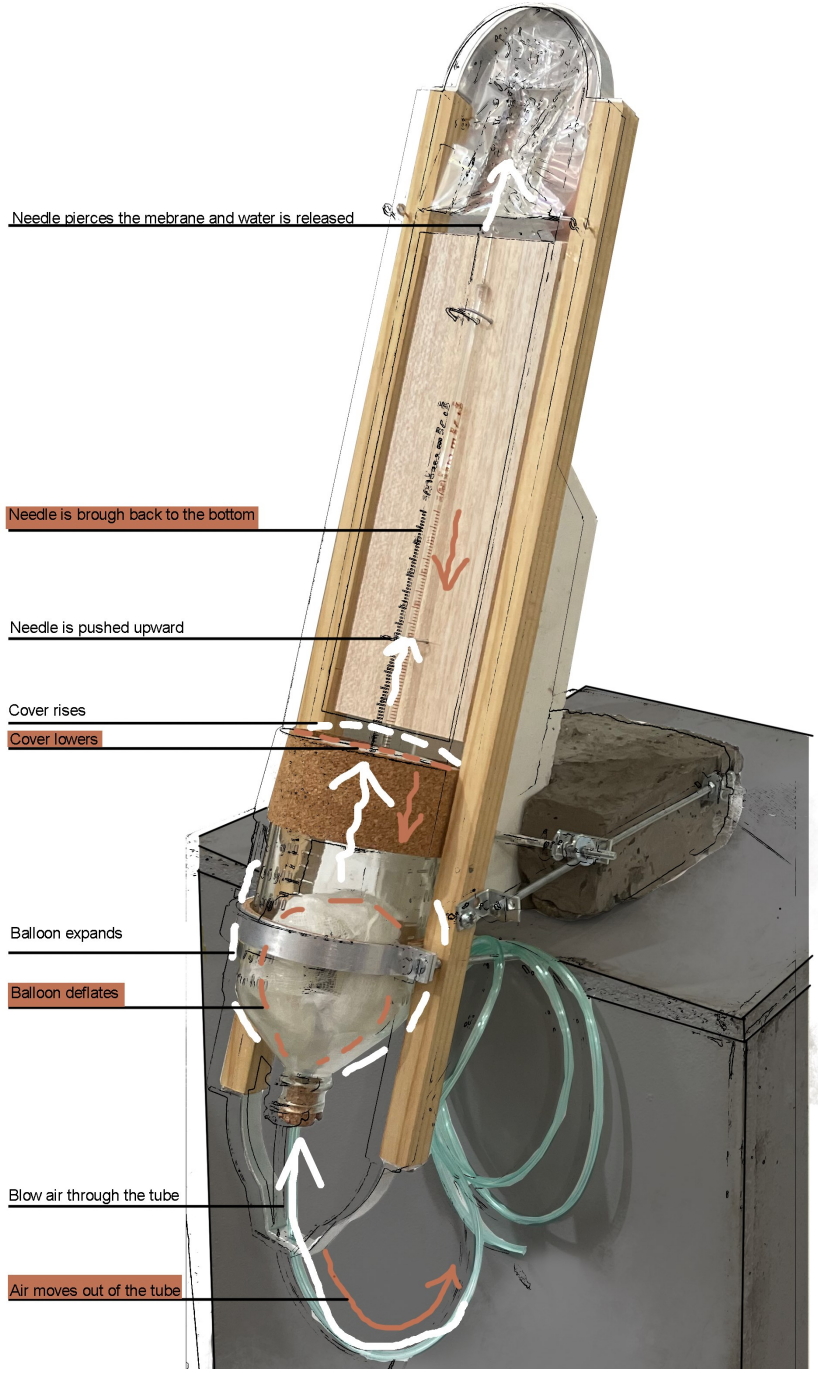
For the touchstone to become the manifestation of a ‘breath of fresh air’[2], one must engage with the object by blowing air into the rubber tube. Air moves from the blower’s lung into a balloon enclosed inside of a glass bottle. As the balloon expands, the pressure inside the bottle increases and the material covering the top of the bottle expands upwards. The needle rests on this material and as it is lifted, the needle pierces through the plastic membrane above it, releasing all the water inside. This mechanism is based on the way our own lungs work when we inhale and exhale, causing our diaphragm to expand and to lower (Figure 046).

An explanation of the touchstone:

The contraption presents itself almost like some sort of medical apparatus that unintentionally alludes to something ominous that is about to take place. However, its intention is to portray a structure with a machine-like quality. When one interacts with it, by blowing into the tube, two significant gestures of poetic revelation take place.

Firstly, for the touchstone to work, one must physically engage with the object. This interaction between mechanism and participant suggests the notion of man and machine working together to achieve a common goal.

Secondly, and most important, as one engages with the touchstone the performance of escapism takes place. Individuals who use escapism as a form of self-expansion engage in an activity with the wish to perform the activity itself and results in a strong since of activity absorption. According to a study by Bojan Musil, when such an immersion into an activity takes place, the performance becomes an important mediator of intrinsic[3] motivation, as it enables us to fully dedicate ourselves cognitively to the activity itself. This often leads to losing track of time or “nowness” and ultimately induces a satisfying experience (Musil, 2020). The touchstone therefore also becomes an expression of the positive effects of escapism and how it can support the design process of designing a futuristic intervention with a typology never explored before. By fully immersing myself into the narrative and imaginary environment that I have fabricated, then the activity of design will lead to intrinsic decision making of satisfying spatial experience.



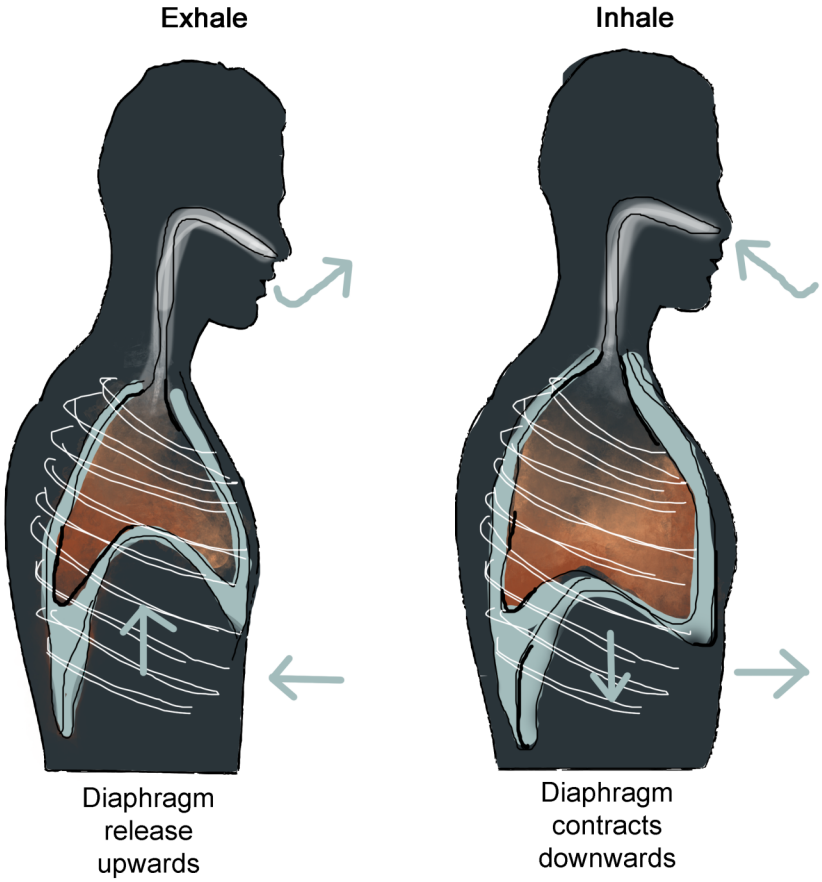
[2]A breath of fresh air is an idiom that means a **welcome relief** or a refreshing change from what one is used to.
[3]Intrinsic: belonging to the essential nature or constitution of a thing.

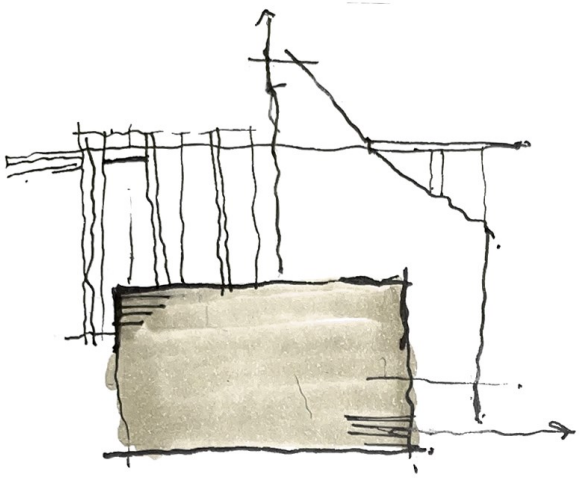
FIGURE 045: How the touchstone works (Author).

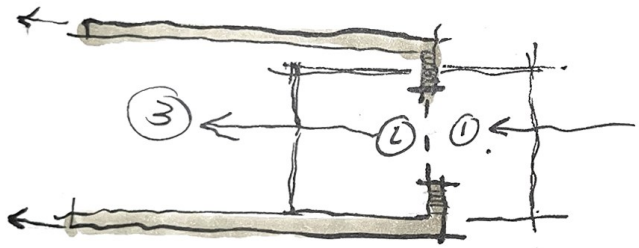
A tool for spatial exploration:

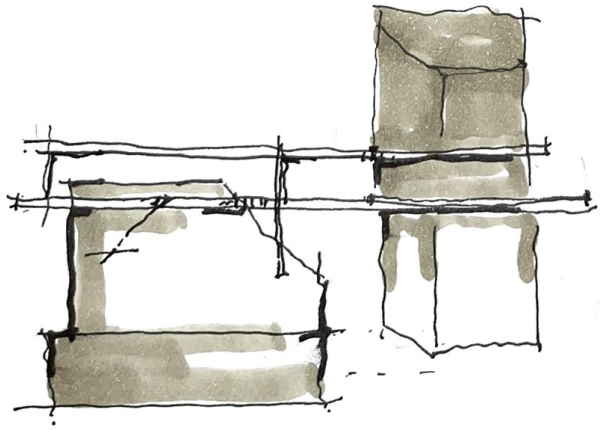
On a spatial level the touchstone becomes a transparent capsule, protecting something delicate on the inside. The light glass membrane appears to be floating above the stereotomic concrete base as it is connected lightly to it by thin, protruding dowels. Architectural gestures have been extracted and explored from the touchstone's structural components and overall form.

FIGURE 046: Bottom: Diagram showing the process of breathing (Author).
FIGURE 047: Right: Spatial exploration based on the touchstone composition and structure (Author).









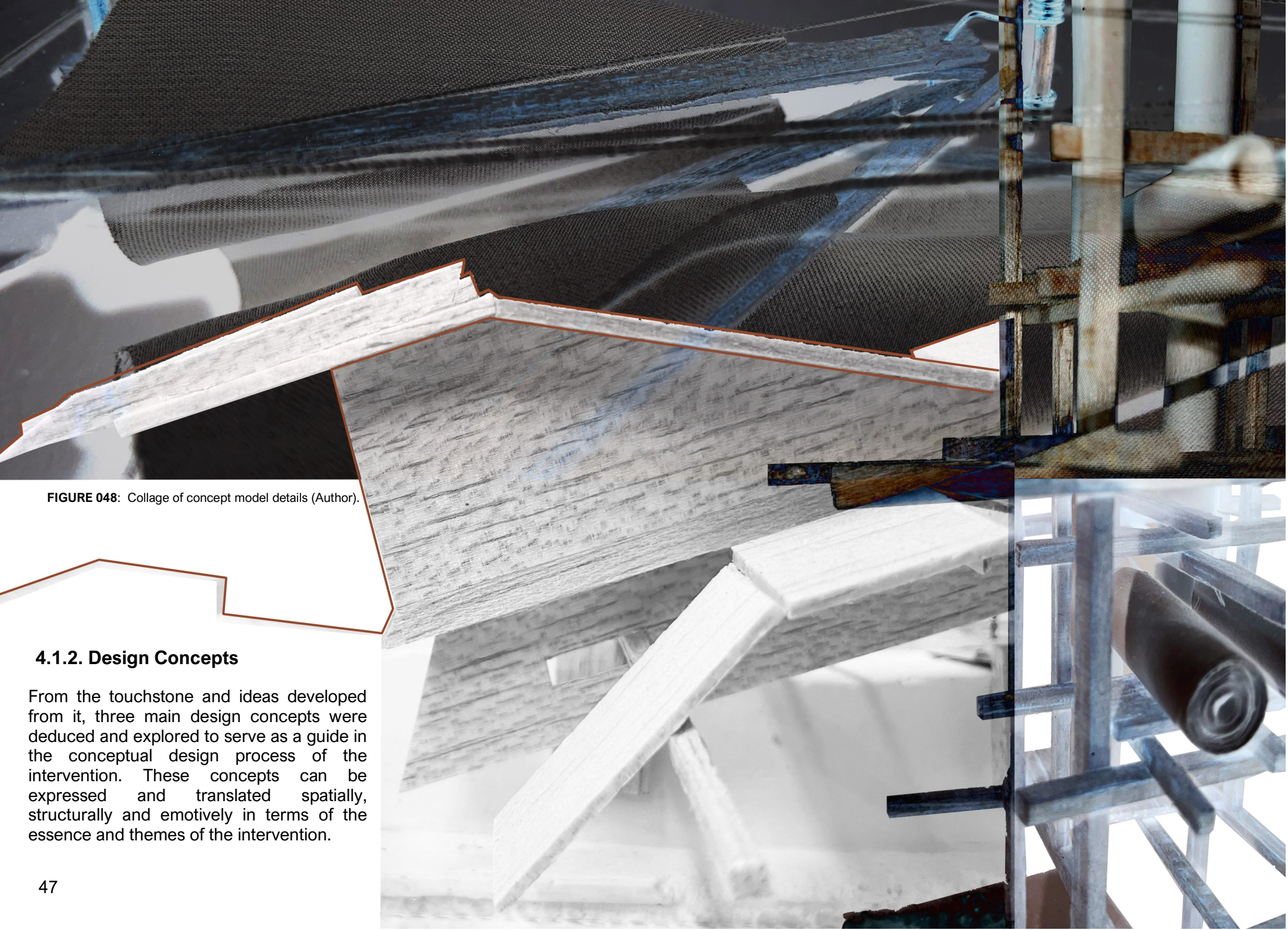


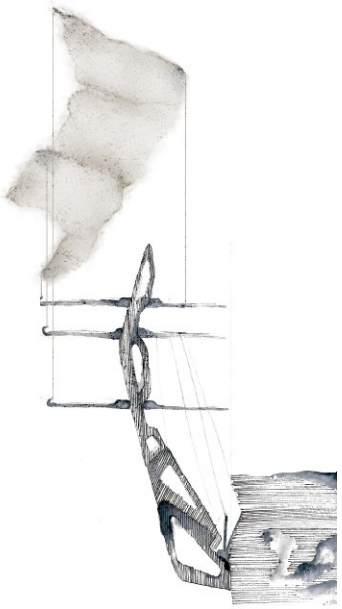
FIGURE 048: Collage of concept model details (Author).

4.1.2. Design Concepts

From the touchstone and ideas developed from it, three main design concepts were deduced and explored to serve as a guide in the conceptual design process of the intervention. These concepts can be expressed and translated spatially, structurally and emotively in terms of the essence and themes of the intervention.

FIGURE 049: **Left:** Drawing of concept 1 (Author).

FIGURE 050: **Right:** Model of concept 1 (Author).



4.1.2.1. Fallibility and Flexibility

My brother and I spend our off days watching the Buy n Large builders and engineers putting the structures together. It's ironic watching them construct a brand-new, high-tech structure against a building dilapidated, destroyed and abandoned by them. We make and then we destroy and then we make again. In a few years even this building could be destroyed again. I also found a book in the rubble the other day. The author, Paul Ricouer speaks of mans faulted condition and how it relates to an anthropology of hermeneutics in which he talks about this very aspect of mans will to destroy.

Celebrated frailty | Faulted condition | Anticipate fault | Adaptability | Transformability | Convertibility

This concept focusses on the spatial quality and structural integrity of the proposed building. It celebrates human frailty by promoting to design **flexibly in anticipation of fault**. The tension that inevitably exists within the anticipation of our '*feilbaar*' nature can be used to its advantage by designing a place that is flexible in adaptation to man caused disasters, has the ability to transform into new spaces without the need for new construction and to convert its functions to adhere to the relevant stages of man's will in the hermeneutics of his existence.

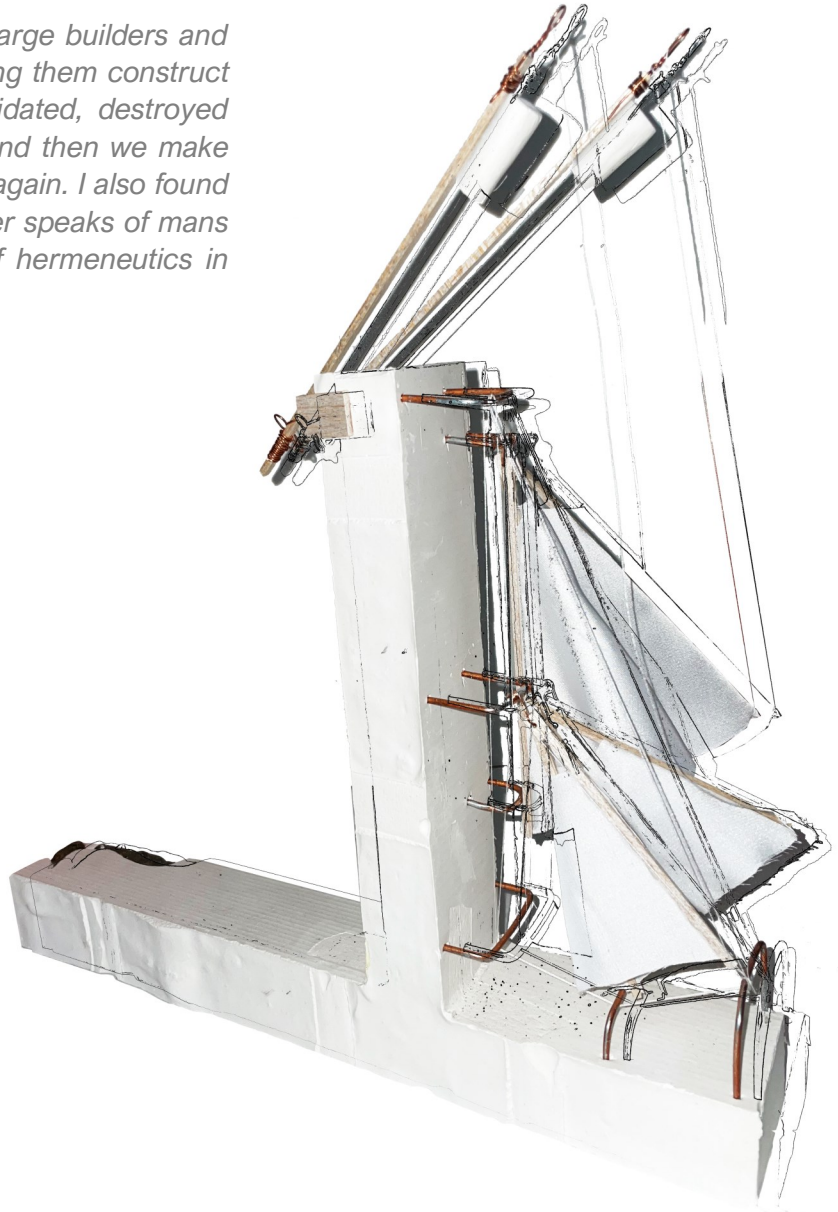
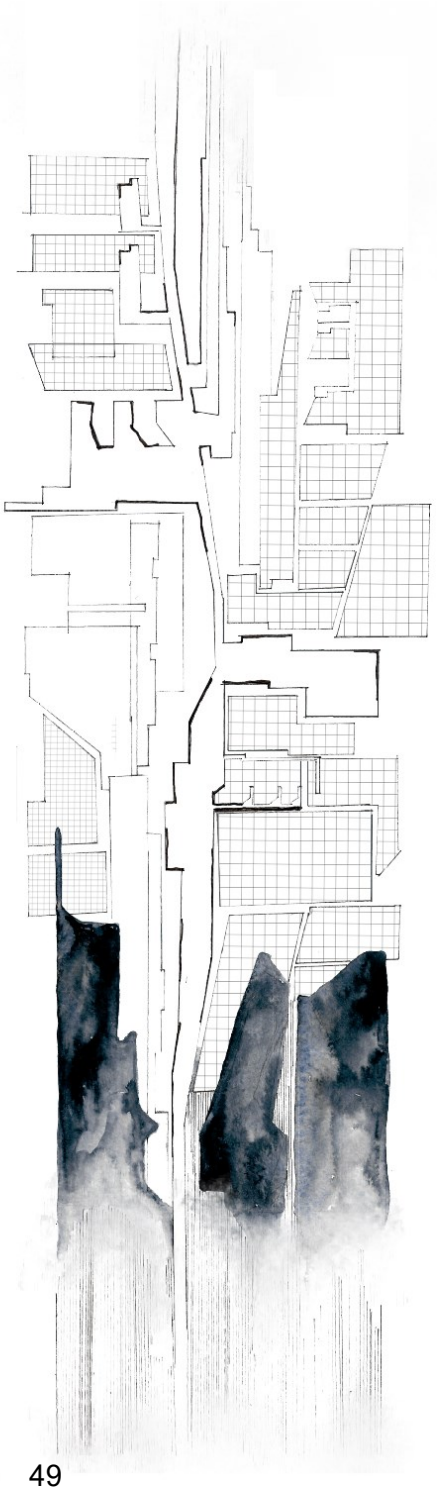


FIGURE 051: **Left:** Drawing of concept 2 (Author).

FIGURE 052: **Right:** Model of concept 2 (Author).



4.1.2.2. Technology and Temporality

A future seemed out of the question for us a year ago but Buy n Large sculpted a clearing in which the essence and importance of technology was revealed as the constituent of human temporality.

Symbiotic relationship | Essence of machines | Clearing | Extension of time | Ecstases | Projection

We are all living with borrowed time due to advancements in technology and mechanical invention. This concept focuses on the symbiotic relationship between technology and temporality, and how both factors depend on each other for survival. Technology can only progress and advance at that rate that humans do, while humans depend on technology for things like the improvement of daily tasks and healthcare assistance. This concept promotes the exploration of co-dependent living between humans and a technologically progressive environment to prolong the existence of both. It does this by including technology as an integrated and carefully considered part of the building's composition.

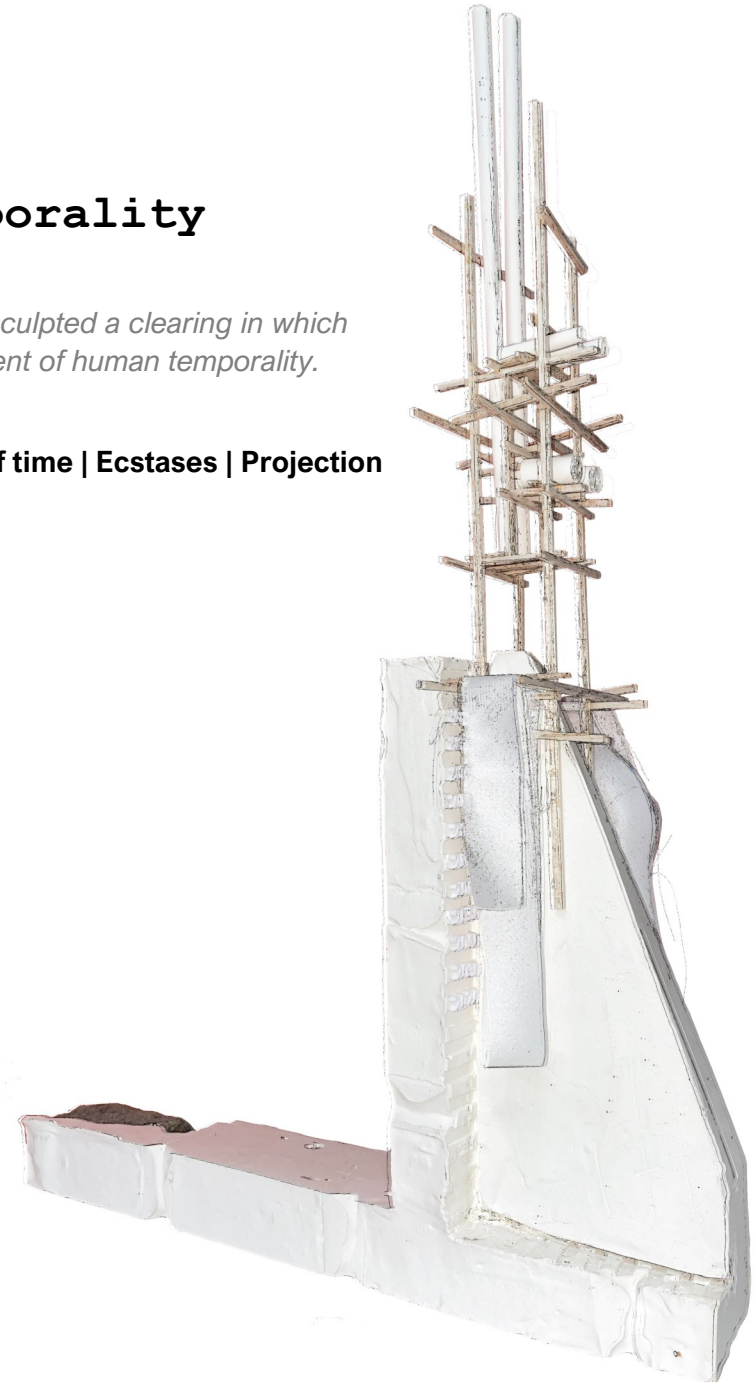


FIGURE 053: **Left:** Drawing of concept 3 (Author).

FIGURE 054: **Right:** Model of concept 3 (Author).

4.1.2.3. The Uncanny

There is something uncanny about its structure though, kind of vulture like. Nestled on a stem rooted in a dump of gross feathers, full gorged it keeps us in easy range with its cold telescopic eyes, signalling the approach of our end. Its parasitic and cybernetic claws grip itself to the old, abandoned city, casting an unhomely reflection against the meatal wall sheets and fields of plastic roses. The reflection portrays a disturbing parallel universe filled with the foreboding horrors of a consumeristic greed ruled world. Is this what our homes have become. A place where we no longer feel safe in?

Unhomely condition | Unheimliche | Heterotopias | Foreboding | Cybernetics | Parallel universe

According to Freud, the uncanny arises as the recurrence of something long forgotten and repressed, something superceded in our *psychic* life: a reminder of our psychic past. The uncanny is thus the psychological experience of an event as not simply mysterious, but frightening in a way that feels oddly familiar. The motive of this design concept is to embrace and investigate how space, while new, can resemble elements of a place from the past to evoke a sense of connection between the project and people who are familiar with the space of Greenmarket square. The sites neglected and abandoned state contributes to the unsteady feeling hosted by the term, uncanny.

4.3. A machine for people to live in

A proposed program

Oxygen production plant and green lung:

1 **Past**: Spaces in which traces of memories and the past are celebrated and acknowledged.

- Place of loss (Reference to the existing Methodist Church)
- Market platforms that acknowledge the stalls that once populated the market
- Remembrance piazza
- Oxygen refill stations/tree symbols
- Virtual garden

2 **Present**: Systems and structures to help combat current architectural and environmental issues and provide solutions thereto.

- Oxygen production system
- Exposed service wall
- Nitrogen battery station
- Engineering and science lab

Other Functions:

Ablutions for staff and visitors

Control check points at every entrance

Oxygen stabilisation zones

Other systems:

Ventilation, temperature, O2 levels, humidity control.

3 **Future**: Spaces that ensure and promote longevity of humanity and nature.

- Oxygen café
- Fynbos biome enclosure
- Urban greenhouse
- O2 refill stations

FIGURE 055: **Right:** The walking City, an ultra tech machine in which people live (Herron, 1964).

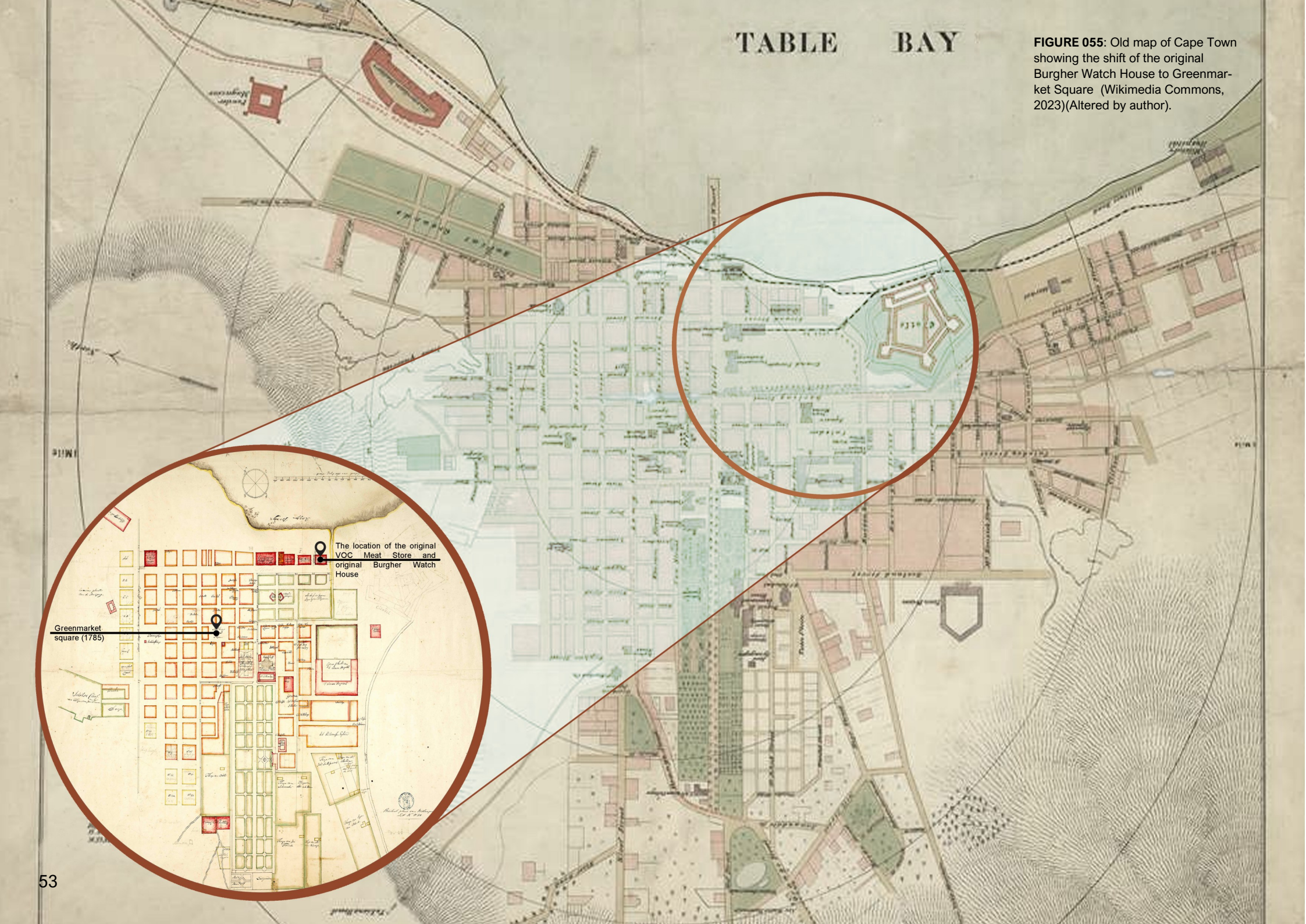


FIGURE 055: Old map of Cape Town showing the shift of the original Burgher Watch House to Greenmarket Square (Wikimedia Commons, 2023)(Altered by author).

4.4. A short history of Greenmarket Square

Establishment of Greenmarket Square:

In 1696, visiting Commissioner Daniel Heyns granted Governor Simon van der Stel permission to move the Burgher Watch who was the police force of that time (figure 55), from their original quarters in the Meat Store (On the shore near the Caste) to a new building that was more central to the residential, western side of the rapid expanding town. In 1710, the Burger Council decided to add two adjoining erven to create the *Plijn voor't Waghuis* (The plein before the Watch House) for a vibrant and open public gathering space. Upon this the future Greenmarket square was established and became Cape Town and South Africa's second oldest public outdoor and open gathering space after the Grand Parade in Central Cape Town (National library, 2023).

The centrality of the square made it an ideal destination for farmers to deliver and sell their fresh produce to the surrounding urban community. As time passed, this open plain came increasingly known as the Groente Markt, or as we know it, Greenmarket Square.

In 1755 the Watch House was demolished and built in its place was the Old Town House we see today (Figure 57).

By 1840 nearly all single-storey structures around the Square had been replaced by more substantial residences (Figure 58).

From 1940 (Figure 59) , the square was transformed into a parking lot and in 1965 the square's distinctive cobblestones were laid and transformed back into an open-air gathering space for the public (Green economy media, 2023). At the turn of the 20th century, much of its trade was transferred to the Parade Ground and has been pedestrianised to become the home of a flourishing African goods and craft market and tourist hotspot (Figure 56). It was declared a National Monument under old NMC legislation on 17 February 1961.

The plain also featured a large stone structure which marked the place of an early well and later a swing pump. The activity of fetching water become a daily chore for household slaves and the pump gained popularity as a gathering space where slaves could enjoy a brief rest from their household duties. In 2023 its function is a public toilet (Figure 58).

FIGURE 056: Famous African goods market and cobblestone paving. (Ritterbach, 2023)(Altered by author).

FIGURE 057: Slaves on Greenmarket Square. Drawing by Johannes Rach, 1762. (Mcgregorza, 2011)(Altered by author).

FIGURE 058: Drawing of Greenmarket Square in 1833 by Sir Charles D'Oyly (Mcgregorza, 2011)(Altered by author).

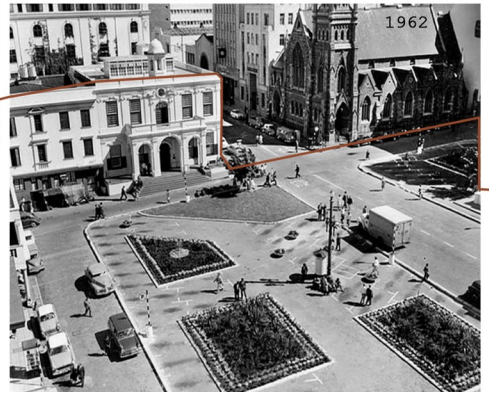


FIGURE 059: Experimental garden on Greenmarket Square (Du Plessis, 2015)(Altered by author).

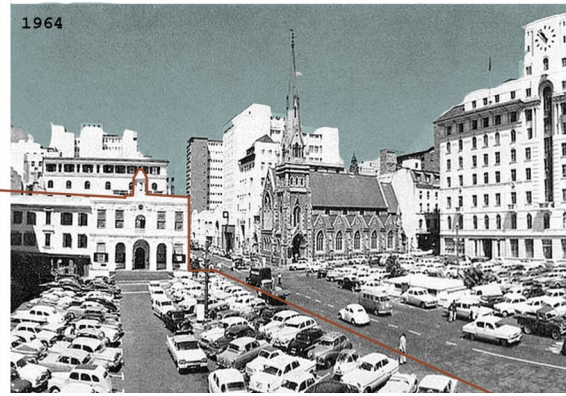


FIGURE 060: Open plain transformed into a parking lot (Mcgregorza, 2011)(Altered by author).

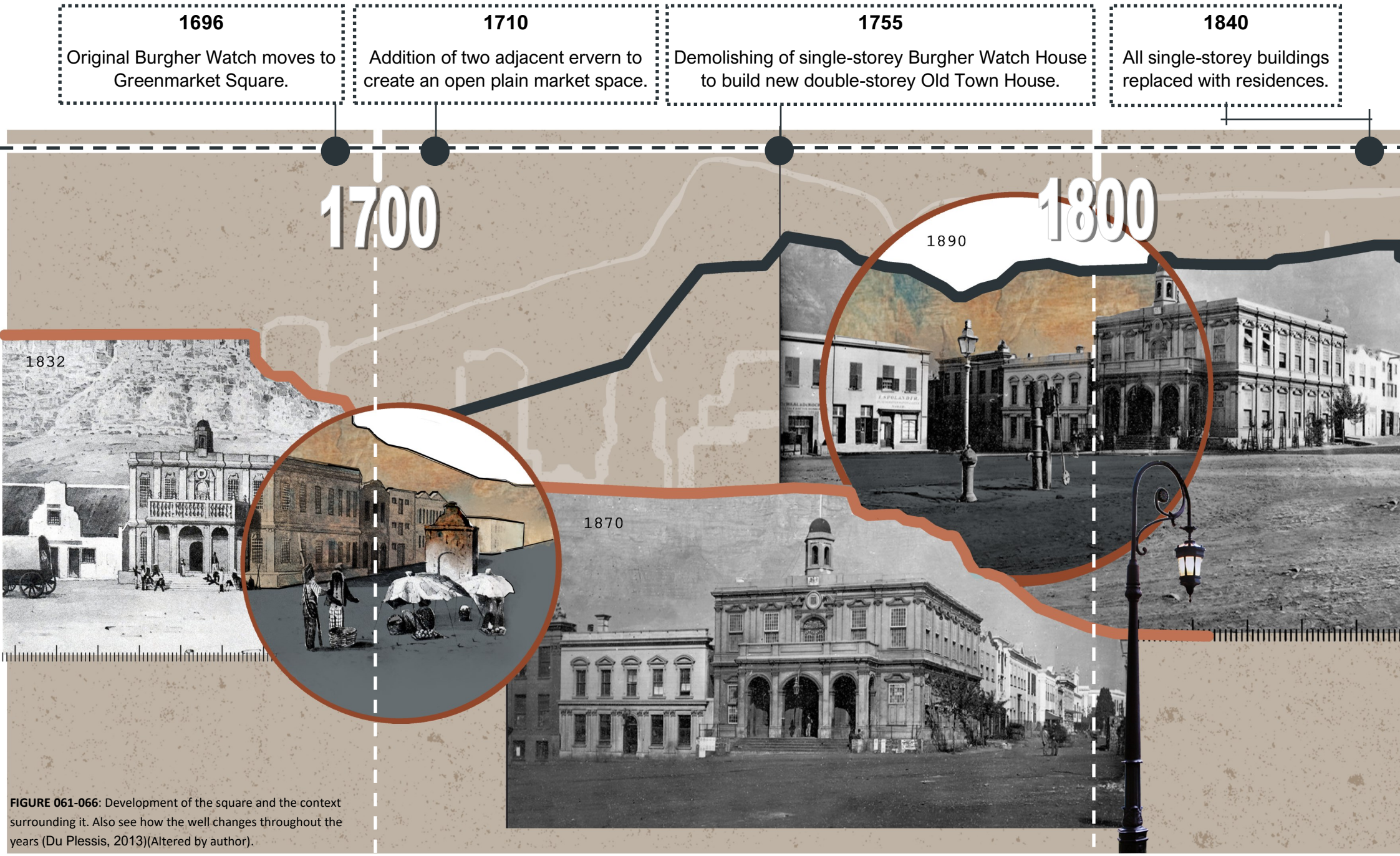


FIGURE 061-066: Development of the square and the context surrounding it. Also see how the well changes throughout the years (Du Plessis, 2013)(Altered by author).

1940

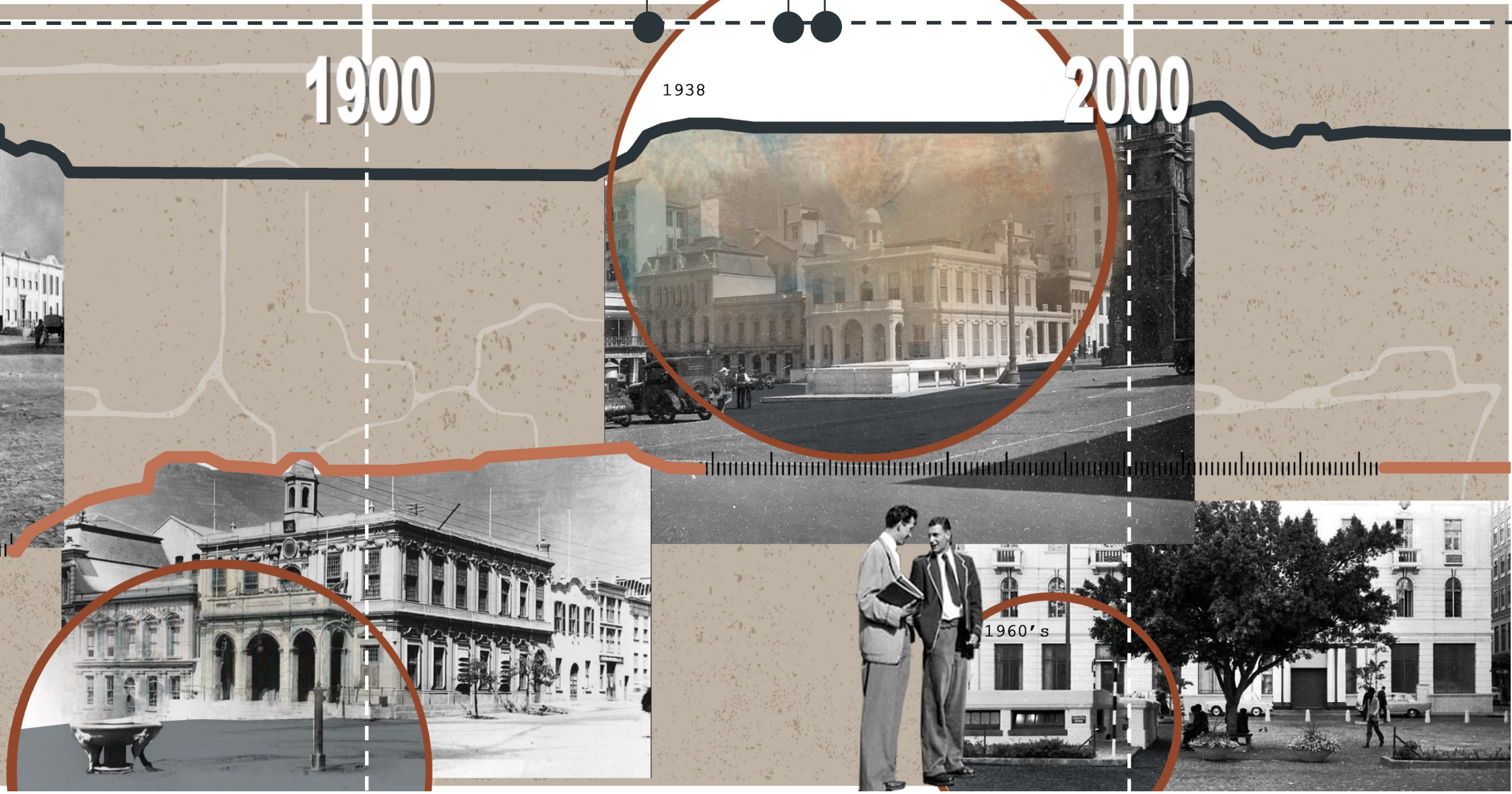
Square converted into a parking lot.

1961

The Square was declared a national monument.

1965

Cobblestones paved way for a new public market space again.



4.5. Topology

This section is an exploration into the typology of the broader context, the immediate context and the proposed site to gain a wholistic understanding of the order of the inner city of Cape Town and the existing structures and urban interventions surrounding the site.

4.5.1. Macro analysis: The inner city of Cape Town

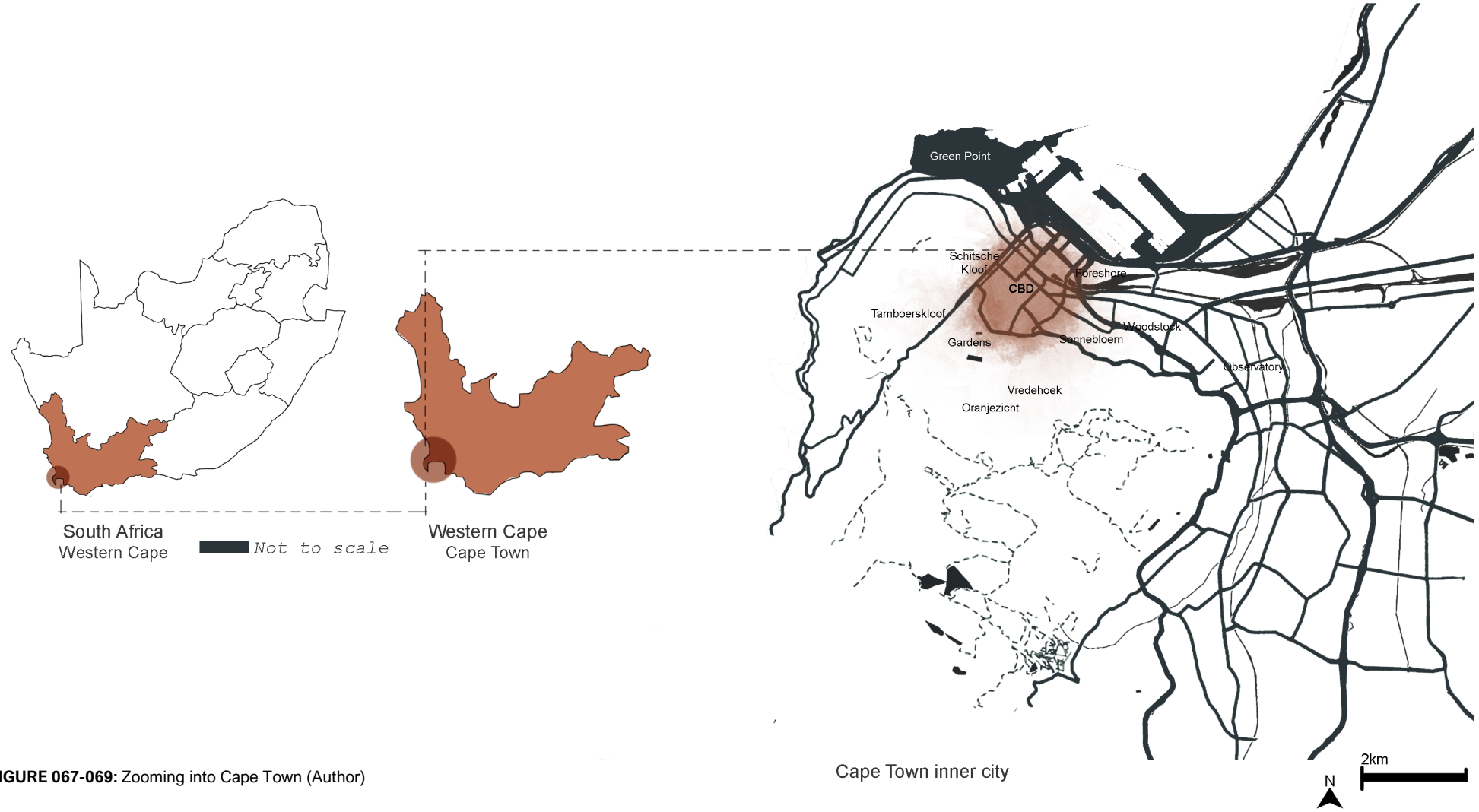


FIGURE 067-069: Zooming into Cape Town (Author)

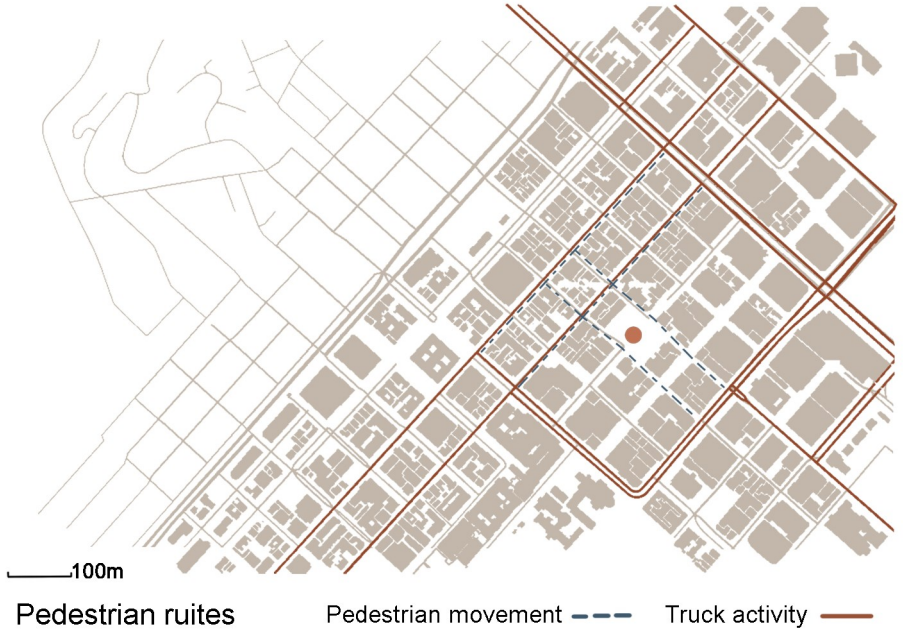


FIGURE 070-073: Zooming into Cape Town (Author)

4.5.2. Meso analysis: The immediate context

The meso analysis borders the context directly around the site. It gives the reader a perspective as to how the proposed building should respond in relation to its direct context. It is important is to understand how the proposed site is prominent within its context as the only open public space amongst a cluster of high-rise buildings.

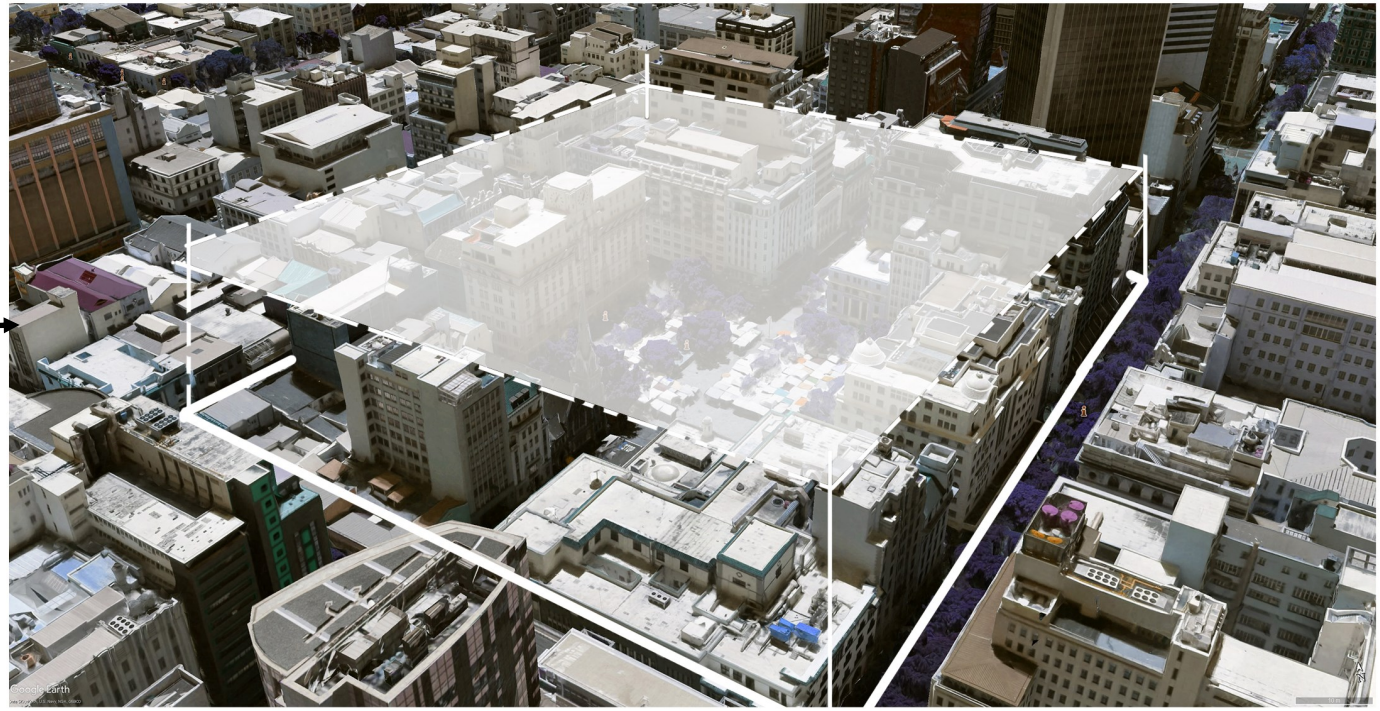


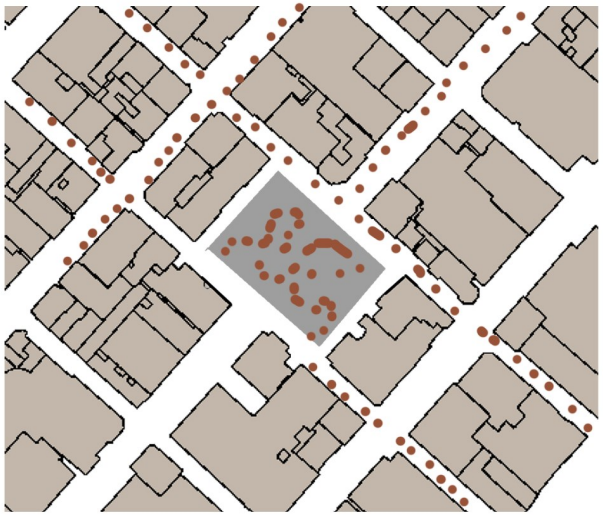
FIGURE 074: Top: Area to be analysed (Not to scale) (Author)

FIGURE 075: Right: Aerial view of city blocks (Google Earth)

Major roads and interchanges *Not to scale*

Access point *Not to scale*

Service access *Not to scale*



Pedestrian movement *Not to scale*

Commercial nodes *Not to scale*

No vegetation *Not to scale*

FIGURE 076-081: Meso analysis of the site and surrounding structures (Author)

4.5.3. Micro analysis: The site and existing buildings

The micro analysis investigates important nodes and features directly on the site that will benefit the layout and orientation of the proposed building.

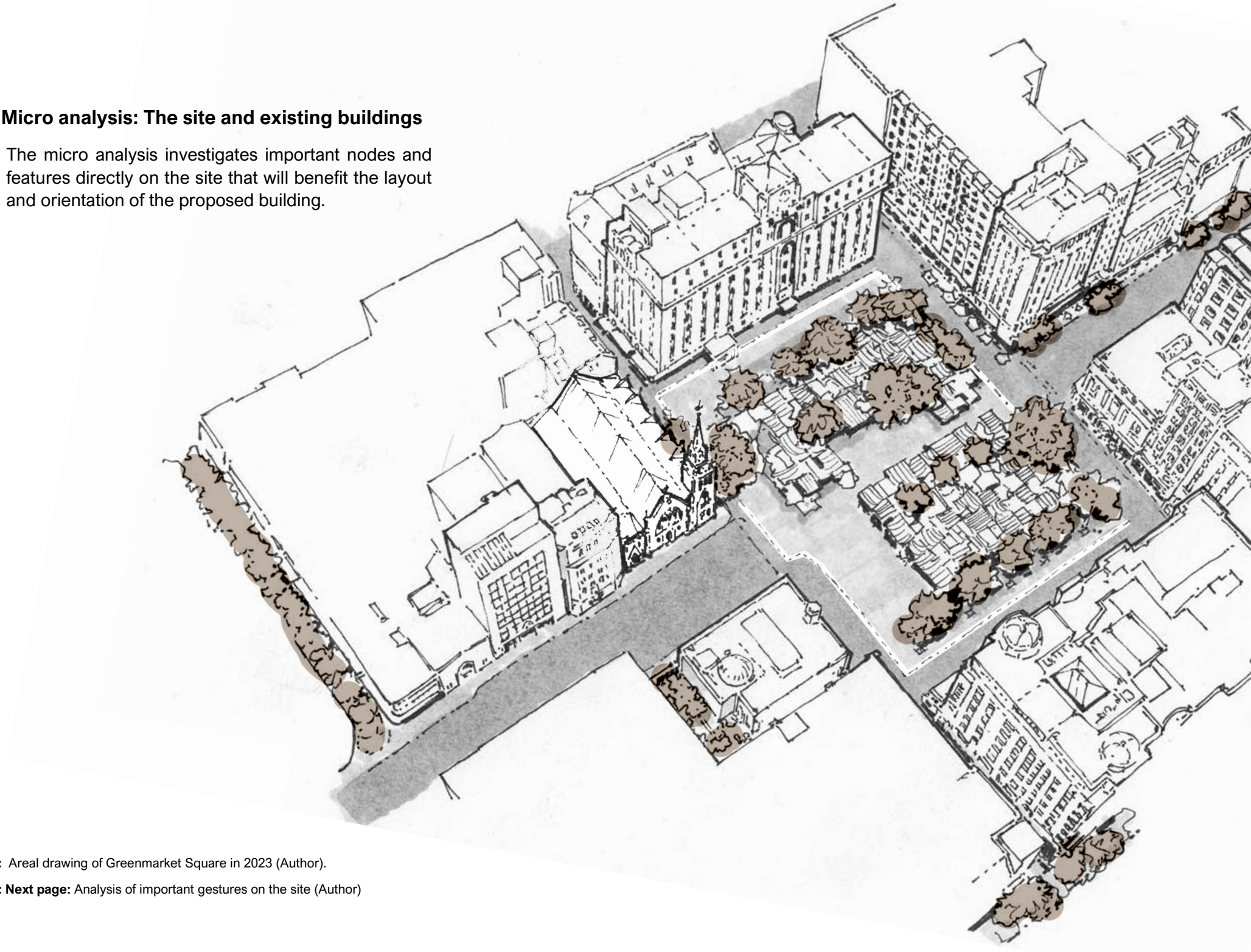
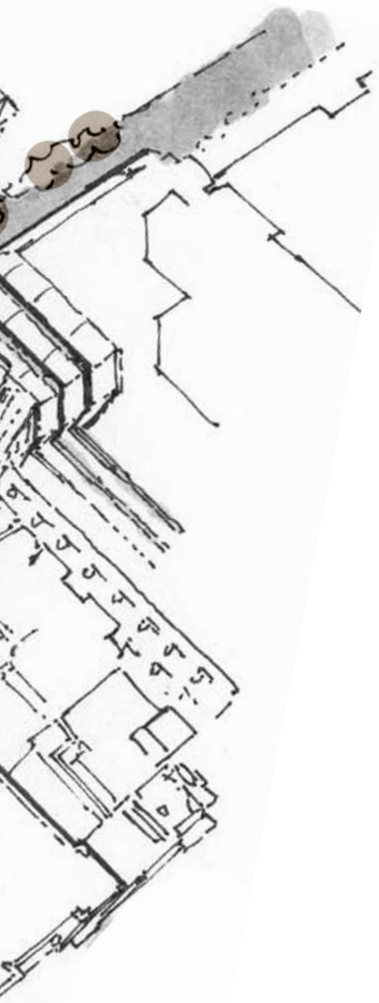
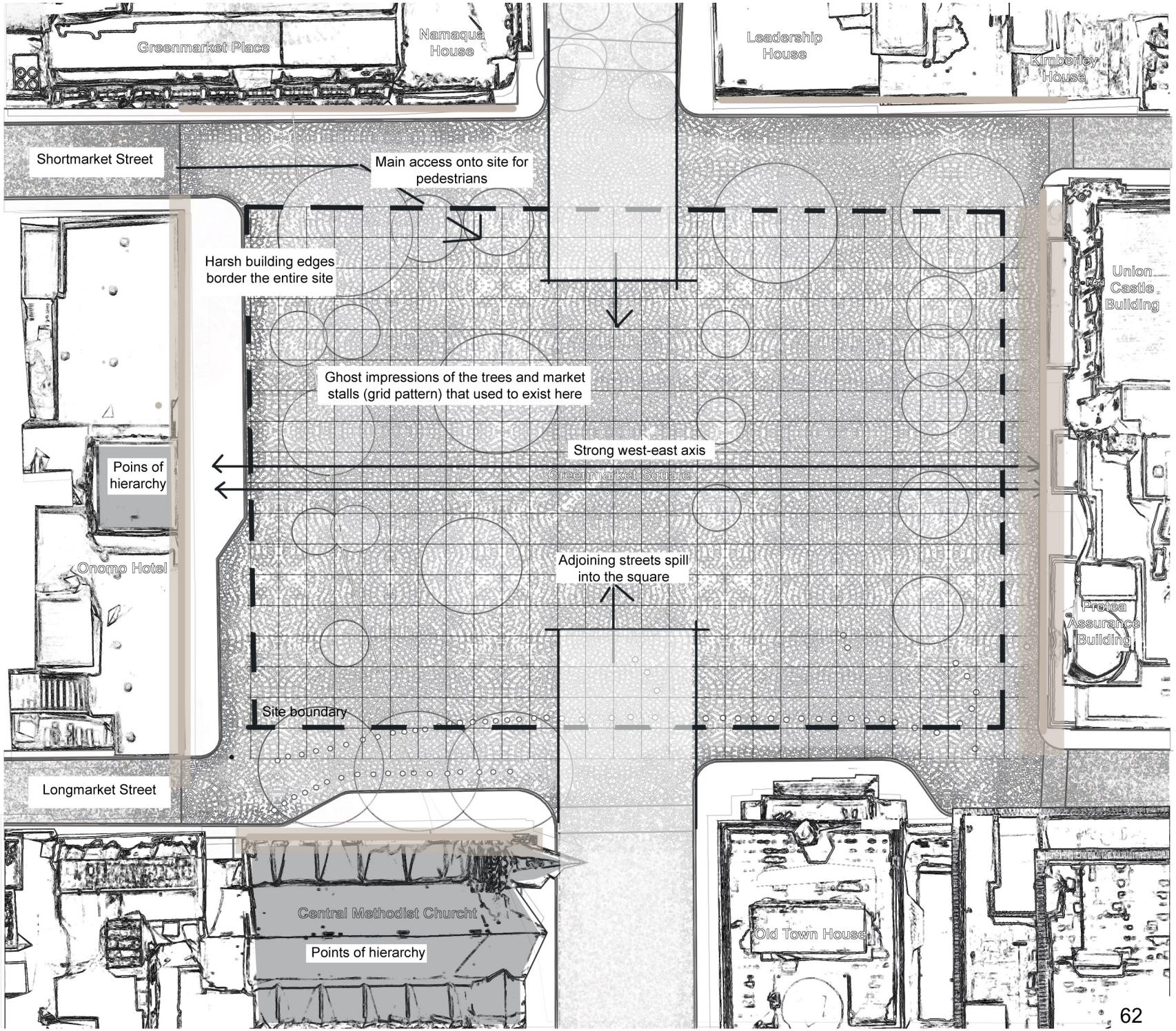
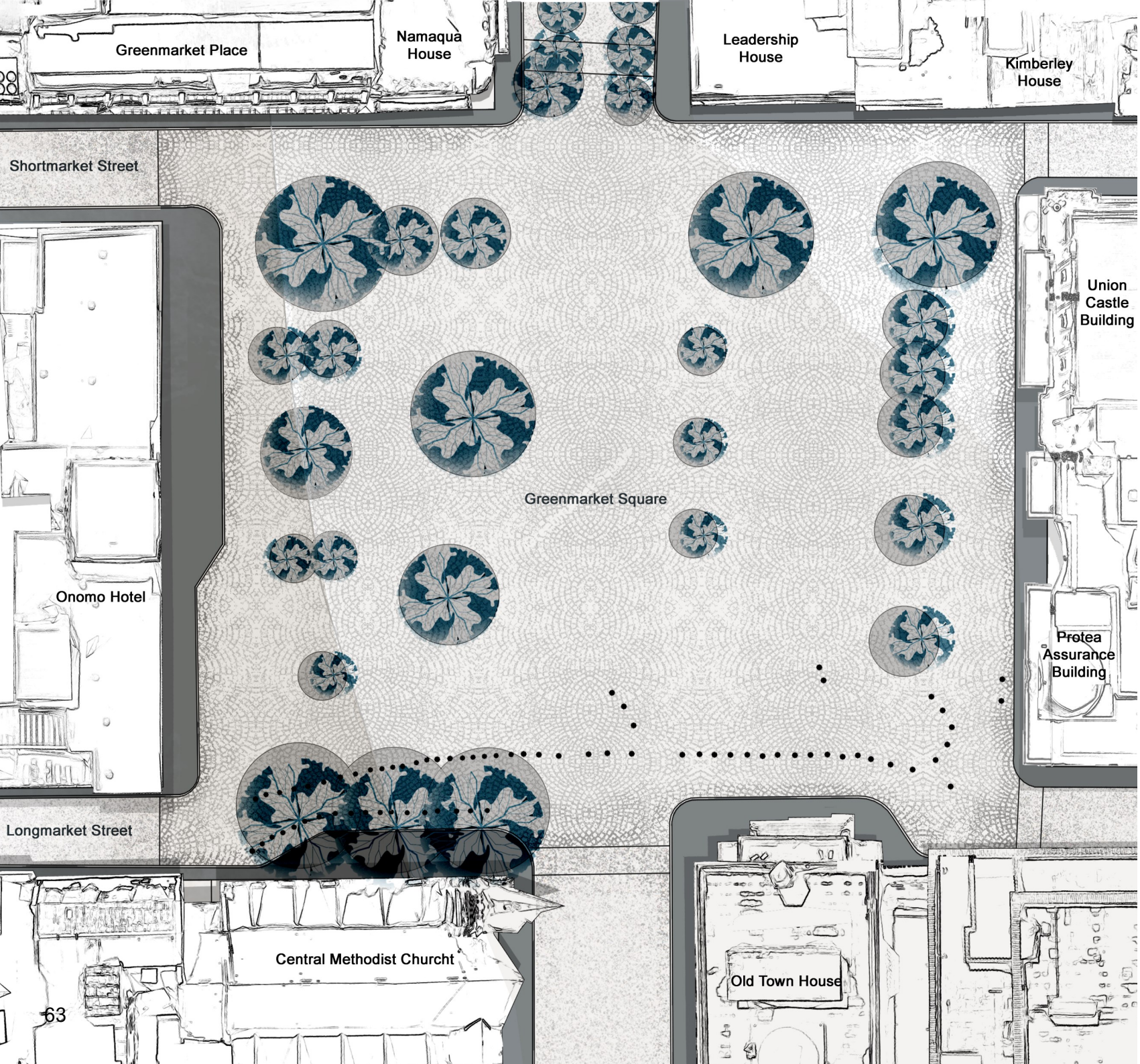


FIGURE 082: Areal drawing of Greenmarket Square in 2023 (Author).

FIGURE 083: Next page: Analysis of important gestures on the site (Author)




Greenmarket Place
Namaqua House
Leadership House
Kimberley House
Shortmarket Street
Main access onto site for pedestrians
Harsh building edges border the entire site
Union Castle Building
Ghost impressions of the trees and market stalls (grid pattern) that used to exist here
Strong west-east axis
Greenmarket Square
Poins of hierarchy
Onomo Hotel
Adjoining streets spill into the square
Protea Assurance Building
Site boundary
Longmarket Street
Central Methodist Churcht
Points of hierarchy
Old Town House



Surrounding buildings:

FIGURE 084: Greenmarket Square in 2023 (Author).

ONOMO Hotel

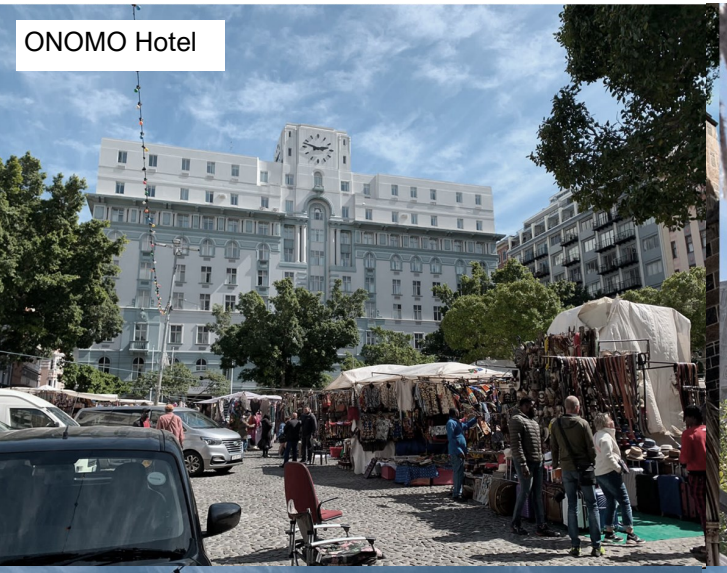
The building that the ONOMO Hotel calls home, was first built in 1696. The old building, with its iconic clock face that still ticks today, towers over the cobblestoned Greenmarket Square and provides a chic and contemporary place to stay for visitors and tourists.

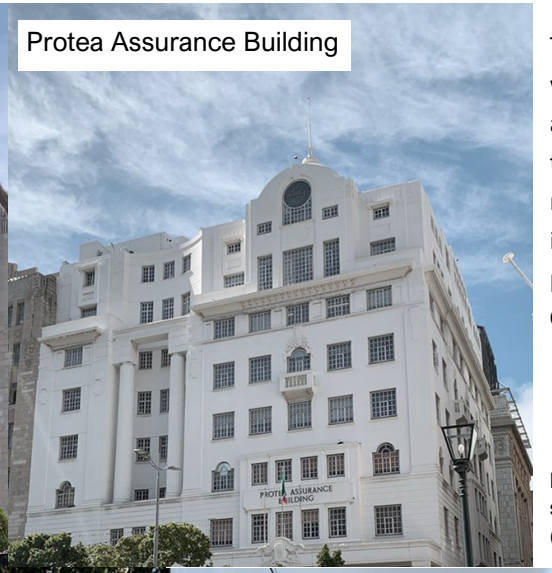
Methodist Church (Built in 1876)

A tall, brown Victorian Gothic Revival monument of architecture. It is the second oldest building constructed on the outskirts of Greenmarket Square, preceded only by the old Burgher Watch House.

Old Town House (Burgher Watch House)

The original building was a thatched, single-storey building. In 1755 the Old Town House became a much grader, flat-roofed and double-story building and was complete in 1761. It remains one of Cape Town's most cherished historical structures and reflects in its design the social milieu of the Cape by the mid-Eighteenth Century. The Old Town House is now a museum that houses the Michaelis Collection consisting of a world-renowned selection of Netherlandish art from the seventeenth-century Golden Age.





These buildings play important roles within my dissertation as they serve as vessels of memory against which the future is juxtaposed . They are not important in terms of their heritage value but rather in their link to past and memory as discussed in **Chapter 3.**

FIGURE 085-090: Photographs of surrounding buildings in 2023 (Author).

4.6. Precedent Studies

This intervention makes use of a typology not typical of buildings we know, therefore this section will explore precedents that share a set of unique ideas similar to that of the proposed intervention.

4.6.1. Precedent study 01: [Mechanical lung]

Centre Pompidou

Architects: Renzo Piano, Richard Rogers
Paris, France

The purpose of this precedent study is to extract its radical design, structural composition and clear conceptual approach of an urban machine to investigate the spatial organisation and functionality of the building. Five principles have been identified and analysed that create this typology.

Community and contextual embedment

Before the design process of the Pompidou began, the two architects walked the streets of le Marais and les Halles when they realized the need for public space in the neighbourhood. The building thus serves as a **forum for public life**, a ‘’palace of culture’’, in which day to day meetings, rendezvous between friends and stranger and children playing can take place (Rogers, 117). An extension of public life is achieved with the large rectangular piazza, as it acts as a lung breathing new life into this urban environment. To ensure the continuation of the rue du Renard street line, one of the longest streets in Paris, the building was positioned to the side of the site so that the eastern façade can follow the line of the street on which the building lies. This also contributes to the integration of the building into the existing urban fabric of the neighbourhood. The centre and the piazza work as a living organism that cultivates culture and community on the street and inside building.

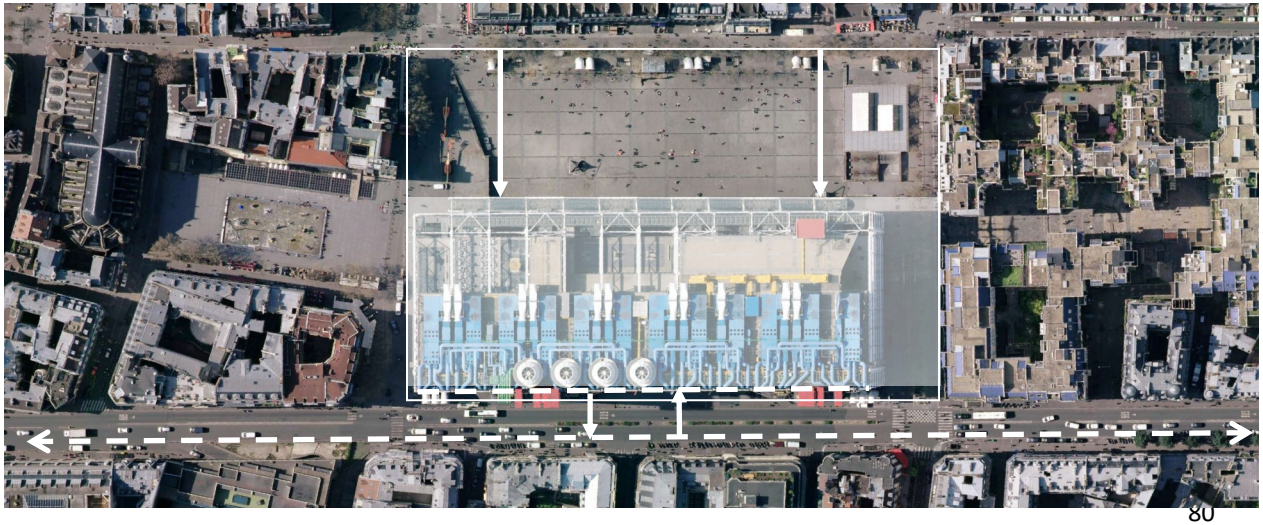


FIGURE 091: Placement of the building in relation to the entire site and context (Altlas, 2017)(Altered by author)

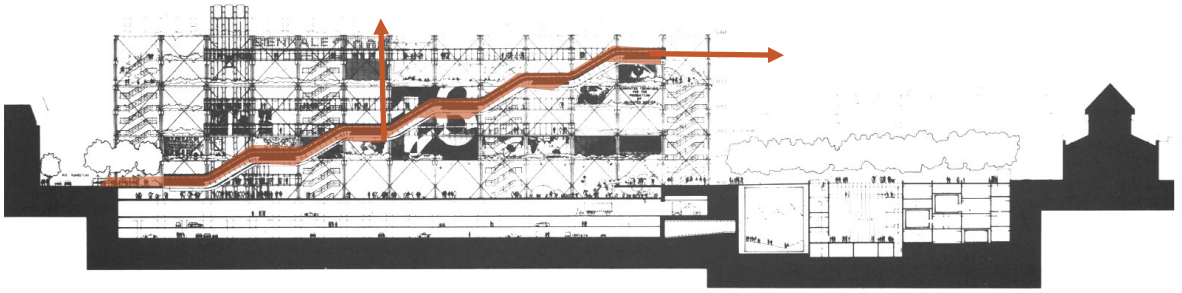
FIGURE 092: Next page: The Pompidou watching over the city (Atlas, 2017).

“In the heart of Paris, a heart, a muscle, a pump breathing in and out in continuous beats, endlessly kindling, regularly and occasionally less regularly, moments of emotion and fever; a body in the shape of a hexagon, and further off, other bodies touching this one...and further away still, from touch to touch... I could go on forever; this is what should be, would be, will be and already is the Beaubourg building. Not so much a monument, more, to invent a word, a *movement*.”

(Ponge, 1977: Online).

Circulation

The piazza and the centre make use of clever circulation routes and methods to ensure a constant two-way participation between the users and the building, and the building and its context. Movement from the piazza continues vertically up the western side of the building with a huge mechanical escalator, transporting the public upwards. It serves as a vertical, semi-outdoor path, or “air street” (Rogers, 117) that is also the primary artery or circulation core of the Centre Pompidou. By placing most of the services and systems on the outside of the building, horizontal movement takes place freely over large spanning floorplates.



The concept was clear from the start of the design process; to create an open steel framework, wrapped in glass, with uninterrupted floor plates. This lent itself to two distinct principles of the Pompidou, namely **transparency** and **flexibility.**

FIGURE 093-094: Top: Horizontal and vertical circulation (Altlas, 2017)(Altered by author).

FIGURE 095: Next page: Transparency, flexibility and structure of the Pompidou explained (Altlas, 2017)(Altered by author).

Transparency

Nothing within the building is concealed. All the building’s inner workings and services are visible from the inside and outside. Features of this skeleton structure is repeated and interlocked to create an illusion of a metal mechanism that celebrates the use of the technology, manufacturing and construction that went into its formation.

Due to the city of Paris being so dense in its urban layout and make up, the transparency of the Centre Pompidou allows for a great amount of light to penetrate the building. With the movement of light through the building, its glass blanket and it being lifted off the ground with piloti style columns, this large structure appears light and ready to lift itself off the ground and walk over to its next available position.

Flexibility

The design of the centre is described as being flexible as six out of its ten levels of uninterrupted floorplates have been organized according to the needs and requirements of a variety of projects and activities (Centre Pompidou, no date: online). Flexibility is thus created through technological innovation and internal adaptability, creating spaces that are not defined by their role. This means that internal spaces can be used for many different purposes and can be adapted to adhere to future functions and needs.

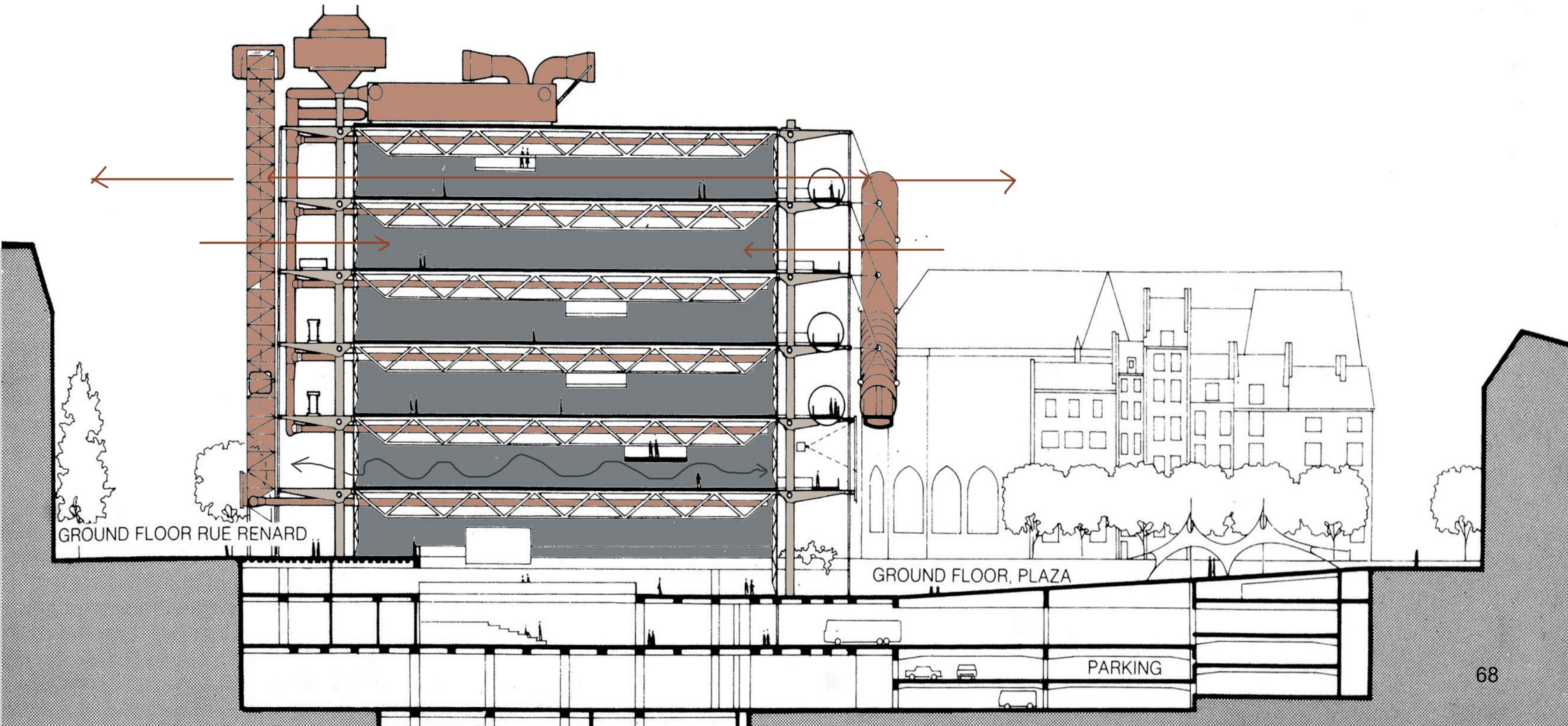
Structure

The structural system of the Centre Pompidou is fundamental to the success of the building. In order to achieve the concepts of uninterrupted, 48x150m floorplates, over 6 levels, a balanced cantilever system was used along with a special designed bracket, named a Gerberette. This system will be analysed in greater detail on page in the technical report as it contributed to the development of the main structural system of my own building proposal.

Transparency: Light and transparent structure (all services visible)

Flexibility: Uninterrupted floorplates

Structure: Gerbette brackets



4.6.2. Precedent 02: [Conservatory]

Wellesley College Global Flora
Kennedy & Violich Architecture
Wellesley, United States

Global Flora reimagines how the design of a sustainable greenhouse can enhance global interdisciplinary science education and deepen a public understanding of nature (Pintos, 2020). The sustainability of the building is improved by demonstrating the integration between design aesthetic with net-zero[4] building performance (Architizer, 2023).

A new model for greenhouse enclosures:

1. A **curved form** allowing the east-west arc of the sun to maximize solar radiance for the plants
2. **Height** of the building **accommodates different tree heights** which produces a dynamic interior space as it adheres to the sites natural topography.
3. Different biomes are separated with a translucent ETFE partition. This allows directs visual comparison of plants between climate biomes.
4. Building envelope integrates passive and active sustainable systems.
5. **Double-layered ETFE** skin over glass improve light quality, reduces heat loss and lightens the building structure.

Lessons learnt:

A completely solid wall to prevent heat loss from surfaces that do not receive sunlight (not typical in greenhouse design).

Functions extracted:

- Separated and different climate biomes.
- Living soils to support flexible public programs (pop-up research labs, places for classrooms, areas for reading, relaxation, and musical performances).

[4] A building that is **highly energy-efficient**, and the remaining energy use is from renewable energy, preferably on-site.

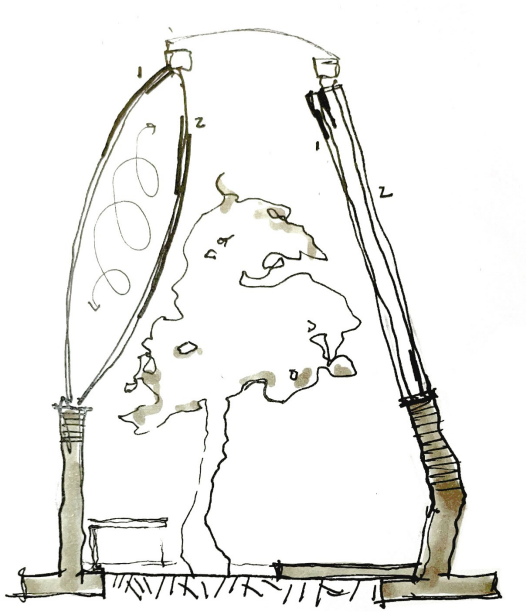
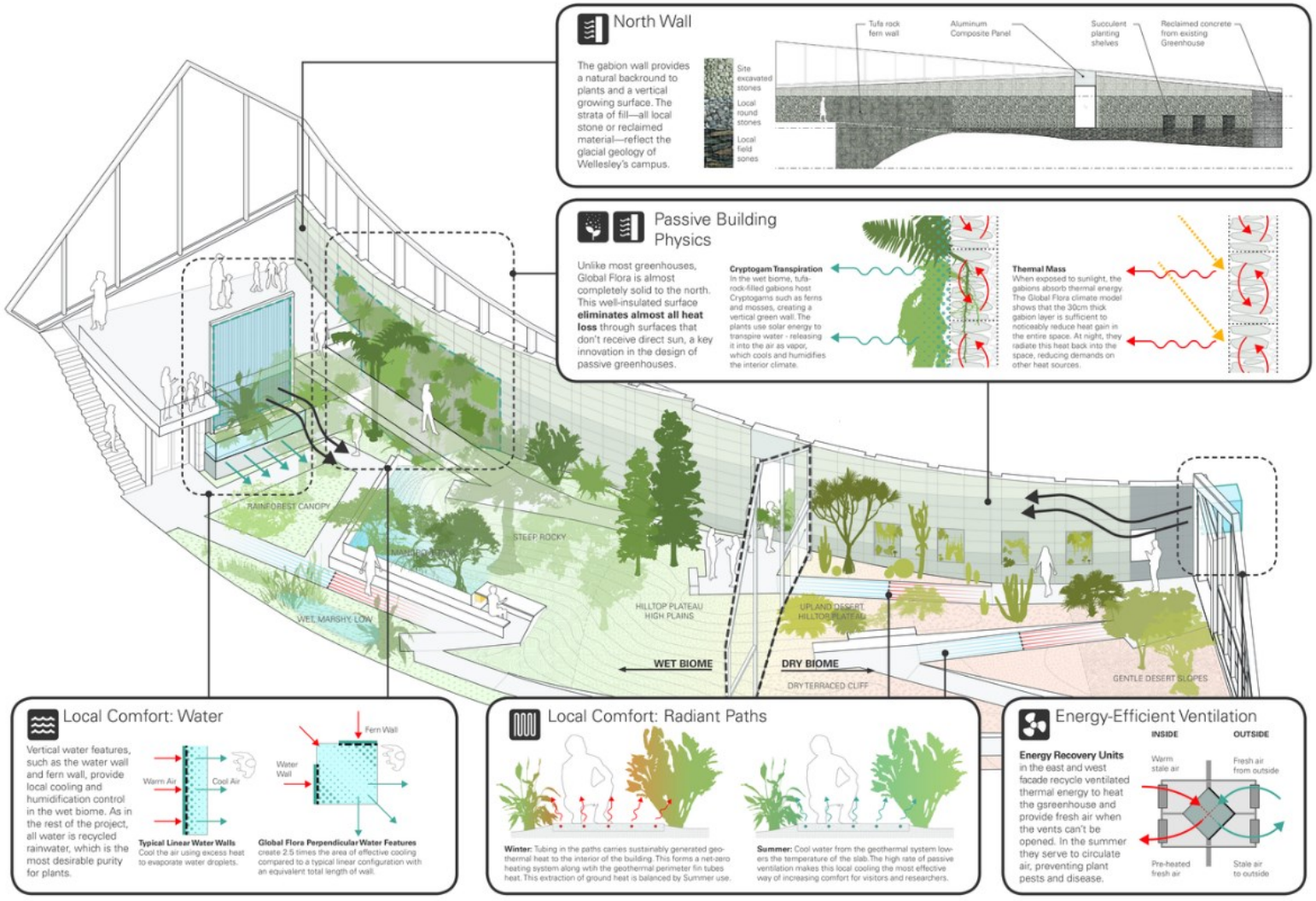


FIGURE 096: Previous: A new model for greenhouses (Pintos, 2019)(Altered by author).
FIGURE 097: Left: Section through greenhouse showing additional height for trees and double ETFE walls (Author).
FIGURE 098: Right: Passive heating systems illustrated (Pintos, 2019)



Passive heating and cooling:

1. In winter, low daylight passes through the skin and warms the concrete-block north wall, lowering overnight energy needs.
2. In summer, **automated vents** and **solar curtains** allow the envelope to 'breathe', eliminating the need for active air conditioning.
3. **Cryptogam transpiration**: the use of vertical growing ferns and mosses to transpire water and releasing it into the air as vapour to cool and humidify the interior climate.
4. **Water features** provide local cooling and humidification control.

4.6.3. Precedent study 05: [Market]

Watershed
Architects: Wolff Architects

This tourist attraction is not only studied for its effective and contemporary composition of South African souvenirs and market space but for its reclamation of public space. A strong axis serves as a pedestrian walkway that sets up an urban pedestrian network, connecting the building with important surrounds areas. This axis is activated with protruding nodes of small businesses, becoming a device for creating economic opportunity; a market (Wolff, 2014: Online).

Functions Extracted:

Market exhibition venue
Rentable office space
Green space

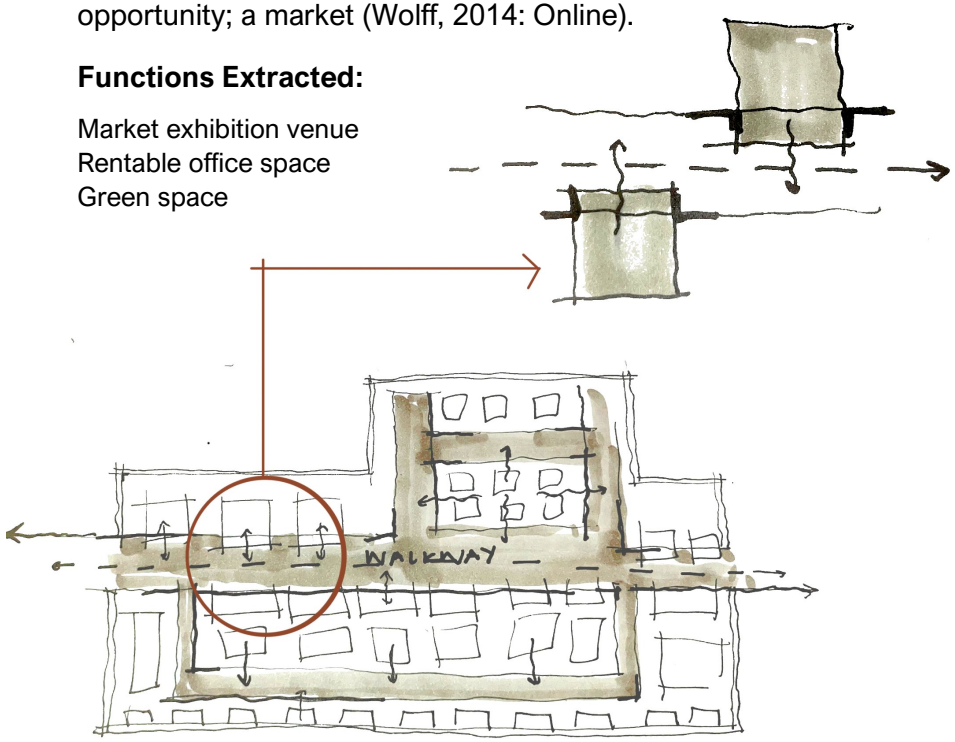


FIGURE 098-099: Central walkway activated by protruding nodes of market stalls (Author)

4.6.4. Precedent 04 [A place of loss]

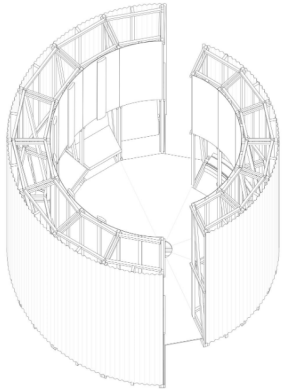
Tin Chapel
Roz Barr Architects
Hammersmith, London

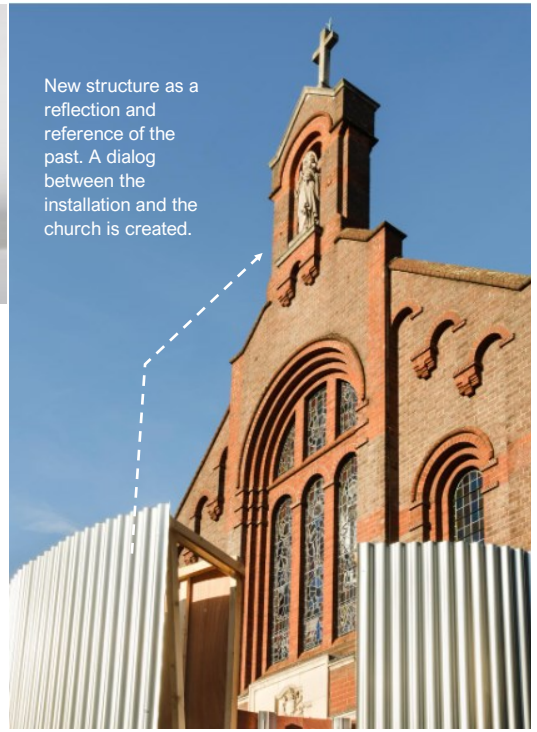
Repurposed memory:

The chapel serves as reminder of temporary tabernacles that were once common in church communities throughout Britain.

The galvanised steel shroud to the external wall references the original 'Tin Cathedral' and the timber frame alludes to the large roof trusses in the church interior (MacLean, 2018), repurposing a space that was once forgotten into a place of hope and peaceful solitude.

FIGURE 100-102: Tin Chapel as a representation of the old church (MacLean, 2018)(Altered by author)





4.6.5 Precedent study 05: [Green lung]

MFO Park

Architect: Burckhardt + Partner in collaboration with Raderschall
Zürich, Switzerland

Symbiosis of greenery and industry:

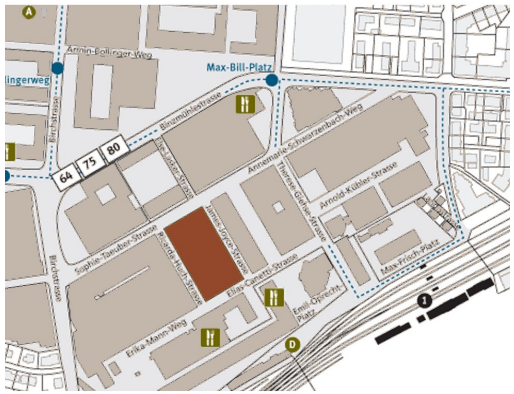
MFO park is used as a precedent due to its ability to rehabilitate a space that once stood for a different function. The park successfully bears witness to the past usage of the site of a former factory building, while providing an appropriate and green intervention within the dense urban fabric of the city (Burckhardt, 2023: Online).

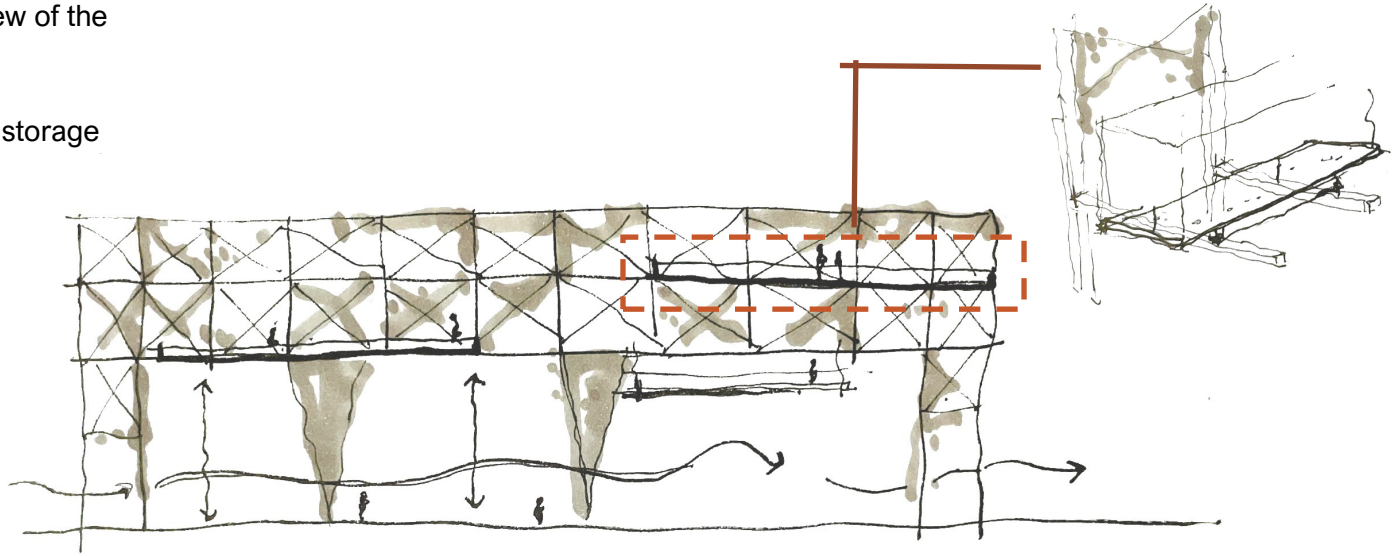
The park is positioned over the former Maschinenfabriek Oerlikin, which used to be a factory that produced weapons. The double walled latticework steel scaffolding mimics the dimensions of the original building structure. Thus based on a basic grid system with its strong geometric shape and scale to create a link with its industrial past (Burckhardt, 2023: Online).

FIGURE 103: Top: Hanging greenery (Burckhardt, 2023: Online).
FIGURE 104: Left: Location of site in its urban context (orange) (Author).
FIGURE 105: Right: Lattice work structure with walkways at all levels (Author)

Functions Extracted:

- Deck on the roof for panoramic view of the area
- Large open space for many uses
- Water flows through underground storage





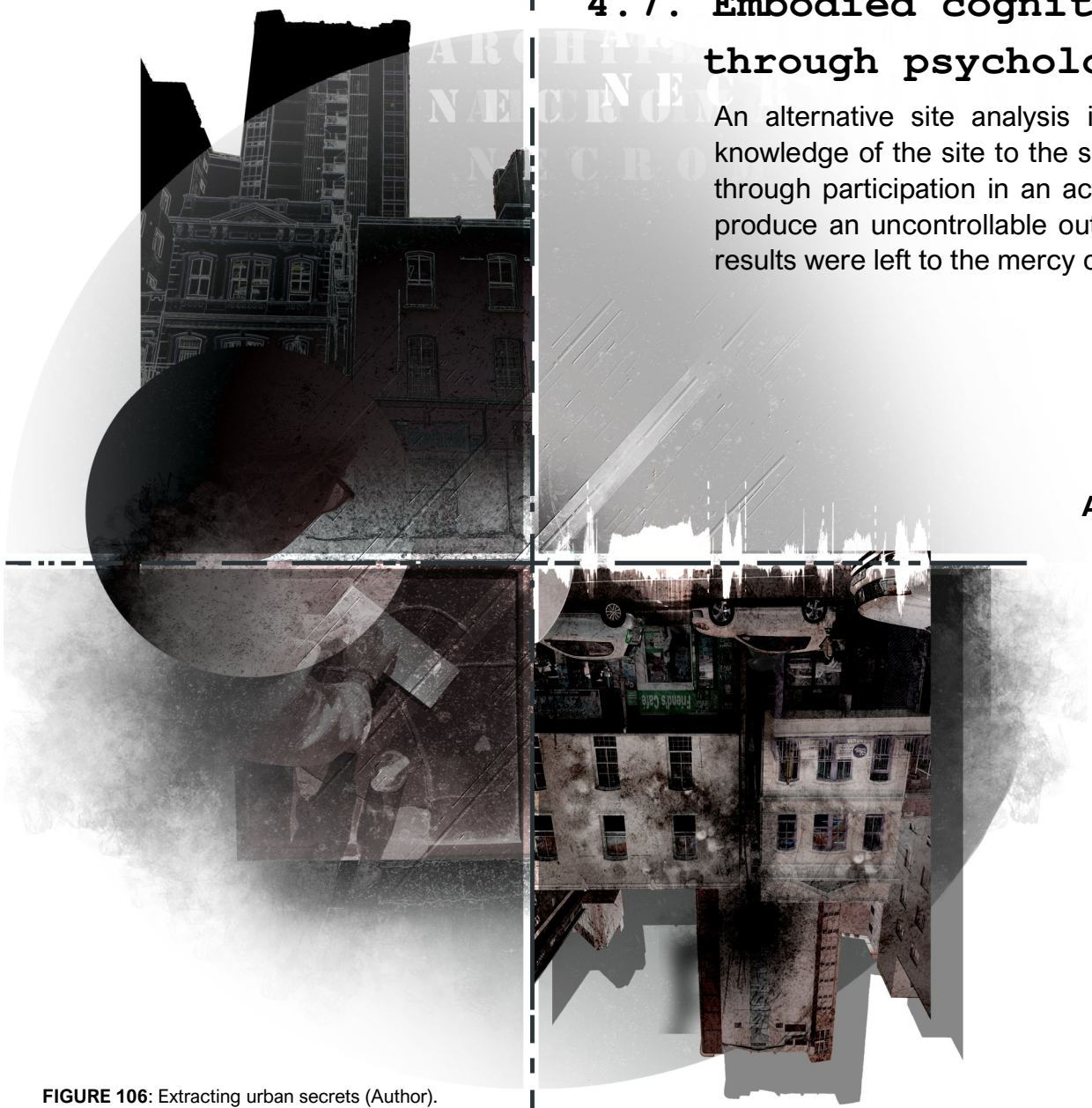


FIGURE 106: Extracting urban secrets (Author).

4.7. Embodied cognition: understanding space through psychological perception

An alternative site analysis in the form of a site date was conducted to bring new knowledge of the site to the surface. The aim of this site date was to get to know the site through participation in an activity that both involves the participant and the site itself to produce an uncontrollable outcome. The method and the activity were planned, but the results were left to the mercy of the site.

Architectural Necromancy: Exposing urban ghosts

The city exists in two forms: the tangible and the intangible. The tangible city is the physical form of the built environment that is perceptible by touch. The intangible city has no physical presence, but a perception of the same physical place. It reveals itself as ghosts that haunt our psychology in which our bodies serve as the vessel of cognitive and spatial understanding. For the site date, my body takes the role of the interpreter of the dialog taking place between the tangible and the intangible city.

Technology plays the role of the translator, transforming my findings into tangible evidence that can be experienced by all. I can feel things even though I cannot see them. The aim is thus to construct intangible perceptions of space based on individual corporeal experience and mental understanding as a means to convey that very experience to others. Therefore, by externalising internal imagery of cognitive experience the users interaction with the city is enhanced and psychological perception is concretised into physical evidence.

Poiesisphilia:

The site date involves the capturing of intangible confessions from building surfaces, tiles on the ground and textures from dustbins and other urban furniture through embossing. The embossed pattern left behind from the tangible building presents itself as a multiverse, a shadow of the world we know. They are whispers from the tangible and are translated into the cognitive ghosts that control the way places make us feel. To reveal these ghosts, I have interpreted the patterns or traces left behind on the paper by extruding them three-dimensionally into building blocks to build the intangible multiverse. These building blocks were further interpreted as a digital built environment on ArchiCAD, replacing the original building with uncanny interpretations of the intangible Long street. I share with you, my intangible experience of Long Street, my construction of a congenital ghost town.

Insights:

These representations and interpretations of the hidden dialogues, aim to give power to the intangible essence of Long Street to understand the conscious significance that we share with our surroundings as a key factor of dweller urban involvement. Through constructing the construing, the ghosts are revealed, and the intangible may manifest through the power of technology. The phenomena of ghosts and imagination which perpetuate mental imagery that create internal and alternative landscapes of physical association are bona fide through the dialog between tangible and intangible as a means of assimilating the dweller to the project and the project to the city.

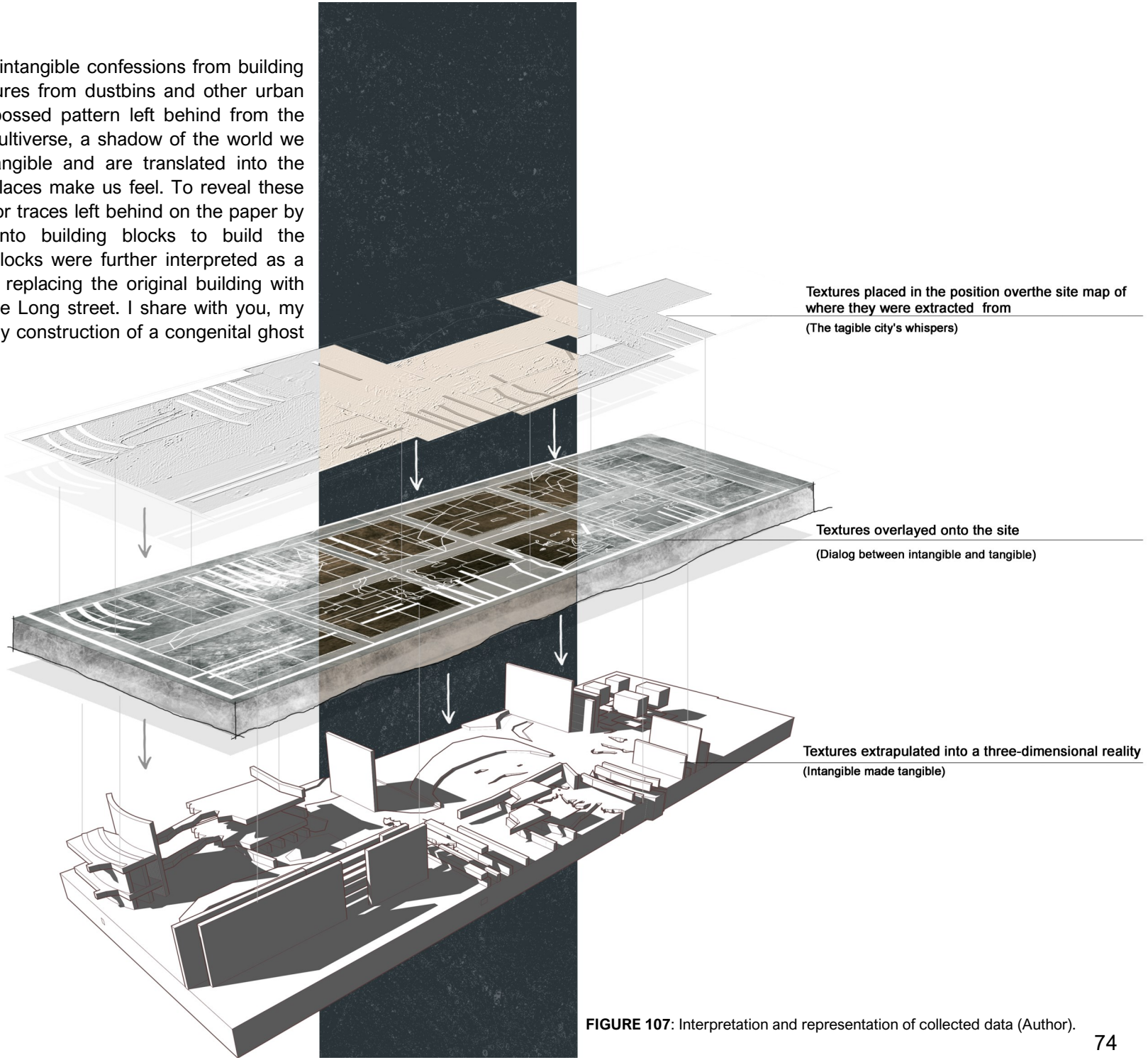


FIGURE 107: Interpretation and representation of collected data (Author).

The Next step:

According to Marco Frascari, detail expresses the process of signification; the attaching of meaning to the man-made world. Technology serves as the basis for understanding the role of these details which in turn become the loci where knowledge is of an order in which the conscious finds its own working (Frascari, 1965). Technology is thus used as a device of revelation that fabricates hidden details of the built environment. In this case, technology is used to reconstruct the intangible moments in Long Street in the form of a video, portraying a virtual reality of the intangible. This provides for a psychological understanding of place, based upon an intangible city and a futural interaction with the site.

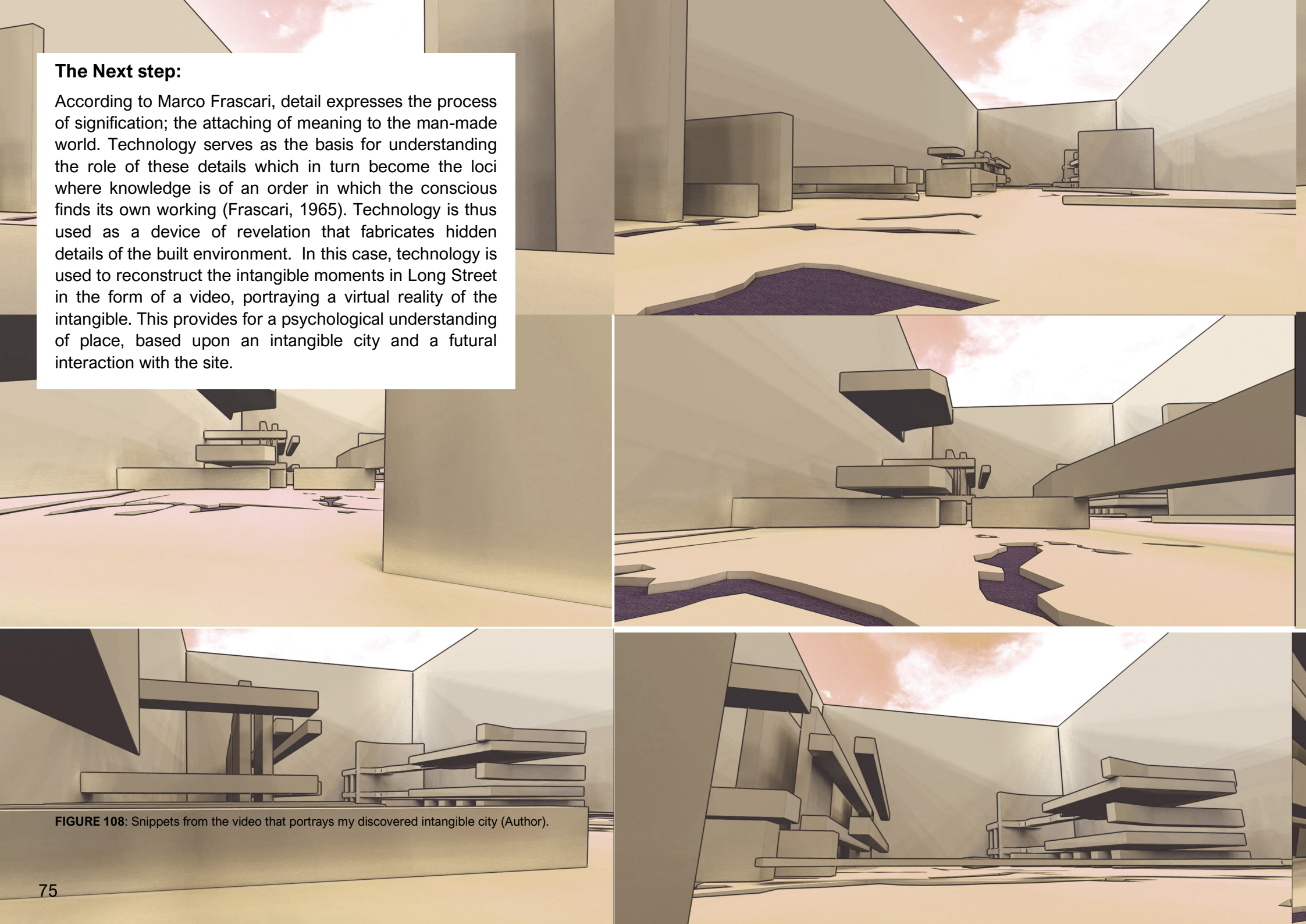
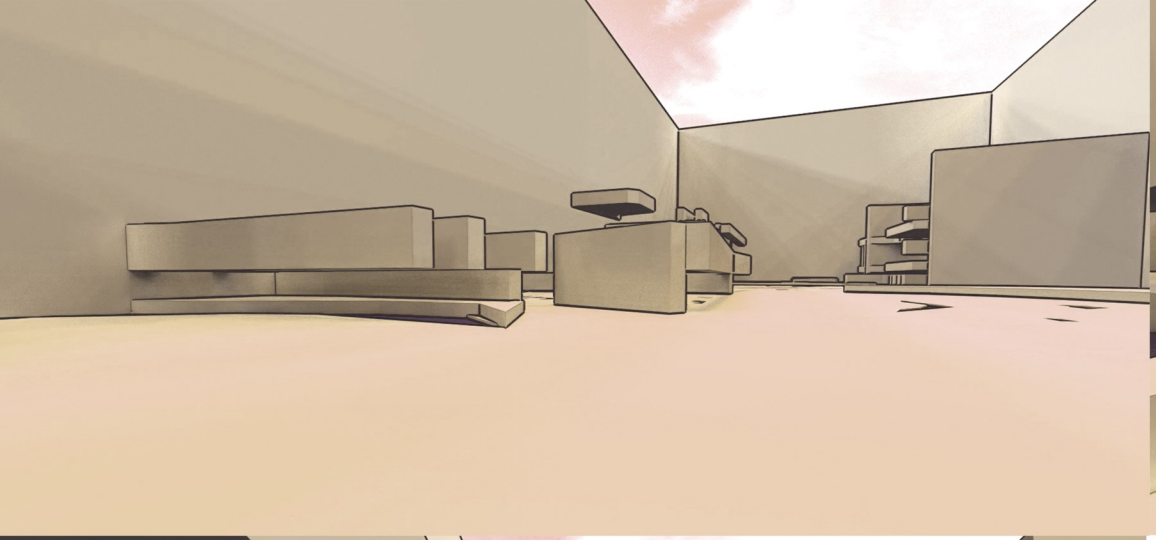
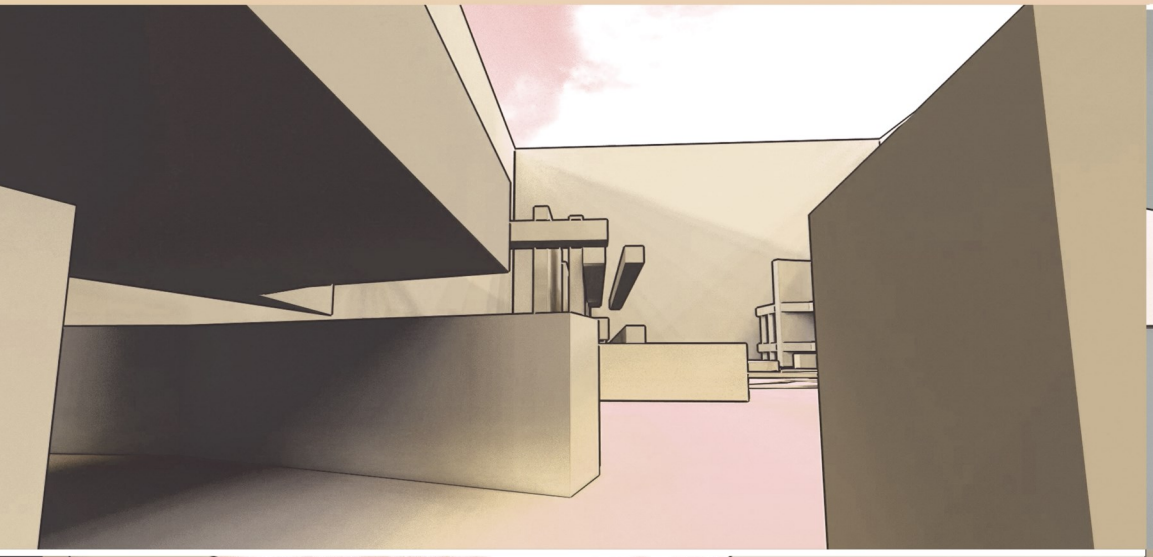
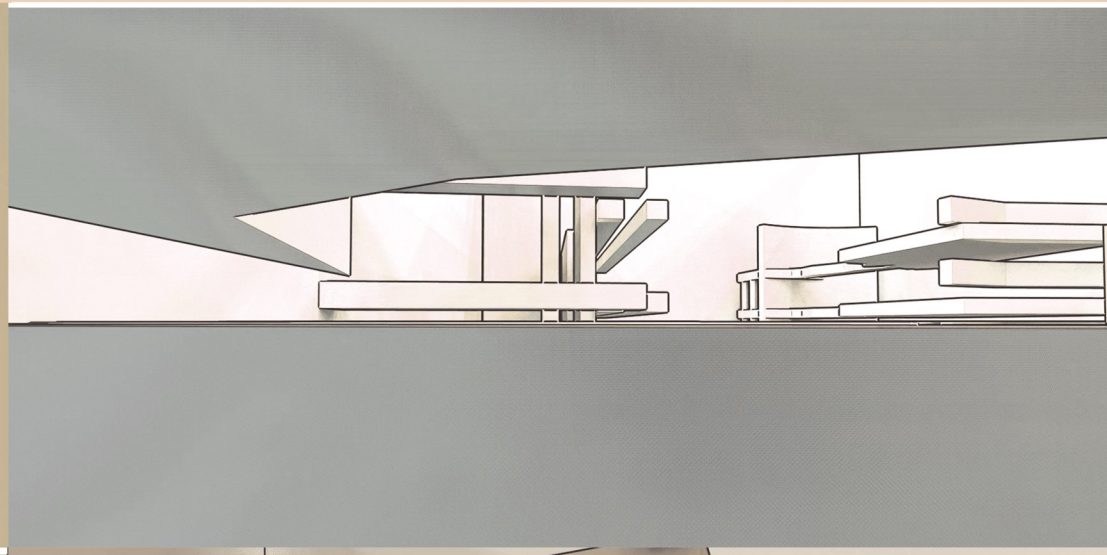
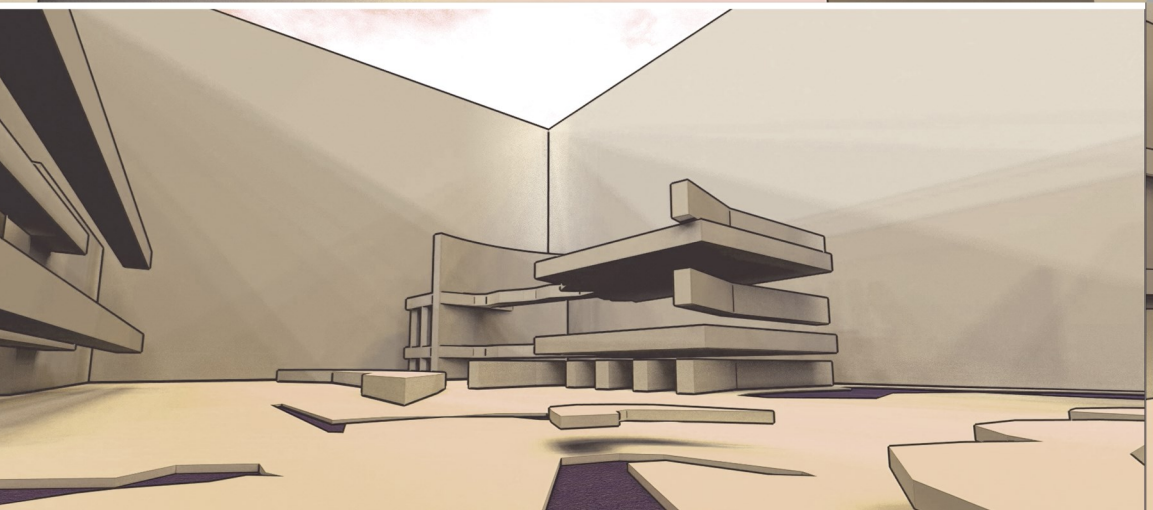


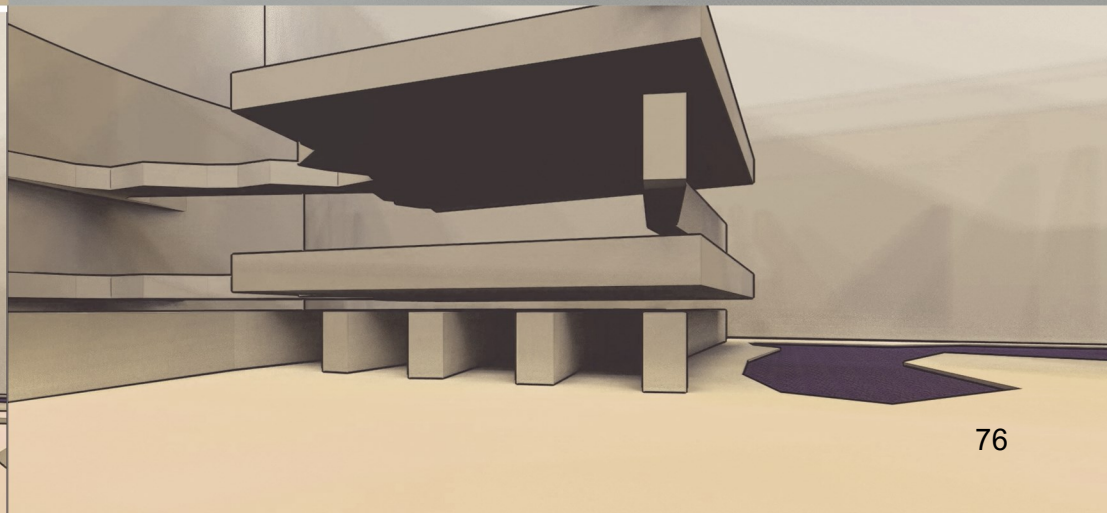
FIGURE 108: Snippets from the video that portrays my discovered intangible city (Author).





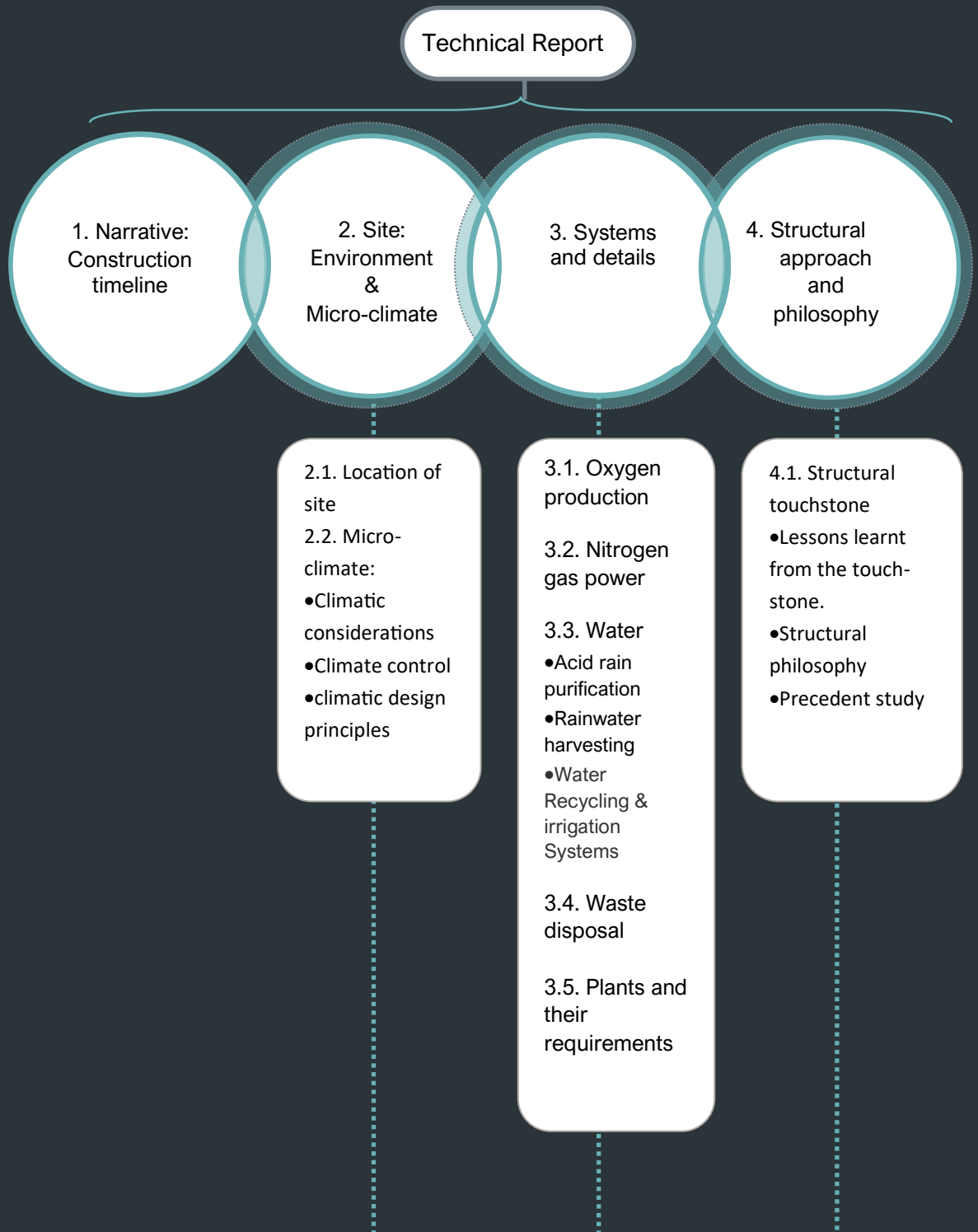




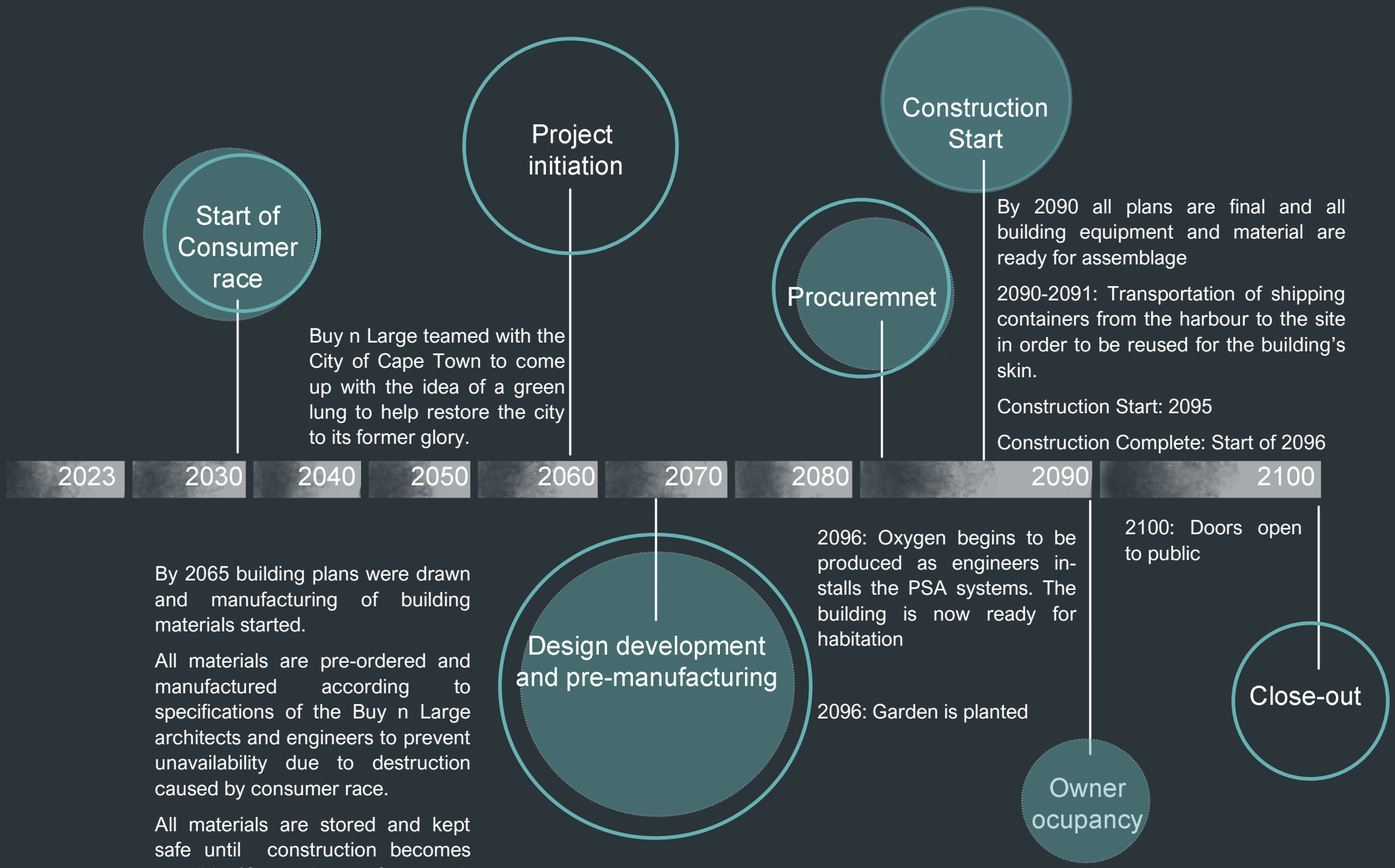


4.8. Technical report

The technical report is an important part of the design approach as it critically analysis the site conditions in terms of environment, climate and material availability, in order to respond appropriately with a technically resolved structural system to enable the building to fulfil its purpose. The structural systems discussed must be most applicable to the invention in terms of function, conceptual philosophy and accessibility. The technical report justifies the viability and structural integrity of my overall design within this fabricated urban scenario.



4.8.1. Narrative: Construction timeline



4.8.2. Site: Environment and micro-climate

By analysing the site's micro conditions, one gains a better understanding of material availability and the building methods best suited for the construction of a building based on its specific location. This will be done by reviewing the immediate **site location** in relation to city resources. To ensure that the intervention remains self-sustainable and energy efficient, maintains comfortable interior atmospheres and protects its users and itself from the harmful environmental conditions and pollutants of the area, the types of pollutants, their effects on the climate along with climatic consideration and the correct application of design principles, materials and specific systems and building requirements to withstand these conditions are explored.

4.8.2.1. Location of site:

The site, as already specified, is Greenmarket Square in the City of Cape Town. It is located in the City Bowl section of Cape Town, adjacent to the major street, Long Street, a prominent connection route from the N1 running along the harbour, into the city. Its central location serves importance for easy collection and transportation of building material in the year when the building's construction begins. All necessary building materials and equipment are transported onto site by construction vehicles and trucks (this was done at the start of construction before materials become unavailable due to exponential rise in pollution and depletion of resources). Weathering steel cargo containers are transported by truck via the route displayed bellow (some arrive whole while others are deconstructed for different component needs). Additional materials such as steel columns and beams, rebars for reinforcement of concrete footings, floor tiles and all specialised structures, systems and components have been pre-ordered and manufactured.

1.	Depart and head **northwest** on **Container Road** • *Private Road*	0,2 km
2.	Make a U-turn to stay on **Container Road** • *Private Road*	0,8 km
3.	Road name changes to **R27 / Marine Drive** • *Gated road*	29 m
4.	Turn **right** onto **R27 / Marine Drive**	0,5 km
5.	Keep **straight** to get onto **N1 / Marine Drive**	0,1 km
6.	Take the ramp on the **left** for **N1** and head toward **Cape Town**	2,8 km
7.	Keep **straight** to get onto **n2**	0,6 km
8.	Road name changes to **M62 / Buitengracht Street** ▲ *Minor congestion*	1,0 km
9.	Turn **left** onto **Shortmarket Street**	80 m
10.	Turn **right** onto **Breë Street**	75 m
11.	Turn **left** onto **Longmarket Street**	0,2 km
12.	Turn **left**	61 m
13.	Arrive at destination The last intersection before your destination is Longmarket Street	

FIGURE 108-109: Container transportation route from Container Depot to Greenmarket Square (Google maps) (Altered by author).

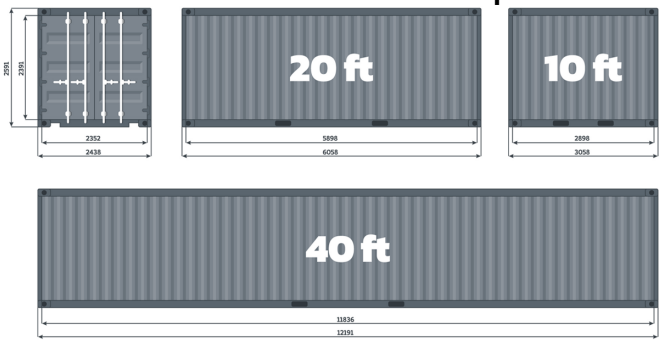
FIGURE 110-111: Container sizes and components to be reused (SCS, 2023) (Altered by author).

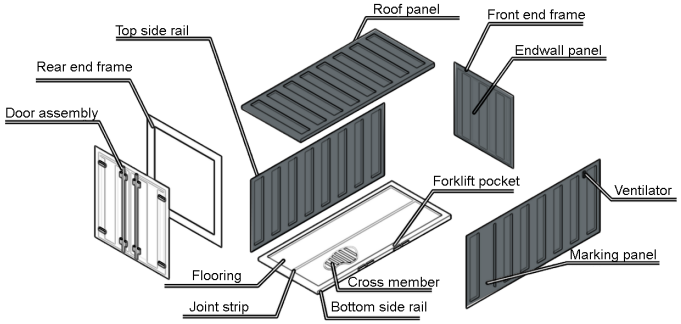
FIGURE 112-114: Methods of container delivery from delivery trucks (SCF, 2023) (Altered by author).

Weathering Steel shipping containers:

Shipping containers from the harbour become the main sources for collection of weathering steel for all cladding on the building. Weathering steel is a sustainable source of material it is recyclable, it can be reclaimed and it is extremely eco-friendly as it releases no toxins or chemicals into the environment. Its surface develops to a stable rust-like appearance from exposure to the natural environment over time, with no maintenance required. By allowing the steel to rust, it forms a protective coating that slows corrosion in the future. Due to its long lifespan, weathering steel saves raw materials, reduces reconstruction, painting, and secondary pollution, and requires no maintenance Khambal, 2022). In atmospheres with higher levels of SO_2 pollution an even greater protective rust layer is formed. While studies into the effect of SO_2 pollution in the atmosphere on weathering steel is scarce, however, if the atmosphere is polluted with SO_2, but not too strongly (>0.09 ppm), then it does promote earlier stabilisation of the rust layers, possibly due to the sealing of internal porosity in the rust by corrosion products formed between SO_2 and copper in the weathering steel (Diaz *et al*., 2011).

Standard container sizes and components:



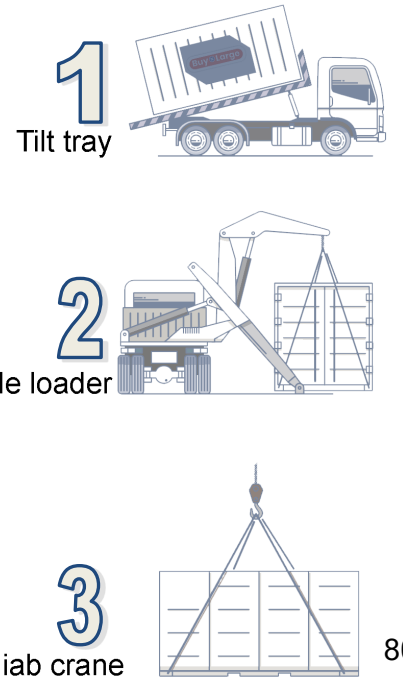


Size and number of panels available for cladding from one standard 20ft container:
2391mm x 5895mm (2 marking panels)
2391mm x 2895mm (1 endwall panel)
2352mm x 5895mm (1 roof panel)

Size and number of panels available for cladding from one standard 40ft container:
2391mm x 11836mm (2 marking panels)
2391mm x 2895mm (1 endwall panel)
2352mm x 11836mm (1 roof panel)

1. **Tilt trays:** Deliver containers off the back of the truck. It is the most common delivery method, however it is not suitable for sites with overhead powerlines.
2. **Side loaders:** Used for 20ft and 40ft containers. Best method for sites with limited space.
3. **Hiab crane:** Used for 20ft containers and sites with limited space. Containers can be easily positioned at an angle or up on a rained area.

How the containers are delivered:



4.8.2.2. Micro-climate:

Climatic considerations

Cape Town's climate before the time of the Great Cloud was a temperate, Mediterranean climate due to its position between the Indian and Atlantic oceans. According to SANS 10400, Cape Town thus used to fall under Zone 4 of the climatic zone map. This meant that Cape town had a temperate coastal climate that experienced mild rainy winters and warm to hot dry and sunny summers. The strong south easterly wind (Cape Doctor) often blew in summer and cooled and cleaned the air. This type of climate require low heating and low cooling energy to bring the internal temperatures of buildings into thermal comfort levels. However, the Great Cloud caused a shift in these conditions. The rise of air pollution within the city has resulted in the following environmental defects and require new climatic considerations to assist this change.

The following tables respectively shows the colour coded categories used to distinguish the amount of pollution in the air compares , how each pollutant is organized within each category based on its concentration and lastly a comparison between the ambient amounts of air pollution in 2023 (as stated in the National Environmental Management: Air Quality Act, 2004 (Act No. 39 Of 2004)) to that in the year 2100, along with climatic considerations. See glossary for units of measurement.

Glossary:

The Air Quality Index (AQI):
A system that reports the level of air pollution and its health effects at a specific location. It measures six air pollutants, including ozone, particle pollution, and four other widespread pollutants. It uses color -coded categories to indicate the risk of breathing polluted air. The pollutants are assorted into a category based on the amount of concentration thereof in the atmosphere. When it comes to determining the concentration of air pollutants in the atmosphere, the units of measurement one would typically see are either mg/m3, µg/m3, ppm, or ppb. These are used in air quality thresholds and air quality indexes to help provide a baseline for what constitutes as clean air and for people to understand the acceptable level of pollutants in the air they breathe.

Parts per million (ppm):
It is a unit of measurement used to express the concentration of a substance in the air.

Micrograms per cubic meter (µg/m3):
One-thousandth of a gram per cubic metre of air

Milligram per cubic meter (mg/m3):
One-millionth of a gram per cubic metre of air

Air quality scale (AQI)					
Good	Moderate	Unhealthy for sensitive groups	Unhealthy	Very unhealthy	Hazardous
0-50	51-100	101-150	151-200	201-300	301-500

Category	AQI	O_3 (ppm) 8-hour	$PM_{2.5}$ ($\mu g/m^3$) 24-hour	CO (ppm) 8-hour	SO_2 (ppm) 1-hour	NO_2 (ppm) 1-hour
Good	0-50	0.000-0.054	0.0-12.0	0.0-4.4	0-0.035	0-0.053
Moderate	51-100	0.055-0.070	12.1-35.4	4.5-9.4	0.036-0.075	0.054-0.100
Unhealthy for Sensitive Groups	101-150	0.071-0.085	35.5-55.4	9.5-12.4	0.076-0.185	0.101- 0.360
Unhealthy	151- 200	0.086-0.105	55.5-150.4	12.5-15.4	0.186-0.304	0.361-0.649
Very Unhealthy	201-300	0.106-0.200	150.5-250.4	15.5-30.4	0.305-0.604	0.605-1.249
Hazardous	301-500	>0.200	250.5-500.4	30.5-1004	0.605-1.004	1.250-2.049

Pollutant	Ambient concentration	Concentration in 2100	Effects on environment	Climatic consideration 2100
PM 2.5 (24-Hour)	25 µg/m3	150.5-250.4 µg/m3	• Reduced visibility (haze). • Make water sources acidic. • Changes the nutrient balance in coastal waters and large river basins. • Depletion of nutrients in soil • Damages farm crops. • Contributes to acid rain effects. (EPA, 2023: Online)	Due to the environmental effects caused by increased pollutants in the air the following climatic changes specific to the location of this scheme have occurred (Western Cape Government, 2022, Online): Temperature: • Higher average annual temperature. • Higher maximum temperatures. • More hot days and more heat waves. • Higher minimum temperatures. • Fewer cold days and frost days. Rainfall: • Reduced average rainfall. • Acid rain • Reduced rainfall results in loss of biodiversity Sunshine: Air pollution absorbs and disperses sunlight and thereby reduces the amount that reaches the Earth's surface. Haze and smog also prevent the sun to deliver energy to Earth's surface in the form of solar radiation (Chinese Academy of Sciences, 2019: Online) Extra: • Rising sea levels • Increased fire risks. • Increase in the frequency and intensity of extreme weather events, including floods, droughts, and storm surges. • Negative impact on food and water security
SO2 (1-hour)	350 µg/m3 (0.134 ppm)	0.089 ppm	• Damage foliage and decrease growth of plants. • Reduce visibility (Haze). • Contributes to acid rain. (EPA, 2023: Online)	
O3 (8-hour)	120 µg/m3 (0.061 ppm)	0.106-0.200 ppm	• Acidification of air, surface water and soil. • Disrupts ecosystems (affects the process of photosynthesis). • Acidification of freshwater lakes and damage to the food chain. • Decreases crop yields. • Degrades materials (rubber), buildings and crops. • Contributes to the greenhouse effect responsible of global warming. (Meersens, 2023: Online)	
PM10 (24-Hour)	75µg/m3	150.5-250.4 µg/m3	• Reduces visibility. • Promote climate change. • Deposition on plants, soil and water and affects the quality. (The science of air, 2022: Online)	
NO2 (1-hour)	200 µg/m3 (0.106 ppm)	0.361-0.649 ppm	• Acid rain • Reduced. visibility (haziness). • Nutrient pollution in coastal waters. (EPA, 2017: Online)	
CO (8-hour)	10 mg/m3 (0.0087 ppm)	12.5-15.4 ppm	• Promote climate change and global warming (land and sea temperature increases changing to ecosystems, increasing storm activity, and causing other extreme weather events) (Breeze Technologies, 2021: Online)	
Annual average AQI	**33 (Good)**	**170 (Unhealthy)**		

Climate control

The climate inside a greenhouse needs to be adapted to the needs of the plants.

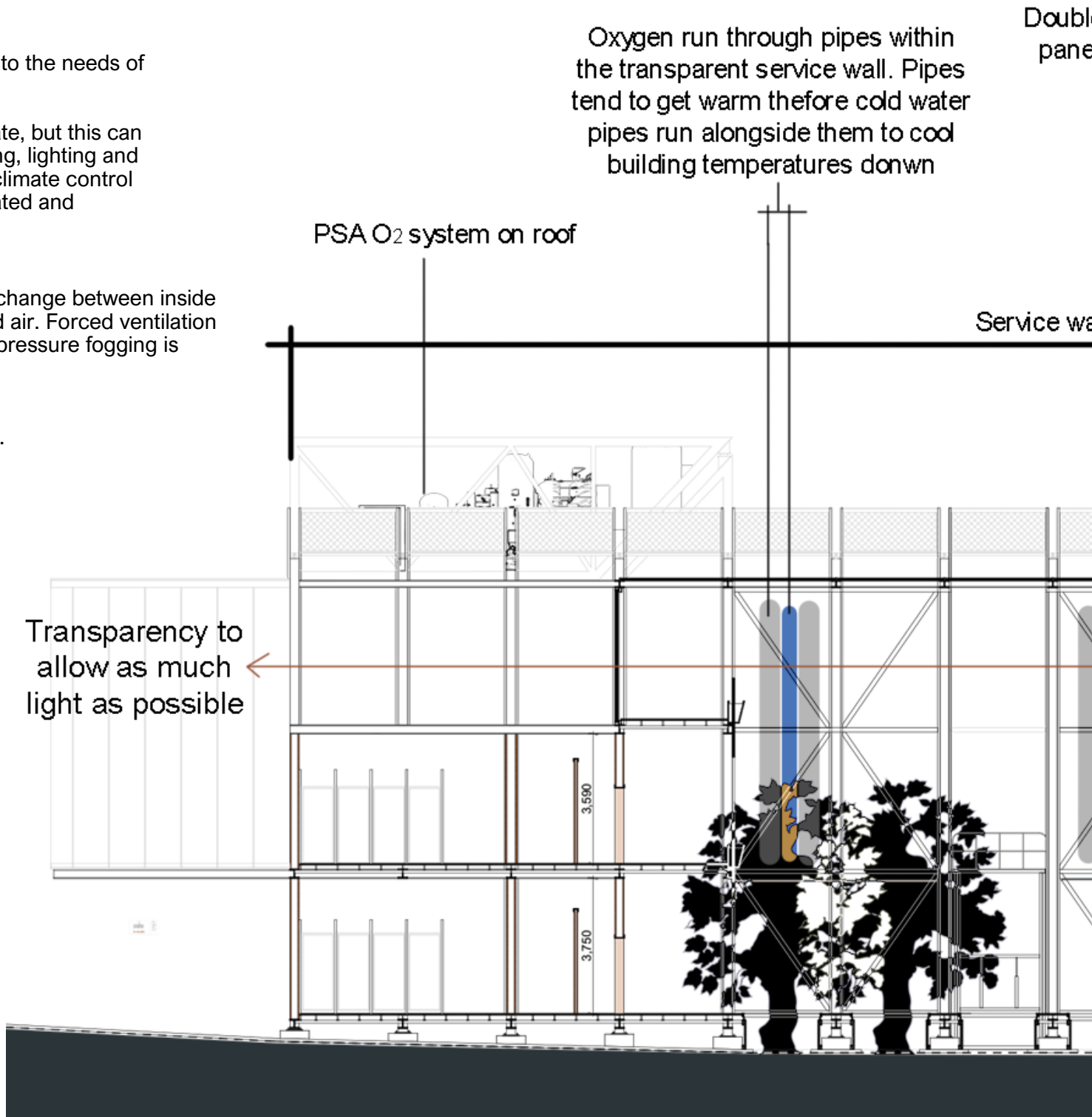
The ambient climate determines the greenhouse climate, but this can be modified by adding systems such as cooling, heating, lighting and Humidification and dehumidification. A computerised climate control automation system maintains all aspects of this generated and controlled internal environment.

Cooling
Natural ventilation through openings to facilitate air exchange between inside and outside conditions are not possible due to polluted air. Forced ventilation or evaporative cooling systems like pad, fan and high-pressure fogging is implemented to reach the desired internal climate.

Heating
Heating systems such heat pumps and tubes are used.

More principles:

- Passive solar heating (without consuming fuels to mitigate pollution).
- Orientation and development of structural system to allow large amount of light to enter the building.
- Insulation of floors, walls and roofs.
- Cross ventilation and development of system/self-adjusting mechanism to allow clean air through the building.
- Use of materials to mitigate pollution and to control heat gain.
- Use of thresholds to prevent direct exposure to pollution.
- Shape optimization of a permeable structure proposed as a windshield to mitigate the strong wind gusts.
- Double glazing, sealants and insulation of frames and fenestration.



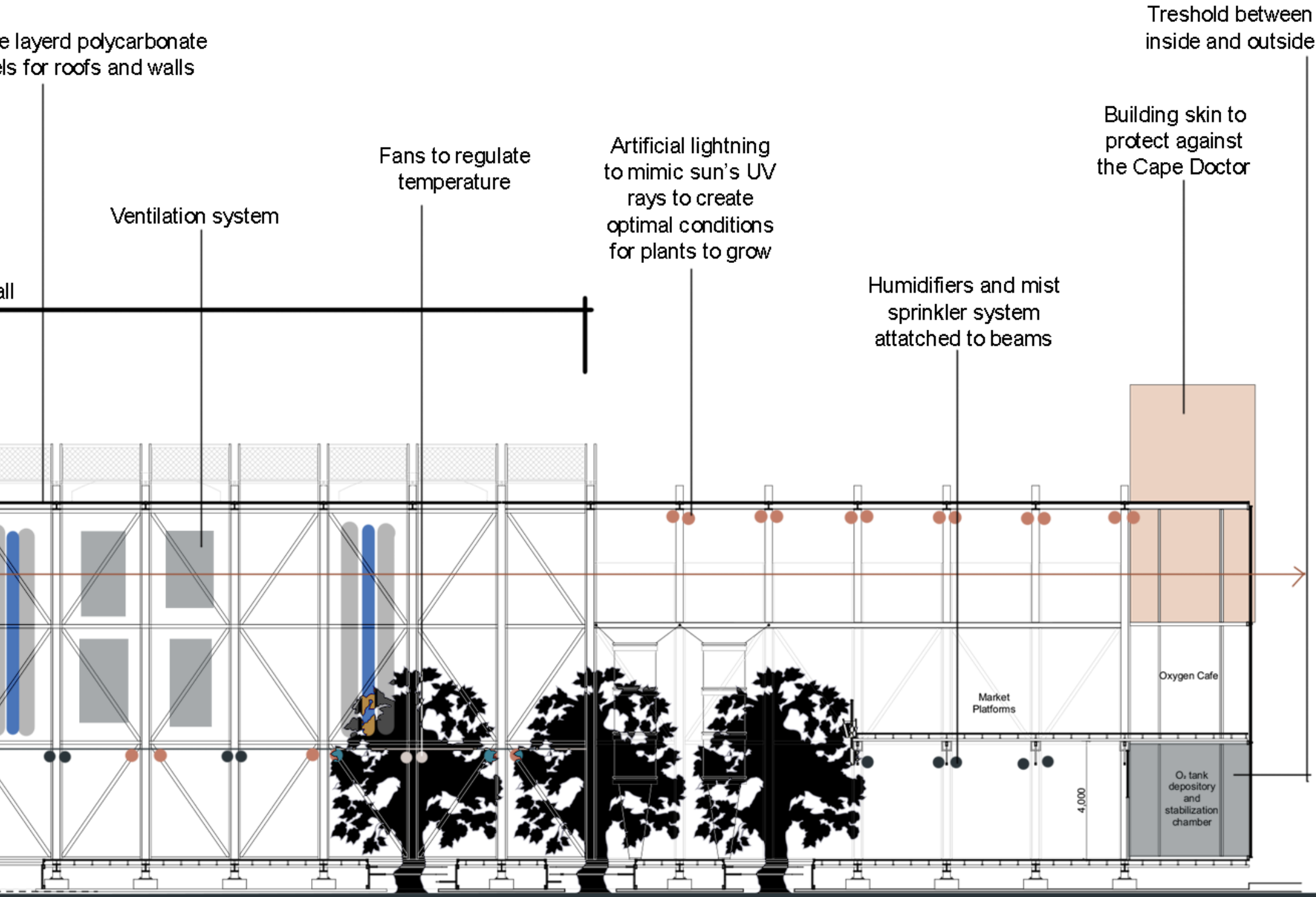


FIGURE 115: Climatic considerations applied to the proposed building (Author).

4.8.3. Systems and details:

Supplier of product:

Foxolution is a South African industry that aids in the manufacturing of onsite oxygen generators, concentrators and systems using PSA technology and will be the main suppliers for this project.

Other Services:

PSA generator maintenance
PSA upgrades, and refurbishments
Calibration of PSA instruments
Oxygen cleaning
Training

Location:

Unit 1, Pine Tree Business Park
Lekkerwater Road
Sunnydale
Cape Town, 7975

4.8.3.1. O2 production plant

Pressure swing adsorption (PSA) oxygen generating plants are a source of medical-grade oxygen and will be the type of system used to generate oxygen for this building.

FOXOLUTION
first oxygen solution

What is PSA?

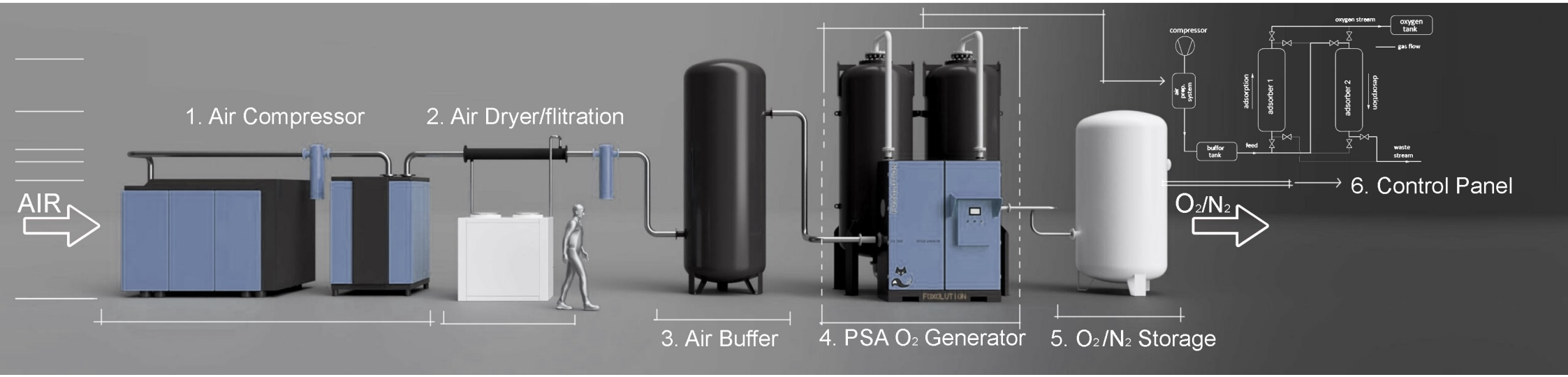
Pressure swing adsorption (PSA) is the process by which ambient air passes through an internal filtration system (molecular sieve made from zeolite granules or membranes) which has a large enough total surface area to separate nitrogen (N2) from the air, concentrating the remaining oxygen (O2) to a known purity. Its components commonly include an air compressor, dryer, filters, dual separation chambers, a reservoir, and controls (WHO, 2020: Online)

How does it work?

PSA oxygen generator plant is a unit designed to concentrate oxygen from ambient air at scale, with output capacity varying according to calculated oxygen demand. Once oxygen has been produced, distribution thereof can take place either by being piped directly from the oxygen tank into the building, or further compressed to fill cylinders via a supplemental booster compressor and a cylinder filling ramp/ manifold (WHO, 2020: Online).

Considerations:

- All medical PSA oxygen generator plants can produce medical-grade oxygen, at scale, 24 hours a day, 7 days a week (WHO, 2020: Online).
- PSA plants can be installed with immediate readiness and is complete with all the necessary equipment and supplies. Specialized training is required by staff operating and maintaining the system (WHO, 2020: Online).
- Strict maintenance schedules are needed to prevent malfunctions (WHO, 2020: Online).
- Adequate supplies and spare parts are needed to allow operations for 5 years in resource-limited settings (WHO, 2020: Online).
- A reliable supply chain for additional needs is necessary. Repairs are carried out by the manufacturer (WHO, 2020: Online).



4.8.3.2. N2 power

As part of the self-sustainable lung, the building is required to produce its own power to keep the engines of the operation running. However, a concern mentioned above, recognizes that solar power will not be enough to power the building as smog and haze prevent the sun to deliver energy to Earth's surface in the form of solar radiation.

Therefore, as the most abundant gas in the atmosphere, Nitrogen gas serves as an attractive source for renewable energy. Researchers in China present one approach to capturing atmospheric nitrogen that can be used in a battery for next generation energy systems. By the year 2100 this prototype will be fully developed and available for use. This rechargeable Li-N_2 battery will be used in conjunction with solar power to run the building's electrical needs. In addition to the battery, a PSA nitrogen generator will also be included into the system to extract large amounts of nitrogen from the atmosphere for the battery (see figure 117).

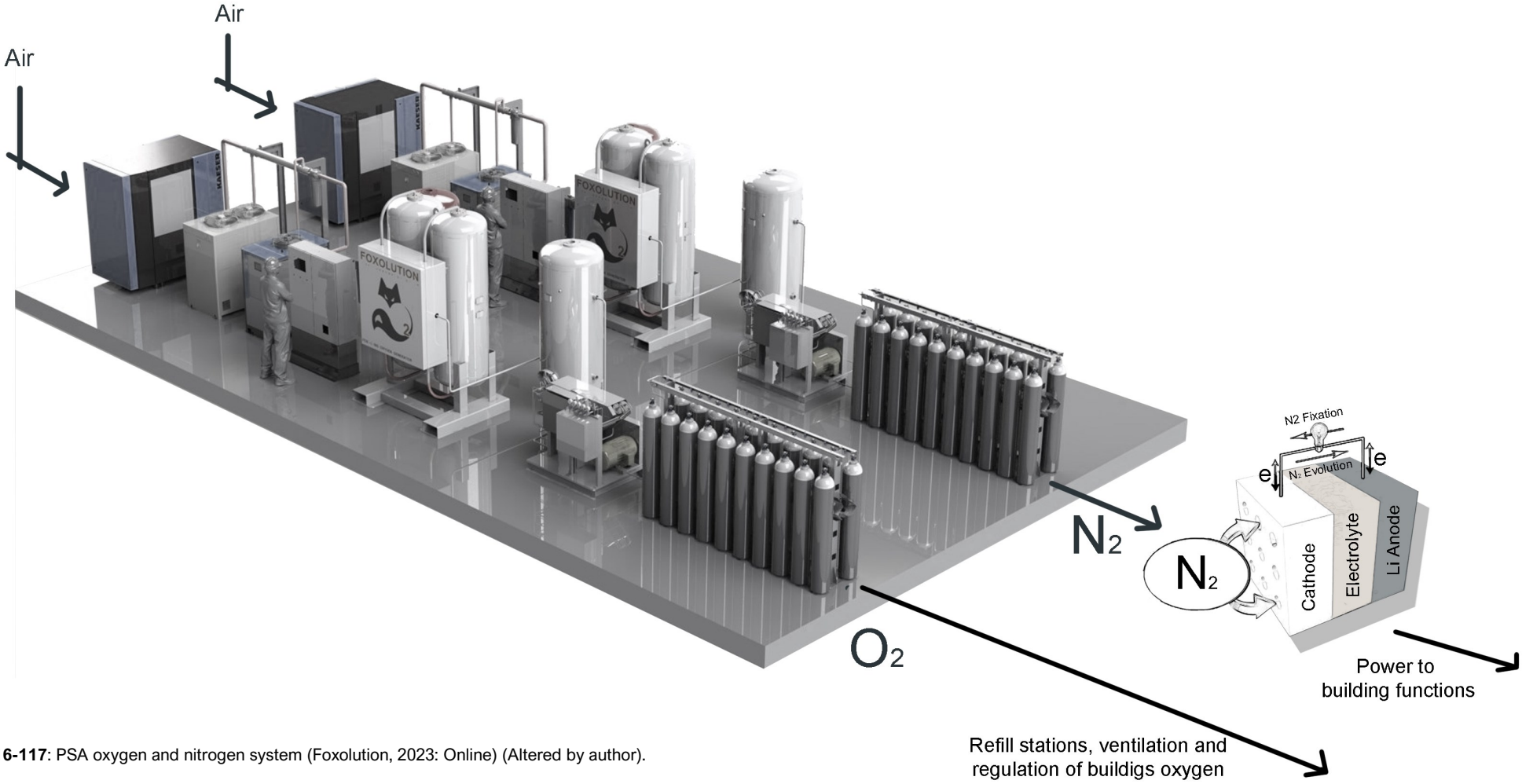


FIGURE 116-117: PSA oxygen and nitrogen system (Foxolution, 2023: Online) (Altered by author).

4.8.3.3. H_20

Within this hypothetical situation, water remains the most vital compound for all known forms of life. The building is however not dependent on the city's municipal water supply as its upkeep and services have been neglected and deserted. The building makes use various methods of water collection, purification, and irrigation to quench the thirst of all life within the bubble. It is important to keep in mind that rainwater has become acidic due to the surge of pollution along with a reduced annual rainfall. Water security is thus scarce and the water that is collected must be used sparingly and efficiently.

Rainwater harvesting

Rainwater harvesting systems make use of technology that collects and stores water for non-potable use as well as for human consumption.

Once the collected water leaves the external pump it passes through a filtration system that removes all harmful acids so the water can be safe to use by users and plants.

Recommendations (Ogale, 2023: Online):

- All pipes and openings must be insect-proof.
- Wire mesh screen covers are usually used over tank inlets, however due to acidity in the water an alternative of nylon mesh filter covers must be placed on all tank inlets to prevent debris from entering and corrosion of metal wire mesh.
- Outlet taps and draw-off pipes must be a minimum of 10 cm above the tank floor to avoid drawing out any sludge that may have collected in the water supply.
- Collection surfaces and tanks should be made from nontoxic and noncorrosive materials.
- A sump pump and washout pipe to remove sludge and regular cleaning of the inside surfaces of the tanks are highly recommended.

1. Collection area
2. Gutter
3. Rain head
4. First flush diverter
5. Nylon tank screen
6. Tank
7. Tank gauge
8. Overflow
9. Internal pump
10. External pump
11. Filtration/ chlorination

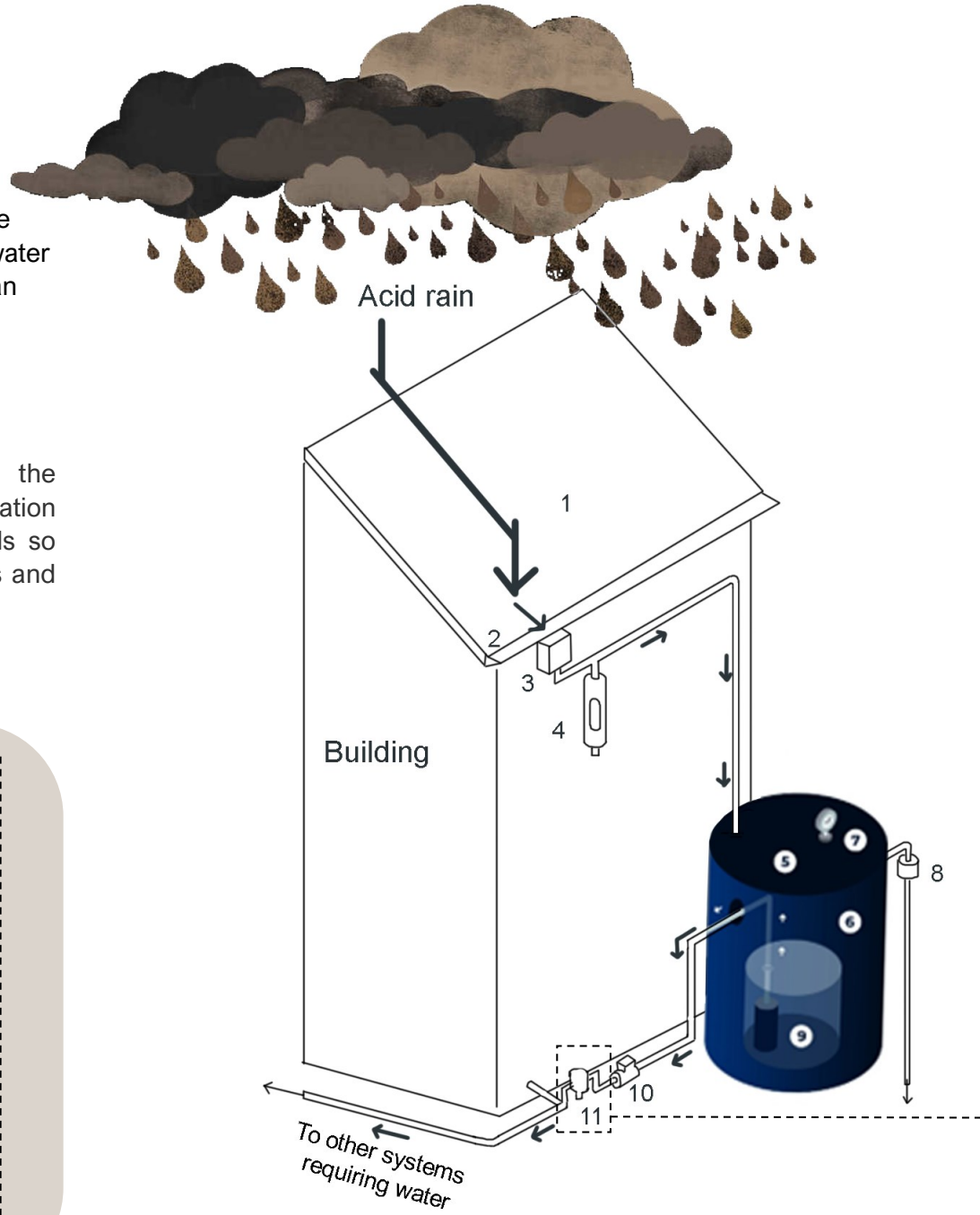


FIGURE 118: Water collection system (Author).

pH: The “potential of hydrogen".

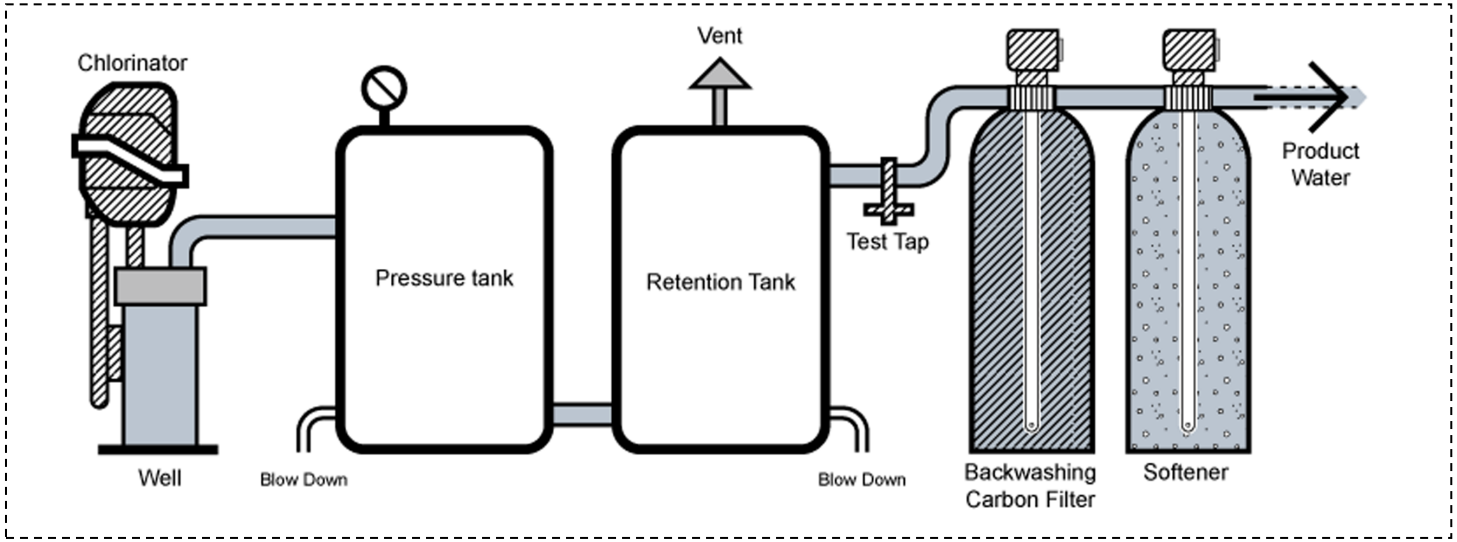
It is a scale used to specify the acidity or basicity of an aqueous solution. Acidic solutions are measured to have lower pH values than basic or alkaline solutions.

Acid rain purification

Acid rain occurs when sulphur dioxide and nitrogen oxides are emitted into the atmosphere and dissolves in water. Water is also contaminated when dust and smoke that contains large amounts of sulphur dioxide and nitrogen oxides settle on surfaces. These gases convert to acids when they encounter water (SDWF, 2017: Online) and the acidity thereof can vary. It is important to note that pure water has a pH of 7 and normal rainwater has a pH around 5.6. In Cape Town 2100, the rainwater has a pH of (See pH scale).

Two problems thus arise. Firstly, water becomes harder to disinfect due to its low pH (the lower the pH the more acidic and the higher the pH, the more basic) and second, if acidic water is transported via metal pipes, the danger of pipe corrosion may occur as metals may dissolve into the water. For a pH less than 8.0 effective chlorination is necessary.

Dry pellet chlorination process



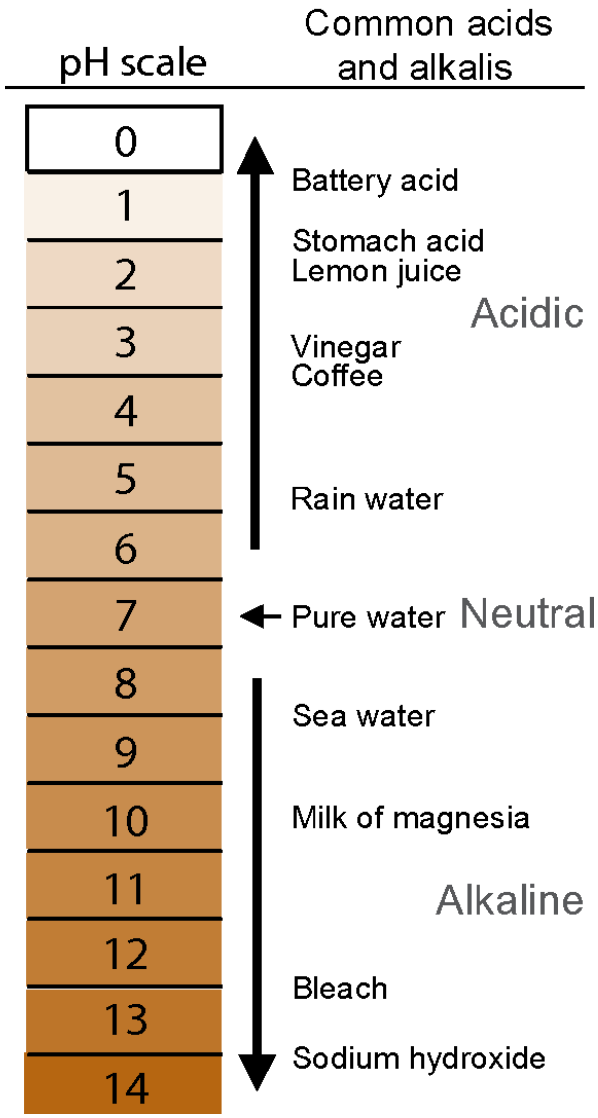
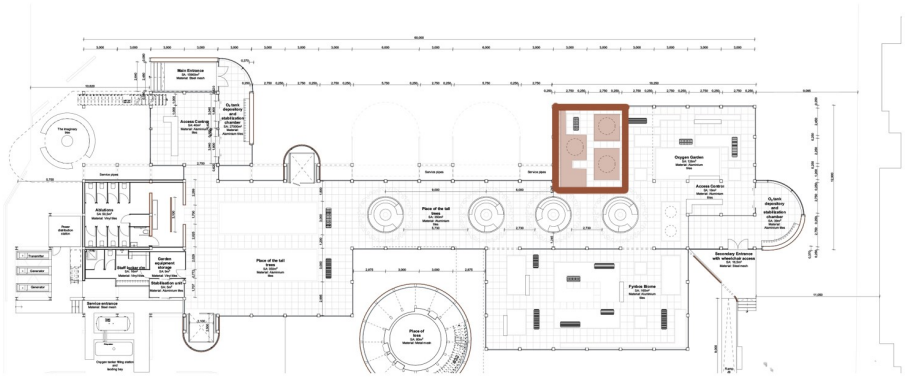


FIGURE 119-120: Chlorination process and pH scale (Author).

Water Recycling & irrigation Systems

FIGURE 119-120: Water recycling and irrigation system used in the proposed building (Author).



4.8.3.4. Waste disposal

As already made evident, water scarcity is a problem within this scheme. Therefore, to minimize the load of water availability, a vacuum system for waste removal is used. Waste is held in special tanks located outside of the building and is moved by specialized tankers and discharged into specifically made and demarcated sites that treats human waste by a biological process called composting. This process leads to the decomposition of organic matter and turns human waste into compost-like material.

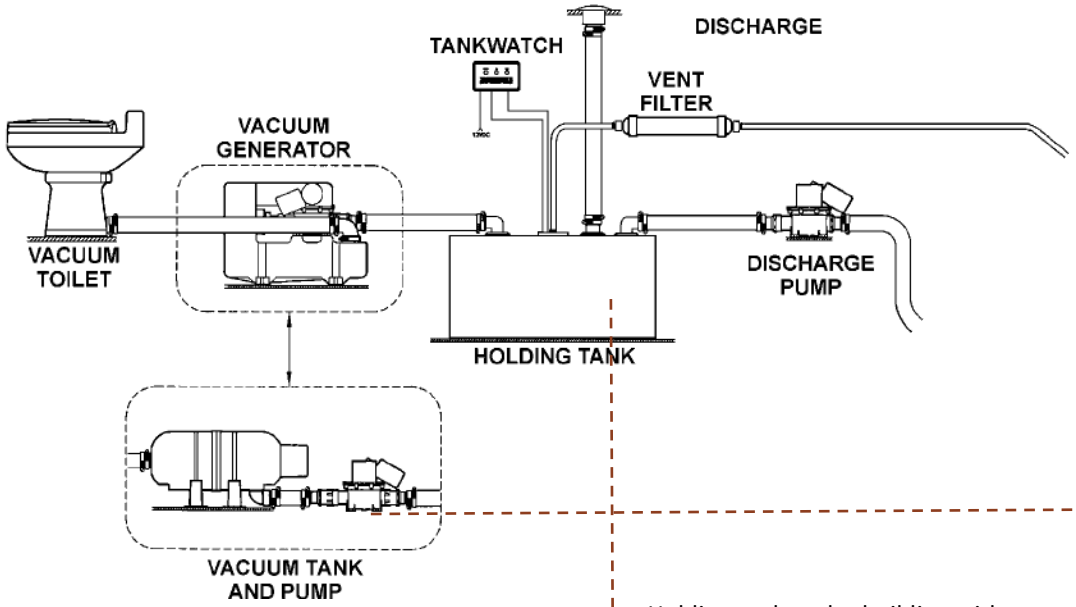


FIGURE 121: Waste disposal system used in the proposed building (Unknown, 2023. Online).

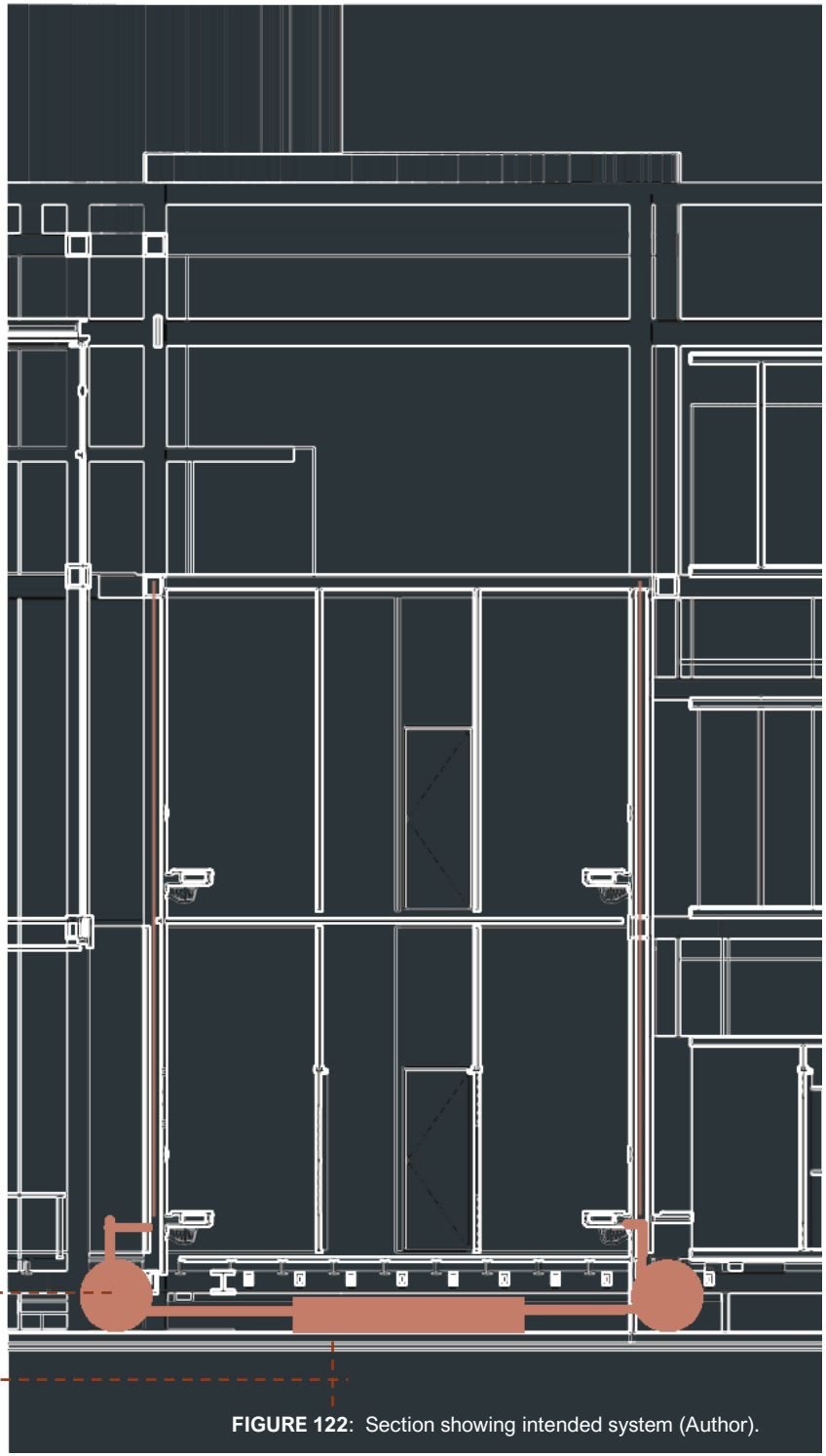
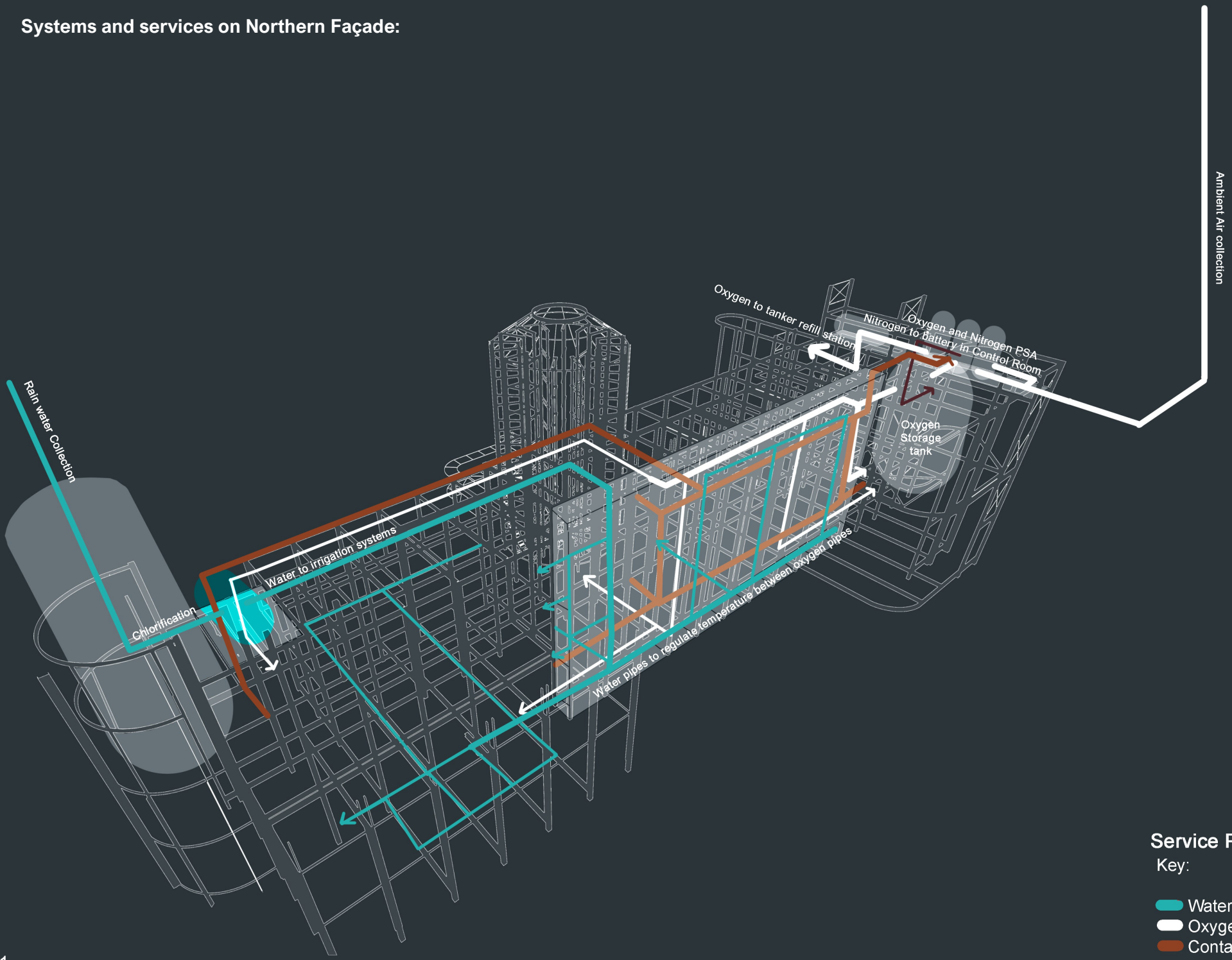


FIGURE 122: Section showing intended system (Author).

Systems and services on Northern Façade:



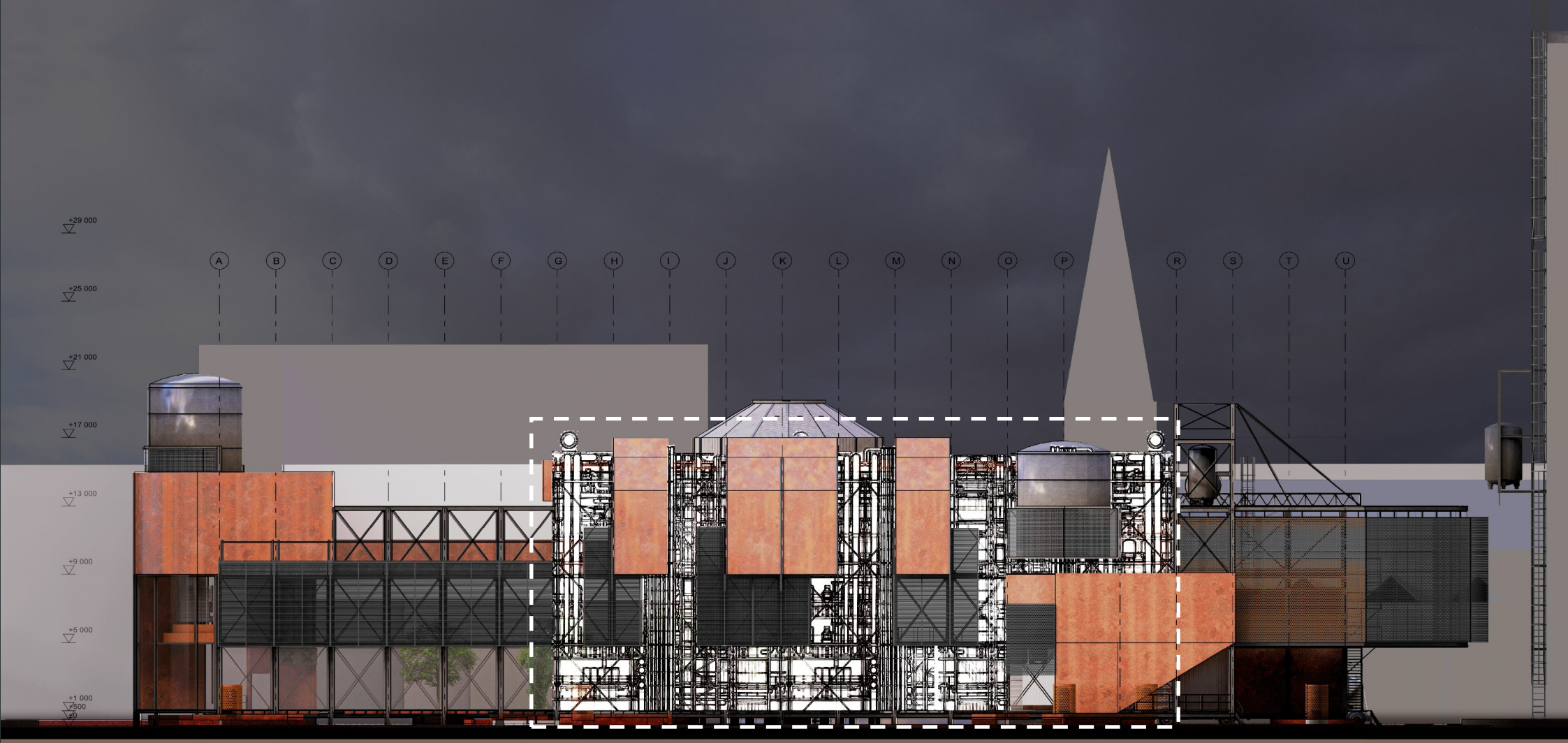
Service Pipes:

Key:

- Water
- Oxygen
- Contaminated Air
- Nitrogen

The breathing machine: A symbiotic relationship between temporality and technology

Infrastructure is typically invisible and inhabits places of no-space. most buildings aims to cloak these zones and hide them however, the oxygen plant aims to do the opposite. Instead of hiding the infrastructure and systems that run this building, the facades screens and frames them. The screens and louvres on the northern façade dances with the equipment it means to hide, teasingly covering and elaborating them at the same time.



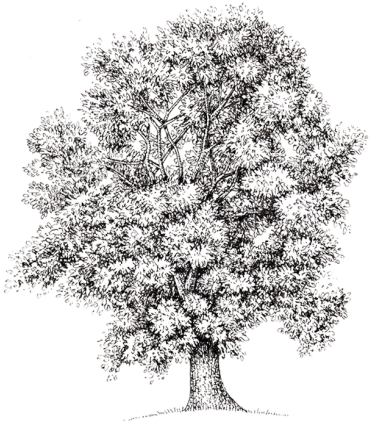
North Elevation

4.8.3.5. Types of plants and their requirements

Place of the tall trees

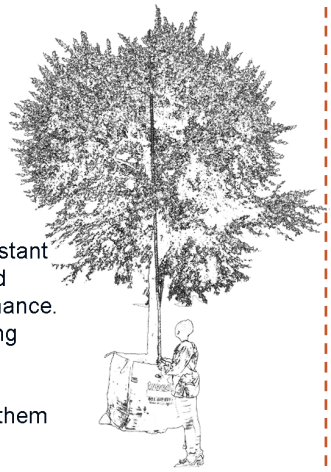
The following trees are native to the Western Cape and will be planted inside of the Green Lung.

Cape Ash *(Ekebergia Capensis)*



-Evergreen
-Edible fruit
-Full sun, semi-shade
-Average growing speed
-12-15m high
-Good for public areas
-Clay/acid sand
-Roots not agressive

False Olive



-Evergreen
-Frost hardy and drought resistant
-Grow in most soils but added compost will improve performance.
-Must be pruned after flowering
-Fast-growing tree
- 4 m high
-Acid and clay sand, making them ideal for the Cape soil.

Oxygen garden

The following plants used within this section are considered as the highest oxygen production plants.

Chinese Evergreens
-Bright, indirect sunlight
-Ample humidity
-Moist soil

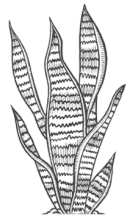
Aloe Vera
-Bright, indirect sunlight
-Dry soil, little water

Boston Fern
-Bright, indirect sunlight
-Ample humidity
-Moist soil

Areca Palm
-Bright, indirect sunlight
-Moist soil
-Little water

Jade Plant
-Bright, indirect sunlight
-Dry soil, little water

Snake Plant



-Water fortnightly, or when the top two inches of soil feels dry
-More sunlight is better, but anything is fine
-Warm spot, ideally above 10°C

Peace Lily
-Low light
-Consistently moist soil

-Bright, indirect light
-Watered fortnightly,

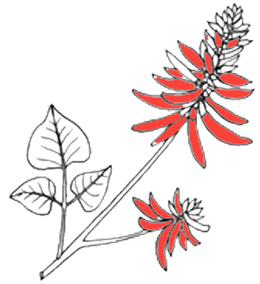
Pothos

Fynbos biome

The following plants make up some of the indigenous vegetation found in the Western Cape.

Metalasia Muricata
Blombos
(Goukamma)

-Full sun
-Sandy and well drained soil
-Tolerate acidic soils
-Water wise



Erythrina lysistemon
Coral tree

-Little water
-Aerated and well-drained soil
-Undemanding

Brunsvigia orientalis
King's candelabra

-Full sun
-Water wise

Yellow Leucospermum
Protea Pincushion

Paintbrush Lily

-semi-shade or even full shade
Well-drained soil

-Full sun
-Well-drained, acidic soil

Dietes iridioides
Wild Iris

-Full sun
-Little water
-Well-drained soil

Protea cynaroides
King Protea

-Well-drained, sandy soil
-Full sun
-Little water

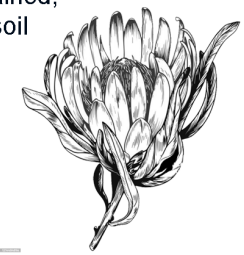


FIGURE 123: Very early section of my proposed design showing the idea of an urban greenhouse (Author).

4.8.4.1. Construction touchstone:

- The combination between **the uncanny** and parasitic architecture

- The idea of constructing the intangible.
- Latches onto existing site
- Multiple skins (layers of recycled material) .
- Light primary structure with secondary structure sculpted around it.
- Mechanical systems always visible and forms part of the design.
- Existing buildings and site become ghostly reminders of the past.

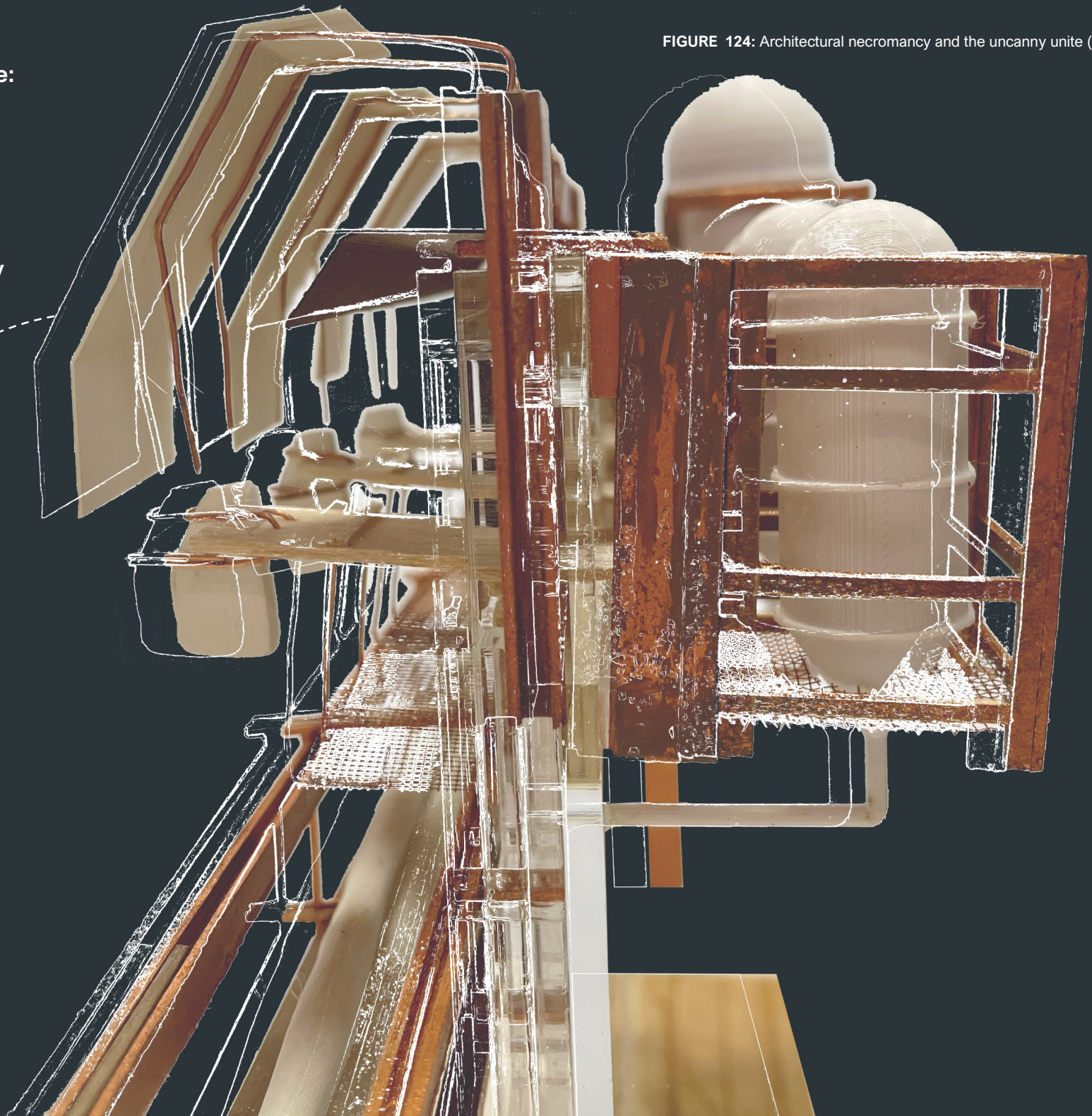
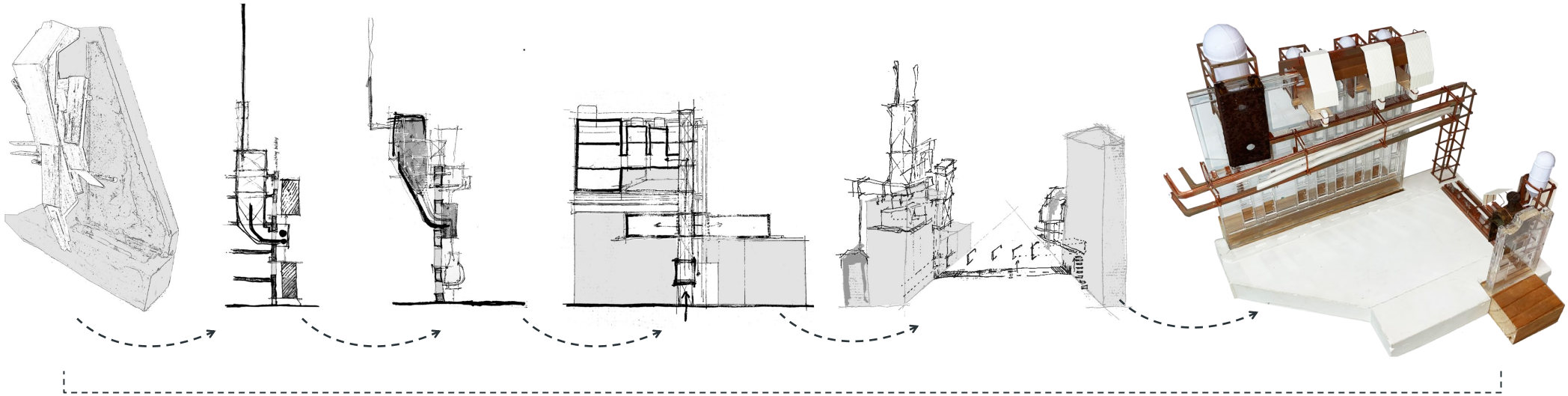


FIGURE 124: Architectural necromancy and the uncanny unite (Author).

FIGURE 125-130: Development of concept into construction (Author).
FIGURE 131-135: Initial explorative drawings (Author).



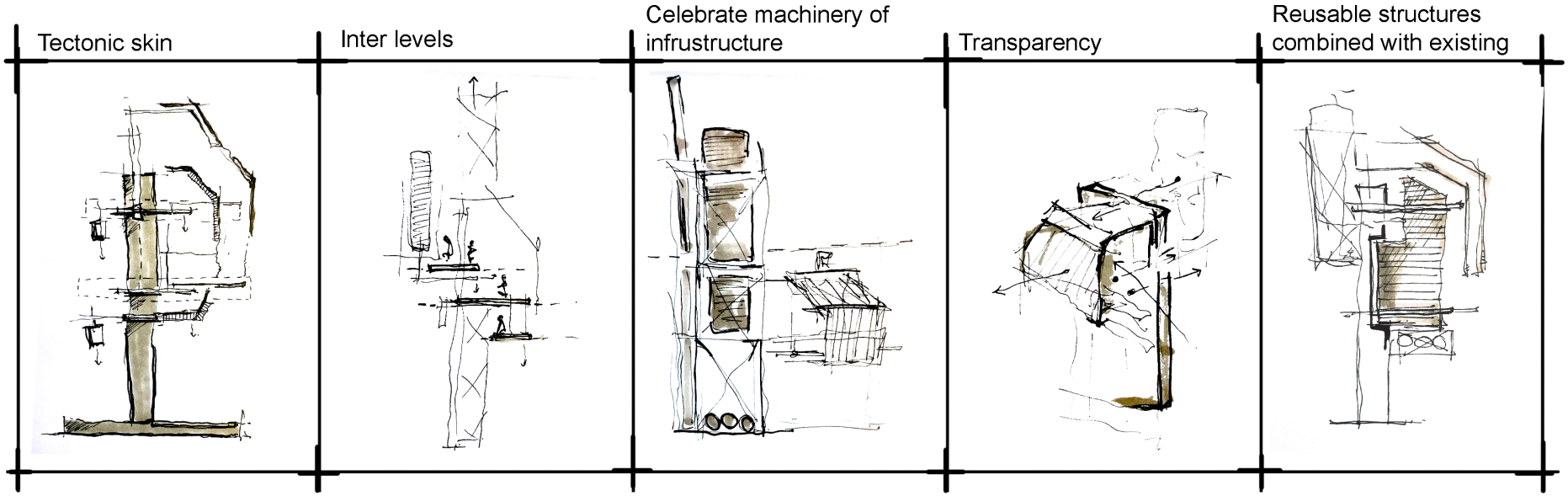
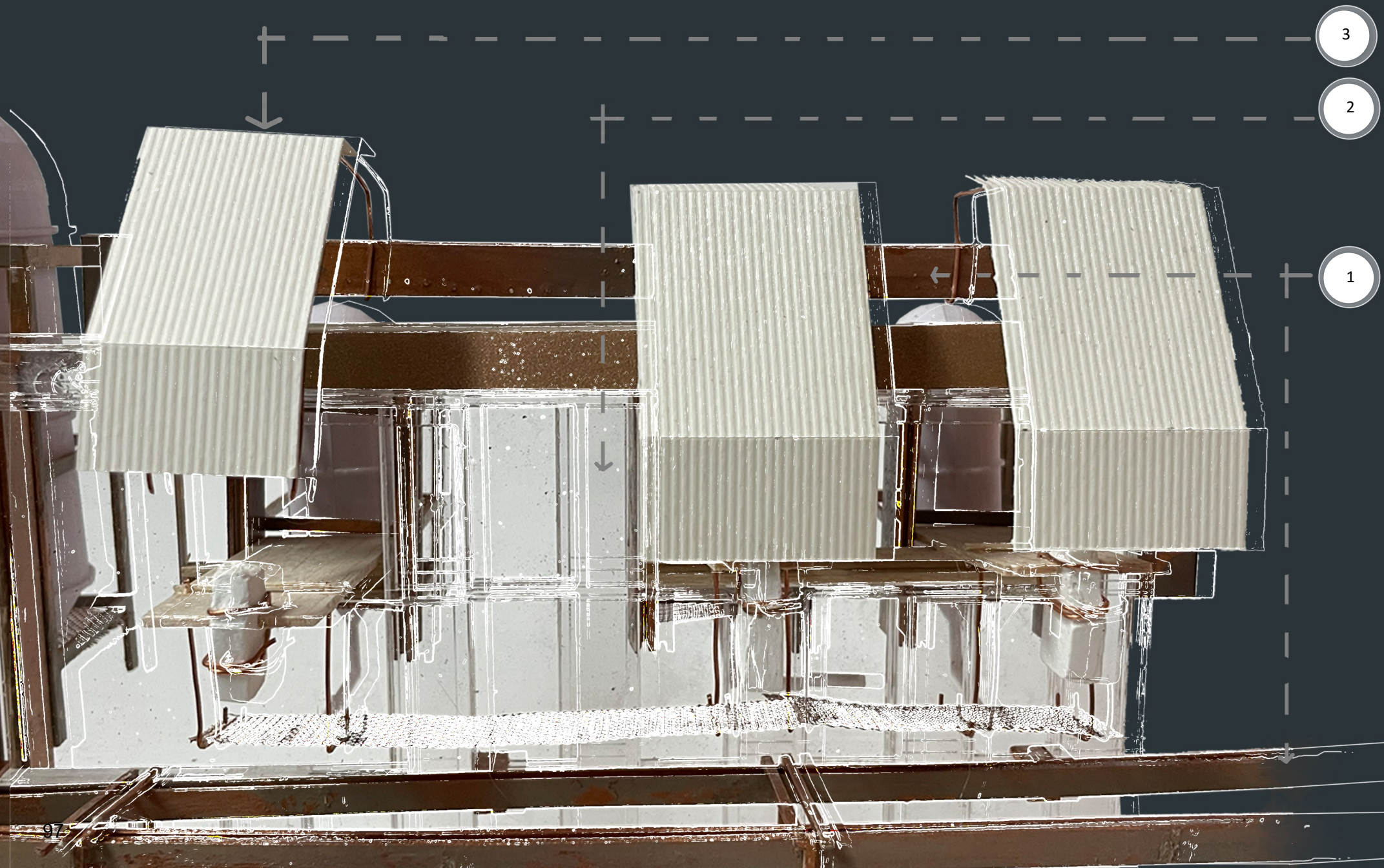


FIGURE 136: Structural philosophy (Author).



• *Construction touchstone*

Structural approach and philosophy

The structural touchstone was developed by merging the three original design concepts and the hints of structural nuances they possess. The connections present between structural components on the design touchstone also provided clues on how to attach the new proposed design onto the existing buildings on site. The touchstone further explored three major themes of potential space-making:

1. **The luminosity framework** : The entire building is metal grid, that appears light and bright as it floats on the square. The metal framework is not concealed and is covered in transparent polycarbonate panels. The joinery and workmanship of the steel structure is highlighted and celebrated.

2. **The presence of absence** : The transparency of the building allows for panoramic views of the buildings surrounding the square. This serves as a constant reminder of what humanity has lost.

3. **Illusions of Impermanence**: The cladding is made from weathering steel, reused and recycled from abandoned shipping containers. The patina forming on its surface creates the illusion that it is nearing its end, when in fact, it is only becoming stronger and more beautiful with the

Structural approach and philosophy: Working with existing buildings

Heritage vs non-heritage:

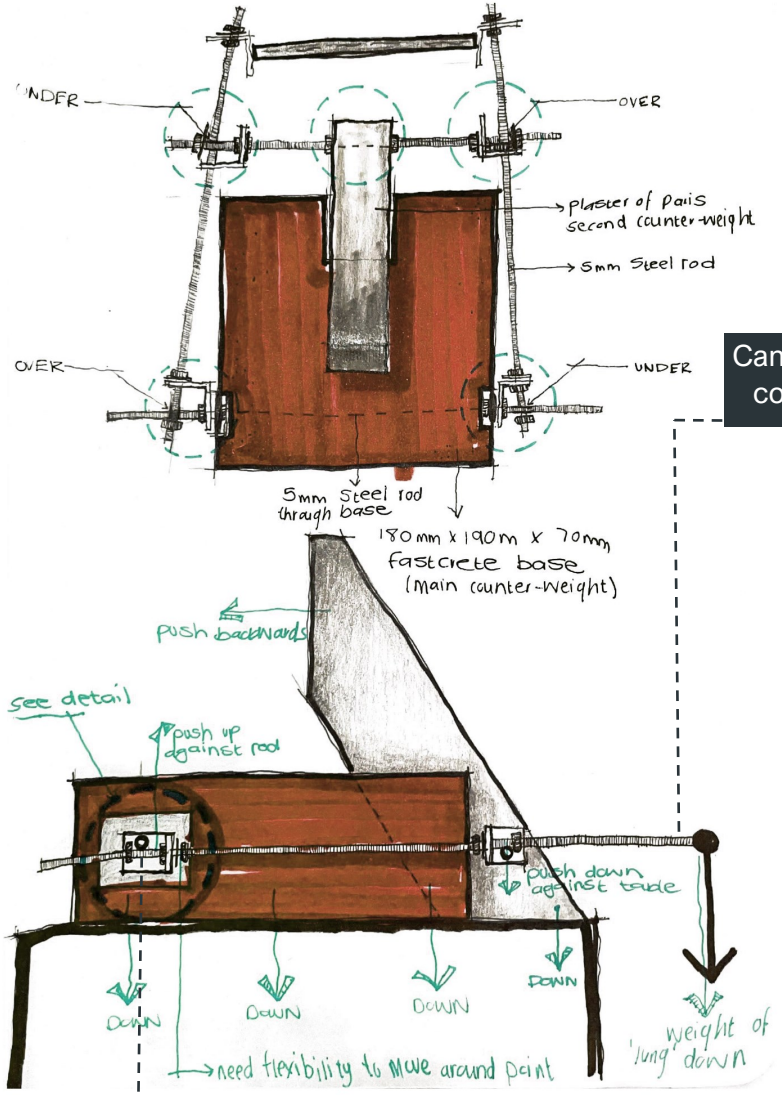
The buildings in Long Street are both heritage and non-heritage, modern buildings. This will affect the design and structural approach, despite the dissertation being positioned within in a hypothetical future scenario. This approach will not be determined based on a heritage impact assessment as in this predicted future, many buildings have lost their heritage value and have become neglected and abandoned. This approach is however governed by the theoretical concept of temporality. Temporality refers to the idea of a linear progression of past, present, and future. Therefore, the proposed design must respond sensitively to the heritage building in order to protect the memories of the past. These buildings reference a time before the great cloud of pollution covered the city of Cape Town and therefore carries great significance in the narrative of the intervention.

ReUrbanism as a strategic response:

How the reuse of historic buildings can bring social and economic benefits to cities. This approach promotes identity and sustainability, enhances walkability, and advances a network of social creativity. The ambitions associated with this urban strategy details how the reuse of historic buildings can bring human, social, ecological and economic benefits to cities.

Principles:

- Older places provide the distinctiveness and character that engender success.
- Preservation is adaptive reuse. Adaptive reuse is preservation.
- Preservation is about managing change.
- Cities are for people, not vehicles.
- The greenest building is the one that's already built.
- Every community has stories and places that matter.



Cantilever system inspired by the conceptual design touchstone

• *Construction touchstone*

Lessons learnt

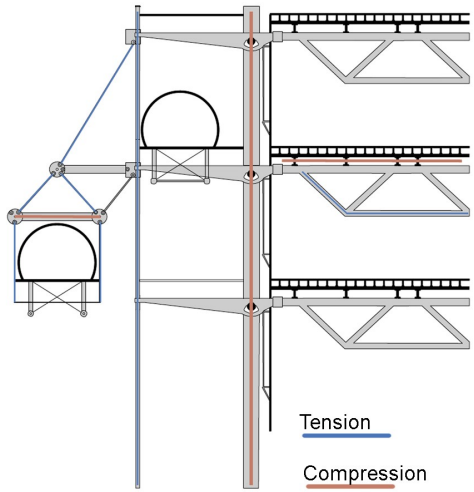
- **Celebrate services, do not hide them**
- **Building skins are sculptural not flat**
- **Memories found in existing materials and provides an additional layer of narrative to the model.**
- **Dialog between transparency and solid forms.**

Precedent: Centre Pompidou

The structural system of the Centre Pompidou is fundamental to the success of the building. In order to achieve the concepts of uninterrupted, 48x150m floorplates, over 6 levels, a balanced cantilever system was used along with a special designed bracket, named a Gerberette. The Centre's structural system comprises out of the following:

Structural system

- 48x150m floorplate supported by two rows of columns on either end of building.
- Simple bracket on the inner column will support the entire width of 48m floorplate and outer column support 6m between 2 columns.
- Huge inner column and girders
- Cantilever: At one end the cantilever support floor trusses, the pivot around pin joints on main support column, outer arms held in tension by external trusses , tying structure down.
- Share load of 48m floor and reduce depth of girder.



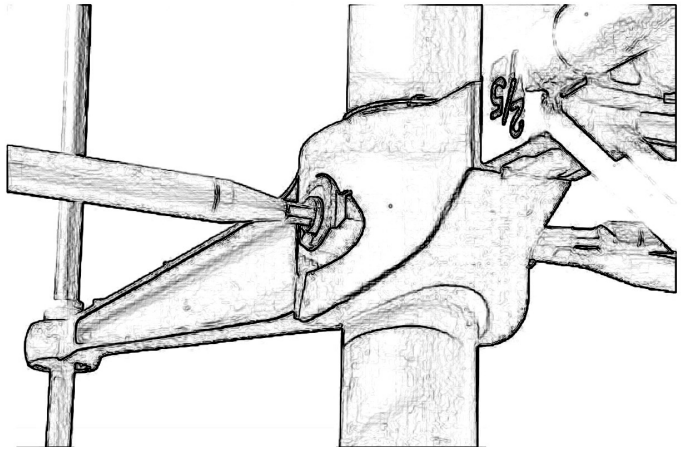


FIGURE 138: Drawing of the Gerberette (Gingrich, 2023: Online)

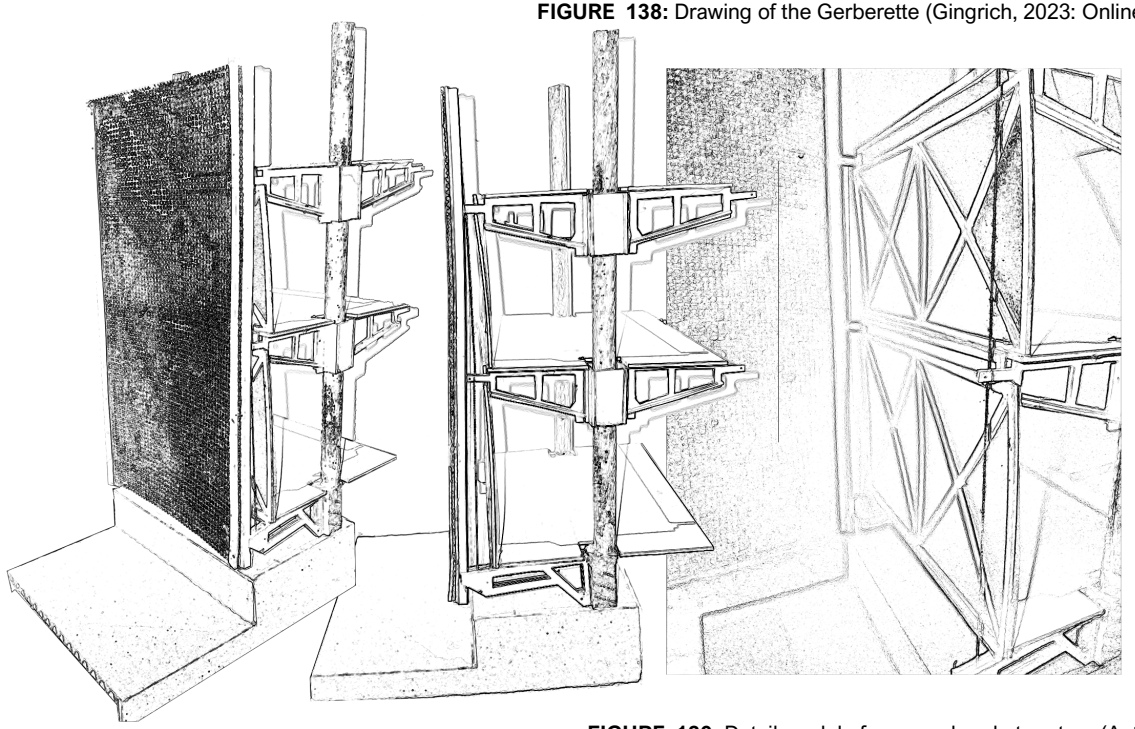
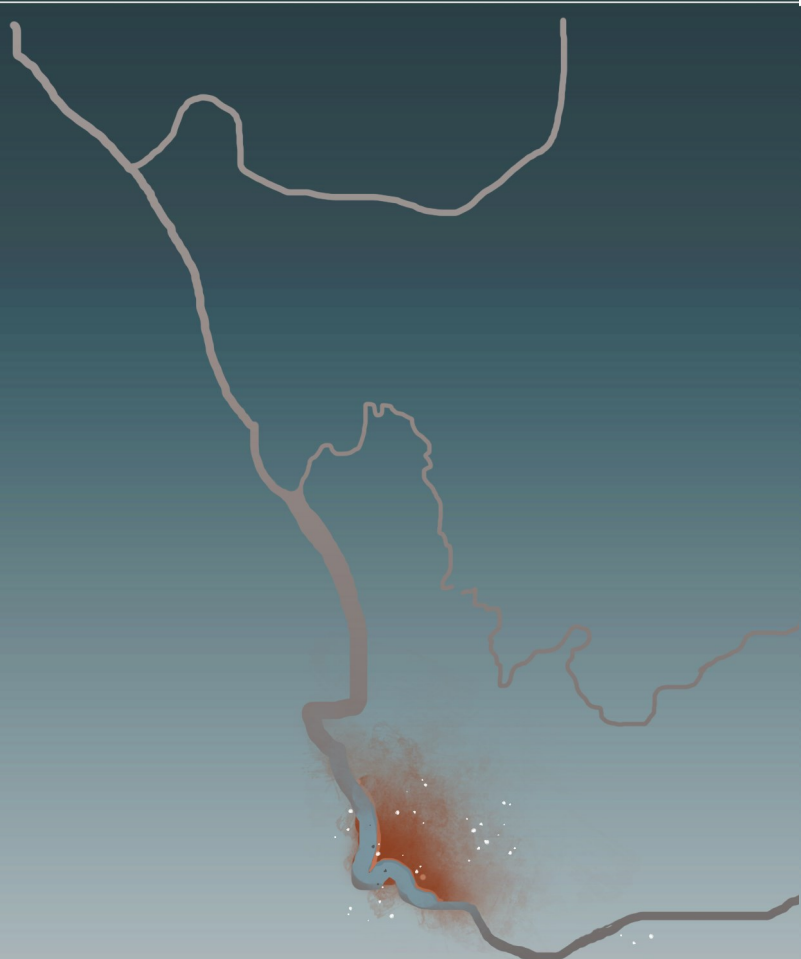


FIGURE 139: Detail model of my own bracket system (Author)

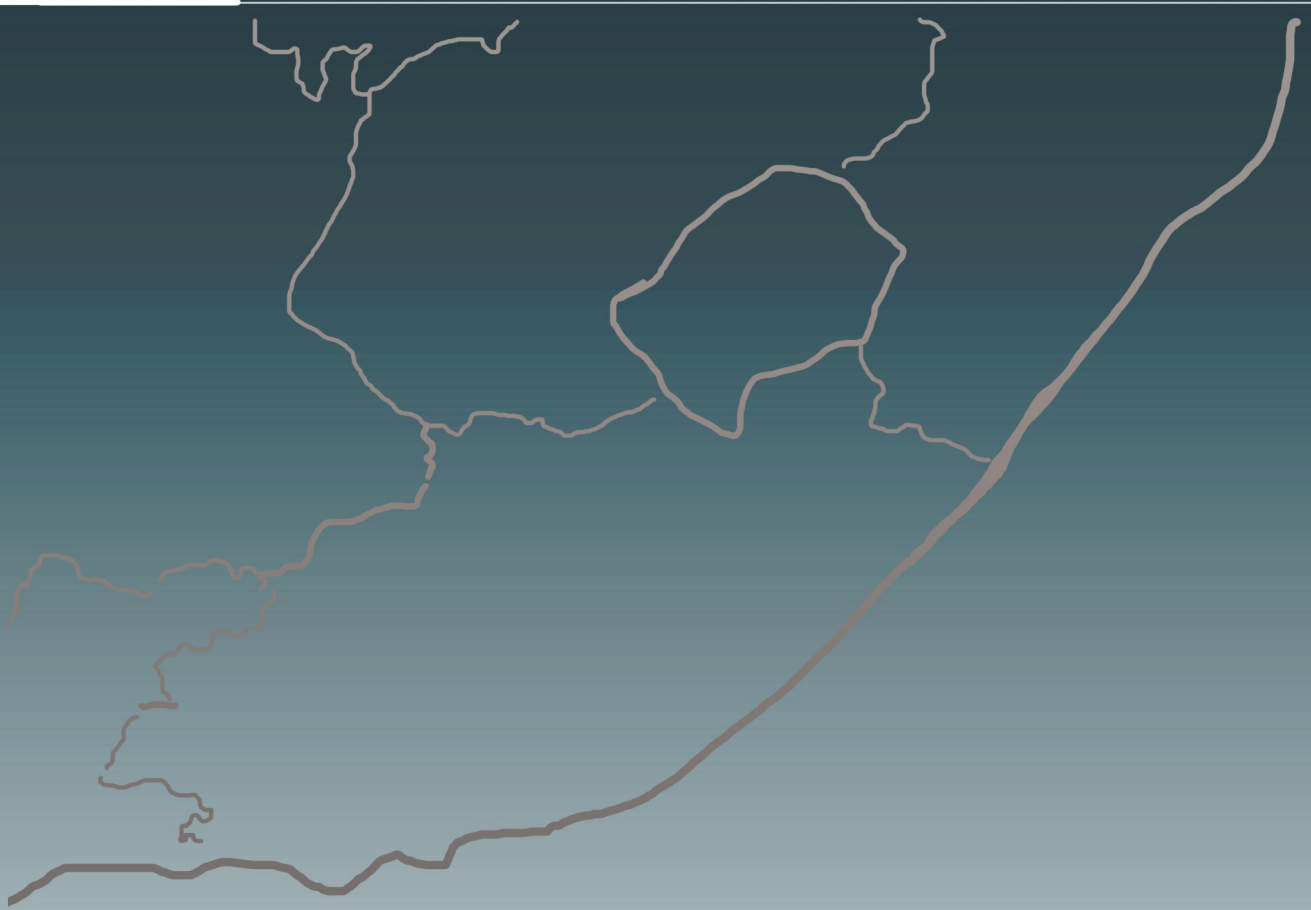
Chapter 05

Design and Technical Synthesis



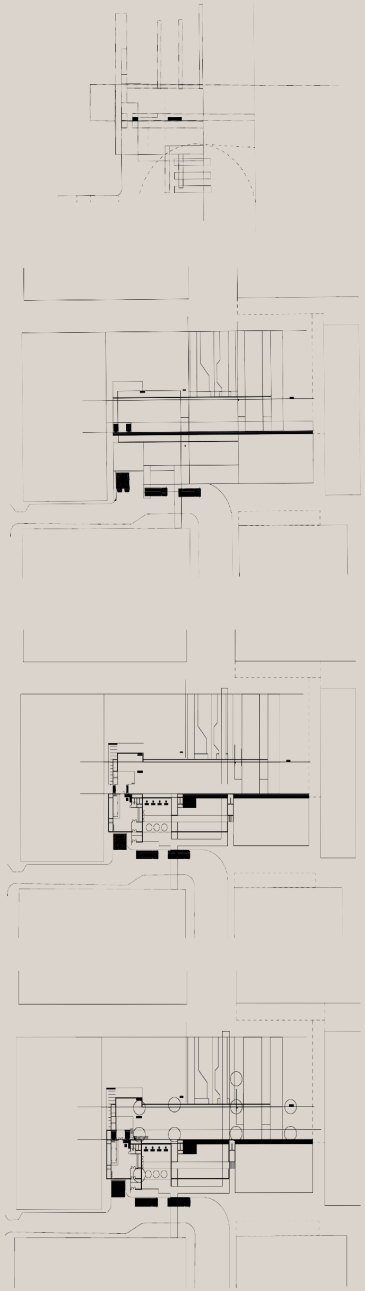
51.
Design exploration and process

5.2.
Towards a final design



5.1. Design exploration and process

5.1.1. Development of the plan



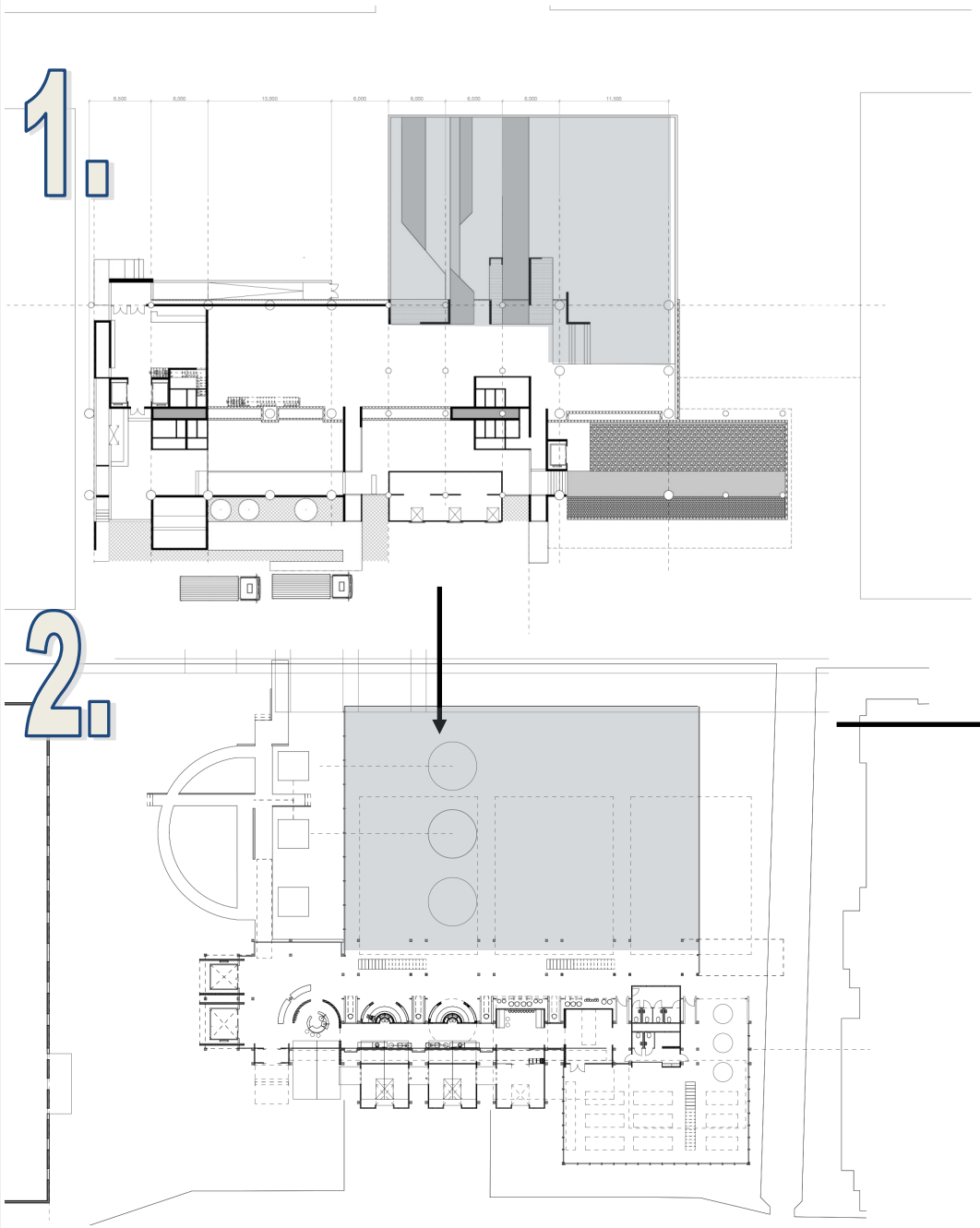


FIGURE 109-112:Left: Organization of function onto the site (Author).

FIGURE 113-116: Right: Plan development (Author).

The development of the floor plan shows how the size of the greenhouse component of the building has changed throughout the process. What remains the same is that the systems and services (mechanical lung) are to the south of the site and the green lung mostly to the north.

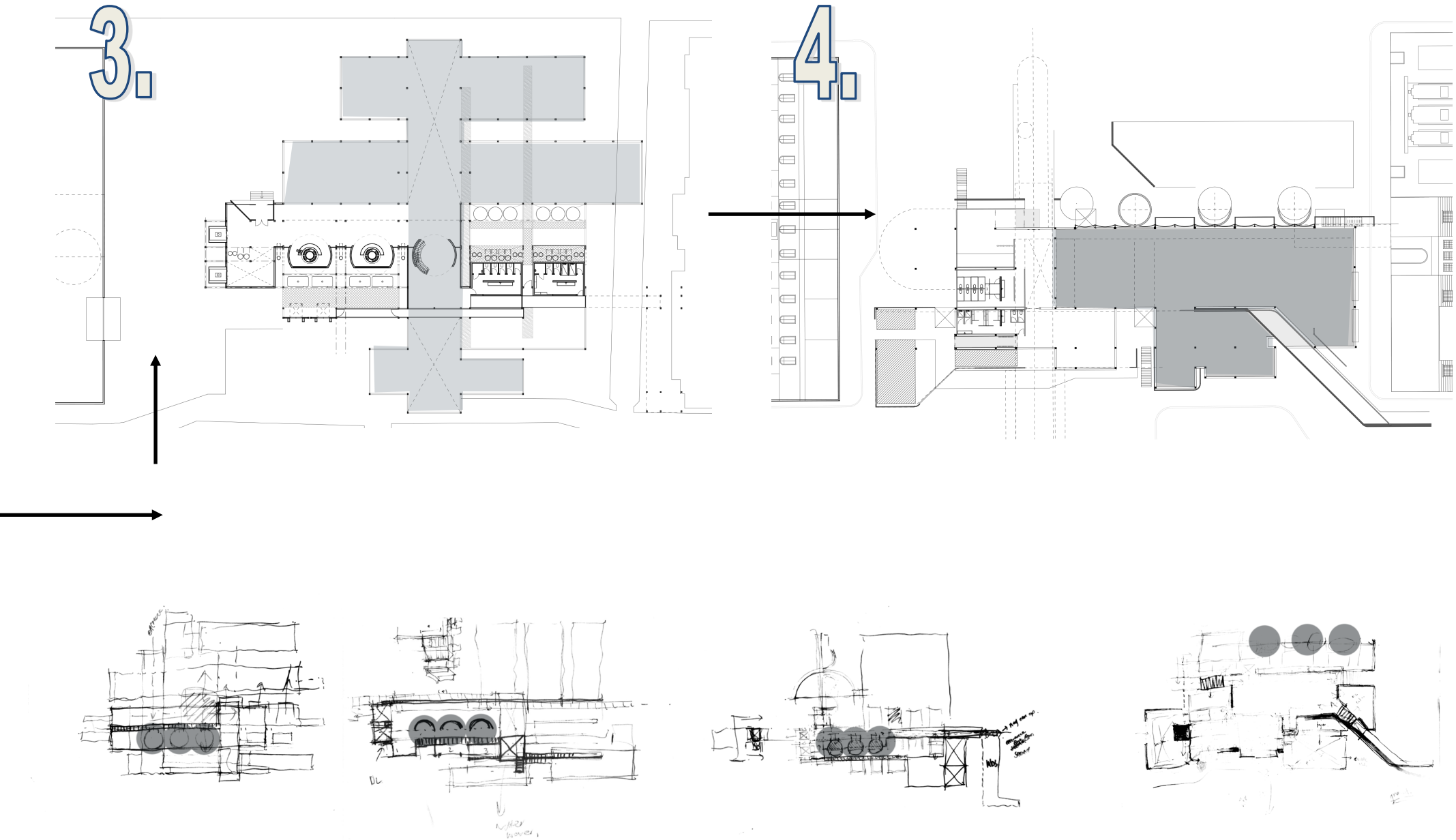
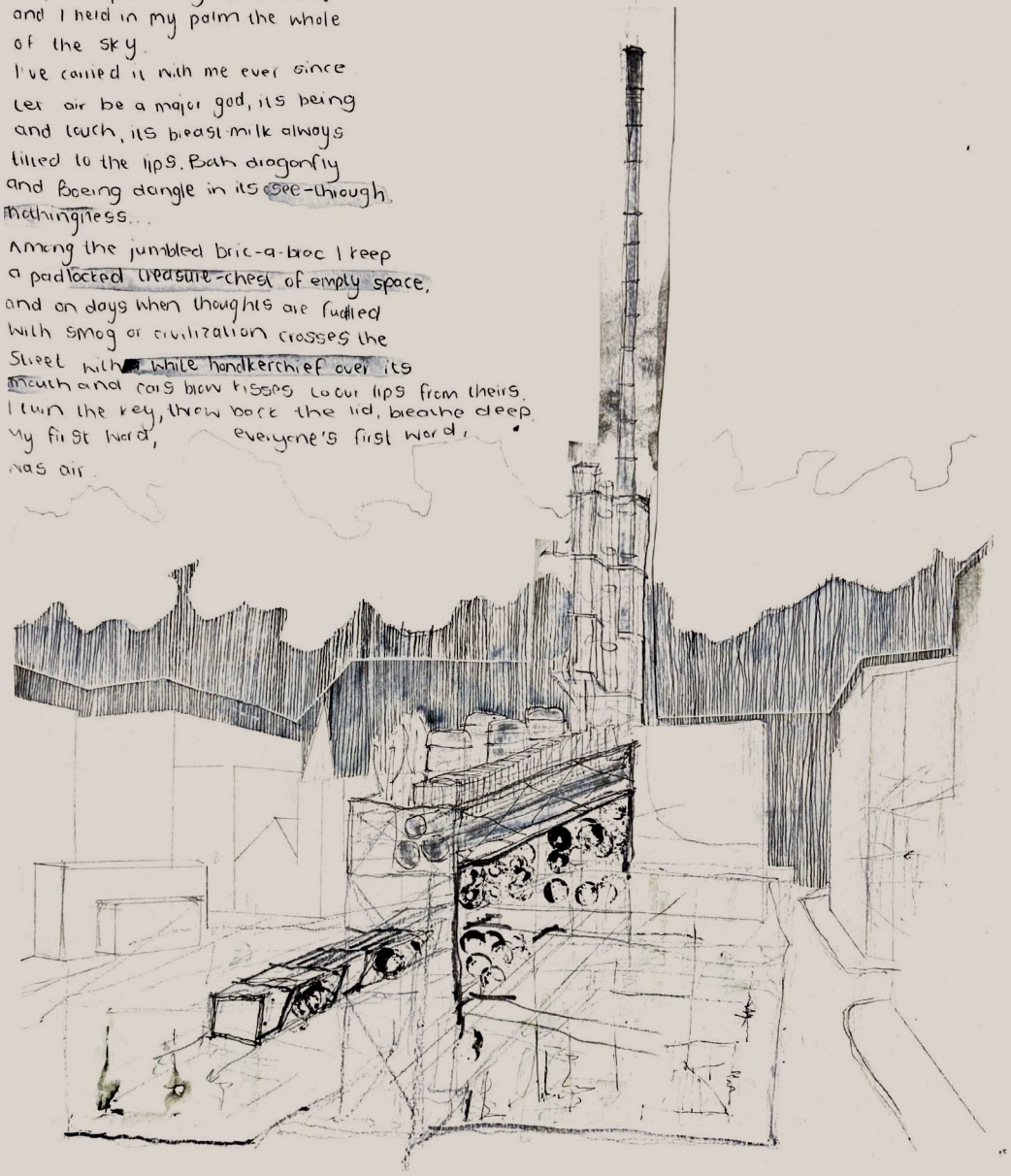


FIGURE 117: Placement of the oxygen tanks (Author).

5.1.2. Exploring the 3D

in Praise of Air

I write in praise of air.
I was six of five when a
conjurer opened my knotted fist
and I held in my palm the whole
of the sky.
I've carried it with me ever since
Let air be a major god, its being
and touch, its breast-milk always
tilted to the lips. Bath dragonfly
and Boeing dangle in its see-through
nothingness...
Among the jumbled bric-a-brac I keep
a padlocked treasure-chest of empty space,
and on days when thoughts are fuddled
with smog or civilization crosses the
street with a while handkerchief over its
mouth and cars blow kisses to our lips from theirs.
I turn the key, throw back the lid, breathe deep.
My first word, everyone's first word,
was air.



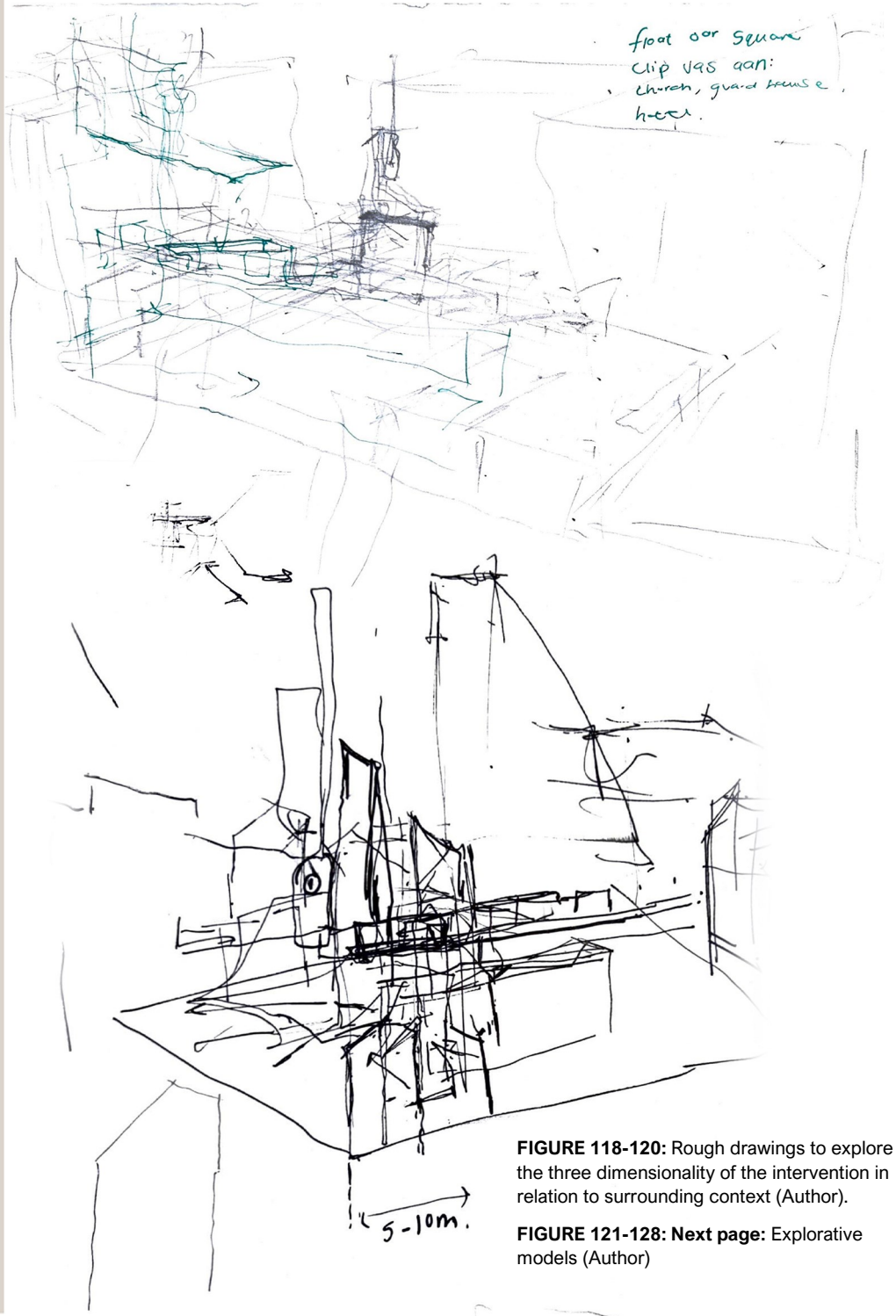
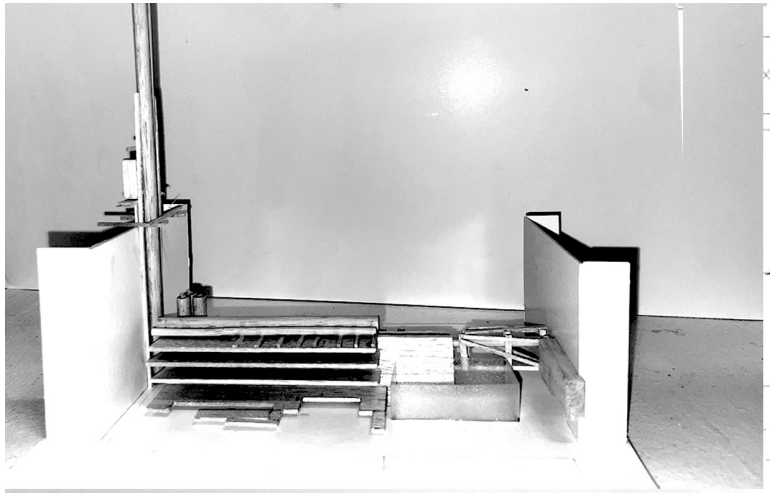
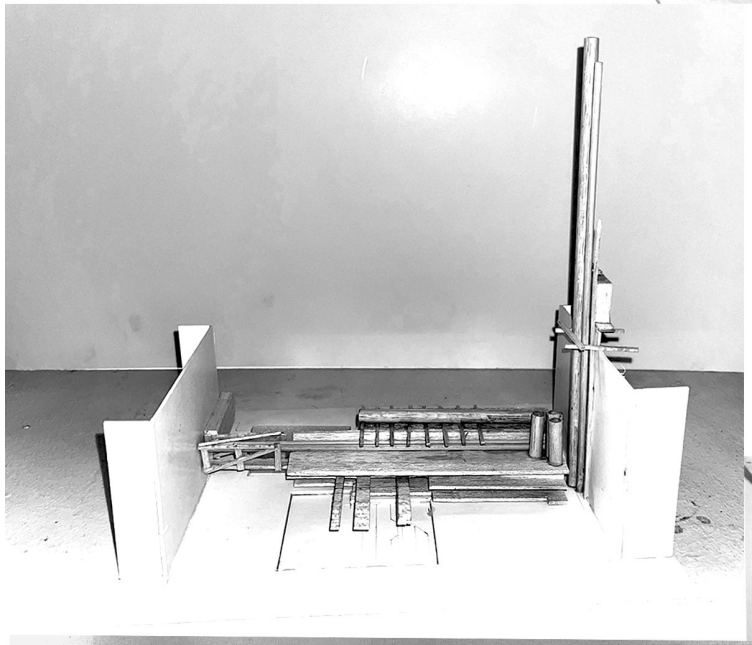
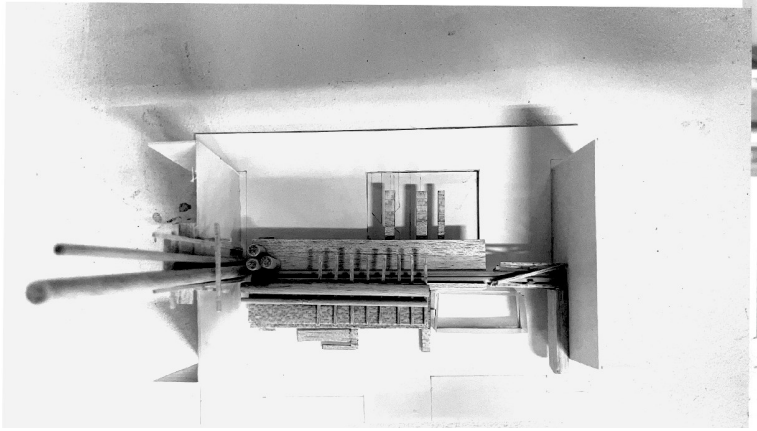


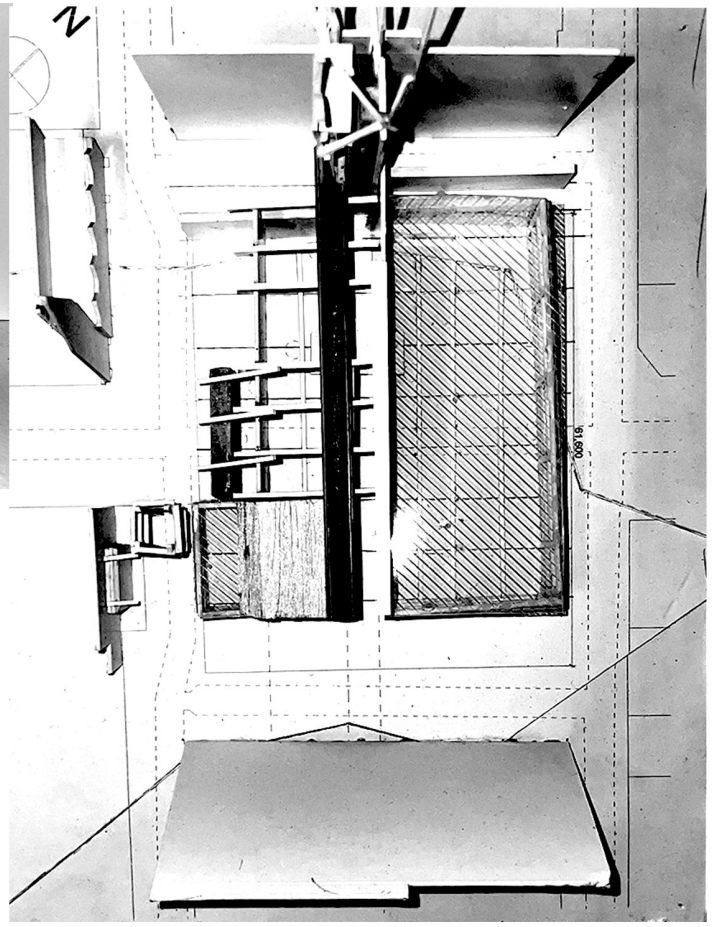
FIGURE 118-120: Rough drawings to explore the three dimensionality of the intervention in relation to surrounding context (Author).

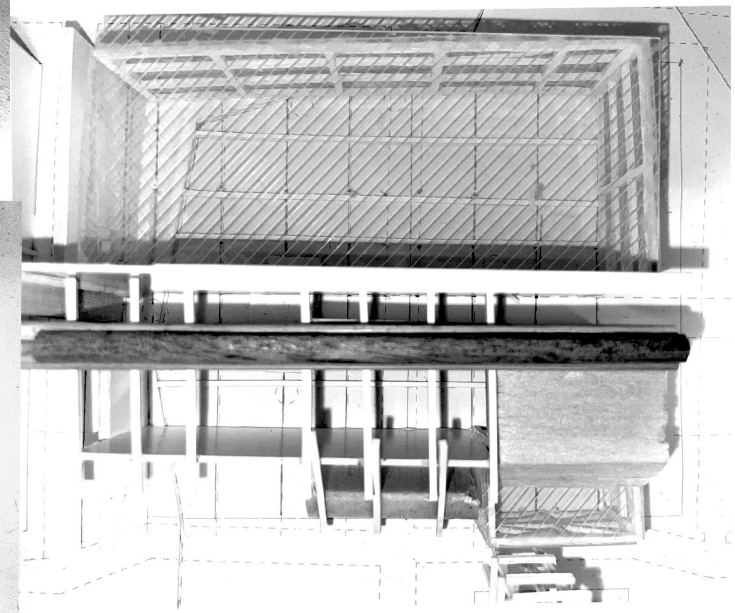
FIGURE 121-128: Next page: Explorative models (Author)

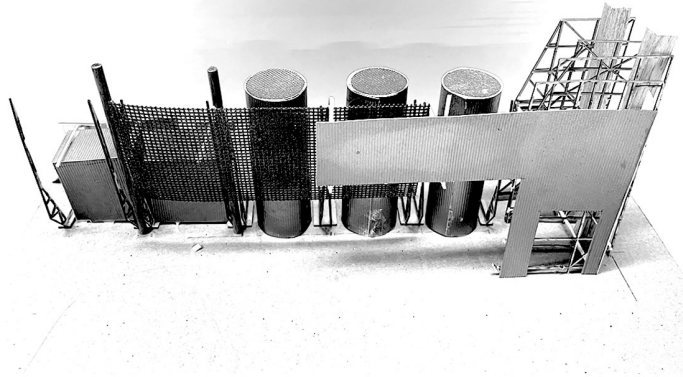


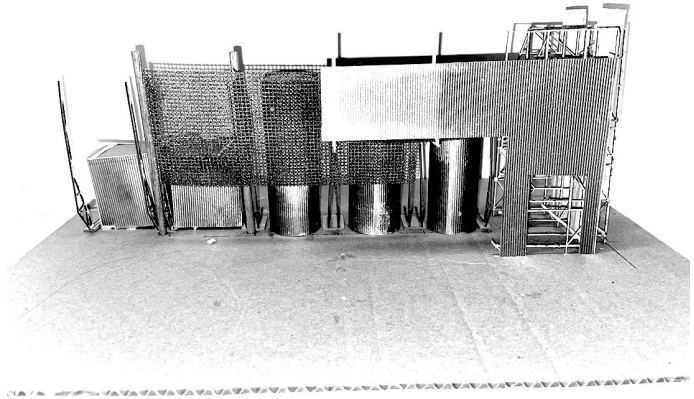


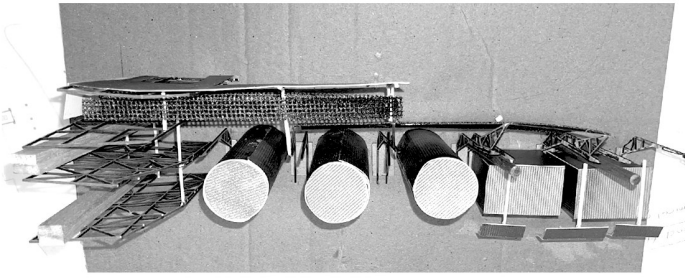




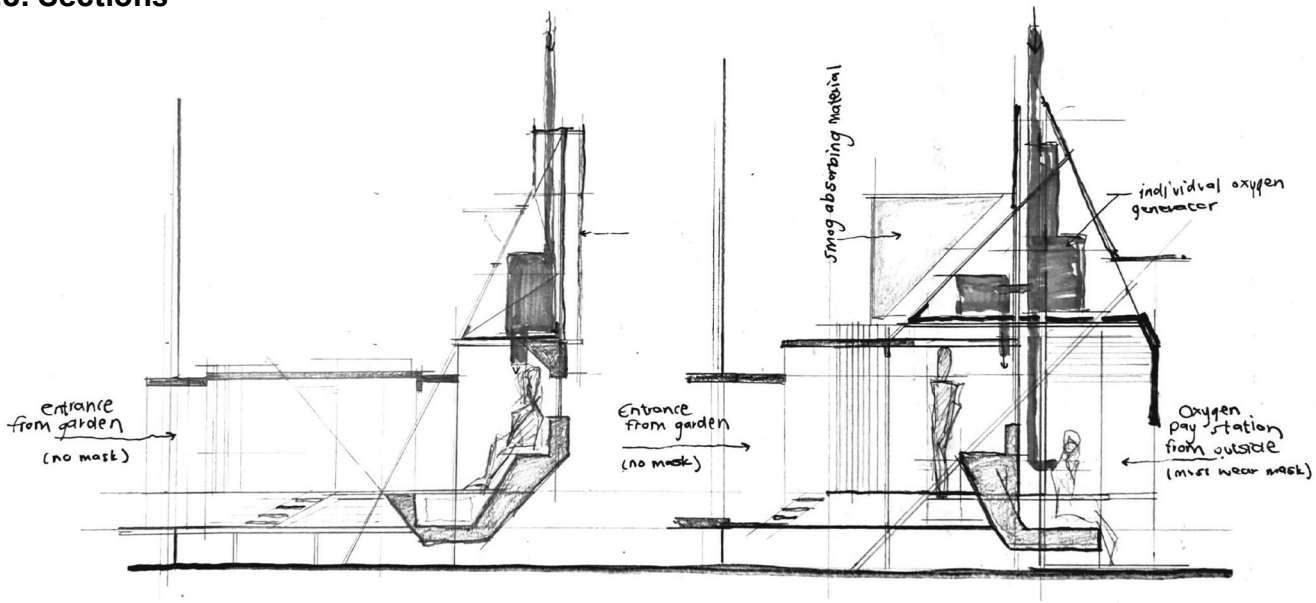


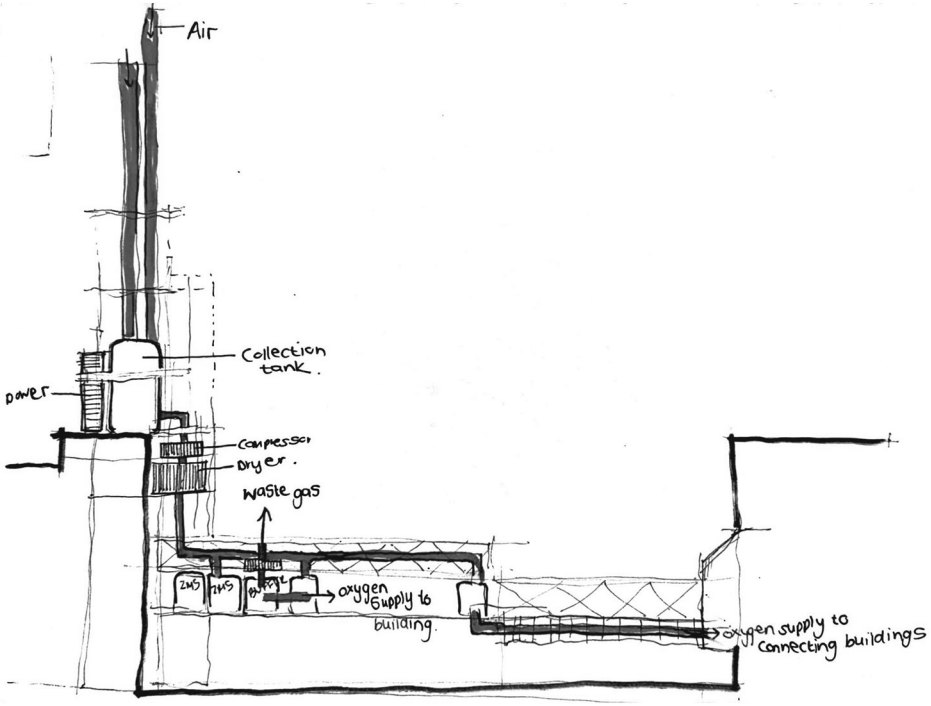






5.1.3. Sections





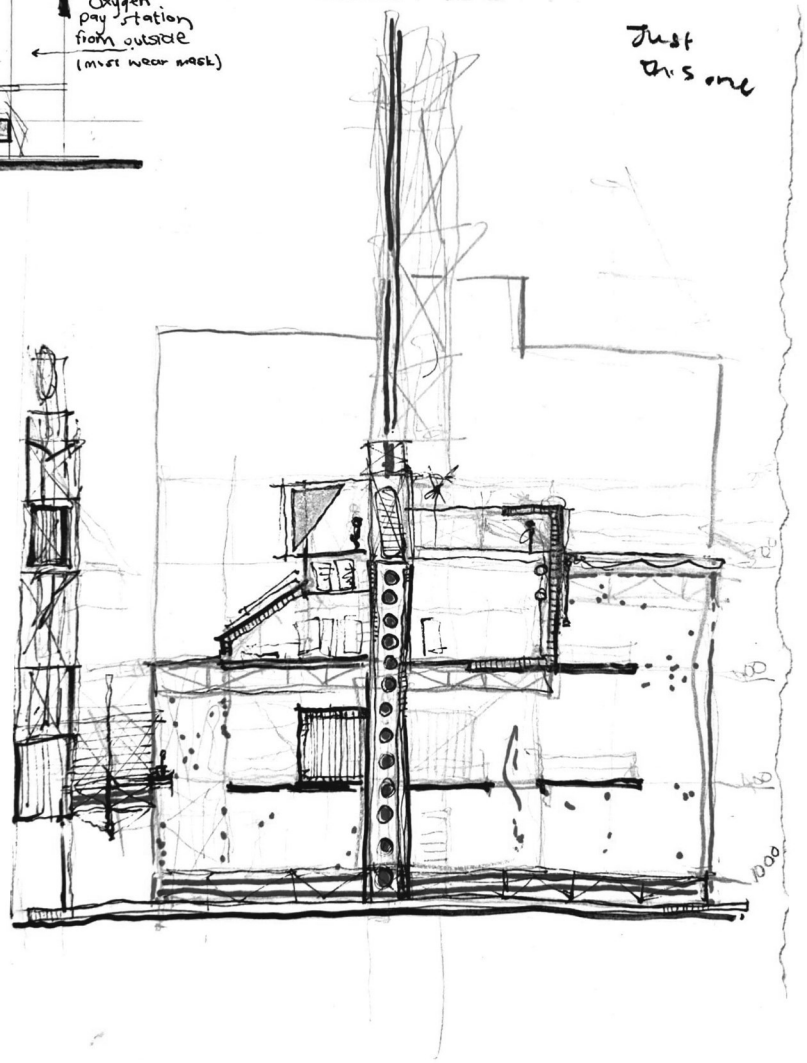
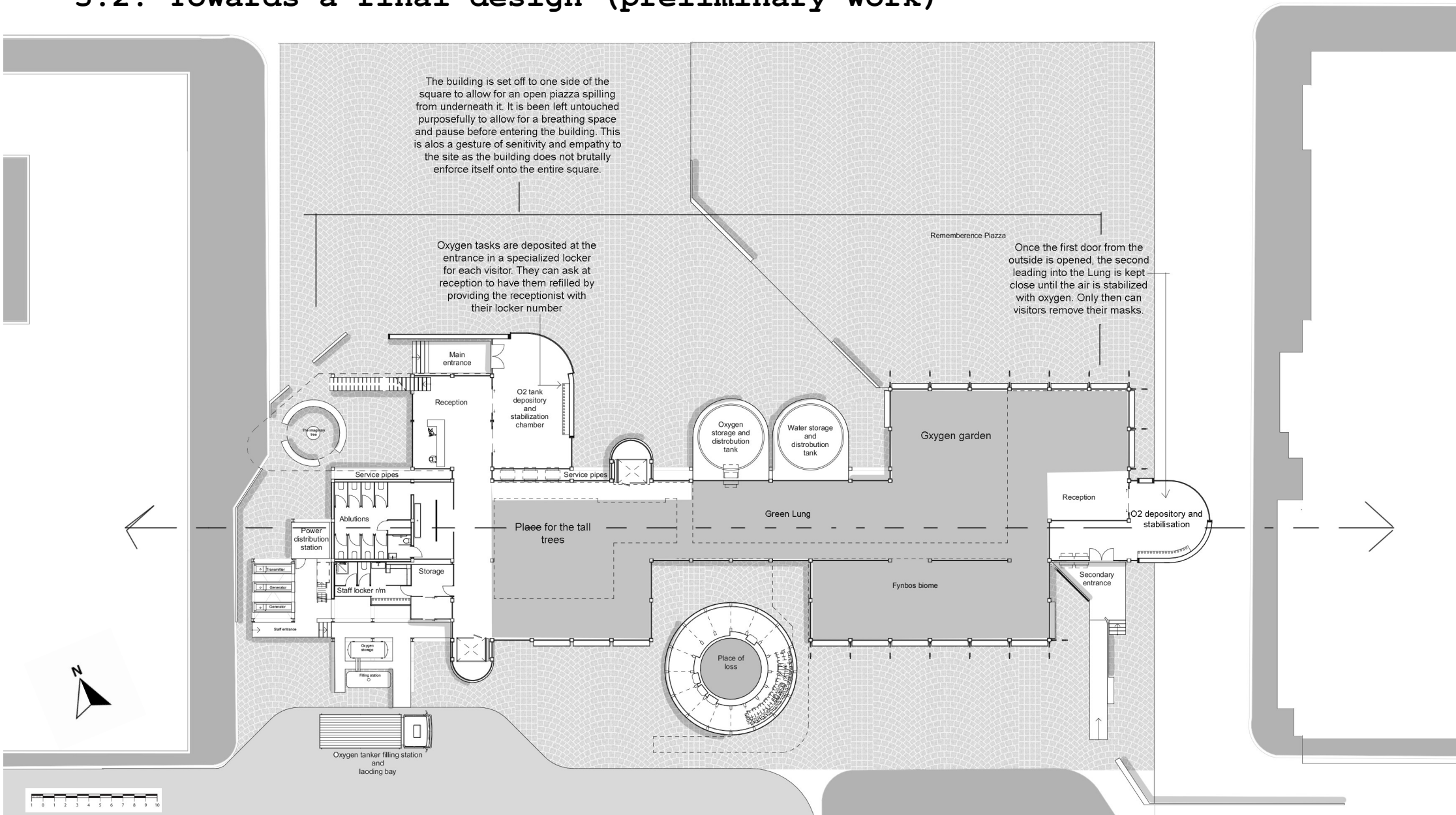


FIGURE 129-131: Explorative spatiality and structure through sections (Author)

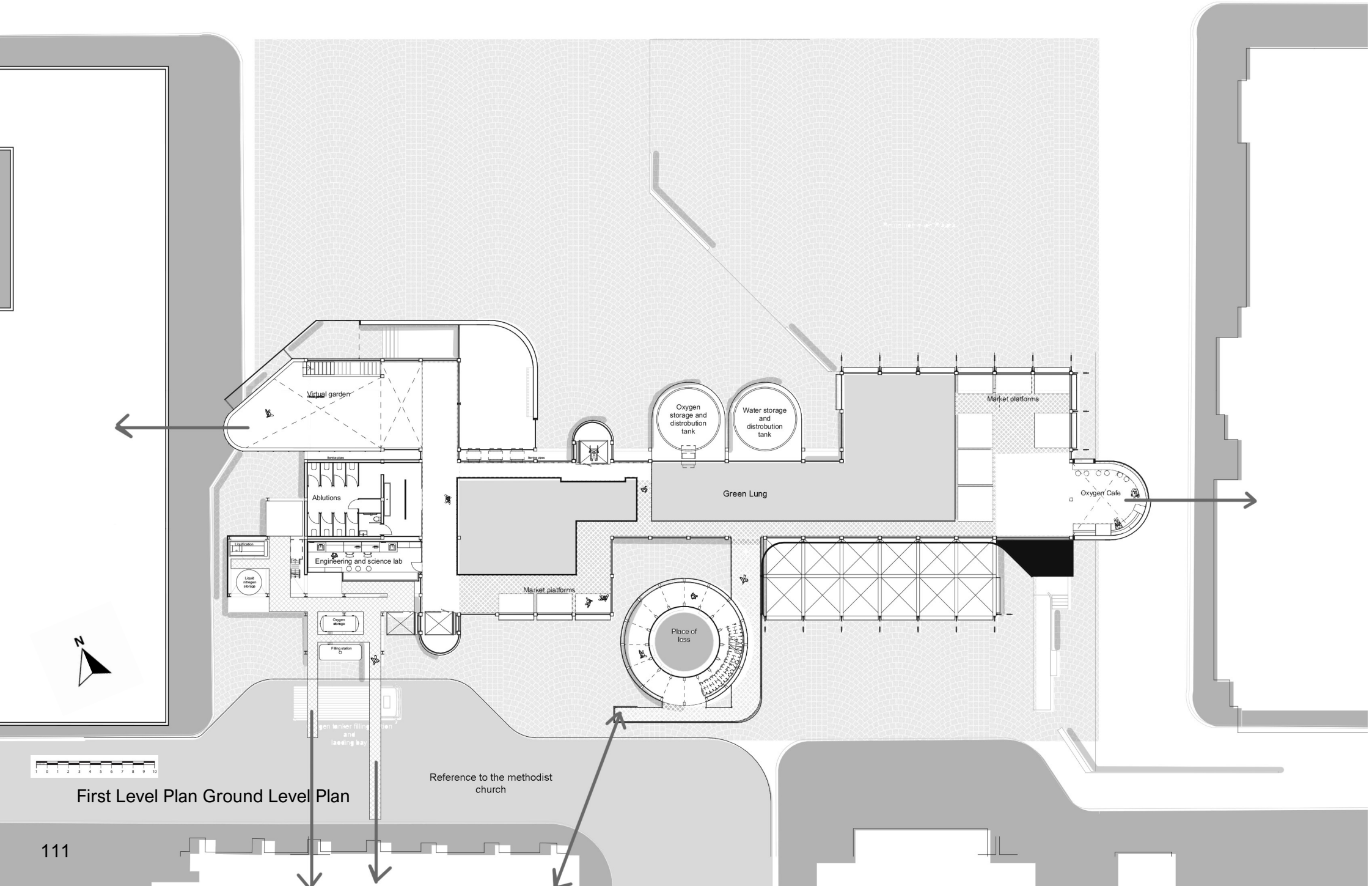
FIGURE 132-133: Next page: Progress of building by August. This design was not effective as the greenhouses were too separate and disjointed from the rest of the building (August).

FIGURE 134-135: Floor plans (Author)

5.2. Towards a final design (preliminary work)



Ground Level Plan Ground Level Plan



First Level Plan Ground Level Plan

FIGURE 136-139: Elevations (Author)

South elevation

East elevation

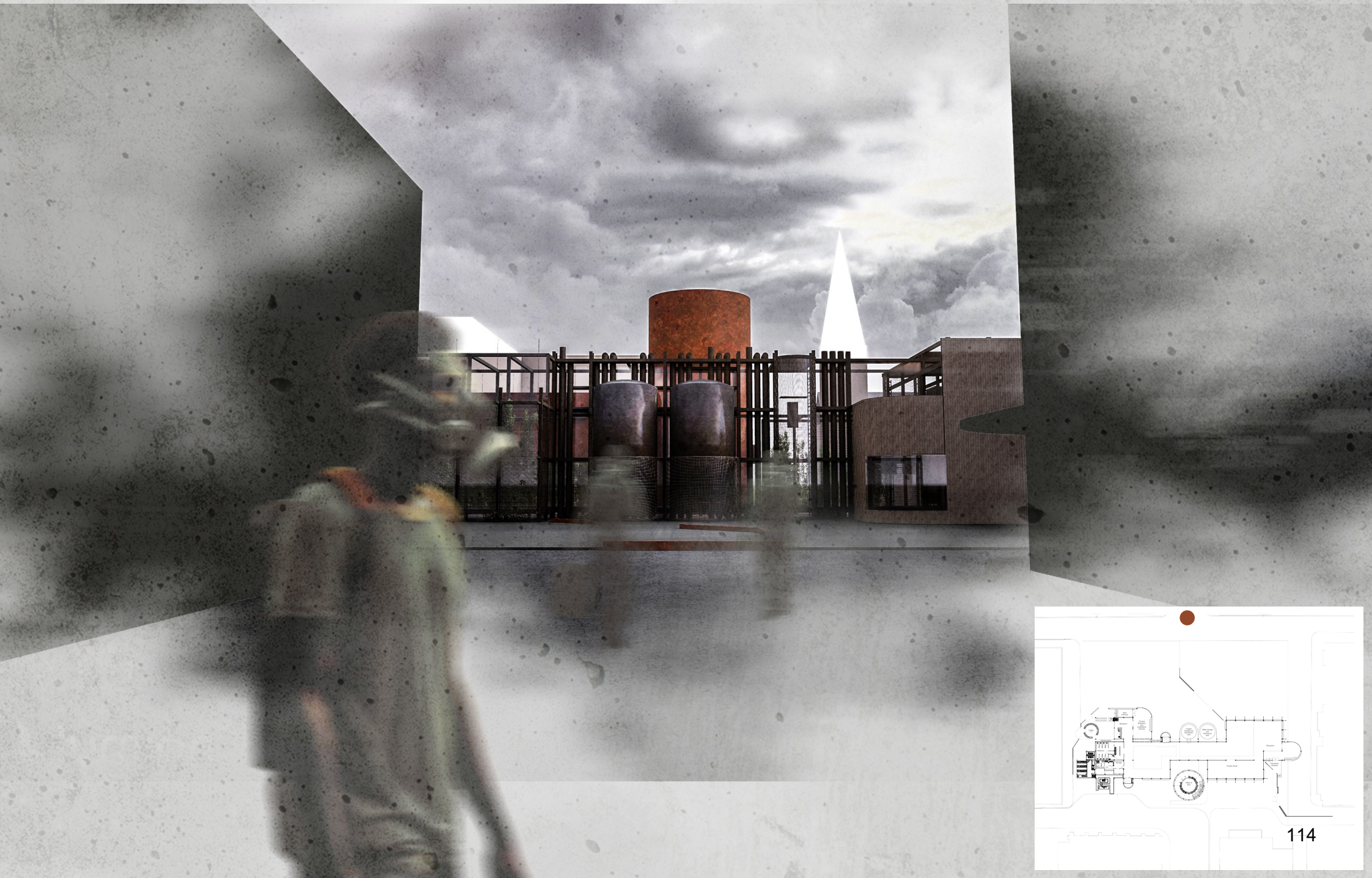
North elevation

East elevation

View from in front of the main entrance, looking up towards the virtual garden.

FIGURE 140-141: Exterior perspectives (Author)

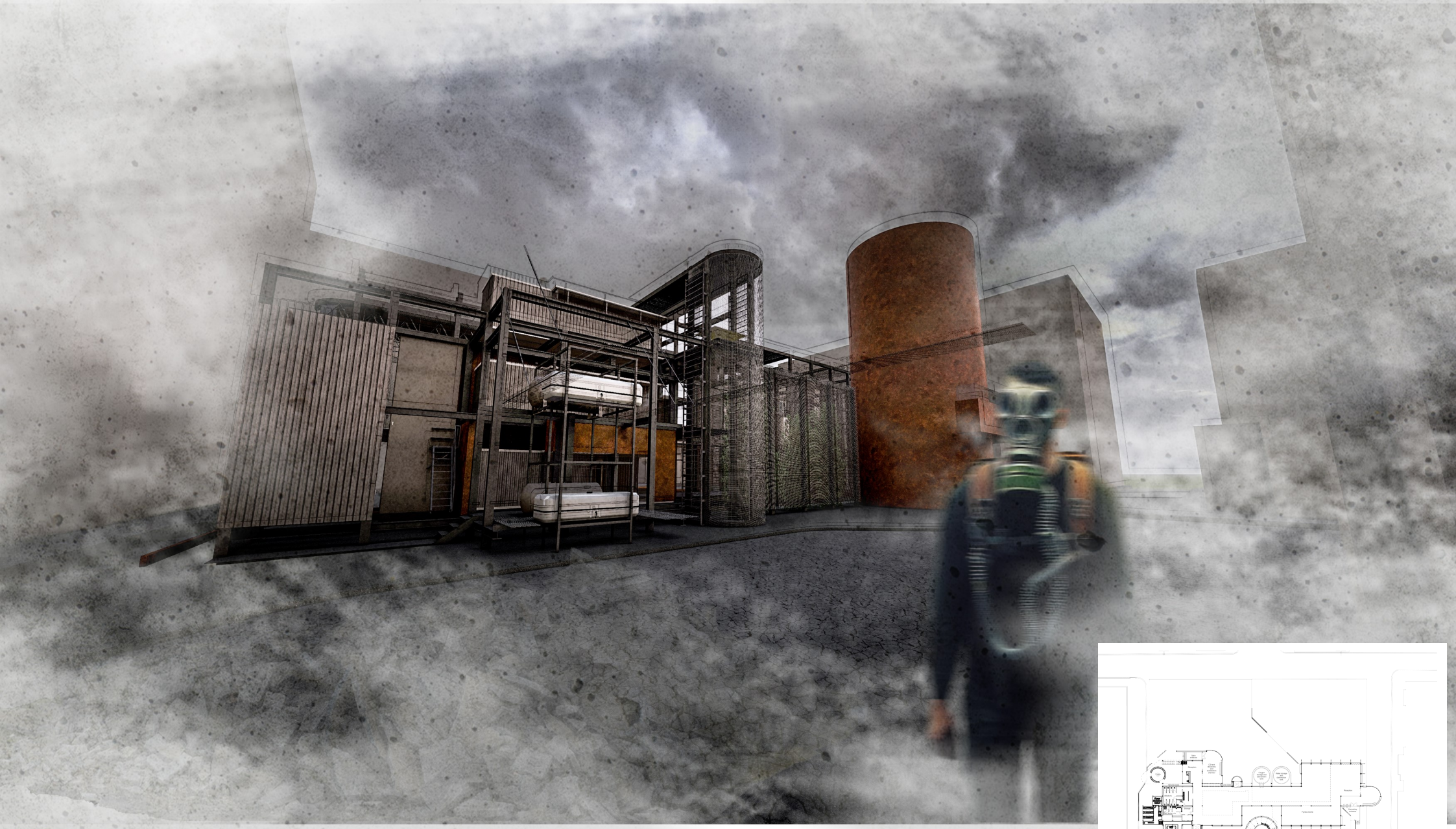
View from Berg Street (between Namaqua and Leadership House) directly onto the Square. The church's steeple becomes part of the building.



View from north-east corner of the site onto the open piazza.

FIGURE 142-143: Exterior perspectives (Author)

View from Longmarket Street showing the loading bay and main vehicle loading bay.



Secondary entrance from the south-east corner of the site.

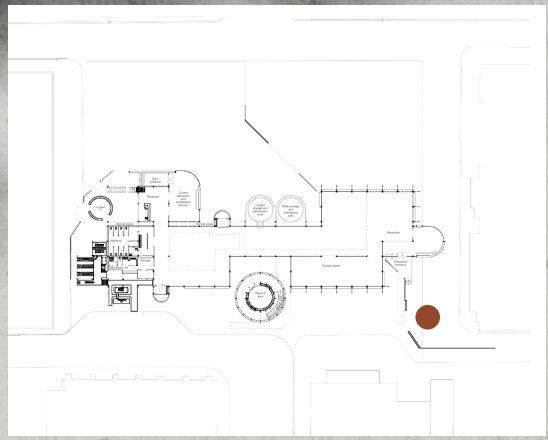


FIGURE 144-145: Exterior perspectives (Author)

View of the ‘Place of loss’ in communication with the church spire.

5.3. A final design (An integration of design and construction)

FIGURE 146: Oxygen tank filling station on a rainy day (Author)

FIGURE 147: Context Plan (Author)


163500
2258
2262
161604
2255
176465
2252
2269
2268
2251
2267
2372
2373
168828
116120
2368
6271
4382
9684
117068
4375
4396
4395
4394
Shortmarket Street
Long Street
9431
143979
2216
2219
2222
160499
2209
2355
2356
2357
154938
2360
2361
2417
2418
2416
2415
2419
Longmarket Square
178024
9920
2547
2544
2548
2539
2538
2537
2536
2549
2535
177095
2554
2554
177406
2464
2465
2467
2466
2463
2468
2461
156100
2460
2474
2473
2470
Berg Street
2433
9419
9988
9420
Locality Plan
N
10m

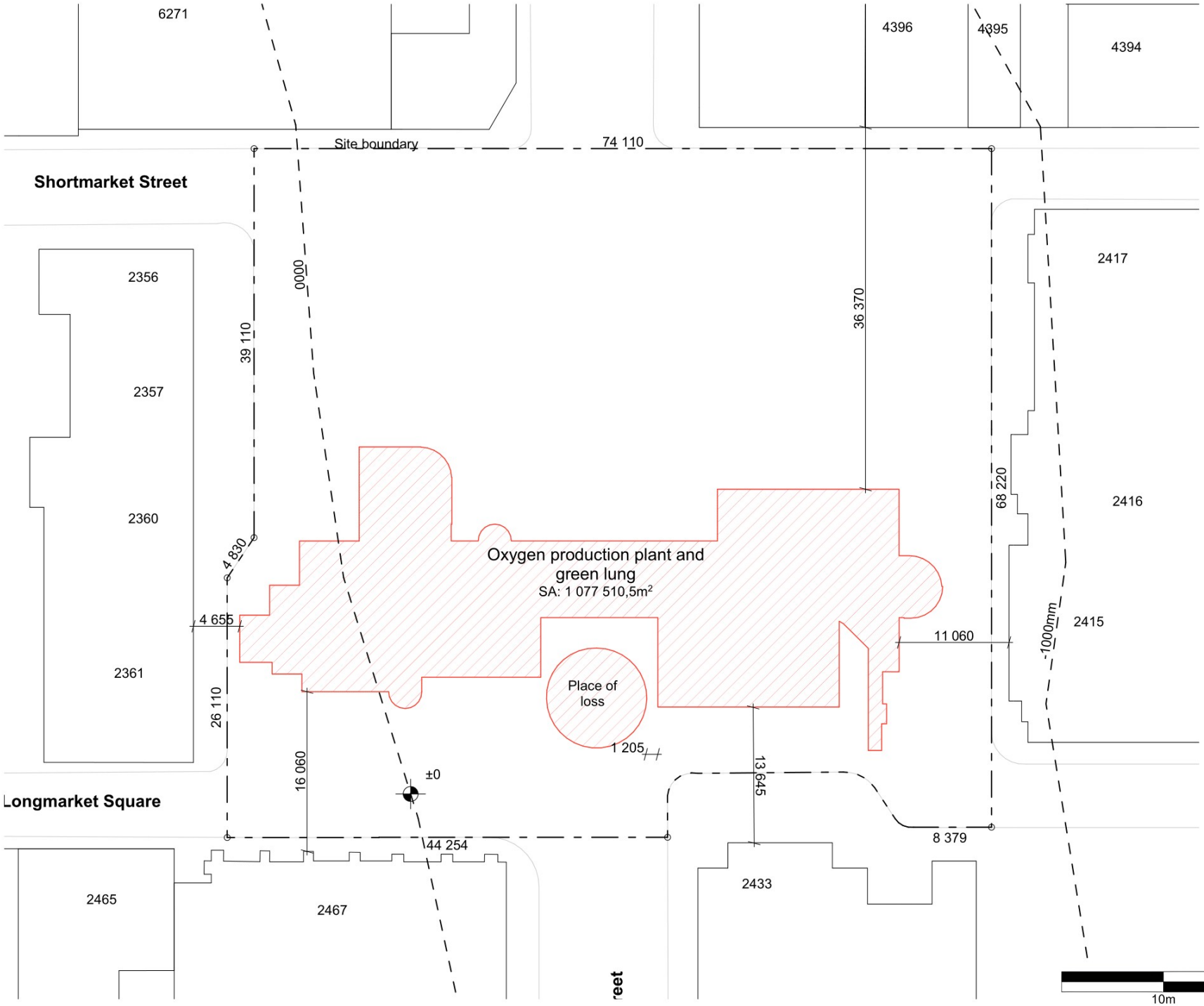


FIGURE 148-149: Construction drawings of Locality and Context plan (Author).

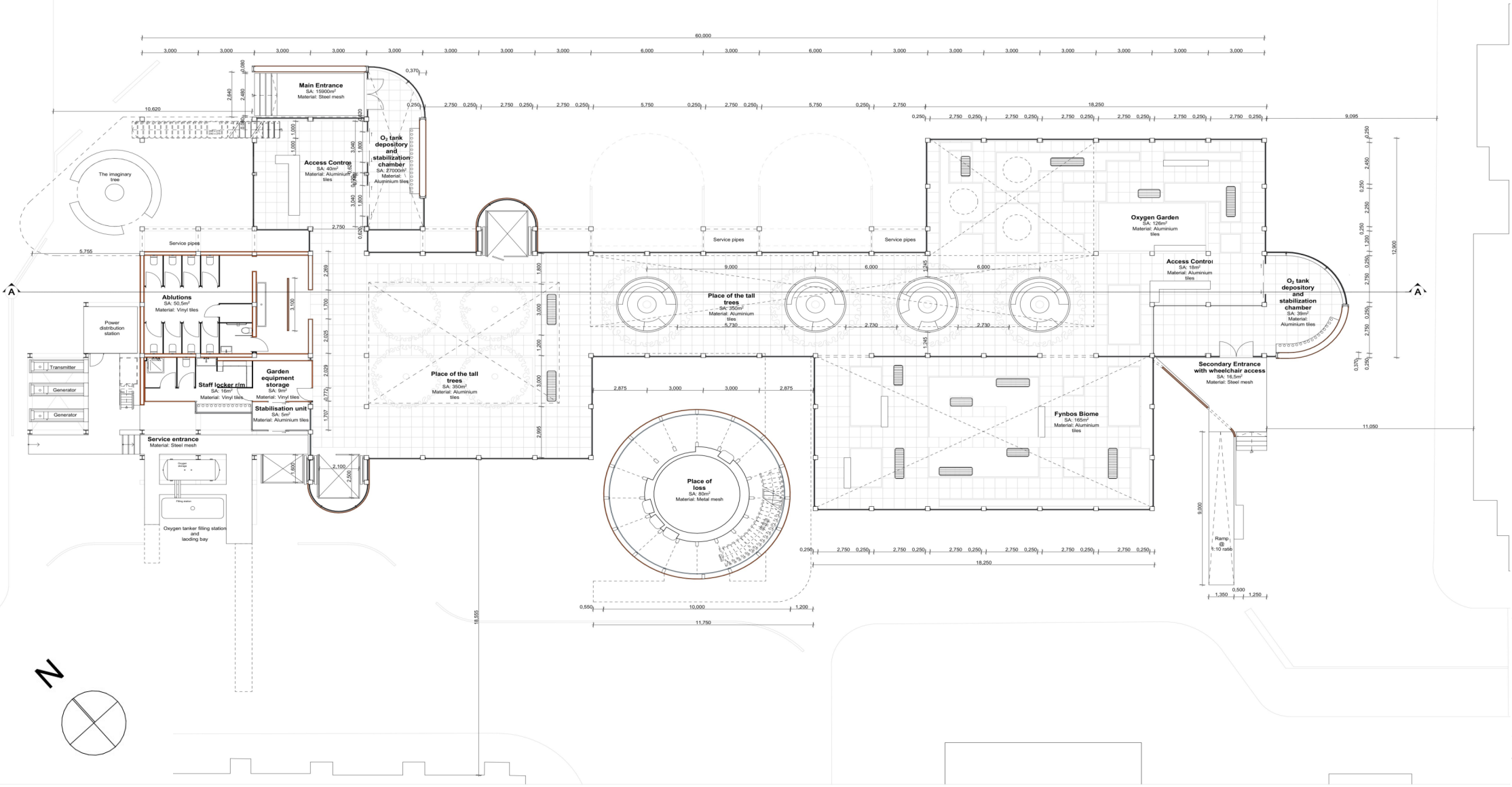
Locality Plan

FIGURE 150: View from Shortmarket Street as one turns around the corner of the Onomo Hotel (Author).

GROUND LEVEL
Scale 1:100

FIRST LEVEL
Scale 1:100

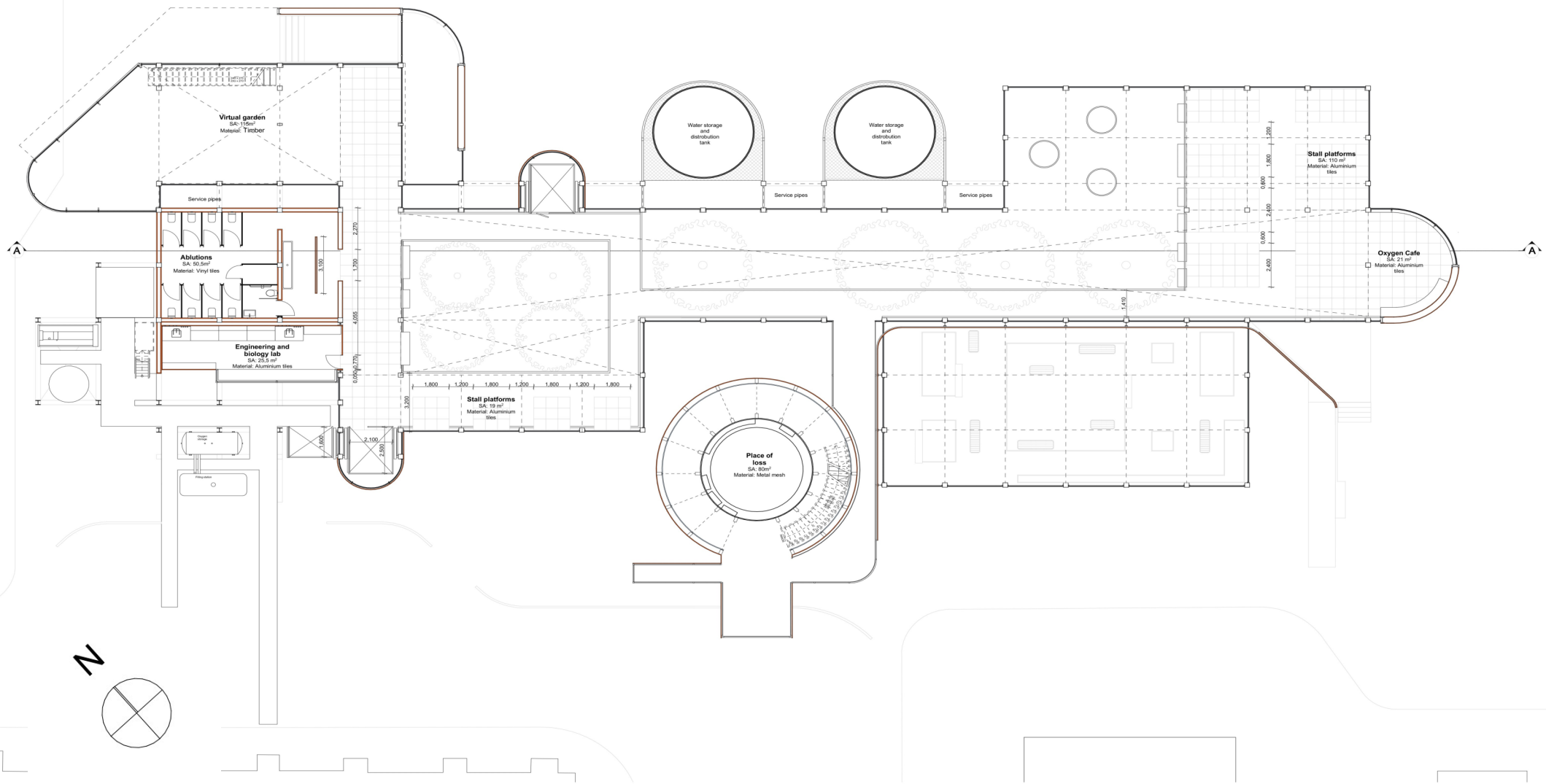
FIGURE 151-153: Buildng plans (Author).



Ground Level

0 1 2 3 4 5 10

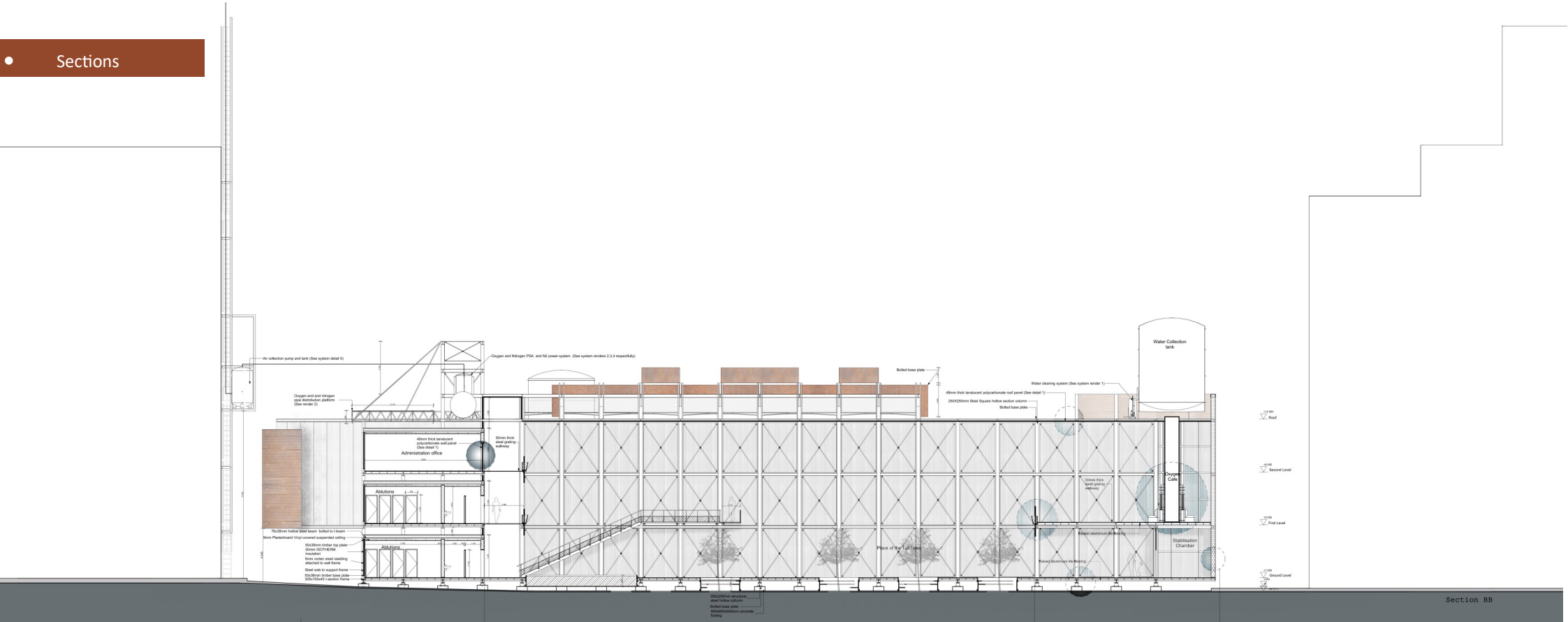
FIGURE 154-155: Construction drawings of building plans (Author).



First Level

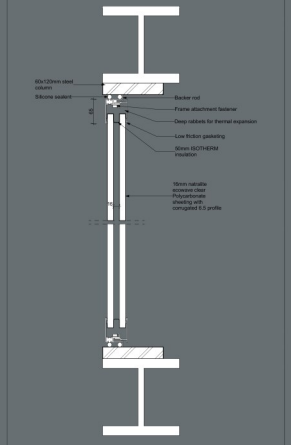
0 1 2 3 4 5 10

Sections

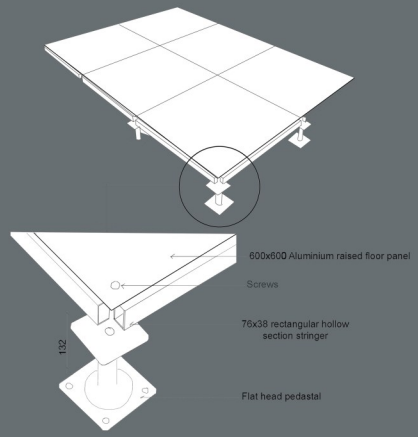


Section BB

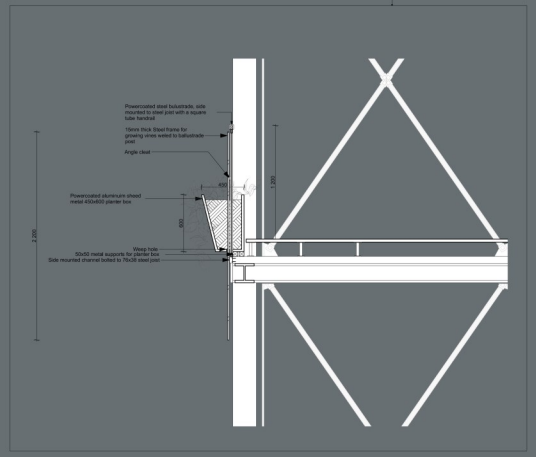
Detail 1:
Polycarbonate wall and roof panel
Scale 1:5



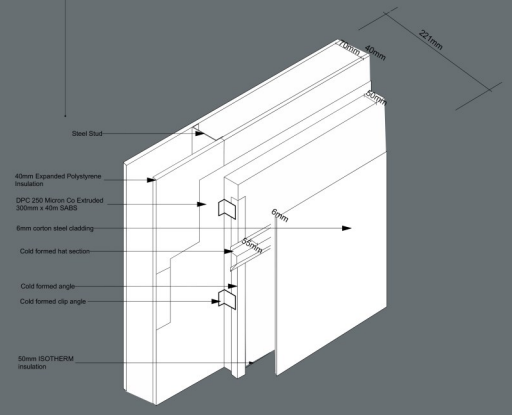
Detail 2:
Raised aluminium tile flooring
(Not to scale)

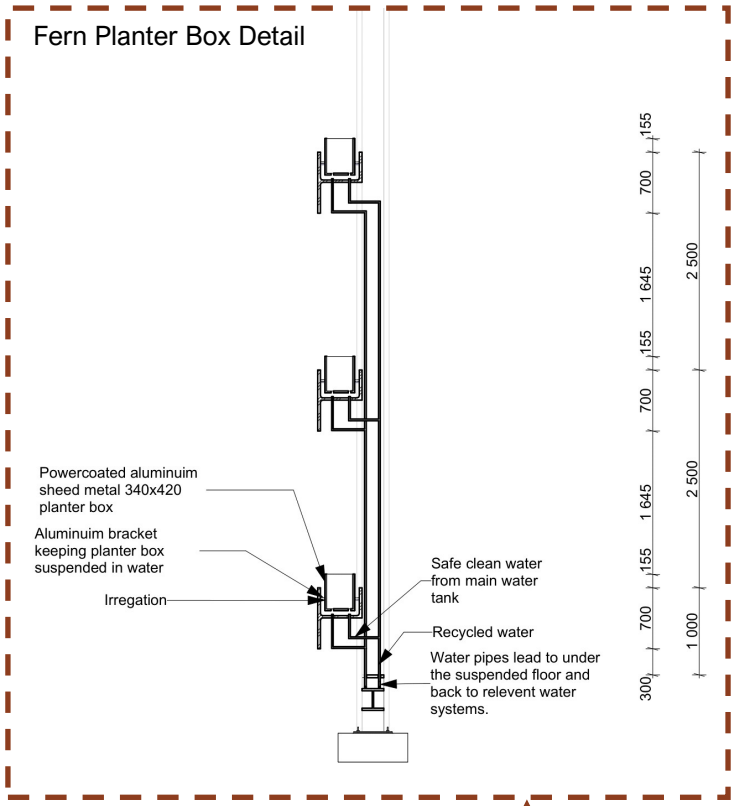


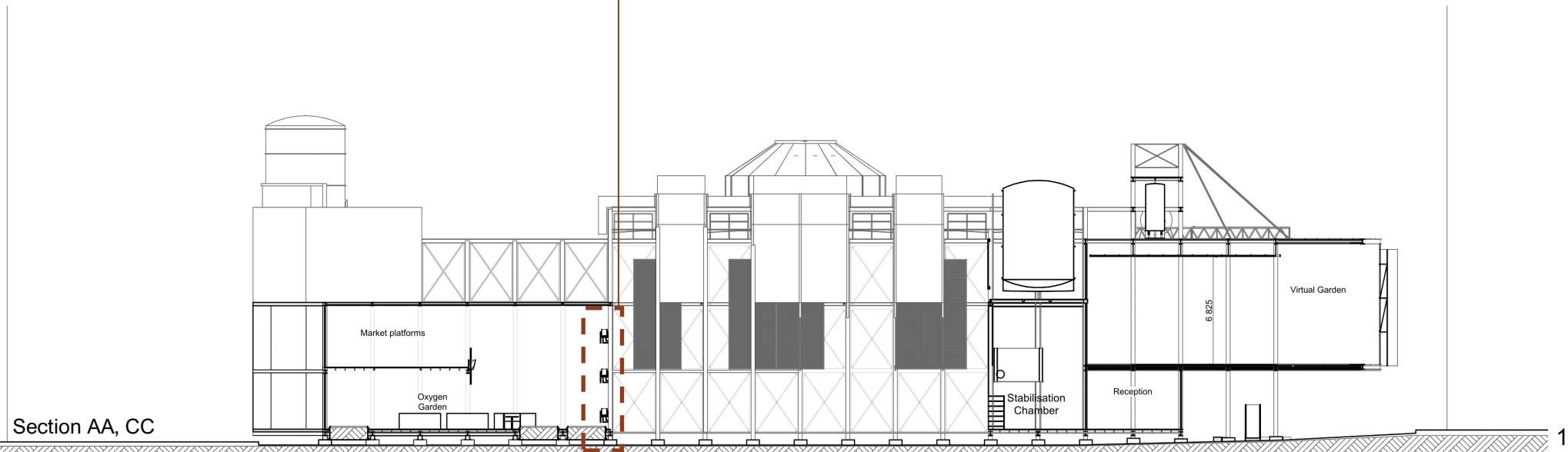
Detail 3:
Ballustrade and planter
Scale 1:20



Detail 4:
Double cladded wall
(Not to scale)







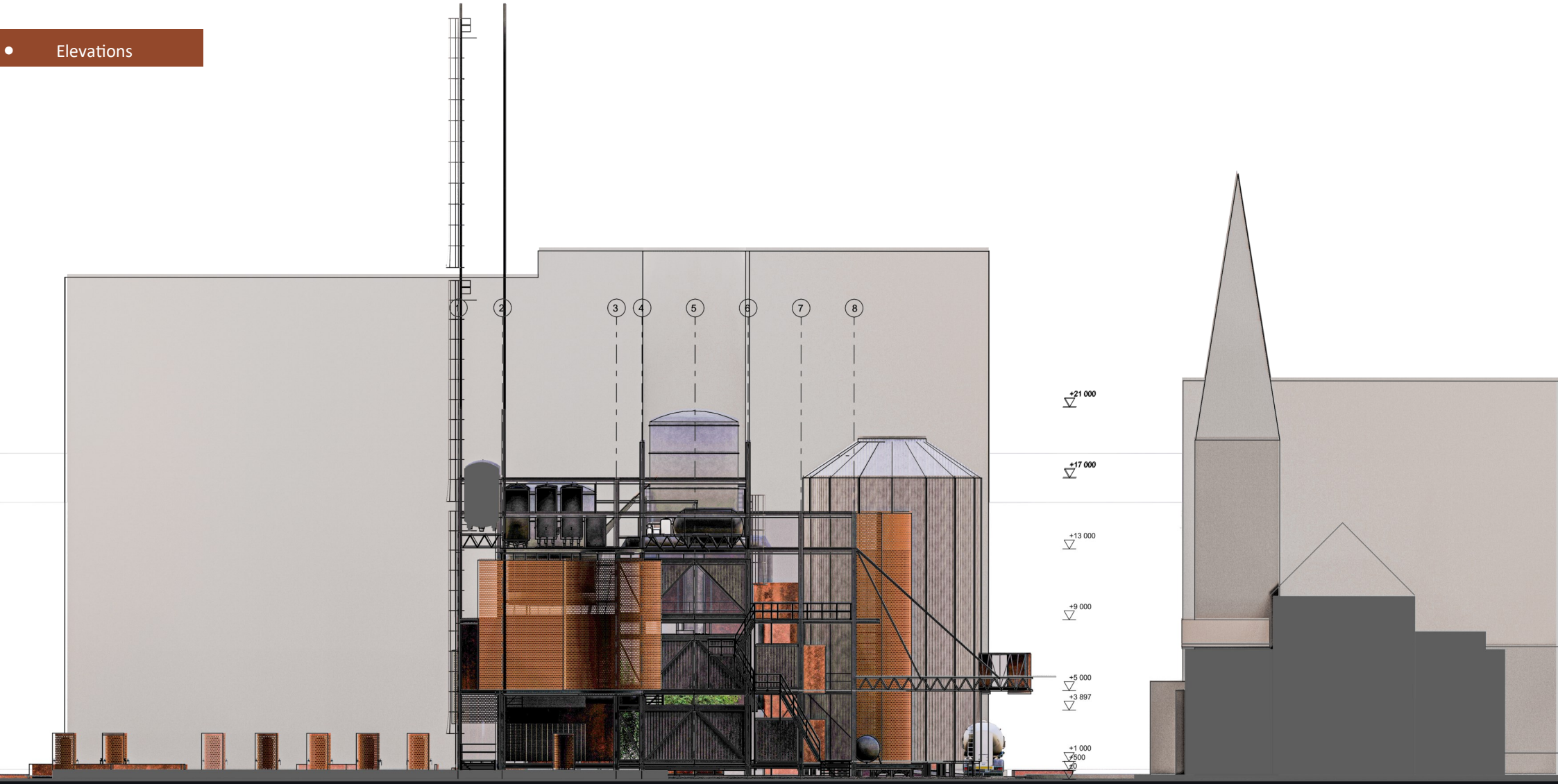
Section AA, CC

FIGURE 156: Section BB through building to show further details (Author).

FIGURE 157-160: Construction details (Author).

FIGURE 161: Section AA and CC combined (Author).

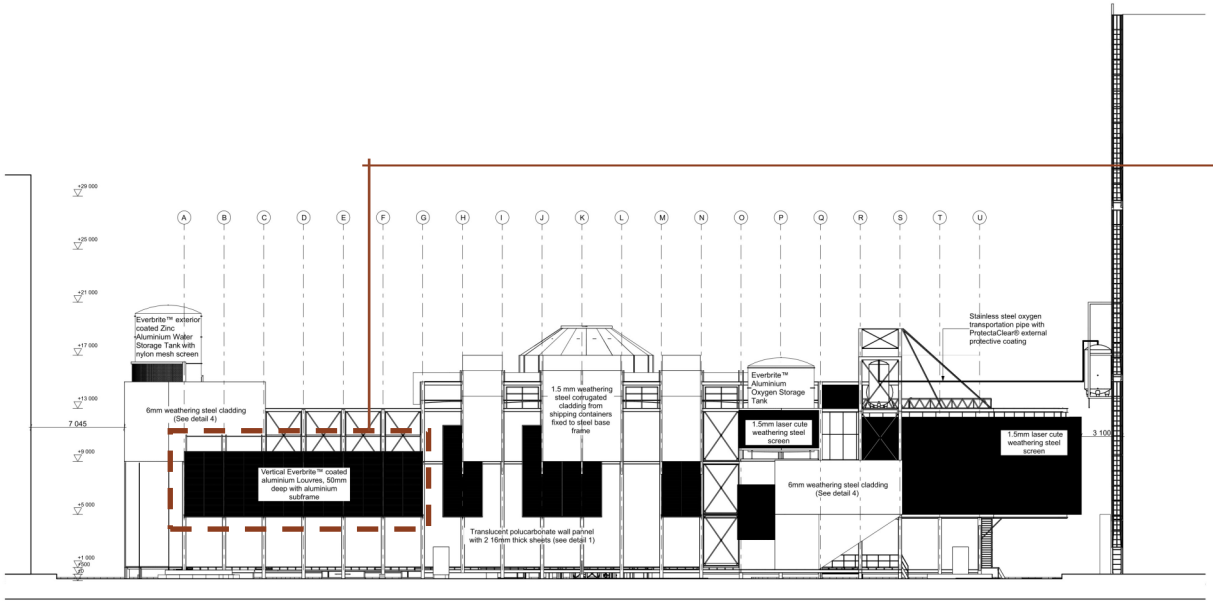
FIGURE 162: Detail section of fern wall in the oxygen garden (Author).



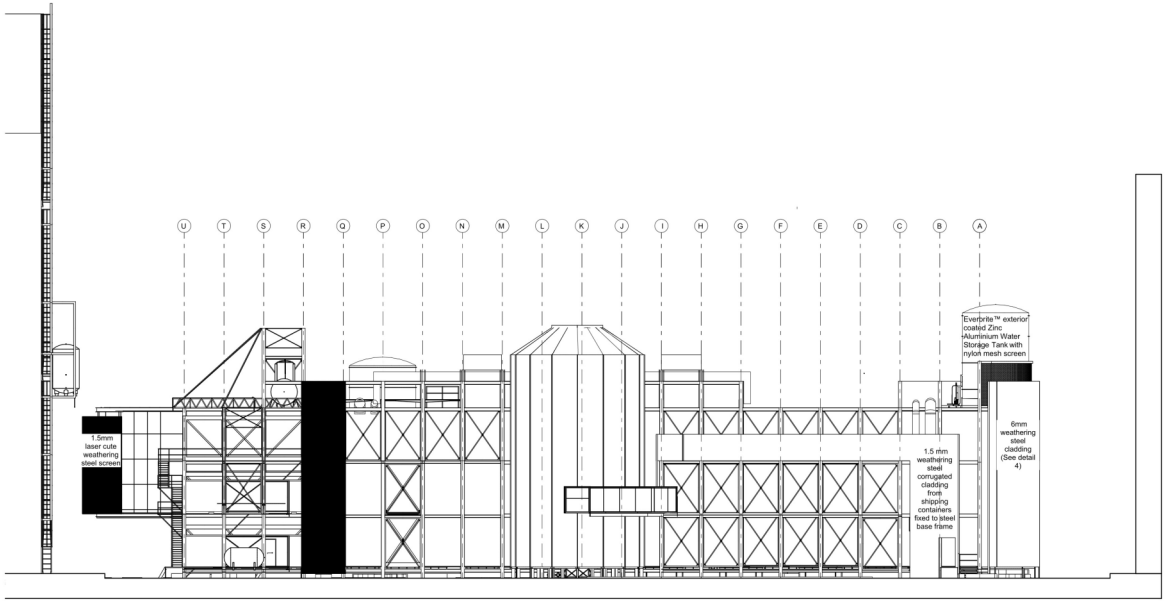
West Elevation

0 1 2 3 4 5 10m

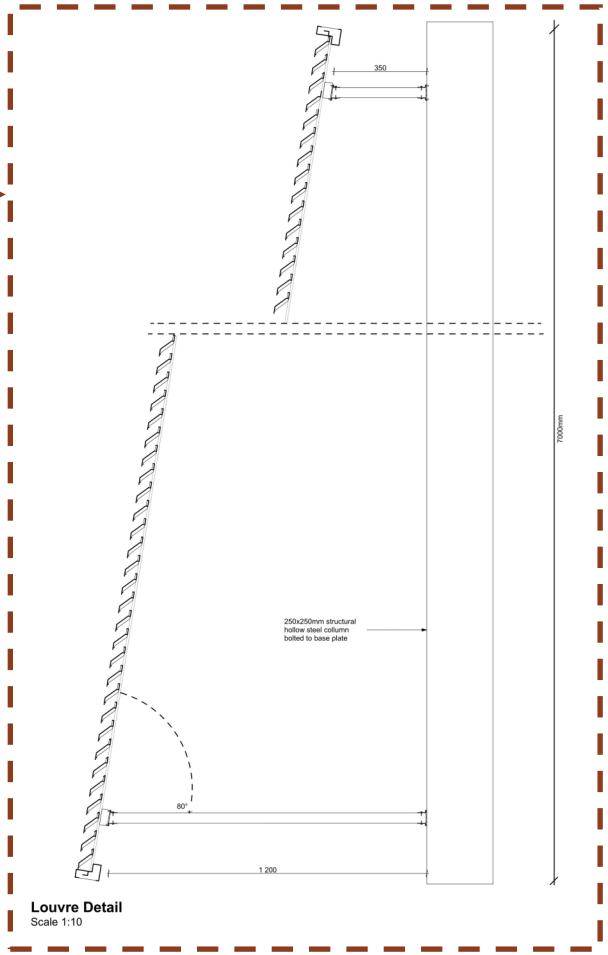
SCALE BAR



North Elevation



South Elevation

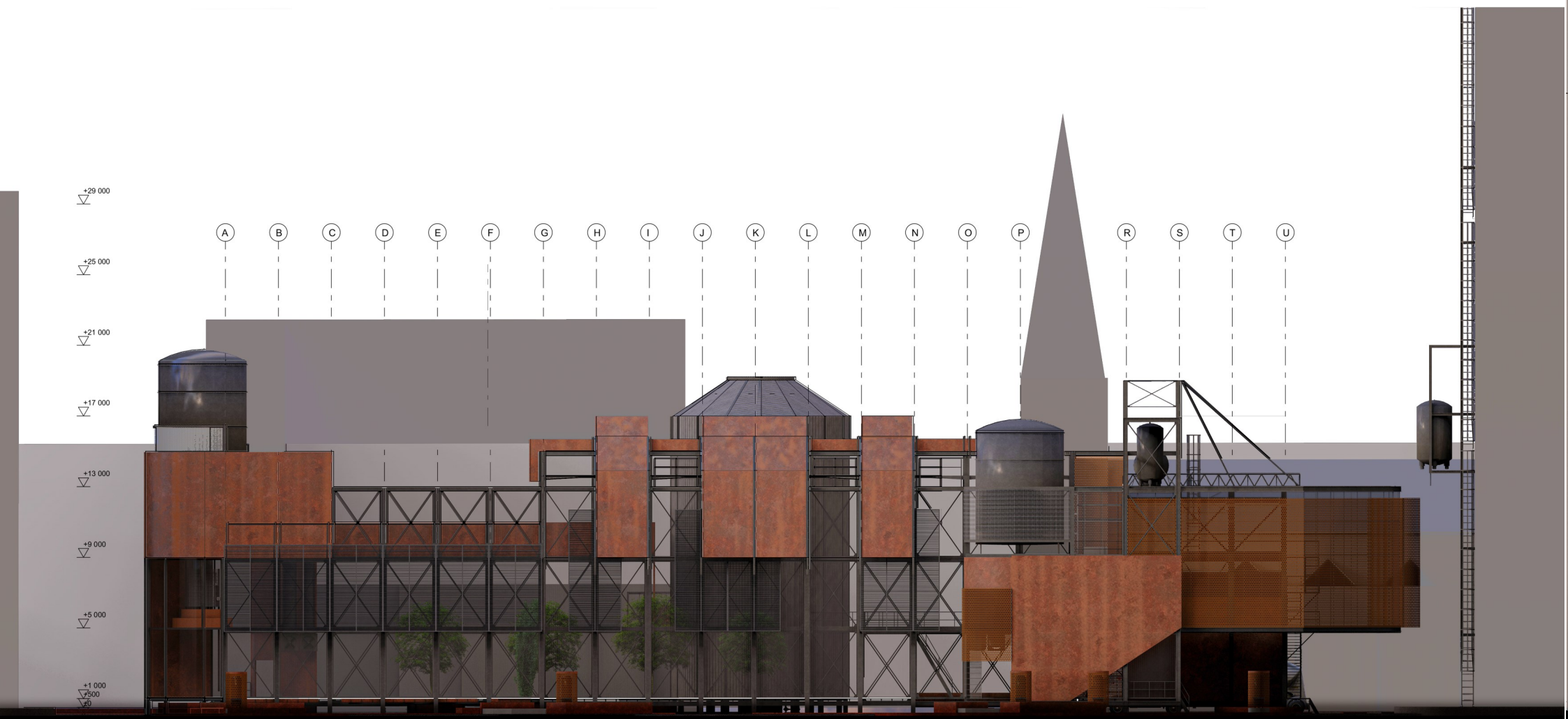


Louvre Detail
Scale 1:10

FIGURE 163: West elevation to show service yard and filling station (Author).

FIGURE 164-165: Construction drawing to show north and south elevations (Author).

FIGURE 166: Detail section of louvre systems on northern façade (Author).

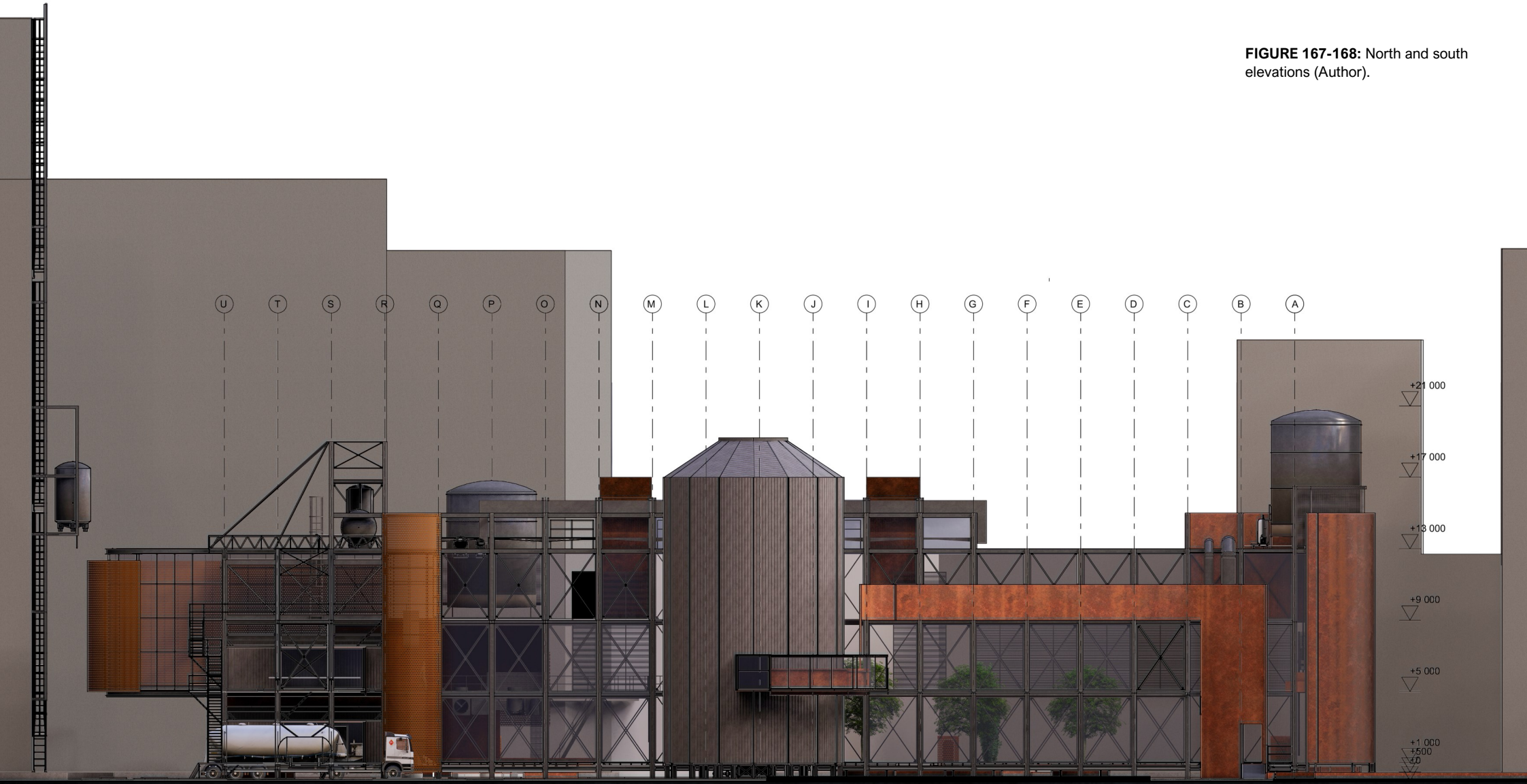


North Elevation

0 1 2 3 4 5 10m

SCALE BAR

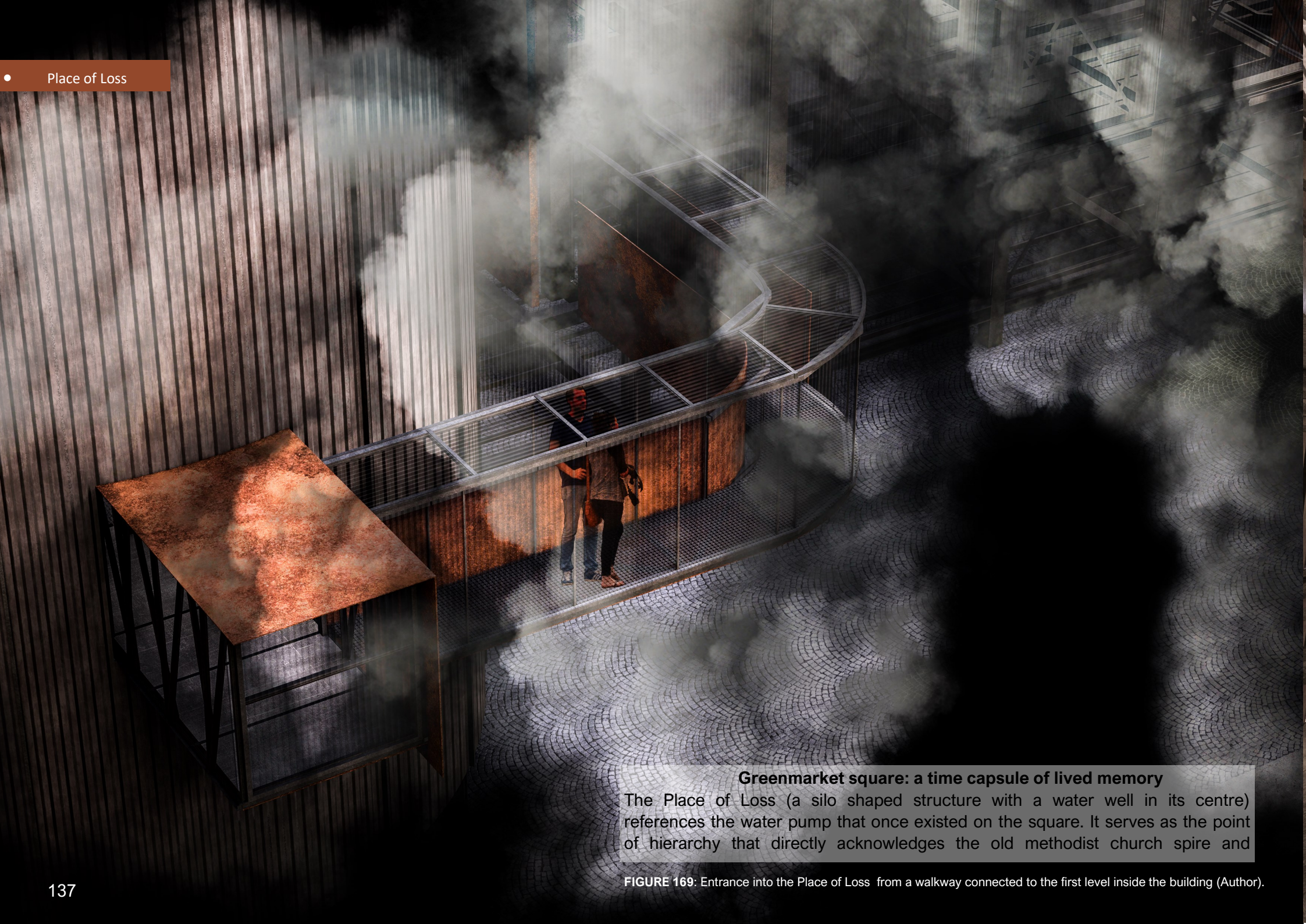
FIGURE 167-168: North and south elevations (Author).



South Elevation

0 1 2 3 4 5 10m

SCALE BAR



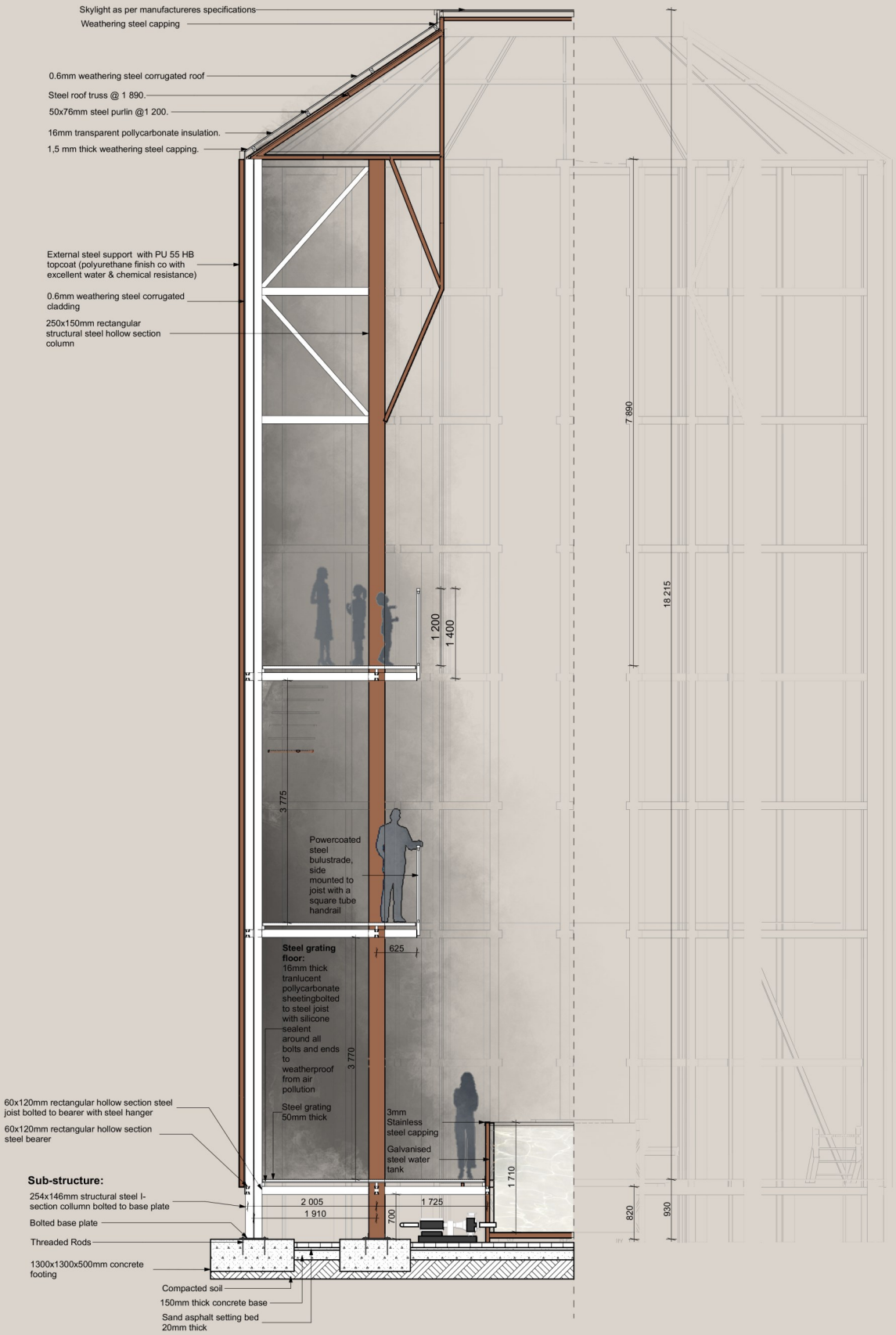
Greenmarket square: a time capsule of lived memory

The Place of Loss (a silo shaped structure with a water well in its centre) references the water pump that once existed on the square. It serves as the point of hierarchy that directly acknowledges the old methodist church spire and

FIGURE 169: Entrance into the Place of Loss from a walkway connected to the first level inside the building (Author).

FIGURE 170: View inside the Place of Loss, looking upwards to the roof and skylight (Author).

FIGURE 171: Construction section of the place of loss to show interior circular grid system (Author).



PLACE OF LOSS DETAIL SECTION

5M

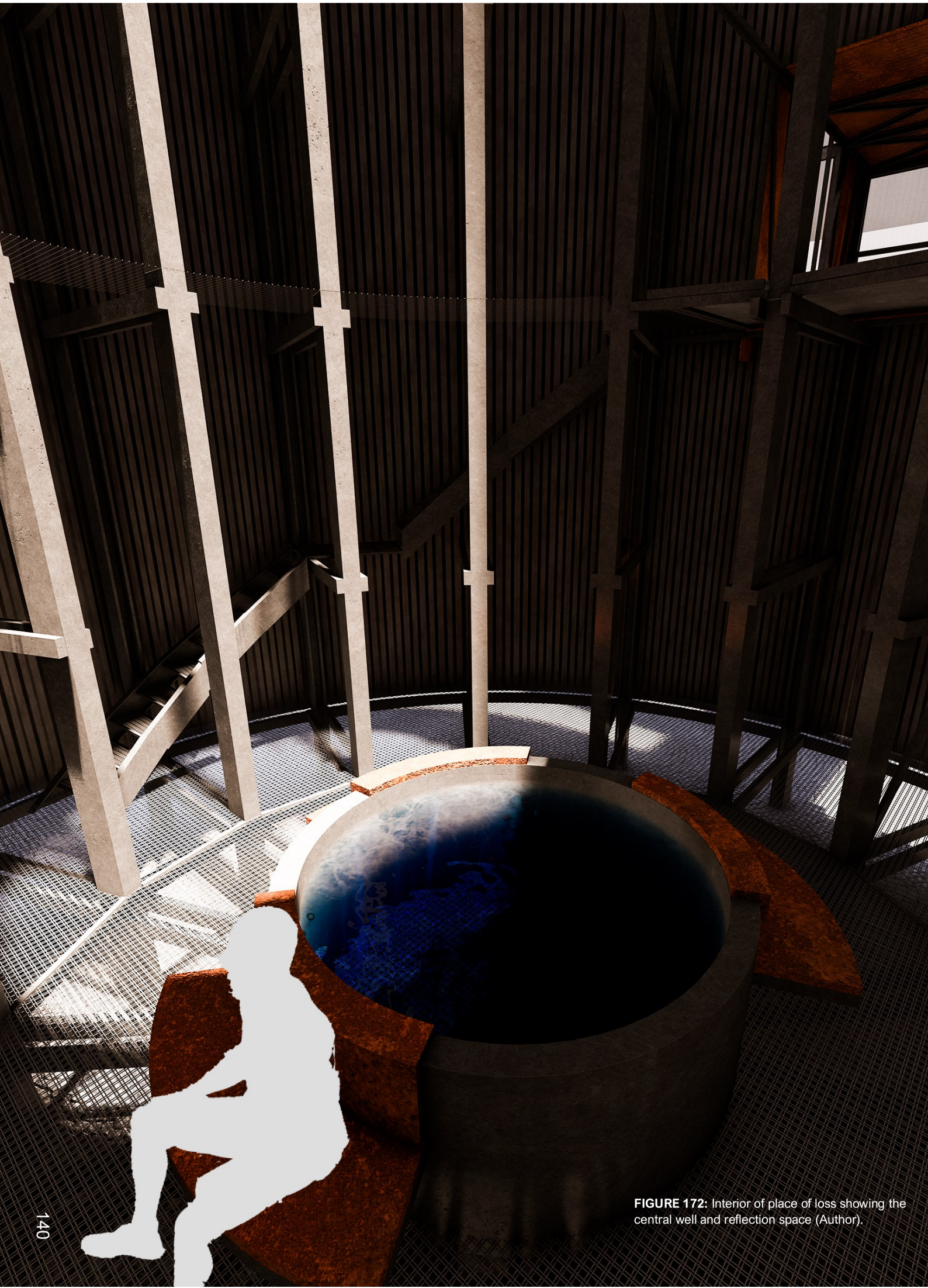


FIGURE 172: Interior of place of loss showing the central well and reflection space (Author).

FIGURE 173: Oxygen collection tower attached to the Onomo Hotel (Author).

- Exterior render

FIGURE 174: Visitors using the oxygen café to catch upon work. They can choose their oxygen flavour, sit back and relax (Author).

Oxygen Refill Taps for Public Use

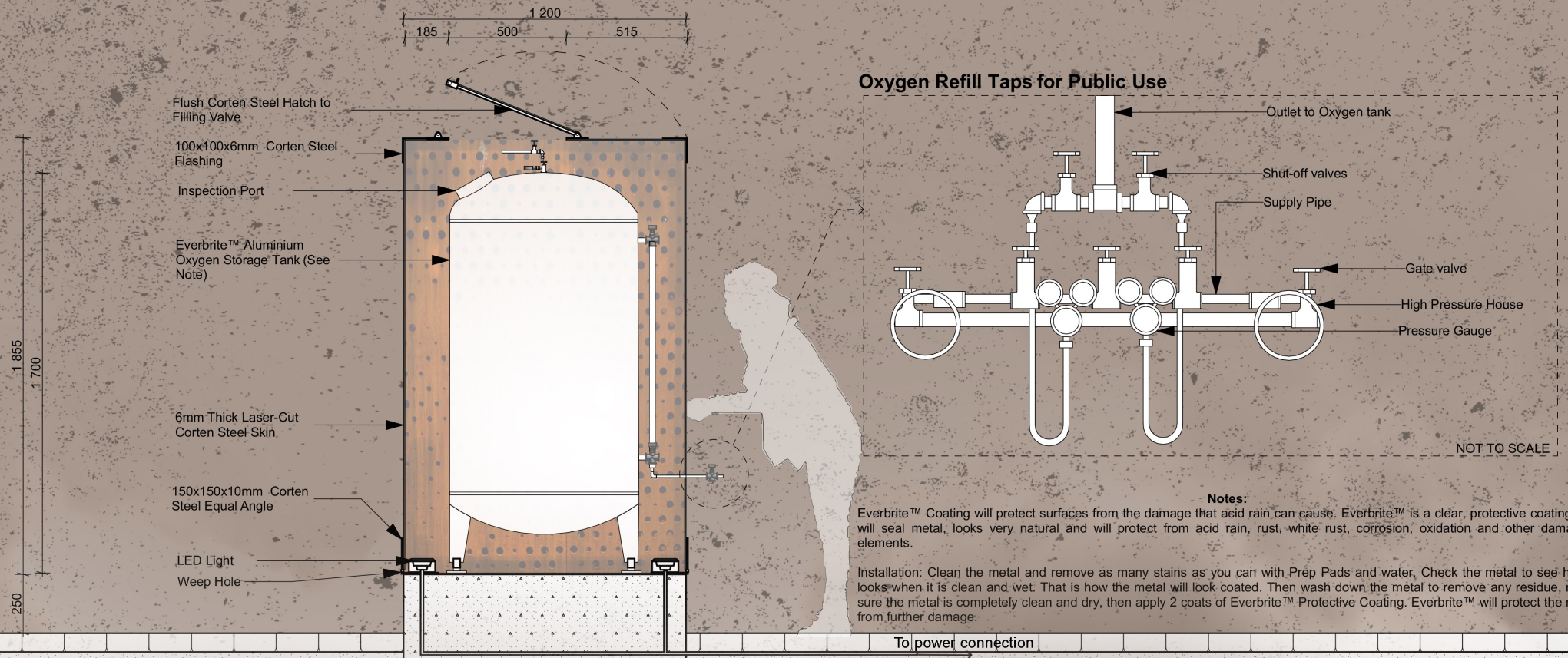
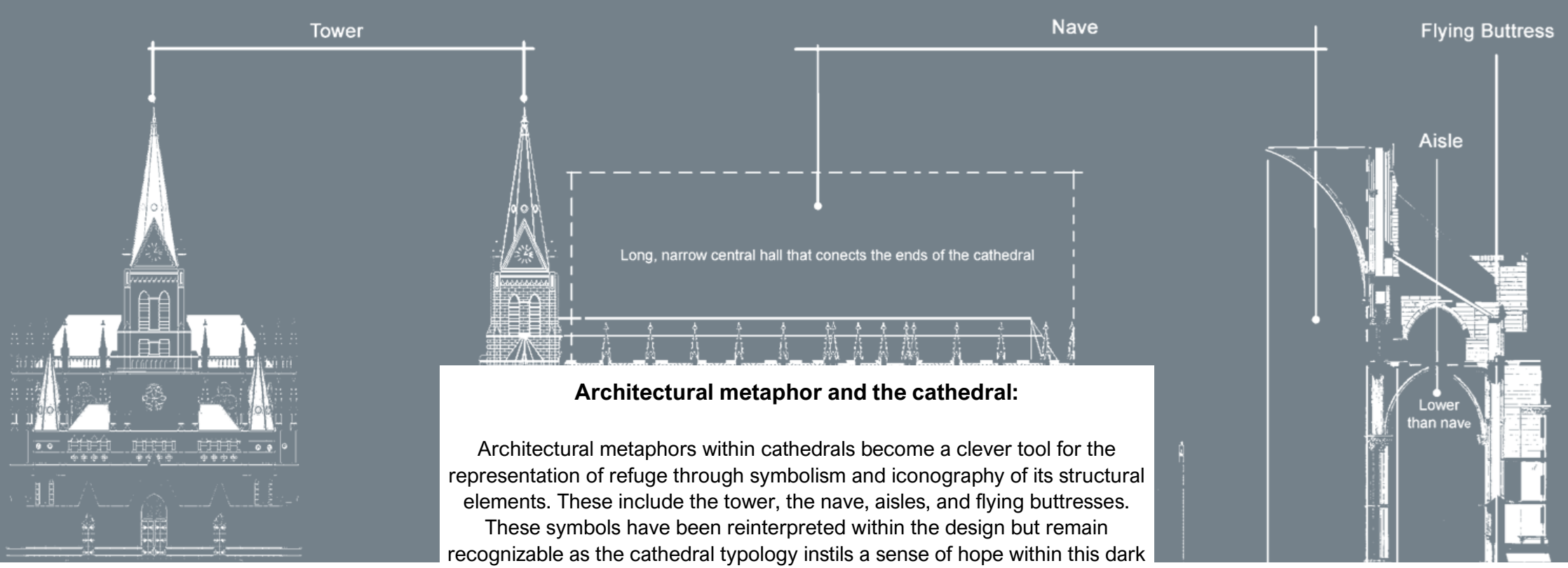


FIGURE 175: Public making use of the refill lanterns on the remembrance plaza (Author).

FIGURE 176: Section and detail of refill taps (Author).

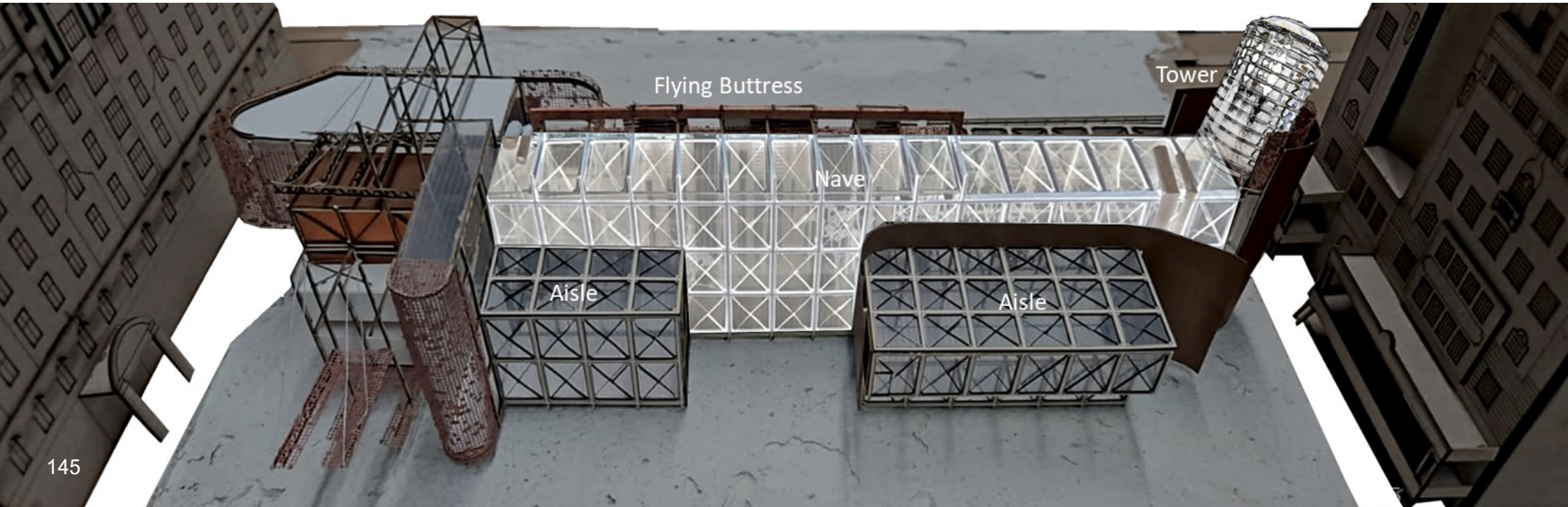
Greenmarket square: a time capsule of lived memory

As no trees can survive outside, they have been replaced with sculptural symbols thereof (Exactly where trees used to grow) with a dual usage of oxygen taps which the public can use to refill their tanks. This also references the water pump that once quenched the thirsts of slaves and market goers.



Architectural metaphor and the cathedral:

Architectural metaphors within cathedrals become a clever tool for the representation of refuge through symbolism and iconography of its structural elements. These include the tower, the nave, aisles, and flying buttresses. These symbols have been reinterpreted within the design but remain recognizable as the cathedral typology instils a sense of hope within this dark future.



Final Model

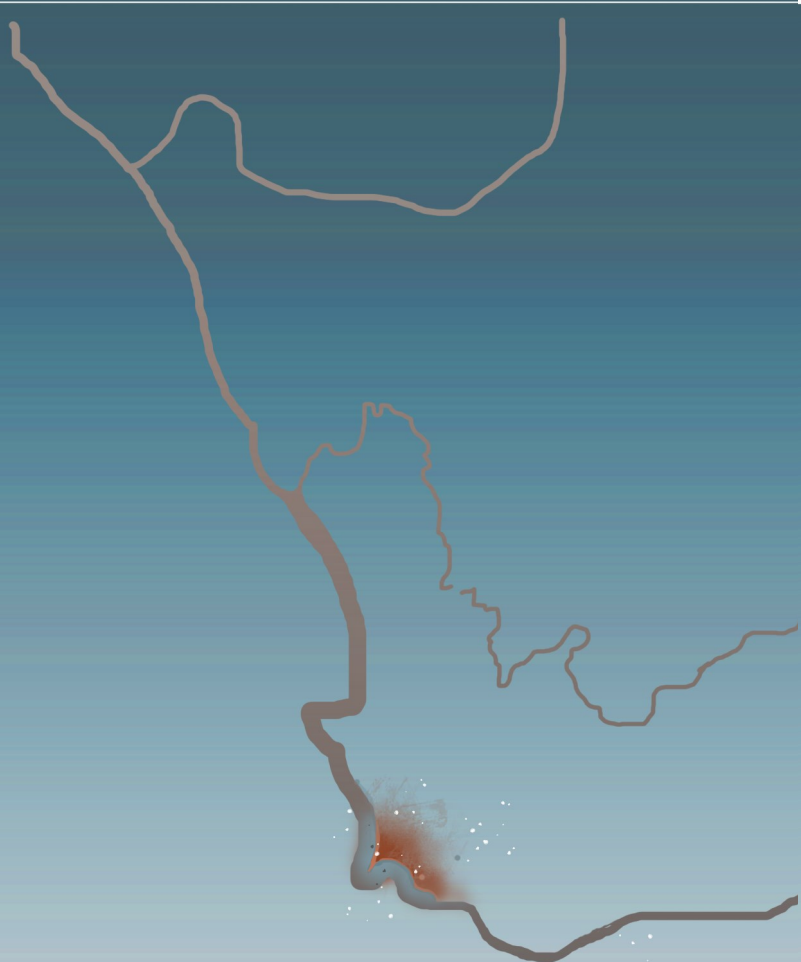
FIGURE 176-177: The final design and its relation with the Cathedral typology (Author).

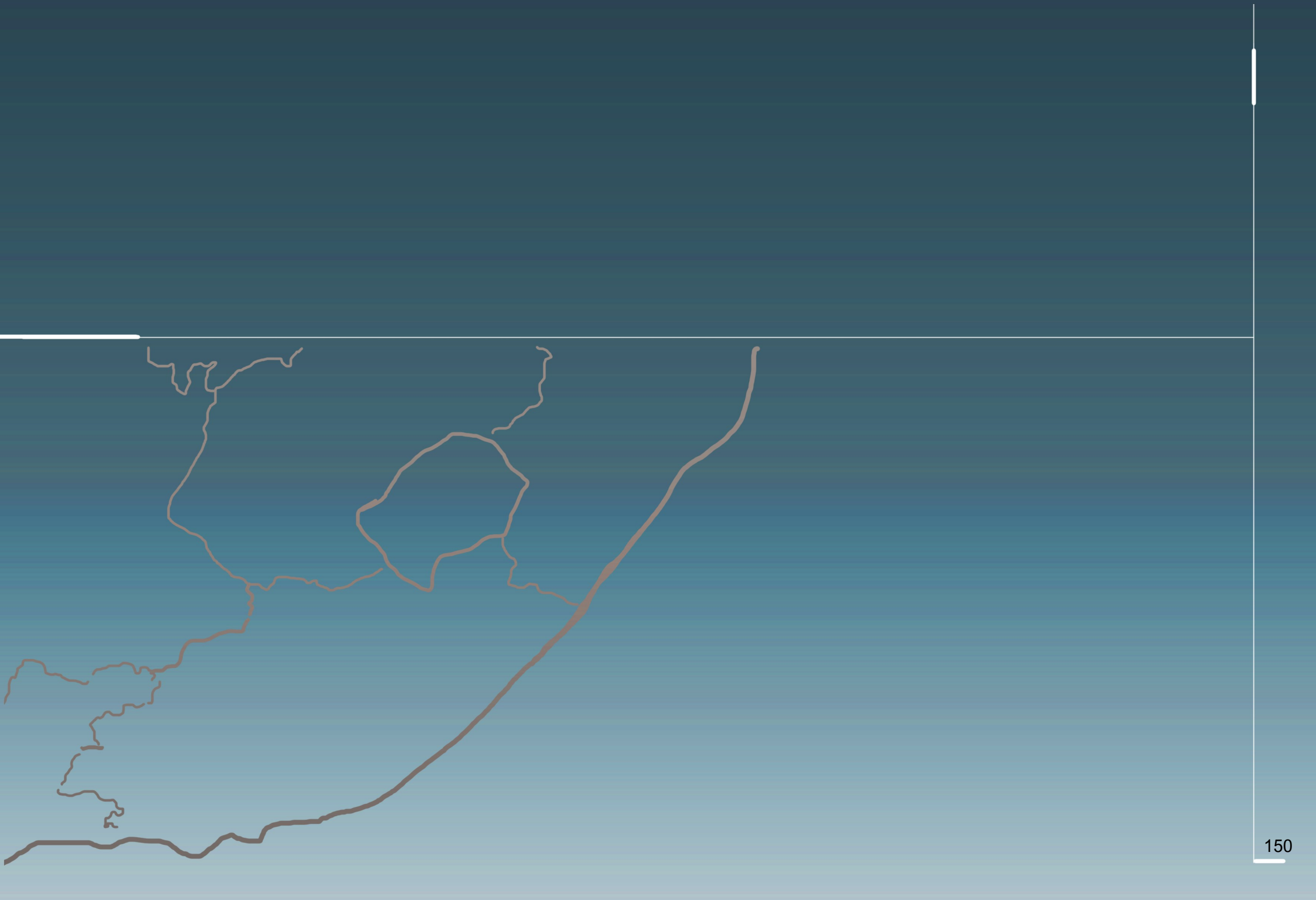
FIGURE 178: Photograph of the final model from an areal view (Author).

FIGURE 179-180: Photographs of the final model (Author).

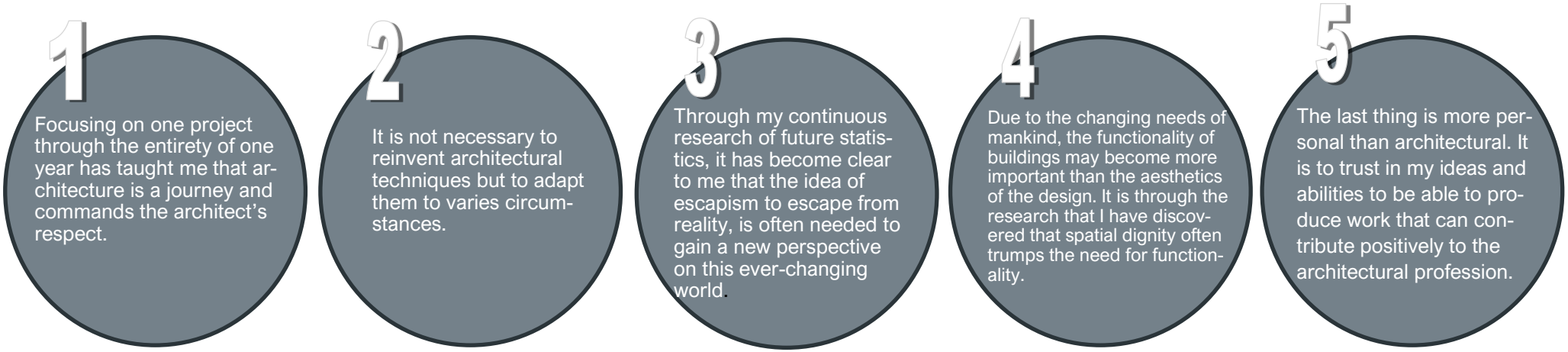
Chapter 06

Conclusion and Reflection




150

Things I have learnt:



Still breathing. Throughout this project I found myself losing touch with reality. Diving headfirst into the future, designing an oasis in a dystopian state, whilst being surrounded by the vibrant present. I sometimes sat and thought what the point of this dissertation is, if mankind is simply going to continue to spiral. What exactly am I trying to design? The concepts, precedents and even the circumstances of this venture are literally non-existent yet. The design has no root to stem from and the events may not even occur. This often made me think, what is the point? I wrestled with this for a large portion of this year and found myself lacking behind my usual pace. I had to immerse myself in a dark future on a daily basis and it definitely took its toll. I struggled to find my grove with little to no inspiration as the only inspiration available would be conceptualized 100 years in the future. This mountain I created for myself began to suffocate me and I was for the first time able to resonate with the Capetonians of the year 2100. I could not breathe. It is within this struggle that I was able to fully immerse myself into the year 2100, insofar making evident the importance for such an oasis to exist. It proved how important it was to preserve humanity and to escape from reality. Everyone has their trials and tribulations from which they wish to escape, whether in the year 2100 or 2023. This is the first time the concept of escapism resonated with me, and the snowball effect was something extraordinary. I finally found my why. This project if for people who will live after me, for those that will suffer because of our failures as humans. I believe that is why it is relevant to sometimes peak forward and not stagnate in the present. Yes, the need for solutions now is clear but if we only fix issues as they arise, how will development ever occur? Therefore, I believe this dissertation adds to the profession as it symbolizes proactive solutions rather than reactive solutions. It restores architecture to one of its original purposes, a time capsule of lived memories. A pillar of worlds before and a reminder for worlds in the future. This is what the oasis at Greenmarket Square aims to do. Its aim is to restore the pleasantness in humanity and to add colour to a dull life, after all, isn't this what architecture is all about?

The vision for my dissertation is to create a lung, a lifeline for the people, through care and through spatial dignity. I have created a space that allows people to remember what makes them human and to be made feel whole again. This dissertation symbolizes a metaphor and a warning. It exposes the flaws we as humans have, guided with greed and consumerism, leading to a world where artificial experiences need to be created. It represents the breakdown of the integration between the man made and the natural. A hole which architecture will be forced to fill. I am concerned architecture will become more about trying to bridge an ever-growing gap between the natural and the man made, instead of innovating new ideas. We must adopt a forward-looking perspective to prevent the realization of this fictitious scenario. It was only now that the purpose for my dissertation was discovered and the mountain that once suffocated me was now firmly beneath me, providing me with a vantage point over the oasis I created on Greenmarket Square. I too am still breathing.

THE END

Chapter 07
Reference list

Architizer. 2023. *Global Flore Conservatory.* [Online]. Available from: < https://architizer.com/projects/global-flora-conservatory/ > [Accessed 2023-10-06].

Bell, J. 2021. *Walking as Artistic Practice.* [Online]. Available from:< https://teaching.ellenmueller.com/walking/2021/10/10/guy-debord-drifting-derive-1958/ > [Accessed 2023-10-05].

Breeze Technologies. 2021. Everything to know about Carbon Monoxide (CO). [Online]. Available from: <https://www.breeze-technologies.de/blog/carbon-monoxide-co/ > [Accessed 2023-09-10].

Chinese Academy of Sciences. 2019. *Air pollution under clear skies reduces sunlight reaching the Earth's surface*. [Online]. Available from: <https://phys.org/news/2019-08-air-pollution-sunlight-earth-surface.html> [Accessed 2023-09-10].

Crichton, M. 1990. *Prologue to Jurassic Park by Michael Crichton.* Online. Available from: <https://www.scribd.com/document/2572842/Prologue-to-Jurassic-Park-by-Michael-Crichton > [Accessed 2023-07-26].

EPA. 2017. *Nitrogen Dioxide (NO2) Pollution*. [Online]. Available from:< https://19january2017snapshot.epa.gov/no2-pollution/basic-information-about-no2_.html > [Accessed 2023-09-10].

EPA. 2023. *Particulate Matter (PM) Pollution*. [Online]. Available from: < https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm#:~:text=Environmental%20Effects%201%20Visibility%20impairment%20Fine%20particles%20%28PM,ground%20or%20water.%20...%203%20Materials%20damage%20 >[Accessed 2023-09-10].

EPA. 2023. *Sulfur Dioxide (SO2) Pollution.* [Online]. Available from: <https://www.epa.gov/so2-pollution/sulfur-dioxide-basics> [Accessed 2023-09-10].

Farmer, B. and Louw, H. 1993. *Companion to contemporary architectural thought.* London: Routledge

Green economy media. 2023. *Cape Town's Greenmarket Square – an authentic piece of Africa*. [Online]. Available from:< https://greeneconomy.media/cape-towns-greenmarket-square-an-authentic-piece-of-africa/ > [Accessed 2023-10-05].

Gwaze, P. 2007. What's that brown haze over Cape Town? *Sabinet African Journals,* 3(4): 17-19. Available from: <https://hdl.handle.net/10520/AJA1729830X_89> [Accessed 2023-01-25].

Hollier, D. 1992. *Against Architecture: The Writings of Georges Bataille.* London: The MIT Press

I. Díaz, H. Cano, B. Chico, D. de la Fuente, and M. Morcillo. (2011). 'Some Clarifications Regarding Literature on Atmospheric Corrosion of Weathering Steels'. *International Journal of Corrosion*. Vol. 2012, Article ID 812192, 9 pages, https://doi.org/10.1155/2012/812192

MacLean, J. 2018. *The Tin Chapel, Roz Barr Architects.* [Online]. Available from: < https://www.harrietjennings.com/articles/the-tin-chapel-roz-barr-architects/ > [Accessed 2023-10-03].

Meersens. 2023. *Ozone (O3): sources and health impacts.* [Online]. Available from: < https://meersens.com/ozone-o3-sources-and-impacts-on-health-and-environment/?lang=en#BLOC3 > [Accessed 2023-09-10].

Musil, B. 2021. 'Escapism: suppression of self or its expansion?' *Studia Historica Slovenica,* 1(01), pp. 279-287. DOI: 10.32874/SHS.2020-09

National Environmental Management: Air Quality Act, 2004 (Act No. 39 Of 2004)

National library. 2023. Greenmarket Square: the vibrant heart of Cape Town for over 300 years. [Online]. Available from:< file:///C:/Users/flall/OneDrive/Desktop/5th%20year/history%20of%20site/HID_Greenmarket_Square.pdf > [Accessed 2023-10-05].

Nordquist, R. 2018. *Definition and Examples of Situational Irony.* [Online]. Available from:< https://www.thoughtco.com/situational-irony-1692521 > [Accessed 2023-09-26].

O'Byrne, N.L. 2020. *Towards an Architecture of Care: Humanising Space for Living and Dying Well.* [Online]. Available from: <https://www.academia.edu/43825125/Towards_an_Architecture_of_Care_Humanising_Space_for_Living_and_Dying_Well > Accessed 2023-09-21]

Oasis No.7 designer Zamp Kelp/Haus-Rucker-Co. 2011. YouTube video, added by coldwarmodern. [Online]. Available from: < https://www.youtube.com/watch?v=3UsuiitOTZM > [Accessed 2023-09-21]

Pintos, P. 2020. *Wellesley College Global Flora / Kennedy & Violich Architecture.* [Online]. Available from: < https://www.archdaily.com/940891/wellesley-college-global-flora-kennedy-and-violich-architecture > [Accessed 2023-10-06].

Ogale, S. 2023. *rainwater harvesting system.* [Online]. Available from: < https://www.britannica.com/technology/rainwater-harvesting-system > [Accessed 2023-09-11].

Pixar Wiki. 2007. *Buy n Large.* [Online]. Available from: < https://pixar.fandom.com/wiki/Buy_n_Large > [Accessed 2023-09-21].

Ponge, F. 1977. *Our building.* [online]. Available from: <https://www.centrepompidou.fr/en/collection/our-building> [Accessed 2023-06-04].

S. Khambal, 2022. *How sustainable is Corten steel?* [Online]. Available from:<https://cortensteeltube.com/blog/how-sustainable-is-corten-steel/> [Accessed 2023-09-11].

SDWF. 2017. *Acid Rain.* [Online]. Available from: < https://www.safewater.org/fact-sheets-1/2017/1/23/acid-rain-fact-sheet > [Accessed 2023-09-11].

Theradicalproject. 2023. *Oase Nr. 7: Kassel Germany 1972.* [Online]. Available from: < https://www.theradicalproject.com/oase-nr-7-kassel-germany1972/ > [Accessed 2023-09-21]

The science of air. 2022. *Why is PM10 harmful?* [Online]. Available from: < https://thescienceofair.com/why-is-pm10-harmful/ > [Accessed 2023-09-10].

Welch, F. and Summers, I. 2009. *Between Two Lungs.* [Online]. YouTube. Available from: < https://www.youtube.com/watch?v=CpjQlpCiWVE > [Accessed 2023-09-21].

Western Cape Government. 2022. *Climate Change.* [Online]. Available from: < https://www.westerncape.gov.za/general-publication/climate-change > [Accessed 2023-09-10].

WHO. 2020. *Technical specifications for Pressure Swing Adsorption (PSA) Oxygen Plants*. [Online]. Available from: < file:///C:/Users/flall/Downloads/WHO-2019-nCoV-PSA_Specifications-2020.1-eng%20(1).pd > [Accessed 2023-09-11].

Wolff Architects. 2014. *Watershed.* Online. Available from: <https://www.wolffarchitects.co.za/projects/all/watershed/> [Accessed 2023-07-27].

Yazıcıoğlu, S. 2020. 'Postponed care: a historical critique of care from the existentialist perspectives of Heidegger and Arendt', *International Journal of Philosophy and Theology*, 81(3), pp. 292-309. DOI: 10.1080/21692327.2020.1786437

List of figures:

Air Liquide. 2018. *South Africa: Air Liquide starts up the world's largest oxygen production unit.* [Online]. Available from:< https://za.airliquide.com/south-africa-air-liquide-starts-worlds-largest-oxygen-production-unit > [Accessed 2023-10-03].

Architectuul. 2023. *Oase no. 7.* [Online]. Available from: < https://architectuul.com/architecture/oase-no-7 > [Accessed 2023-10-03].

Atlas, 2017. *Renzo Piano & Richard Rogers, Centre Pompidou.* [Online]. Available from: < https://www.atlasofplaces.com/architecture/centre-pompidou/ > [Accessed 2023-10-03].

Bamarni, Z. 2023. *The Architecture of Escapism: 8 Dreamlike Renderings That Showcase Bold Utopian Environments.* [Online]. Available from: < https://architizer.com/blog/inspiration/collections/rendering-utopian-environments/ > [Accessed 2023-10-03].

Bghekaya, 2011. *Orographic Cloud Formation on Table Mountain, Cape Town.* Available from: < https://ekayasolutions.blogspot.com/2011/01/orographic-cloud-formation-on-table.html > [Accessed 2023-09-21]

Bloomer, K. C. 1977. *Body, memory and architecture.* [Online]. Available from: < https://openlibrary.org/books/OL4563063M/Body_memory_and_architecture > [Accessed 2023-10-03].

Du Plessis, 2015. *Town House, Greenmarket Square, Cape Town.* [Online]. Available from: < https://www.flickr.com/photos/hilton-t/8727302879/in/album-72157623376342033/ > [Accessed 2023-10-03].

Du Plessis, E. 2015. *Greenmarket Square, 1962.* [Online]. Available from: < https://www.flickr.com/photos/8270787@N07/16334056949/ > [Accessed 2023-10-03].

Mcgregorza. 2011. *Greenmarket Square – a sense of place in Cape Town.* [Online]. Available from: < https://www.globalbuzz-sa.com/mcgregorza/2011/09/10/greenmarket-square-a-sense-of-place-in-cape-town/ > [Accessed 2023-10-03].

Metalocus. 2023. *Rehabilitation of the Santa Maria de Vilanova de la Barca, by AleaOlea Architects.* [Online]. Available from: < https://www.metalocus.es/en/news/giving-light-without-touching-rehabilitation-ancient-church-vilanova-de-la-barca-alea-olea > [Accessed 2023-10-03].

Pixar fandom. 2008. *Buy N Large, a leader in worldwide affairs.* [Online]. Available from: < https://fictionalbrandsarchive.com/item.php?id=2 > [Accessed 2023-10-03].

Ritterbach, J. 2023. *Greenmarket square*. [Online]. Available from: < https://www.travel4pictures.com/greenmarket_square/h6f3bd1bf#h6f3bd1bf > [Accessed 2023-10-03].

Wikimedia Commons. 2023. *Old maps of Cape Town.* [Online]. Available from: < https://commons.wikimedia.org/wiki/Category:Old_maps_of_Cape_Town > [Accessed 2023-10-03].