Liquid Identity

Fountains Valley: The origins of a City.

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M(Arch) Prof.
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Summery
Project location:
Fountains Valley Resort, Pretoria, Gauteng

Program:
Artisan Whiskey Distillery

Client:
Private Sector Investor

User:
General public

In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that this thesis, which I hereby submit for the degree of Master of Architecture (Professional), at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my thesis has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

Philip Albert Myburgh

"Architecture belongs to poetry, and its purpose is to help man to dwell. But architecture is a difficult art. To make practical towns and buildings is not enough. Architecture comes into being when a total environment is made visible." Norberg-Schulz

Preface

This document serves as informant to the rest of the thesis dissertation and are to be viewed as part of the design process. It should be iterated that although it is compiled of separate parts, in the forms of chapters they should be read as contributing to the whole.

The first part deals with the theory and context. Each are used to introduce and explain the terms of self-identity and place identity as well as the relationship with context. It acts as the backdrop that each part should be viewed against. The intention thus is to develop a design morphology that would relate and reflect the design concepts of “(re)defining and gathering”

Acknowledgments

Special thanks to Dr. Arthur Baker (Studio Master) and Gary White (Study Leader) for their knowledge and support.

Samevatting

Pretoria is a stad wat sy oorsprong te danke het aan die oorvloedige beskikbaarheid van vars water. Die bron van hierdie vars water is geleë in 'n vallei net suid van die stad, wat vandag bekend staan as Fonteine Dal. Dis hier waar die water van uit die dieptes na die oppervlak bruis in die vorm van twee afsonderlike fontein oë. Die oë word erken as die ontspringings punt van die Apies rivier, asook die oorsprong van die stad Pretoria.

Benewens die natuurskoon, is daar verskeie terreine binne die grense van die Fonteine dal, wat van besondere kultuur en histories van waarde is. Ten spyte van hul belangrikheid is daar min wat kennis dra van hierdie terreine. Tans is hierdie terreine bloote bakens in die landskap wat kan getuig van gebeure wat die totstandkoming van die stad Pretoria as ook sy identiteit beinvloed het.

Hierdie dissertasie sal poog om die potensiaal van Argitektuur as agent te ondersoek, wat die herlewing van die vergete indentiteit van die Fonteine Dal as die oorsprong van die stad van Pretoria te bewerkstellig.

Abstract

Pretoria is a city that was founded upon the abundant availability of fresh water. The source of this water can be found in a valley just south of the city centre, today known as Fountains Valley. Here the water surfaces from the depths at two separate spring eyes, forming the origins of the Apies River. Ultimately the Fountains Valley can be viewed as the origin of the city itself – the reason that made it possible for it to exist by providing fresh water of exceptional quality as it still does to the present day.

In addition to the natural features, the Valley contains several sites of great historical and cultural significance. Despite their importance they now only serve as markers in the landscape, unknown to many, and bears silent testimony to the events that help shape the city, its identity as a place and the identity of those who reside in it.

This dissertation will explore the potential of architecture to act as an agent in reviving the forgotten identity of the Fountains Valley, by redefining those lost elements and in order to truly understand and appreciate the significance of place and place identity and its ability to shape the identity of the individual.

Contents

Chapter One - Introduction

1.1 Introduction

Pretoria has lost its connection with water, and in the process lost its identity as a water city.

Fountains Valley is were the origins of this water can be found. The remnants of the intricate water system supplied water to the city. The landscape also hold several other sites of great cultural and historical significance which includes signs of the first peoples in the area, the first pioneer settlers and some of the earliest forms of urban infrastructure and industrial architecture.

Currently these site are in dismal state of neglect, with only a small part of the public that are aware of their existence. Without any action the risk of losing these cultural and historical significant sites looms ever so close.

A theoretical investigating into the manner in which Self-identity and Place identity are constructed and to what extent it informs the relationship between man and place, the dissertation poses to revive that lost identity by going back to the place of origin, the place of the first connection.

The narrative of place, would be used as a vehicle to explore the potential of architecture in the from of a artisan whiskey distillery to act as an agent of regeneration and defining the tangible as well as the intangible heritage. By doing so promoting a renewed understanding and appreciation of the site and the great significance it holds.

Figure 1.1. The dense treed vegetation of the area. Photo: Author, 2014.

1.2 Hypothesis

Fountains Valley is the origin from which water was collected to build the city of Pretoria. It is, in many ways, the origin of Pretoria. This condition is unbeknown to most of the residents of Pretoria, and has the risk of being completely forgotten, which would be a loss to the heritage of this city.

To preserve the heritage of Fountains valley, it is necessary to celebrate the history of place, and through doing so also ensure that future generations will have the opportunity to share in the heritage.

This dissertation aims to rediscover the identity of place through creating a spatial narative. Through the creation of architectural form, it becomes possible to celebrate, and create a deeper understanding of the importance of this place. The architecture attempts to create a renewed appreciation for this once critically important place.

The intervention portrays the industrial typology. referencing the history of the area as place of production. Fragmented remnants of historic buildings are scattered throughout the site, with the intervention celebrating the route between these sites, creating the narrative of place through a linked pathway.

Figure 1.2. The rocky hill sides surrounding the valley. Photo: Author, 2014.

1.3 Research Methodology

The investigation of this dissertation will take on the following form:

Part One: Introduction
Outlining the context of the dissertation, its supposition that will be explored as well as the limitations set.

Part Two: Theory
Literature investigation into the constructs of Place Identity, Self Identity, and the manner in which the relationship between these concepts influence architecture.

Part Three: Background
An exploration of the historical and cultural background in order to compile a narrative of place.

Part Four: Context
Providing the base for the intervention with the analysis of the context on both a macro and micro scale together with the establishing of a framework.

Part Five: Program
Introduction and explanation of the architectural program(s) to be proposed as part of the intervention.

Part Six: Concept Development
Incorporating all design generators and influences into the developing a design concept.

Part Seven: Design Development
Evolving of the concept into an architectural response.

Part Eight: Technical Investigation
Demonstrating how the concept is expressed as an technical solution of the architectural response.

Part Nine: Conclusion
Conclusion of the findings of the dissertation.

1.4 Location

The dissertation is located within the Fountains Valley Resort which forms part of the Groenkloof Nature Reserve. The resort is situated just south of the Central Business District (CBD), that represents the historical core of the city of Pretoria.

Figure 1.3. Aerial photo of the site location. Photo: Department of Geography, UP, 2014.

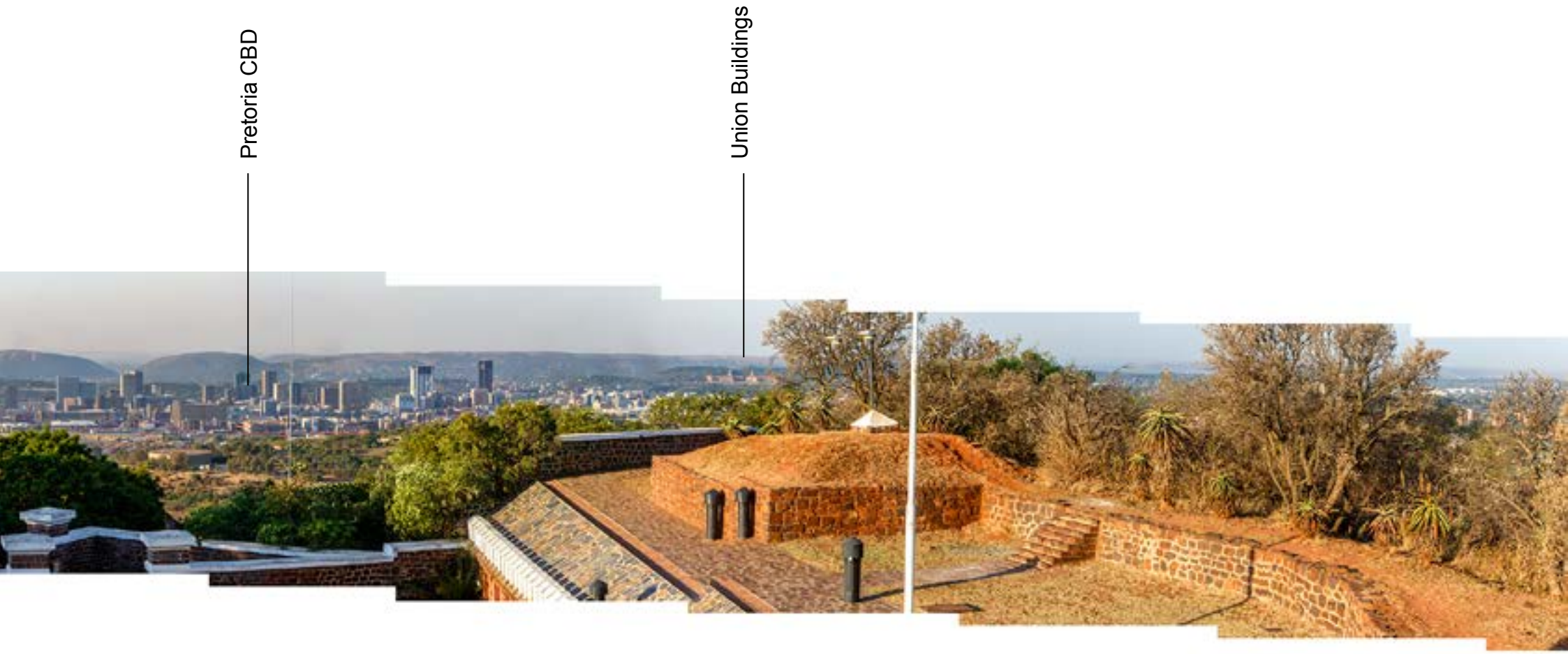


Figure 1.4. Panoramic view form Fort Skanskop accorss the valley. Photo: Author, 2014.

1.5 Aim

The aim of the dissertation is to investigate the forming of place identity and the its relation to self identity and architecturally re-establish the hidden, lost and forgotten connections, in order to unlock the narrative and identity of place.

The intervention will explore the possibility and ability of architecture to act as an agent in the redefining of lost/forgotten identity giving elements utilizing the narrative of place.

Through redefining these lost/hidden elements the intent is to create a renewed understanding and appreciation of the significance of place and by doing so, riving the forgotten identity.

1.6 Problem statement

General Issue

The city of Pretoria has lost its connection with the element it was founded upon – Water. As the system that acted as the lifeline to the city became obsolete and disappeared from view, so too did the identity of the city.

Site Issue

The series of sites in the Fountains Valley and especially the two springs played major role in the establishing and shaping of the city. Despite their great historical and cultural significance very little is being done to conserve and celebrate these important sites. Poor knowledge, neglect and vandalism threatens their existence.

Architectural Issue

Immense potential for regeneration lies hidden in the valley. The dissertation will investigate to what extent architecture can act as an agent in the rediscovering, understanding and appreciating the significance of the valley as the true origin of the city.

1.7 Limitations

Due to the size of the area under investigation, the research area had to be limited to by focusing on the area directly surrounding the two springs.

1.8 The Client

The proposed project can be run on the basis of a concession with the land being leased out for a fixed period. Therefore the client(s) would likely be form the private sector that will have able resources at their disposal.

1.9 The User

The general public would be the main users, with the potential of a small tourism component that consists of international as well as local tourists.

Chapter Two - Theory

The Muse

Consult the genius of the place in all;
That tells the waters or to rise, or fall;
Or helps th' ambitious hill the heav'ns to scale,
Or scoops in circling theatres the vale;
Calls in the country, catches opening glades,
Joins willing woods, and varies shades from shades,
Now breaks, or now directs, th' intending lines;
Paints as you plant, and, as you work, designs.

Epistle IV

2.1 Introduction

An introduction to the theoretical premise on which this dissertation is based, with a discussion of the theoretical concept(s) and approaches that would ultimately inform the design of the proposed architectural intervention.

2.2 Genius loci - Man and the Spirit

The concept of *Genius loci* stems from the ancient Roman believe that each and every being possessed a *genius* or a guardian spirit. This spirit gave life to people as well as places, and determined their character or its essence.

Ancient man perceived his environment as consisting of these different characters. It was important for him to come to know the particular *genius* of the locality where he existed in. His survival depended upon a good relationship with his environment on a physical as well as psychic level (Norberg-Schulz, 1980:18).

It is thus the belief that knowledge of the *genius loci* and the existence of a critical 'man-place' relationship, determined how man is in that environment.
The term dwelling or to dwell is used to describe this relationship man and his environment. When this relationship are present, man are able to dwell, meaning that he is able to orientate and identify himself within this environment, giving him a sense of belonging Norberg-Schulz (1980:18).

"One of our deepest needs is for a sense of identity and belonging. A common denominator in this human attachment to landscape and how we find identity in landscape and in place" Ken Taylor.

However, in the case where the relationship does not exists or has become undone, man are without a sense of belonging and will not be able to make sense of his environment.

2.3 Place

The definition of place as per the dictionary
ambiguous term, space en place.

Place is can be considered as the unique, multi-layered network of living systems that exists within a geographic region that results from the complex interactions, through time, of the natural ecology and culture. The ecology can be seen as consisting of the climate, mineral and other deposits, soil, vegetation, water and wildlife of that area, while culture is viewed as customs, expressions of values, economic activities, forms of association, ideas for education, and traditions (Mang:[S.a]).

" We are in constant dialogue and interaction with the environment, to the degree that it is impossible to detach the image of the Self from its spatial and situational existence." Juhani Pallasmaa.

Figure 2.1. Tree canopy. Photo: Author, 2014.

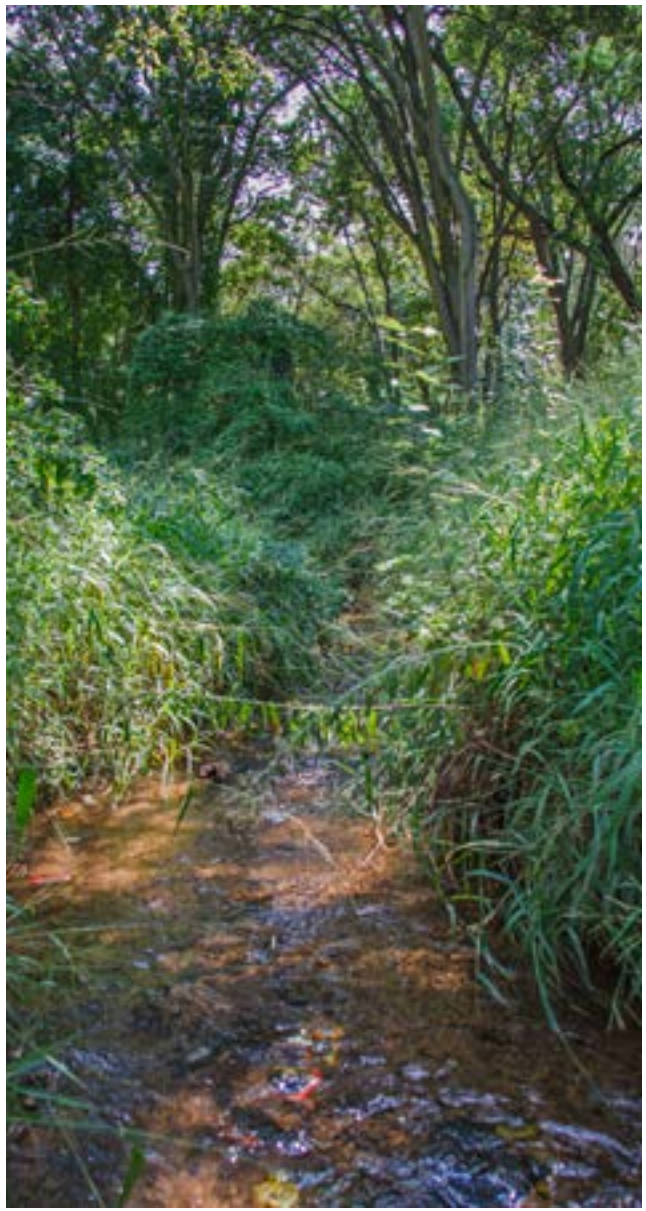


Figure 2.2. Stream formed from water discharged form the spring. Photo: Author, 2014.

The author therefore agrees with Pallasmaa and the statement that place is unmistakeably part of our everyday life, whether the "interaction" is on a conscious or unconscious level and the influence it has on the forming of the identity of a person.

2.4 Construction of Identity

Each individual experiences their environment in an unique way. Therefore it constitutes that the manner in which a person's identity is constructed would differentiate form individual to individual, giving each person a unique character — a way in which that individual is in this world.

According to Norberg-Schulz (1980:21) the forming of a person's identity are determined by a series of *schemata*, that are brought forth by the environment a person grows up in. In the process, the person is subjected to a series of experiences that acquaints them with that specific environment.

Following this argument that a individual's identity is influenced by their environment, it is important to understand what components makes up that environment. Ralph (1979:61) states that the manner in which 'place identity' is constructed, consists of three components. These components are interrelated and can be viewed in similar light as the "schemata" mentioned by Norberg-Schulz 1980:21).

The diagram in Figure 2.1 indicates the three components and how each component contributes to the construction of place identity, that influence self identity. The first component refers to the physical features of a place, meaning what is observable or tangible. Second are the activities or functions that takes place within a place. The third component deals with the meanings or symbols that are attached to the first two components.

It would therefore be a fair to assume that when one of these components that make up place identity have become undone, damaged or missing, that it would have an negative impact on place identity as well as self identity.

According to (Krupat 1983:343) the first concept of place identity emphasizes the key role that a person's relationship to their environment plays, but not simply in terms of a context for action or in facilitating certain forms and behaviour, but in becoming 'part of the person', and being incorporated into one's concept of self.

2.5 Self-identity and Place identity.

The term 'place identity' refers to the connection people have too places. It also refers to the sameness and or the distinctness of a certain place (Lewicka, 2008).

Inherently this forms the basis of reference in determining people's identity as well as how they would orientate themselves. He proves his point by taking an example from the common use of language: "When a person wants to tell who he is, it is in fact usual to say: "I am a New Yorker", or "I am a Roman"..."

It is clear indication that it is not merely a reference to a geographical location, but indicates that a person's identity is an extended function of place.
This notion is supported by Proshansky with his definition of place identity as "those dimensions of self that define the individual's personal identity in relation to the physical environment..."

Place identity formation diagram

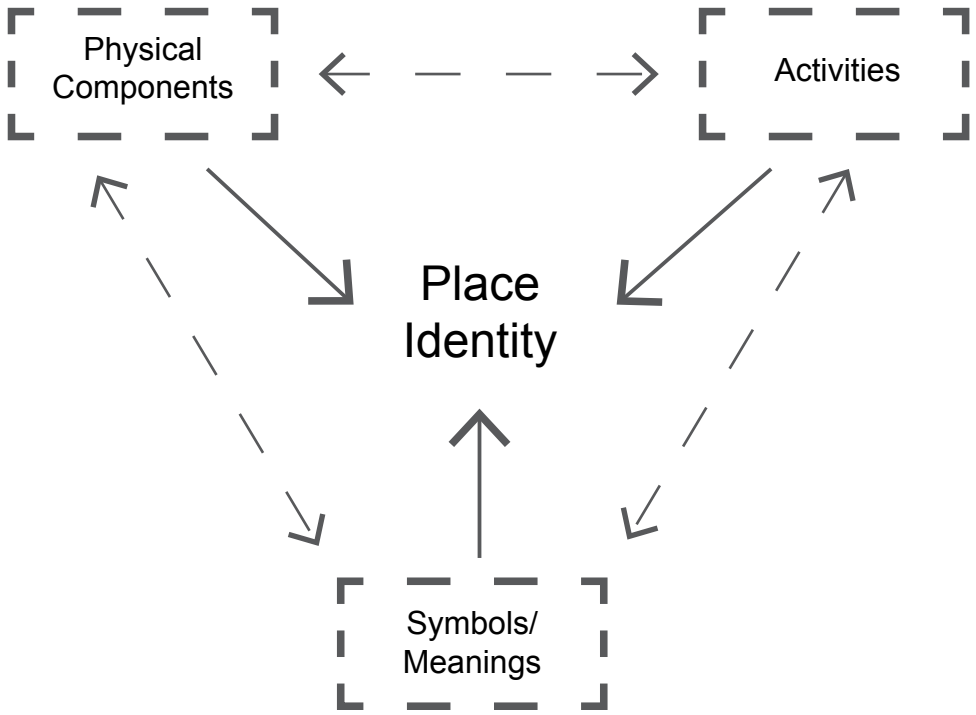


Figure 2.3. Construction of 'Place Identity'.

Figure 2.4. Remains of the stone lined furrows close to the Lower spring. Photo: Author, 2014.

2.6 Conclusion

It is clearly evident that a person's identity, or how that person is, are influenced by their environment — the place they are in. It is from this theoretical stand point that the relationship between human and place is of critical importance as it is not only man that influences the place around him, but that the place also has an immense influence on the identity of man. It marks the departure point for this dissertation.

Place-based meanings tell us something about who we are and who we are not, how we have changed and into what we have changing. Stokols

Chapter Three - Background

The Narrative of Place

"Awareness of place history intensifies place attachment.."
Lewicka 2005

3.1 Introduction

This chapter sets out with the historic context in which this dissertation is based. It will touch on information that has relevance to the large scale context, the site and the proposed intervention. Knowledge of the historical and cultural context as it is integrated within the narrative of place.

3.2 The Pre-historical Period

The Stone and Iron Age

The history of Pretoria and surrounding area, dating from these periods is very unclear due to the absence of recorded history. The evidence of the early inhabitants of the region can be found in the archaeological artefacts that is scattered throughout the area.

The two caves are situated on a rocky outcrop on the eastern slope of the Apies River, overlooking the valley, contained such artefacts. These artefacts were recovered during a survey done in 1993 and a later survey in 2006.

The artefacts date back to Middle to Late Stone age as well as Iron Age. Among the artefacts were pot-shards that can be associated with pottery from the Moloko Tradition. This style of pottery was practised by the early Sotho-Tswana speaking peoples (van Tonder, 2008).

The location of the cave site is in close proximity of both the Upper and Lower Fountains. It is fair to assume that the water of the springs and the bounty of the valley played an integral part in the livelihood of these early inhabitants of the area that would later become the city of Pretoria.

Figure 3.1. Present inhabitants. Photo: Author, 2014.
Figure 3.2. Entrance to the cave. Photo: Author, 2014.
Figure 3.3. Opposite page. Entrance to the cave. Photo: Author, 2014

3.3 Early recorded History

Tribal unrest and arrival of European settlers

Several black tribes lived in the area of the valley Apies River and the Magaliesberg mountain range. Among those were the Bakwena who according to legend ruled over the area during the seventeenth century (Andrews, 1989). This was abruptly ended with the arrival of Mzilikazi, king of the Matabele in 1825.

His reign of terror has led to large areas that were previously inhabited by other tribes to become depopulated. Robbert Moffat –missionary and traveller –met with Mzilikazi and described the encounter and the area in his book *Missionary labours and scenes in Southern Africa* (1842). Zulu impi's launched raids on Mzilikazi's kingdom during the 1830's. Finally in 1832, the Zulu impi's succeeded in driving Mzilikazi out of the region (Andrew, 1989).

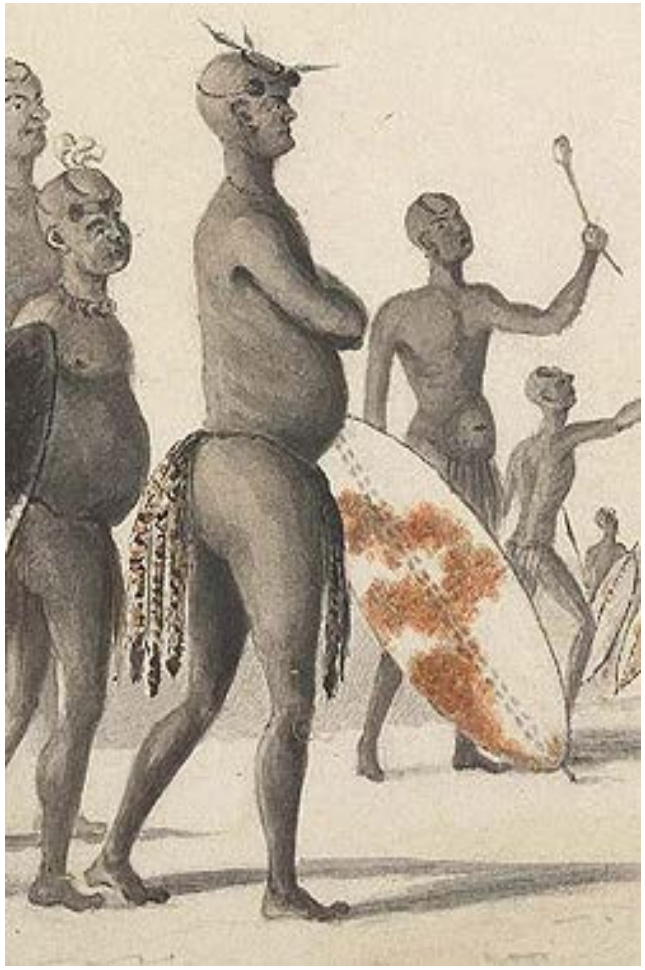


Figure 3.4. King Mzilikazi.

During December 1836, the first Voortrekkers started to arrive in the area, which were found to be mostly abandoned after the Zulu defeated Mzilikazi a few years earlier. Among these Voortrekkers were the Bronkhorts brothers. They settled in the valley, and set out the farms Elandspoort and Groenkloof. It is on these farms that the settlement that would become Pretoria were established. Not long after, more Voortreker families arrived in the area.

Figure 3.5. Bronkhorst Ruins . Photo: Author, 2014.

3.4 The founding and development of Pretoria

Around 1850 several factors led the need for a more centrally located town that would provide a permanent seat of government in the region north of the Vaal River. These factors included friction between some of the Voortrekker leadership, the growing British threat and the great distances between the already established towns of Potchefstroom and Klerksdorp in the west and Origstad and Lydenburg in the east, as well as Rustenburg to the north.

In 1854 a motion was passed by the Volkraad for the establishment of a church farm or a "kerkplaas" on the farms Elandspoort and Daspoort. The new congregation was called Pretoria Philadelphia, named after Commandant–General A.W.J Pretorius.

On 16 November 1855 the town of Pretoria was proclaimed (Dippenaar, 2013; Andrews, 1989). The main factor for the selection of the site for the proclamation of the town were the abundant availability of fresh water that were provided by the two springs that were situated just south of the site.

A further contributing factor was the close proximity of the wagon trial and the site was used as a stop-over by travellers and traders on route towards Delagoa Bay– today known as Maputo, long before the proclamation of the town (Dippenaar, 2013). On the 1st of May 1860, Pretoria became the seat of government of the Zuid-Afrikaansche Republiek (ZAR).

Figure 3.6. Church Square 1895. Photo: HiltonT.

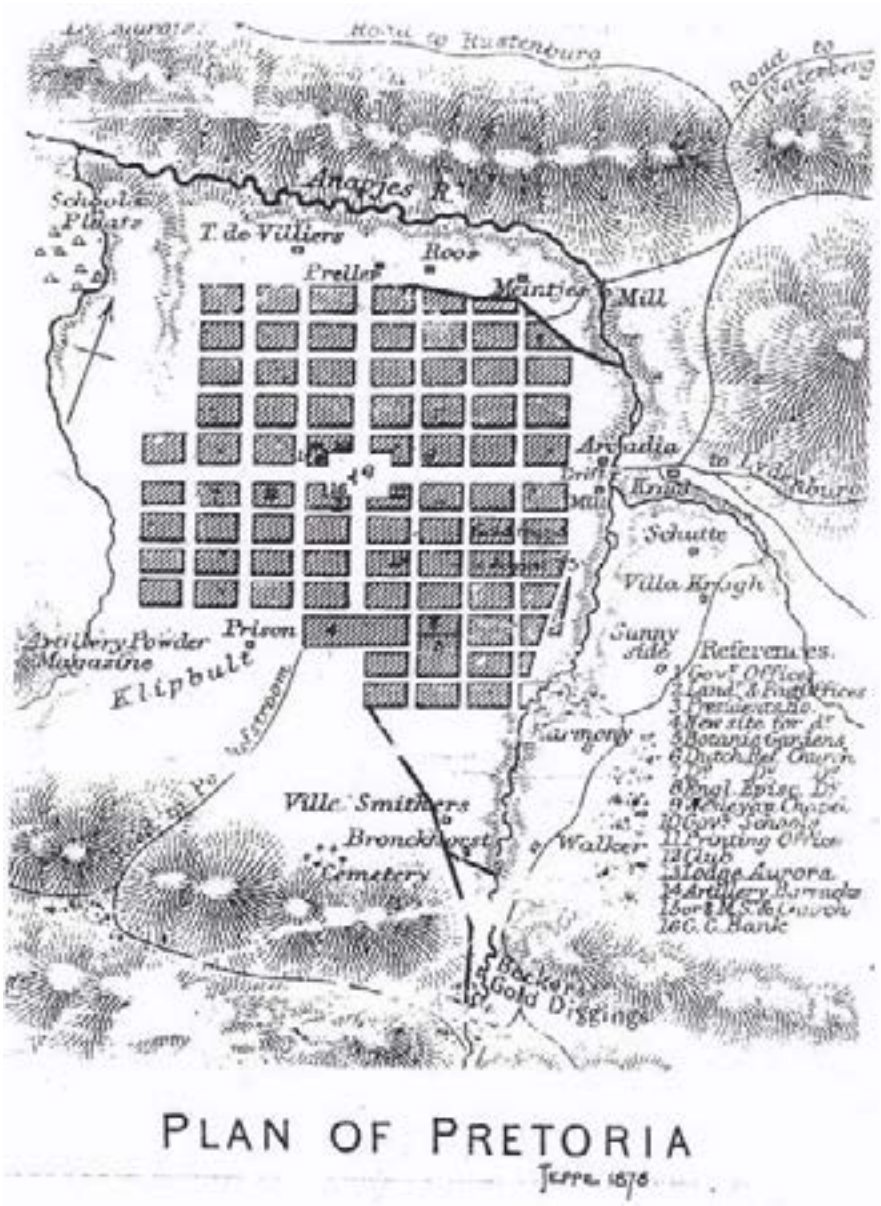


Figure 3.7. Plan Layout of Pretoria. Jeppe 1887.
Figure 3.8. Skinner Street circa 1897. Photo: Van der Waal Col. UP.

3.5 Harnessing the waters of the Valley

The story of Production

Water from the springs in Fountains Valley was gravity fed via a slate lined water furrow to Church Square. Work on the furrow were started as early as 1854/5, in order to provide water to the town. Parts of the slate lined furrow can still be seen in the parts of resort, but are in desperate need of restoration and protection. A collection chamber where constructed, around the upper spring to protect the eye of the spring against contamination (Swanepoel 2010).

The Second Anglo Boer War (1899-1902) led to the fall of the ZAR, with Pretoria surrendering to British forces on the 5th of June 1900. In 1902 - while still being under British occupation – a decision was taken to construct a military pumping station in the valley. The pumping station provided water to the then new cantonment at Quaggaspoort known as Roberts Heights, which later on became Voortrekker Hoogte and today is known as Thaba Tswhane.
A coal fired, steam engine with a capacity of pumping 900 mega litres per day were installed. The replacement of the steam engines with electric pumps led to the demolishing of the boiler room together with its tall brick chimney. The "pump house" remained and is still in use today, housing the electric pumps that provide water to the Central Business District of Pretoria (Dippenaar, 2013; Panagos, 2003).

Timber and Paper Production

In 1910 portions of the farm Groenkloof were rented out for the establishing of plantations, due to the shortage of timber and paper (van Vollenhoven; van Tonder, 2008). Remnants of the pine plantations can still be seen in the resort and in the parking area of the Nature Reserve.

Figure 3.9. Remains of pipes at the Pump Station. Photo: Author 2014.

Figure 3.10. Old Pump Station before demolishing of boiler room.

Figure 3.11. Remnants of the pine plantations. Photo: Author, 20014
Figure 3.12. Old Pump Station. Photo: Author, 2014.
Figure 3.13. Interior of the Pump Station. Photo: Author, 2014.

Recreation

The valley as a place of leisure and recreation has a long history dating back to even before the existence of the town. It was a popular resting point "uitspan plek" among traders on the transport route to the east coast. The densely vegetated valley provided ample shade and protection for their wagons and oxen.

Later on the valley became a popular Sunday picnic spot. Despite being regarded as far from the town in that time the inhabitants spend the afternoons on the banks of the Apies River.

Almost a 160 years on, Fountains Valley are still used as a place of recreation. Recreational activities include large open lawn areas for braai's and picnics, various hiking and mountain biking trails. Weekends mark the peak time when these facilities are utilized by the public staying mostly under-utilized during the rest of the week.

Figure 3.14. 'Lovers Walk'. Photo: Van Der Waal Col.
Figure 3.15. Fountains Grove Hotel . Photo: Van Der Waal Col.

Figure 3.16. Fountains Valley 1950. Photo: HiltonT.

3.6 Conclusion

It is clear that the Fountains Valley is a complex layered system of historic and cultural sites and events dating from the Iron and Stone Ages up to the present day. Therefore the construction of a narrative of place is of critical importance in order to understand and appreciate this complex multi layered environment.

"The Story of Place provides a framework for an ongoing learning process that enables humans to co-evolve with their environment" (Mang [S.a]:10)

Chapter Four - Context

The Story of the Mind's Eye

"The … landscape itself, to those who know how to read it aright is the richest historical record we possess."

G. W. Hoskins

4.1 Introduction

This chapter sets out the urban framework that will provide the larger scale context to the proposed architectural intervention as well as providing the smaller scale, site related context in which the intervention will be grounded.

4.2 Location

Study Area

The greater Fountains Valley area are located 4km south of the city centre of Pretoria, on the former farm of Groenkloof (358-JR) The valley runs in a general north-south direction with a gradual slope towards the north. Pretoria are situated in the transitional zone between the Highveld and the plains of the Bushveld to the north.

The most northern point is marked by the remains of the old NZASM train bridge, just before one enters the city. The southern boundary is edged off by the grounds of the Air Force Base Waterkloof and the suburb of Kloofsig. The eastern and western boundaries are defined by the natural ridge topography with additional boundaries formed by Nelson Mandela Drive (R21) in the east, and Christina De Wit Avenue and the railroad tracks on the west.

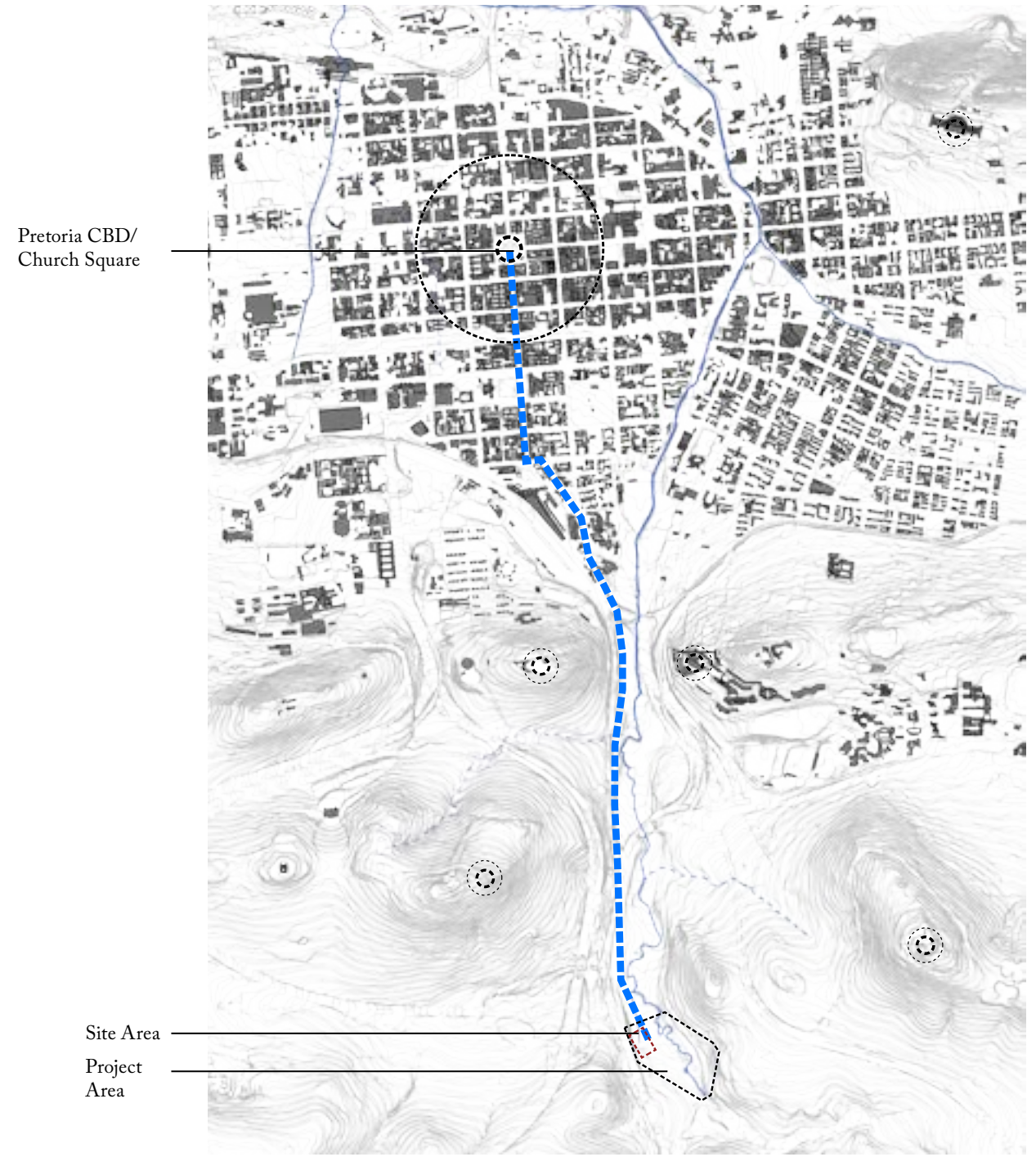


Figure 4.1. Site relation to City. Diagram: Author, 2014

Location of the Project area within the Groenkloof Nature Reserve and the Fountains Valley Resort.

Figure 4.2. Location of research area. Diagram: Author, 2014.

Project Area

Majority of the project area are located within the boundaries of the Fountains Valley Resort, with portions spilling over into the into the area that is under the jurisdiction of the Groenkloof Nature Reserve. The Apies river acts as the border between the resort and reserve with an additional fence restricting movement between the two areas.

The area that falls within the area of the resort are characterized by large open lawns and interrupted by pockets of large White stinkwood and River bush-willows. The portion that fall within the reserve are dominated by the dense riverine vegetation that changes to a dryer bushveld vegetation as one move up the rocky slope that forms the eastern ridge of the valley.

The project area contain several sites that have great historical, cultural and architectural significance. The map indicates the location of these sites within the project area and their relation to the project site.

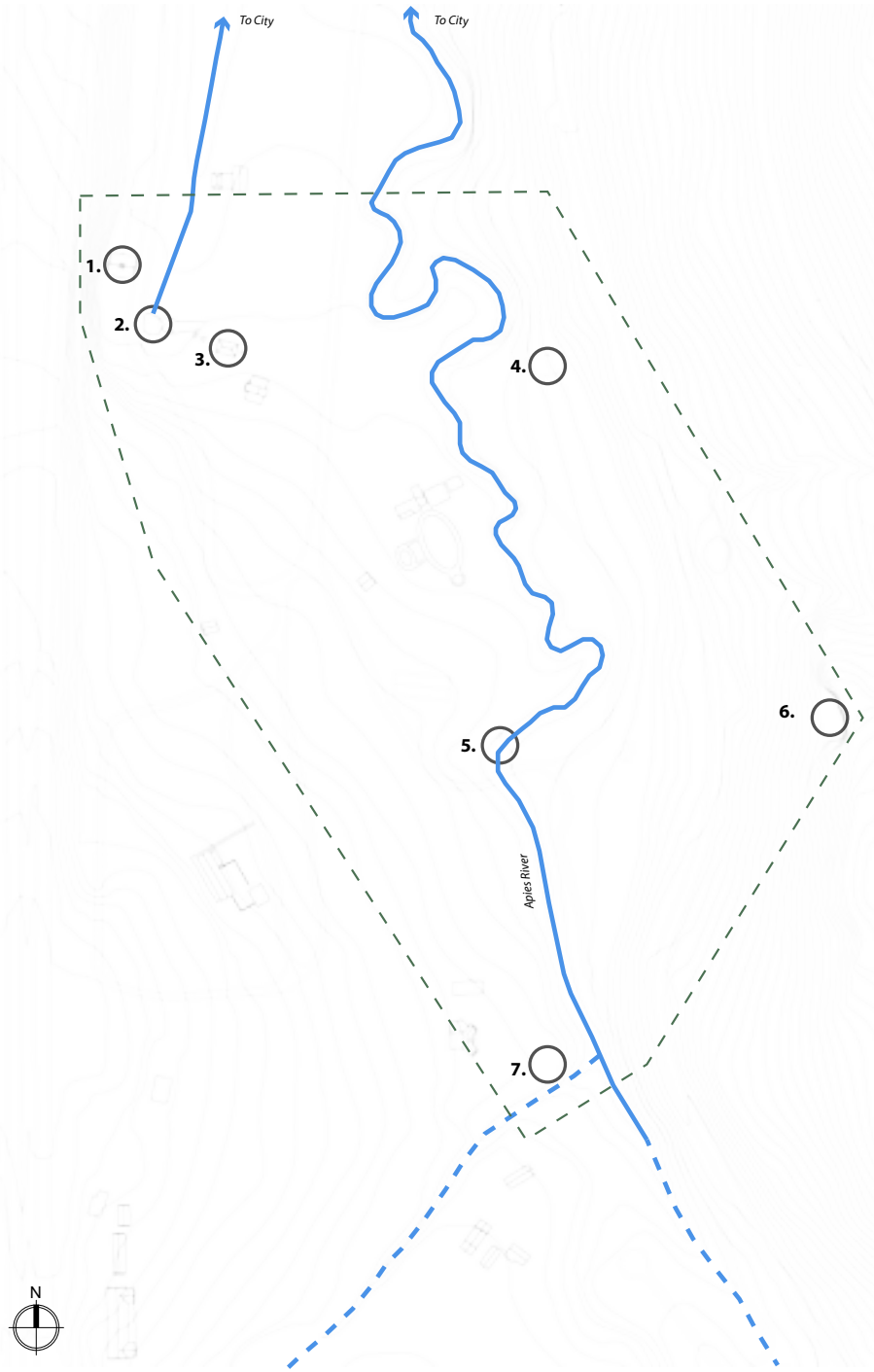


Figure 4.3. Defining of Project area. Diagram: Author, 2014

Figure 4.4. (1) Old Pump Station. Photo: Author, 2014.

Figure 4.5. (2) Upper Spring. Photo: Author, 2014.

Figure 4.6. (3) Collection & Chlorination Chamber. Photo: Author, 2014.

Figure 4.7. (4) Bronkhorst Ruins. Photo: Author, 2014.

Sites

1.Old Pump Station

The Old Pump Station were constructed in 1902 to house the coal fired steam engines. Today only the pump room remains. It has significant importance as the earliest remaining examples of industrial and urban infrastructure in the region.

2. Upper Spring Eye

It is the strongest and most visible of the two springs that are located in the valley and discharges 24 000 litres per day. A collection chamber were constructed and encloses the eye of the spring to prevent contamination. Not accessible to the public.

3. Collection and Mixing chamber

The collection chamber collects 80 percent of the discharge of both the Upper and Lower spring. Despite the fact the water is of the highest quality, chlorine is added to the mixture to adhere to international standards form.

4. Bronkhorst Ruins

The site contains the ruins of the house built by the first pioneers that settled in the area, therefore it has great historical and cultural importance.

5. Dam and Weir

Initially constructed by Lucas Bronkhorst for irrigation purposes, the wall of the dam were raised in 1895 to provide water to the two forts and Pretoria. The site has great importance in terms of the water system that were the lifeline to the city and is a very good example of 19th century industrial architecture.

6.Caves

The cave is located on the eastern ridge of the valley. Evidence of artefacts that dates back to the Stone and Iron Age have been found at the site. The site has important cultural and educational value as to the presence of these people as the earliest inhabatants of the area.

7. Lower Spring Eye

The site is situated in the western banks of the Apies river. Hidden in dense vegetation it is easily missed. The water is pumped via a pipeline to the collection chamber. Although the smaller and less dramatic of the two springs, the site holds great significance as one of the sources of water that the city of Pretoria were founded on.

Figure 4.8. (5) Dam and Weir. Photo: Author, 2014.

Figure 4.10. (7) Lower Spring Eye. Photo: Author, 2014.

Figure 4.9. (6) Caves. Photo: Author, 2014.

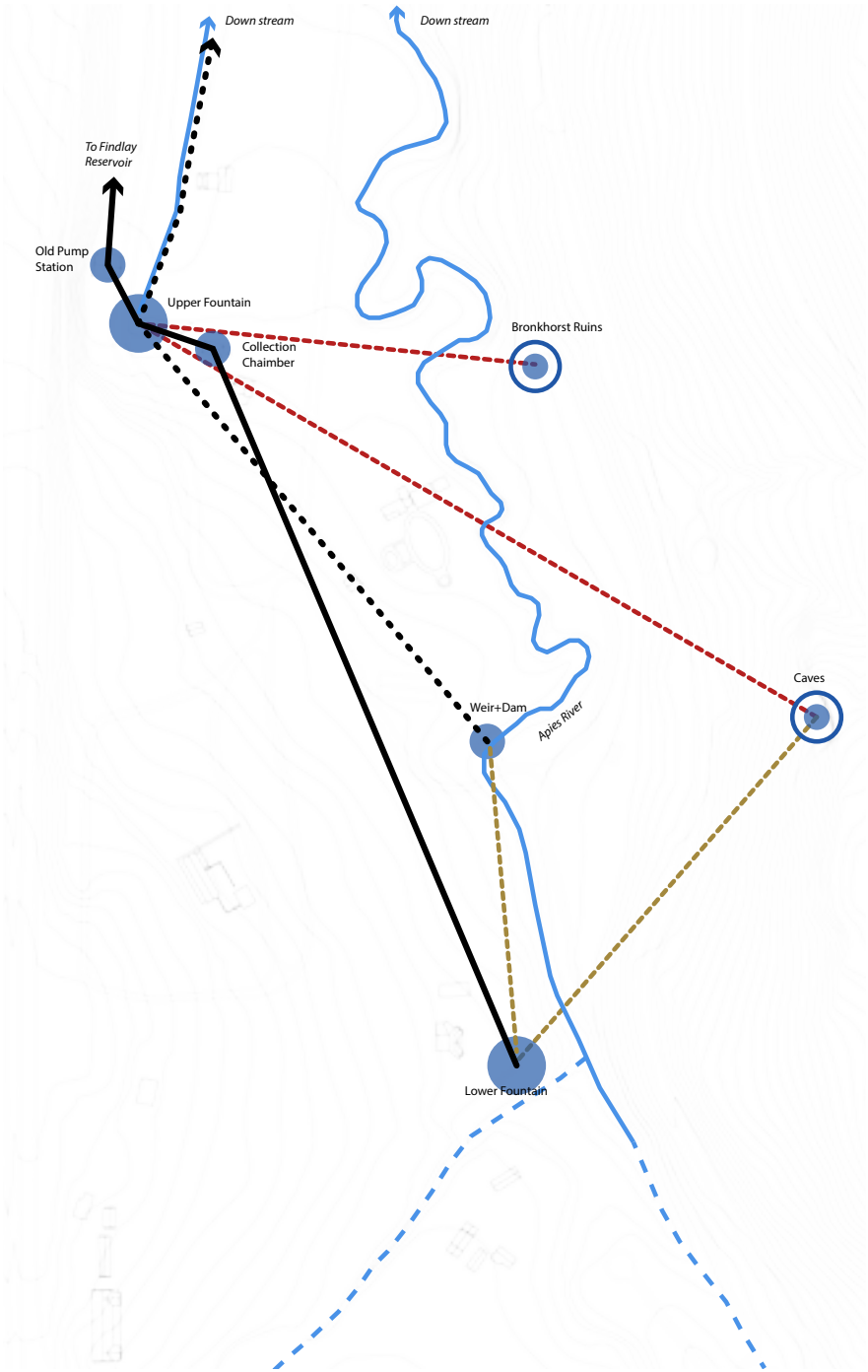


Figure 4.11. Identified relations between sites. Diagram: Author, 2014.

Site relation

All the sites that were identified in the project area have relation to each other. Although being scattered over such an large area and haling from different time periods, each site an direct or indirect connection to the water of the springs and one another. The connections or relations have mapped and categorized into 4 categories:

- Physical 1: Present connection but not visible.
- Physical 2: Past connections, hidden, damaged or forgotten.
- Symbolic 1: Visual - Indirect connection/relation (Activity).
- Symbolic 2: Intangible connection (Function).

Figure 4.12 indicates the four categories and how the connections are constructed.

Relation categories

Physical 1
Physical describes connections that is currently present but not visible. This is the case with pipeline that transfer water from the Lower Spring to the Collection chamber.

Physical 2
The are connections that previously existed as proven by historic document but that have been either hidden, damaged or forgotten.

Symbolic 1
Indirect connection that would have been associated with an activity like the water collection for consumption purposes.

Symbolic 2
These are intangible connection associate with function that is only manifested by a visual connection.

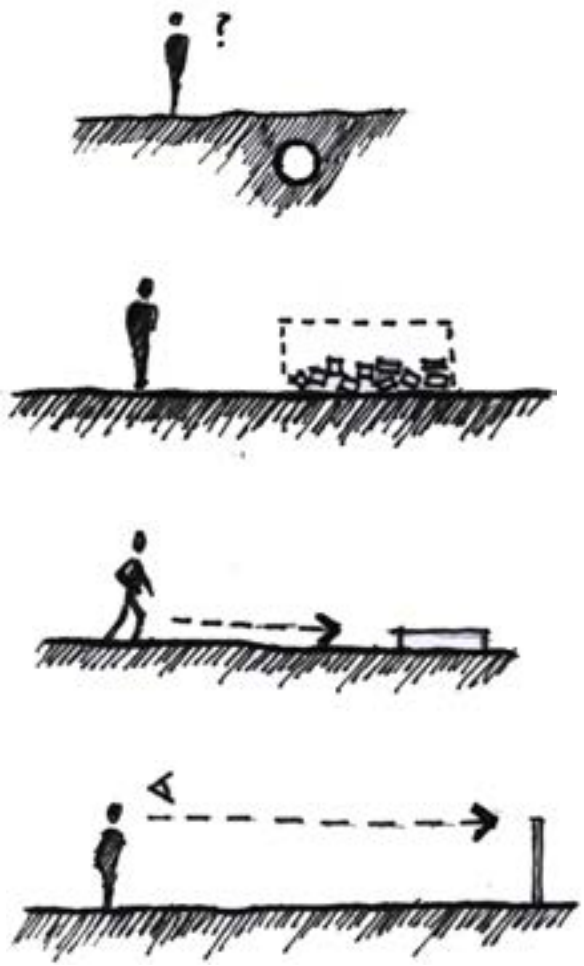


Figure 4.12. Relation category interpretations. Sketch: Author, 2014.

Figure 4.13. Water pipeline from the Lower Spring eye.
Photo: Author, 2014.
Figure 4.14. Remnants of the water system. Photo: Author, 2014.

4.3 Project Site

The Project Site is located within the borders of the Fountains Valley Resort, with the focus on the area surrounding the Upper Spring Eye, Old Pump Station, and the current Municipal Collecting and Chlorination Chamber. The project site is characterised by large open lawn areas with the Fountains ring road dividing the area in two. The Old Pump Station is located on the western edge among dense vegetation, with the Upper Spring Eye in close proximity. A red brick structure encloses the eye of the spring, with a steel palisade fence preventing any unauthorized access to both the Eye and the Collection Chamber. The project area are located with in the greater Groenkloof Nature Reserve, which consists of the Fountains Valley Resort and the Nature Reserve.

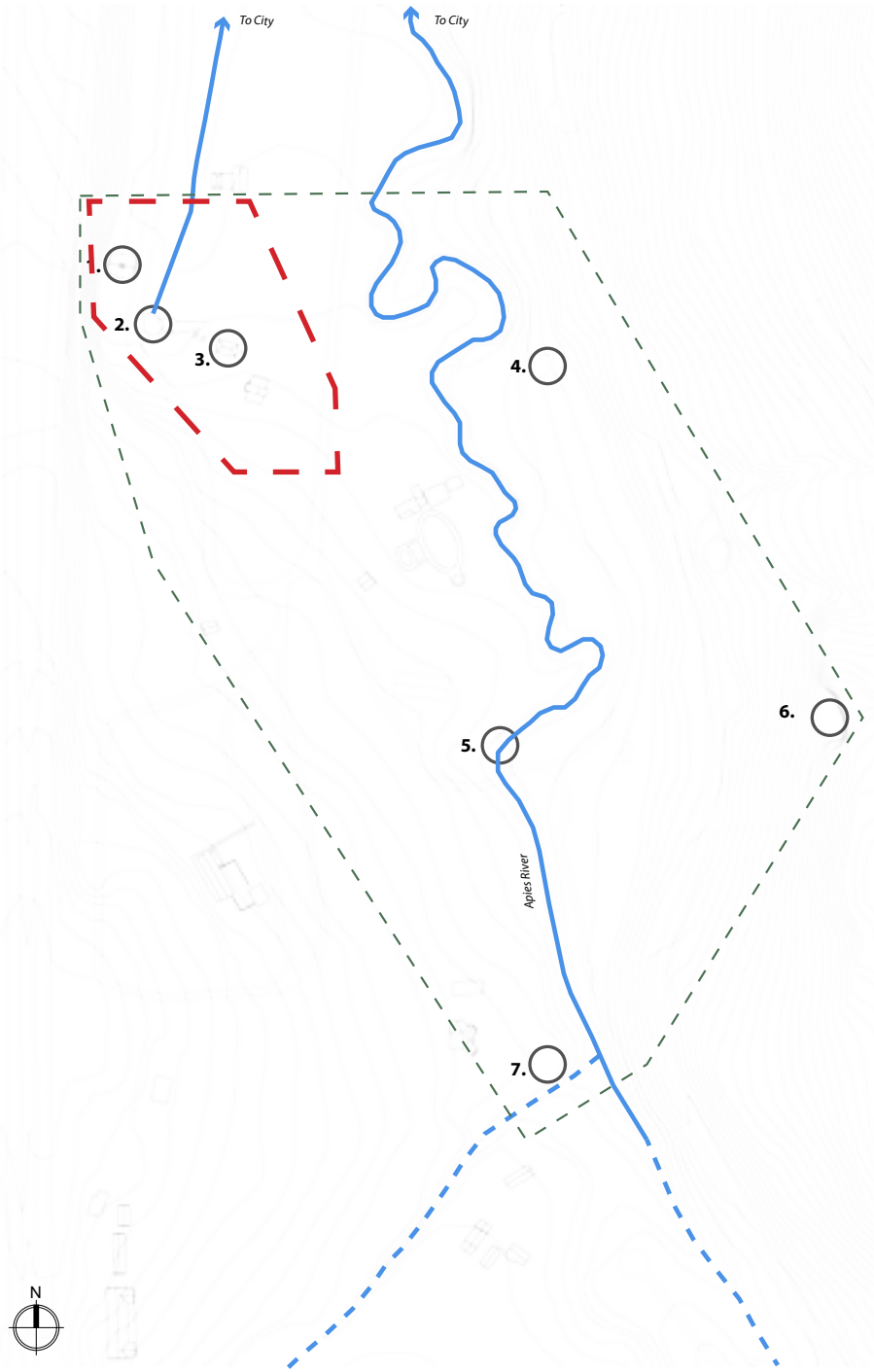


Figure 4.15. Panoramic view to the north east.
Photo: Author,2014.

Figure 4.16. Panoramic view to the south west.
Photo: Author,2014.

4.4 Framework

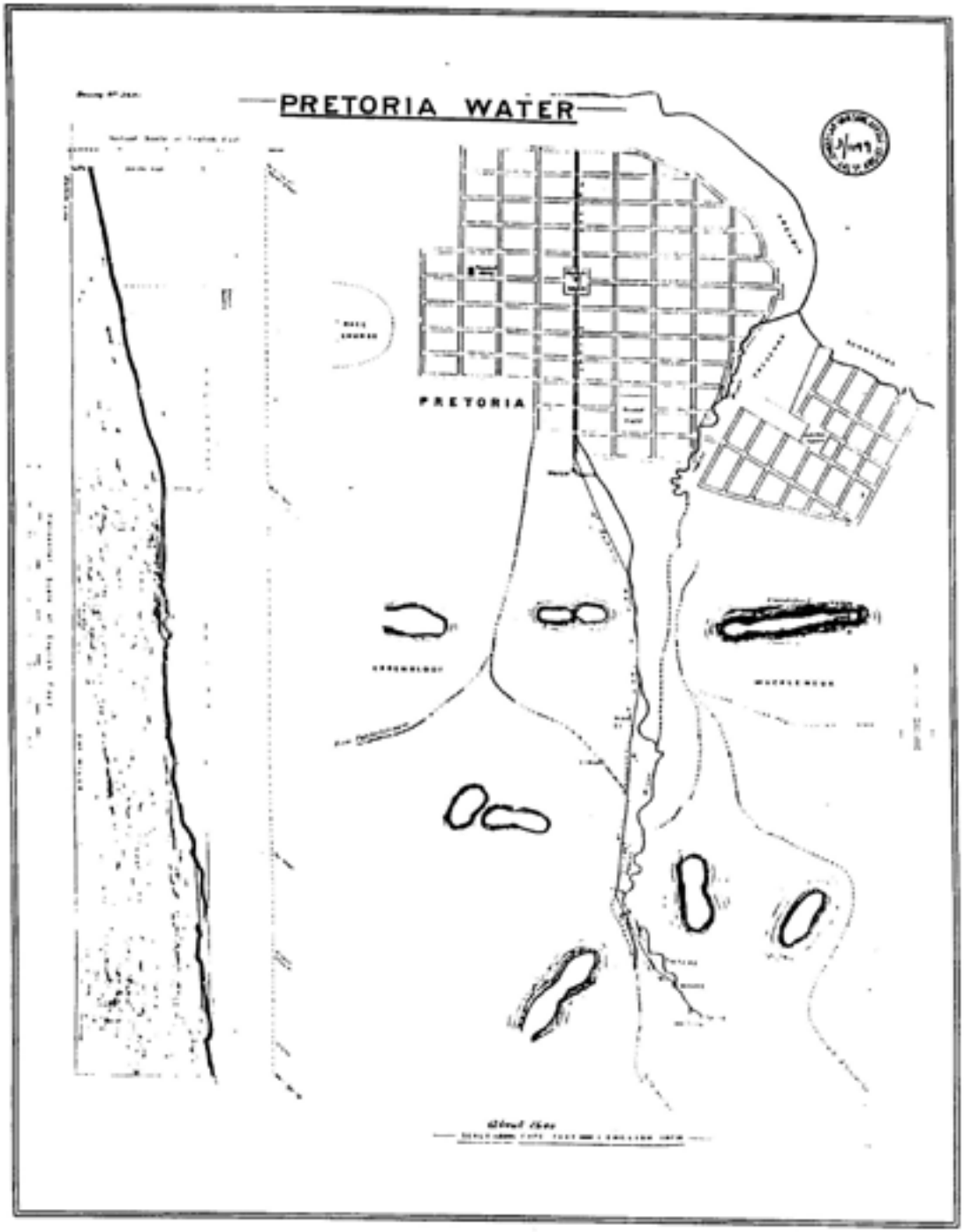
The Fountains Valley and more specificity the project area is of great significance as it contains various of sites that played critical roles in the coming into being of the city of Pretoria. The most important of these sites being the springs, which is the origins of the water that the city was founded on.

The geographical locations together with development over time has led to the separation of the city from the valley. Therefore the author proposes a framework that will be two fold, with each part paying reference to the other as a means of reconnection.

The two parts of the framework will function as separate entities, but with the same basic principle of promoting and re-establishing the lost connection between the springs and the city.
Part One of the framework will respond to the city and its critical connection to the water from the two natural springs.

Part Two of the framework will be based in the valley itself and will deal with the various cultural and historical sites that were discussed in the project area as base.

Figure 4.17. Aerial photograph indicating the two locations of the framework.



Part One - (Re)introduction of water in the city

The memory of Pretoria as a water city

Water was gravity fed from the fountains to the city via open furrow system. The furrows were a complex system, waterways criss-crossing the city and thus played a major role as a form giving element to the city's fabric as it known today. All the water infrastructure were on the surface and in public view making it part of everyday city life.

Various factors including the location and character of the landscape of the valley, has always separated it from the urban condition that it brought into being. As the city's water demand grew so did the need for an improved and more efficient water infrastructure system. The development in combination with various factors, has forced water out of the view of its citizens.

Hidden under ground, the water that gave life to the city, shaped it's from and identity became all but a memory. The proposed framework aims to re-evoke that memory of Pretoria as a city of water.

Figure 4.18. Map indicating the water system form Fountains Valley to Church Square. Africana Col. UP.

Figure 4.19. Drinking fountain on Chruch Square. Photo: HiltonT.

Figure 4.20. Road near Daspoort. Photo:HiltonT

The Physical reintroduction

The objective of the physical reintroduction of water into the city is to re-evoke the memory of water as a founding and life giving element by engaging the city dweller on a sensory level. of the city. This will also act as an opportunity to bring water back into the public realm, and serve its residents by adding value to public spaces.

These interventions are proposed at strategic locations along the historical route of the water furrow that fed water from the Fountains Valley. The proposed interventions will be in the form of water features that would encourage public interaction The plan indicate the route that water followed as well as possible locations for the proposed water interventions.

Figure 4.18 indicates possible ways in which these water inventions can be integrated into the existing urban fabric of the city.

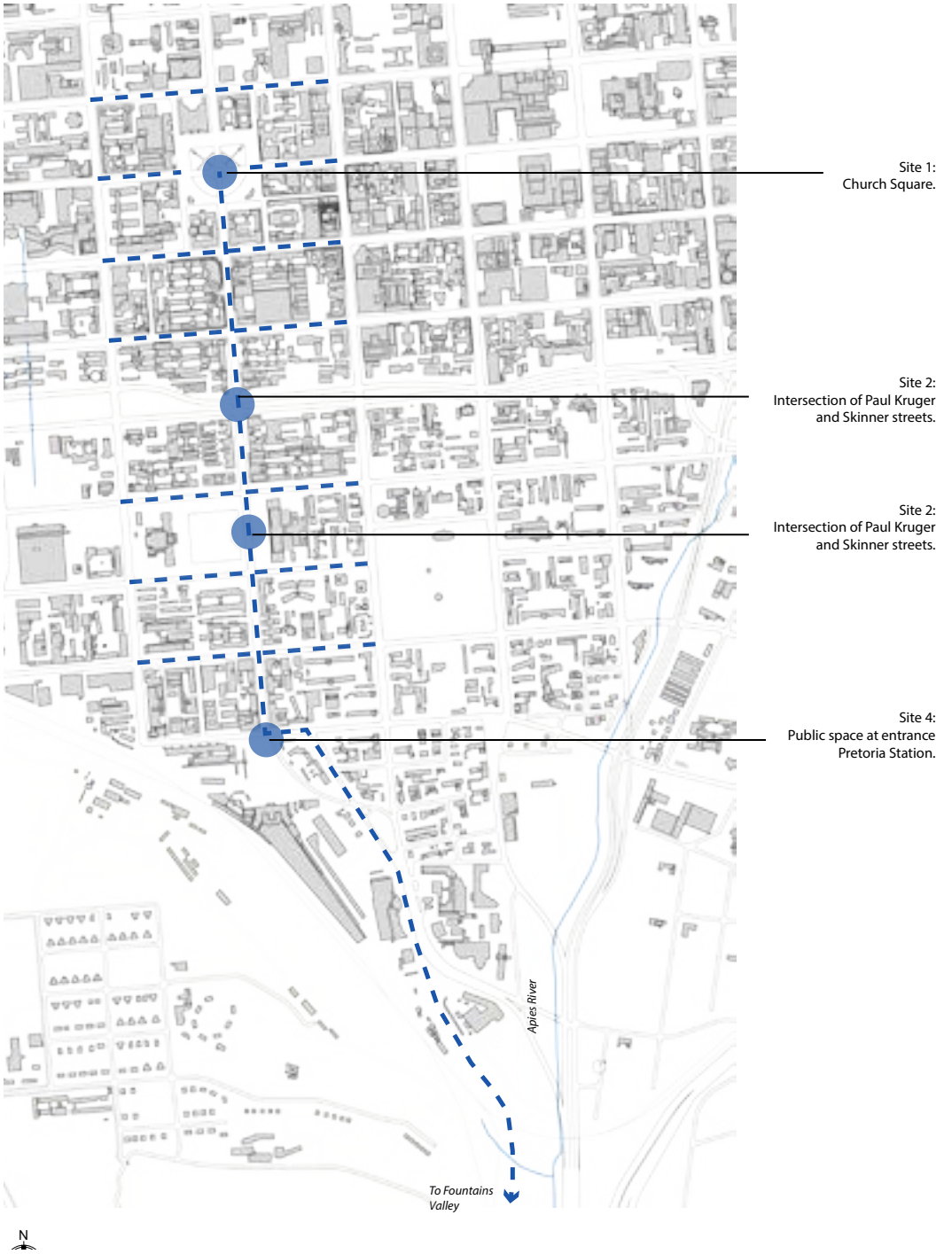


Figure 4.21. Locations of proposed water interventions. Diagram: Author, 2014.

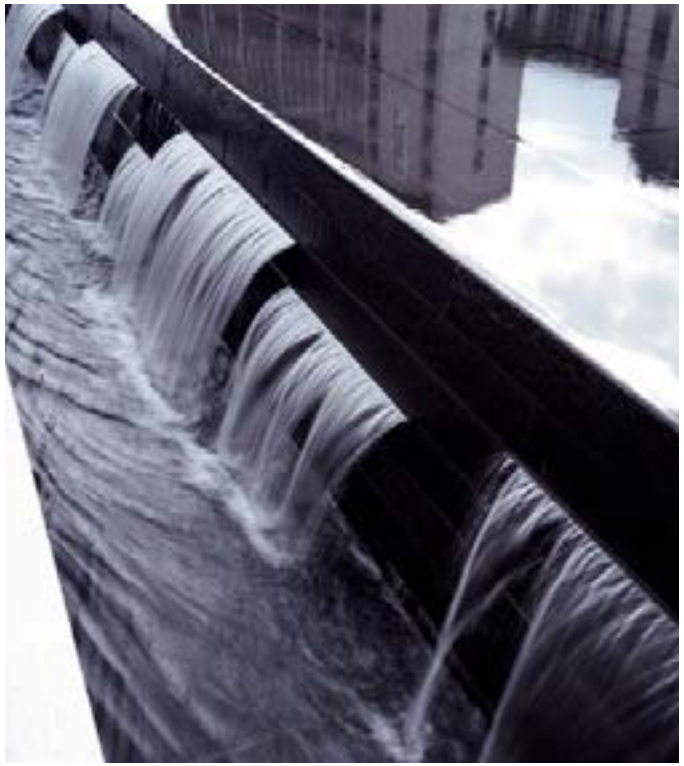


Figure 4.22. Proposals for water interverntion in the city.

The Symbolic reintroduction

As the water furrows criss-crossed the city in order to provide water to all areas. The aim of the symbolic reintroduction is to indicate and the extent of the water furrow system in the rest of the city. The vision proposes sidewalk paving with informational inlays or patterns that will engage the pedestrian when moving through the city. The paving inlay will metaphorically bring the water system back to the surface and into the public view and acting as a tangible element to the identity of Pretoria as a water city.

Figure 4.20 indicates possible solutions to how the paving intervention could be achieved, thus intergrating historic urban fabric into the exting urban fabric.

Figure 4.23. Locations of proposed pavement interventions. Diagram: Author, 2014.

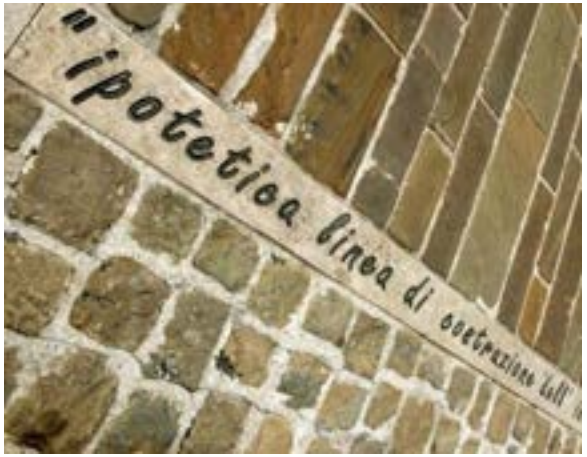


Figure 4.24. Possible proposals for pavement interventions.

Part Two: The (Re)Defining of lost connections

Considerations taken .
Part two of the frame work is located in the area earlier identified as the Project Area. It address the several historic and cultural significant sites. The Cultural Heritage Management Plan for the Groenkloof Nature Reserve, drafted in 2006, contains recommendations regarding the management of these sites that are in focus, and are as follow:

- Cave Site: Access needs to be controlled as to prevent damage to the site, with the possibility of an outdoor exhibition.

- Bronkhorst Ruins: Restoration of the site can be considered to improve the current state of the site.

- Weir: Restoration and protection of the structure is recommend.

- Old Pump Station: Proposes that the structure be declared as a National Heritage Site.

These recommendations have been taken in consideration in Part Two of the framework proposal.

Figure 4.25. Plack on the Old Pump Station. Photo: Author, 2014.
Figure 4.26. Vandilized gate at the Bronkhorst Ruins site. Photo: Author, 2014.

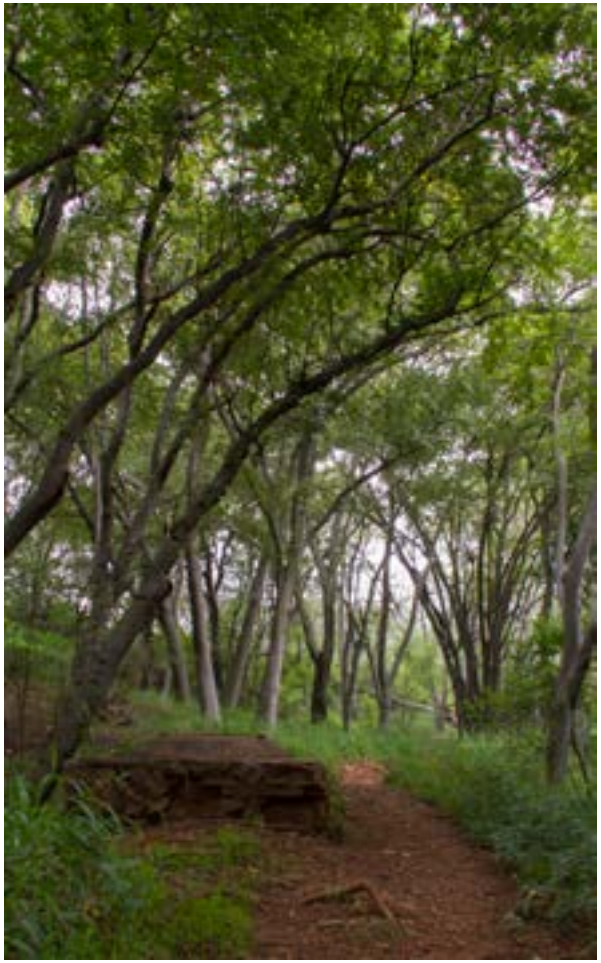


Figure 4.27. Remnants of the watersystem. Photos: Author, 2014.

Information Platforms

Despite the fact that the sites and structures as mentioned in the project area are currently in a state of neglect with no means of identifying and informing the a visitor to these sites of their historical and cultural significance.

The proposed "information platforms" would allow for controlled access in order help protect and conserve each site. By providing the visitor with information in the form of permanent or temporary exhibitions on what each individual 'site' is, its history and their significance as well as its relation to the other sites. Each "information platform" acts as an story teller that engages with the visitor in the experiencing the narrative of place.

Proposed walkways will connect the individual "platforms" as to take the visitor on a journey of rediscovery form one site to the next. The proposed walkways are based on the identified Only by moving through the landscape and experiencing it can one start to create awareness and understanding of each of the sites and their significance as part of a network that make up the site as a whole.

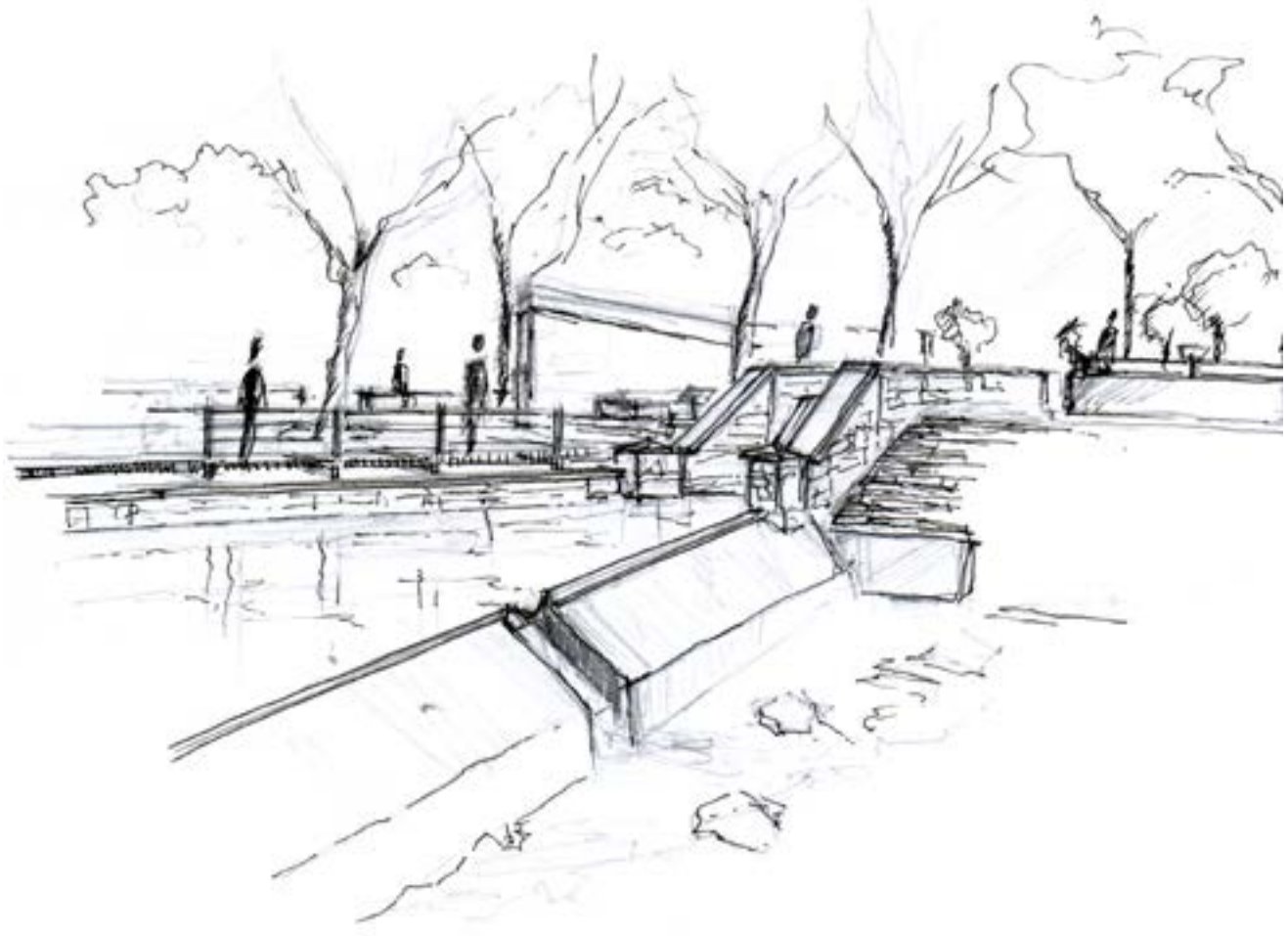


Figure 4.28. Sketch of proposed "information platform at the Weir. Author, 2014.

The walkways will give easy access, especially to the cave site as it is located on the hillside adjacent to the valley. Providing the visitor with views of the sites in the valley as well as the landscape beyond, further enriching the experience and understanding of the site and its natural and cultural context.

The proposed architectural intervention will be located along one of these paths, thus forming a part of this network of paths. The paths are and will act centralising point which will tie the whole network together.

Figure 4.29. Current state of neglect and disrepair at the Weir. Photo: Author, 2014.

Figure 4.30. Weir and dam. Photo: Author, 2014.

Figure 4.31. View west ward from the cave site. Photo: Autor, 2014.

4.5 Conclusion

The aim of the proposed two part framework should not be viewed as an attempt to reinstate the tangible connection between the Fountains Valley and the city of Pretoria. The framework should rather be interpreted as acknowledging the historical connection and the critical role water performed in the founding and developing of the city.

The reference that the two parts of the framework pay to one other manifests this acknowledgement and start to create an understanding .... The framework also provides the macro as well as the micro context in which the proposed intervention of a artisan whiskey distillery will be grounded.

By engaging with the narrative of place, the framework serves as the basic building blocks for rediscovering and regeneration of the site as a whole.

Chapter Five - Program

The Story of a New Layer.

5.1 Introduction

This chapter lays out the choice of architectural program(s) and the factors that influenced the choice of program.

5.2 Program

A artisan whiskey distillery is proposed as the main architectural program. The distillery will produce a hand crafted single malt whiskey on an non industrial scale. Secondary programs will include a small scale Aqua culture facility, Deli and whiskey tasting room. The aqua culture facility will together with the distillery function as part of an closed loop production cycle, meaning that by-products from the one process is used in the second process.

As mentioned in the context chapter, the site has a history that is richly layered as a place of production and a place of recreation. In order for the architectural program to perform the role of a regenerator for the site, relying on a historically depended program alone would not provide the driving force needed, to sustain the regeneration of the site.

Therefore proposing a program(s) that would incorporate all three themes present on site namely: Production, Recreation and Heritage. The incorporation of all three of these components will provide the sustained energy needed in order to regenerate the site.

Figure 5.1. Copper pot stills, 2014.

Program informants

• As mentioned, the site has a rich history as a place of production and recreation. It would therefore be appropriate for the new program to serve as a new layer in this narrative of production and recreation.

• The initial idea was to find a way to unlock the immense hidden potential that lies within the waters of the springs. The program had to able to showcase the importance of the water as oppose to the current situation where it is concealed and kept from public view.

• The water of the two springs are of exceptional quality and purity with characteristics that makes it ideal for the production of an alcohol spirits, in this case whiskey.

• The fact that maize/barley can be stored over a longer period of time would allow for the production of whiskey all year round as opposed to other alcohol spirits which uses fruit as ingredient, and thus production is bound by the seasonally availability.

Figure 5.2. Old Pump House. Photo: Author, 2014

Program components

Component Relation

The relation between the three components is of critical importance **Production**

An artisan whiskey distillery is proposed as the main program in the production theme. This will include grain storage and preparation, whiskey distilling and maturation, bottling and a tasting facilities.

Secondary programs in this theme will include a small scale aqua culture operation that functions in tandem with the whiskey distillery as part of a closed loop production process – by-products of one process is used within another process.

Recreation

A restaurant/deli together with the outdoor spaces forms part of the recreational theme as it would allow the visitor to enjoy the some of the final products of the various production processes in a recreational manner.

Heritage

Heritage is constantly present in both the production and recreation themes thus through the experience of these themes, the visitor is been made aware of the narrative of place, thus fostering a new appreciation and understanding for place.

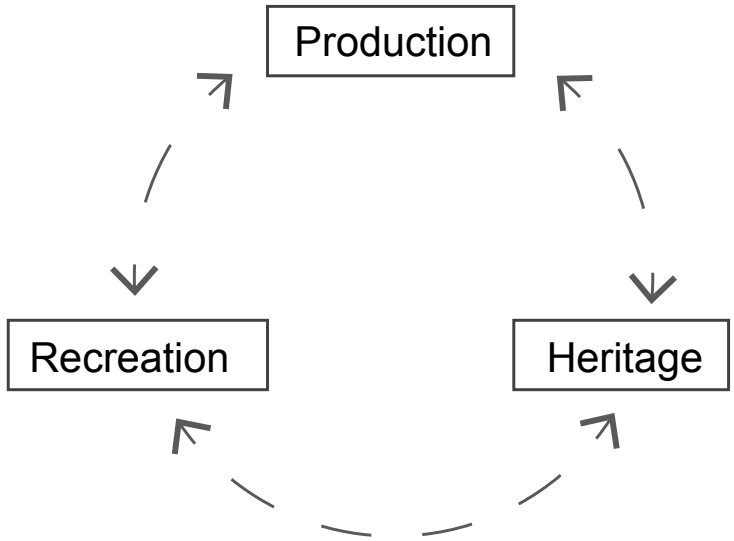


Figure 5.3. Component relation diagram. Author, 2014.

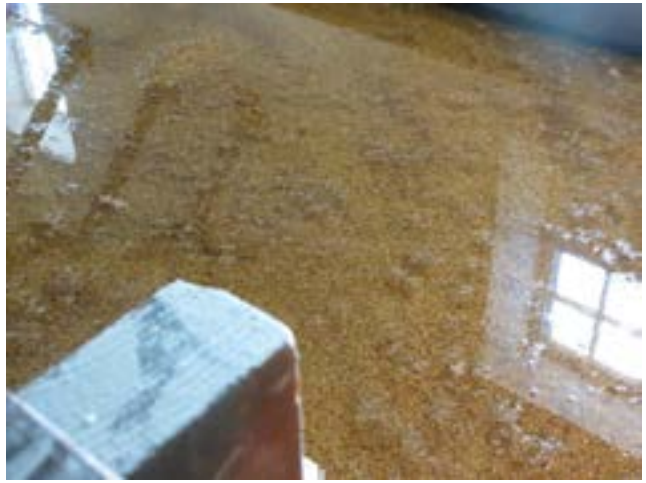


Figure 5.4. Grain in Steeping tanks.

Figure 5.5. Celindrical dryer.

Figure 5.6. Grain on the malting floor.

Figure 5.7. Milled grain.

Primary Production : Whiskey

The production of whiskey process gets divided into three basic stages: Grain preparation, Distilling and Maturation.

Stage One:

Steeping

The first process in the preparation of the grain is called steeping. This where the grain gets soaked in water in steeping tanks, until the moisture content of the grains are 45 percent. The water is drained off and the grain is transferred to the malting floor.

Malting

Malting is the process where the soaked grain is spread out on the floor, to allow for the grain to germinate. Germination converts the starches into sugars, which is essential for the production of alcohol.

Drying or Kilning

In order to stop the germination process, the grain is air dried. Its is also used to “roast” the grain.....

Grinding

After drying the grain is grinned to a coarse powder and bagged in manageable quantities to be ready for the next stage in the whiskey production process.

Stage Two:

Mashing

The malted grain are added to warm water. This converts to a sugary liquid that is known as mash.

Fermentation

The mash is pumped to a fermentation tank where yeast is added. The yeast converts the sugar into alcohol. The process takes three to four days. The result is a liquid with 10 percent alcohol concentration, and is called wash.

Distilling

The wash is transferred to the wash still. Here the wash gets heated to the point where the alcohol turns into a vapour with the water remaining. The alcohol is collected, and the process gets repeated in the spirit still to produce “high wine” or “new whiskey”.

Stage Three:

Casking

Water is added to the high wine to lower the alcohol concentration to the desired level. It is then aged in oak barrels for a minimum of three years.

Bottling

When the correct matured age is reached the whiskey

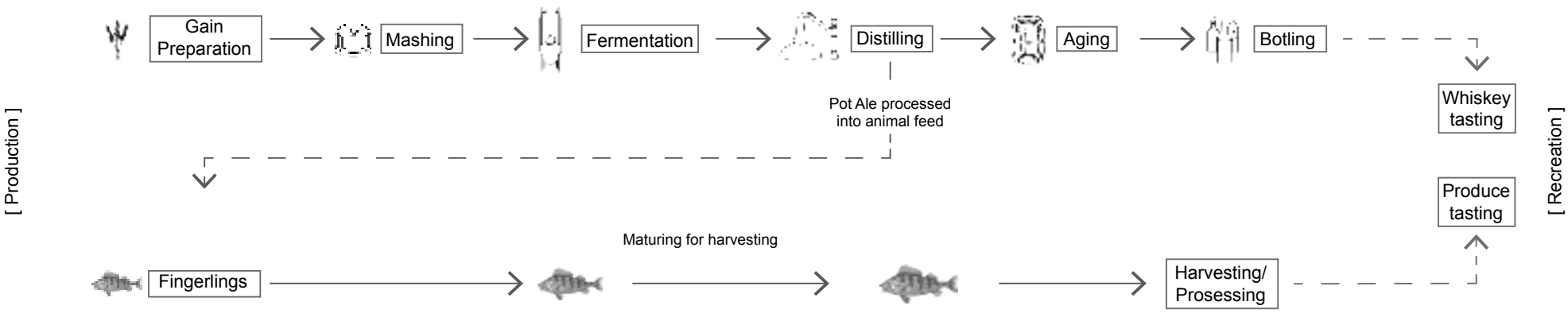


Figure 5.8. Proposed closed loop production process. Author, 2014

is bottled and ready for enjoyment.

Recreation

The recreational section of the program comprises of a Whiskey tasting room and a Restaurant or Deli. These two programs can be viewed as the manifestation of the production processes. Provides the chance for the visitor to experience these products on a sensory level, while being in the environment in which was produced in.

Heritage

Heritage are intertwined with both the production and recreational components. Through recreation and production, heritage gets promoted.

Conclusion

The architectural program acts as a vehicle and creates the opportunity for the regeneration of the site. By regenerating the site it will serve the intent of the dissertation, that is to promote understanding and appreciation of the site, as a place of great historical, cultural and architectural significance for the city and its residents.

Chapter Six - Conceptual Development

The Story of a new chapter.

Concept – (re)Define and Gather

"…the path structure is usually centred on the foci, thus making the whole settlement appear as a meaningful organism where the meanings present at the centre determine the form, in interaction with the external situation." Norberg-Schulz, 1980

6.1 Introduction

This chapter describes the conceptual approach that was taken that influenced the ideas that would inform the architectural intent and the basis for the design of the proposed architectural intervention.

After the historic and cultural "reading" of the project area as discussed in chapter four, it has been established that the landscape consists of a series of individual sites that all have either a direct or indirect connection to the water of the springs. It is from this notion of connectedness and relation that the architectural concept in drawn.

6.2 (re)Defining elements

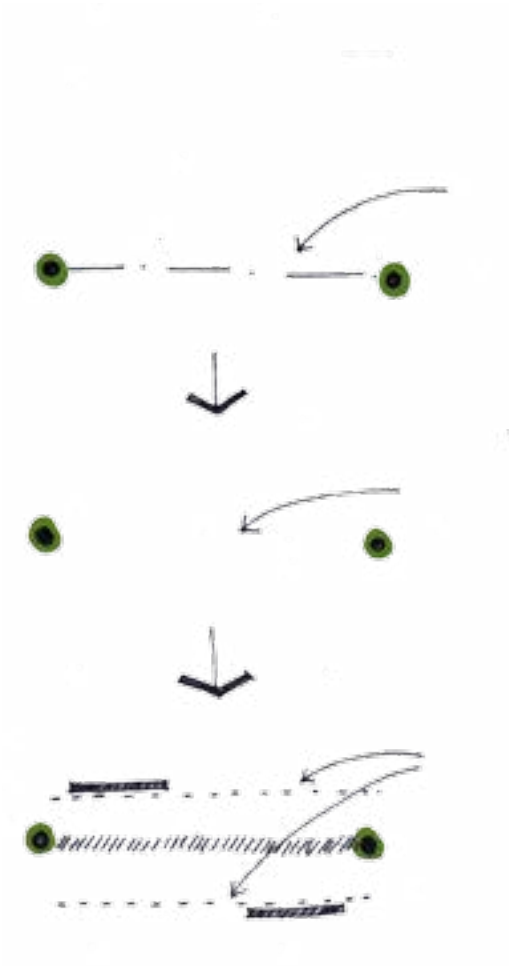
As mentioned in Chapter Four the research area contains of a series of sites that are linked either directly or indirectly to one another. The elements that connected these sites did not merely perform a functional role, but as in the case of the water system, also provided a way of "reading" and understanding the system, thus giving meaning to the landscape.

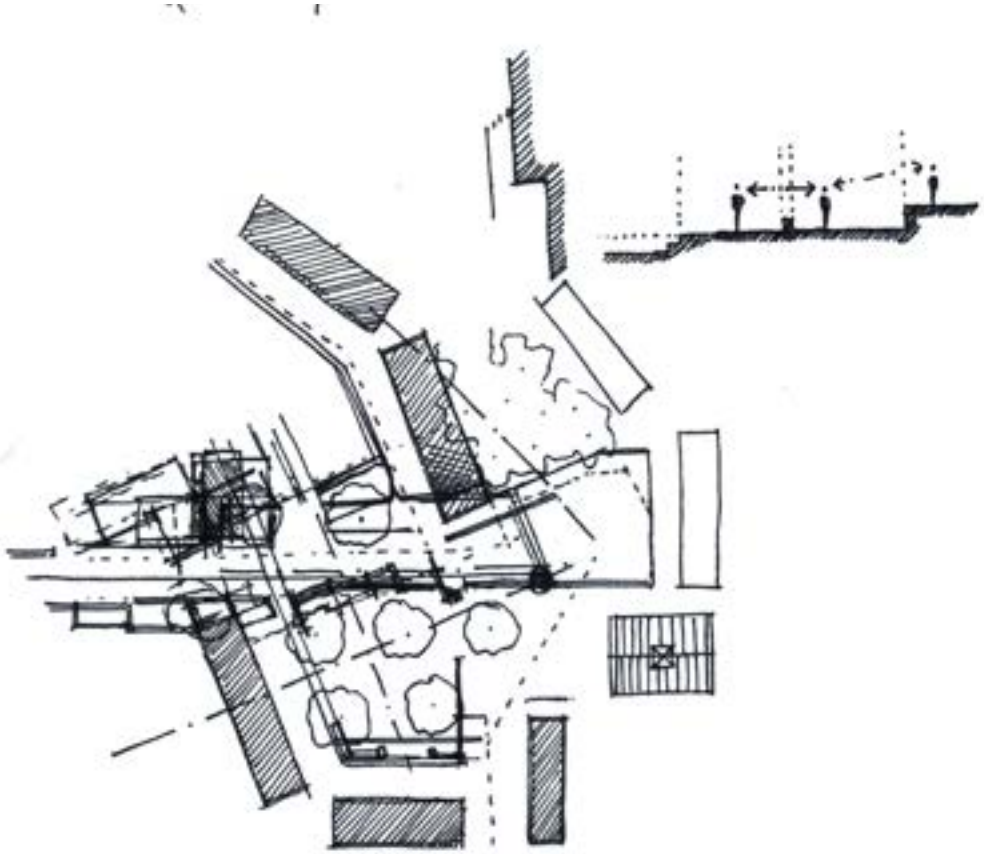
Understanding and appreciating the landscape in its current state is problematic due to the absence of the elements that promote legibility. The results in sites that are disconnected from meaning and thus being regarded as unimportant.

The landscape is conceptualized as consisting of a series of points and lines. The sites are represented by points and the connection between the sites as lines. This means that in the present state, only points exist.

Ching (1996:6) describes the notion that two points describes the line that connects them. The points gives length The author therefore makes the statement that the two point can imply the existence of the connecting line even when its been removed or destroyed. In cases were it would not be possible or advisable to reinstate the missing line, the space that it previously occupied can be defined to imply the line.

This entails that the points no longer stand only as points but have regained meaning and thus can be understood and appreciated.





6.3 Gathering – Spatial foci

As mentioned, the main area under investigation is comprised of a series of smaller sites. All these smaller sites or points relate there existence directly or indirectly to the two natural springs. This means that all the lines lead to and from the point of the springs, making it a central point – *foci* - from where the rest of the landscape can be understood.

Viewing the springs as the central point of origin, induces a notion of spontaneous gathering. By defining the space around the central point, underlines the significance of the spring as origin and as a place of gathering.

This concept of gathering is derived from Norberg Schulz where in *Genius Loci,* he describes the condition of a space that is a continuation of its surroundings, a "space within space". He explains that in order to experience a role of place, a spatial foci needs to be defined.

The role of urban foci as gathering spaces at the hand of cathedrals on the European continent. The urban spaces that precedes the cathedral serve to unite the interior spaces to the rest of the city, as well as acting as a threshold between the urban fabric and the spiritual interior of the cathedral (Norberg-Schulz, 1980:).

The notion of urban foci as being places of gathering can also be identified Church Square, less so today as during the early days of Pretoria, before the central church were demolished

6.4 Spacial relations

The presence of the spatial relations between the existing individual elements are very apparent from the contextual analysis. Each existing element are also in relation with the landscape it in located in.

When introducing new entities to the existing context, they are to be in a sensitive manner as to support the existing elements in amplifying the significance of place.

Although the site is located in a natural setting with very little reference to a conventional urban context, the same principles of gathering in an urban context are implemented to define the "place of gathering" from the rest of the surroundings.

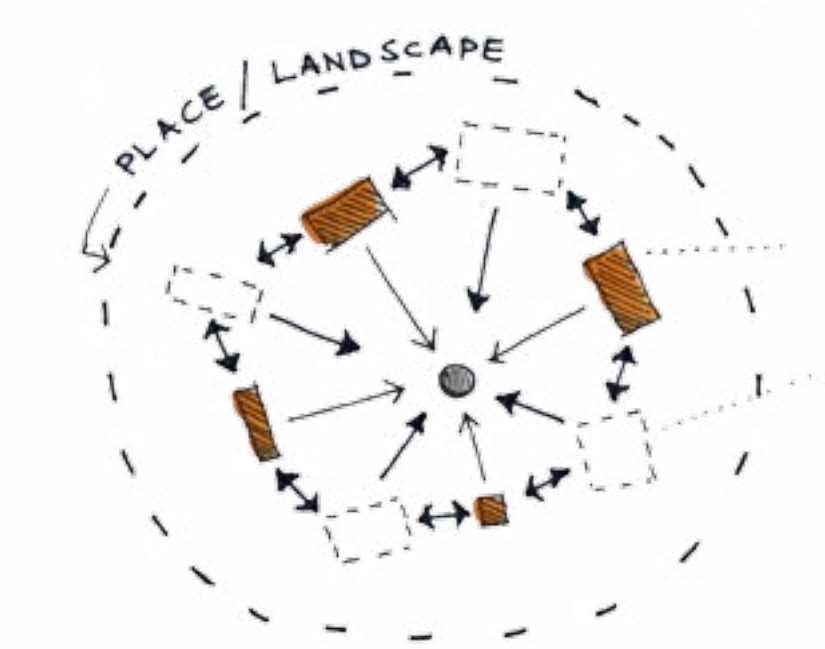


Figure 6.1. Spatial relation diagram. Author, 2014.

6.5 Precedent Study
Electric Ladyland Offices (2000)

OMM Design Workshop
Kloof, Durban, KwaZulu Natal, South Africa.

Precedent: Spatial organization.

The office complex were constructed on a site with existing structures. Among these structures were a Cape Dutch homestead, together with some outbuildings, a swimming pool, pergola, and a garden with large matured trees. The homestead were retained as the focus point for the new development. The positioning of the new office block is set at varying angles in relation to the existing house. This created a complex series of courtyards that varies in scale and importance (Joubert 2009:420)

Relevance:
The manner in which an existing structure were used as base for the placement of new structures, thus the relationship between new and existing, although unorthodox creates a series of space that complex in scale and character.

Figure 6.2. Electric ladyland Offices's courtyard.

Chapter Seven - Design Development

Taking Shape

7.1 Introduction

This chapter sets out the development of the design of the proposed production complex, marking the iterations as they developed in chronological sequence.

7.2 Design Process

The scheme sets out to facilitate an architecture of spatial exploration that would mediate between heritage, production, recreation and the landscape.

The spatial defining of lost elements in the landscape reveals the hidden conditions that offer the opportunity for interaction between the past and present.

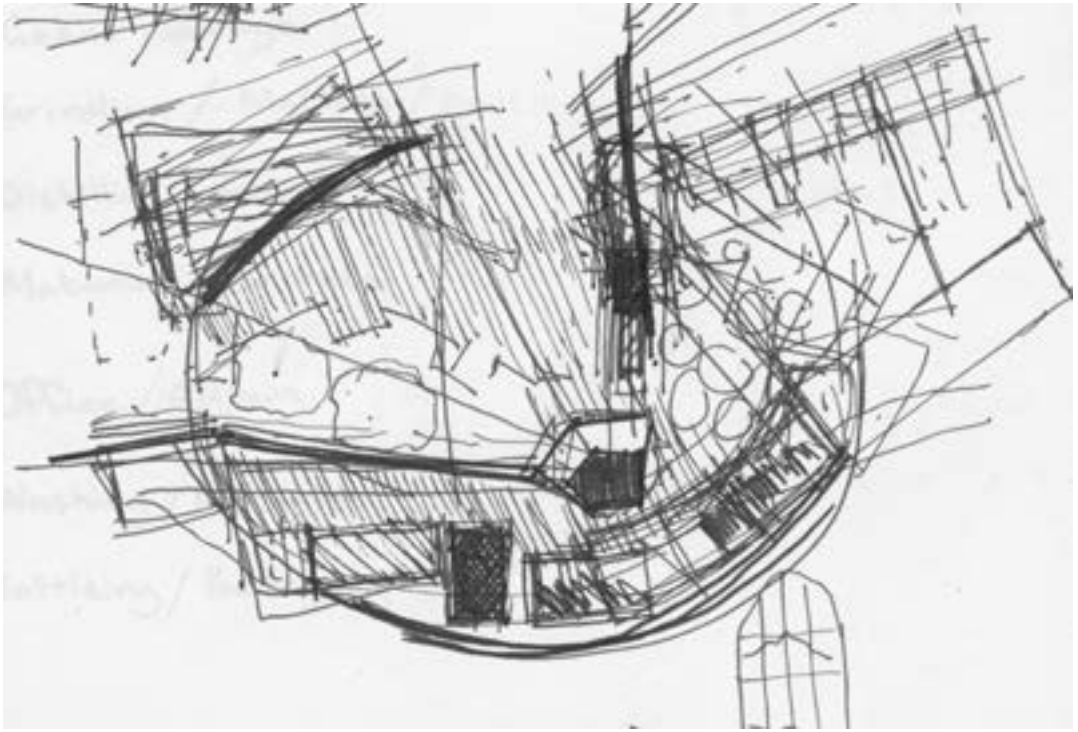


Figure 7.1. Initial Parti diagram - Plan. Author, 2014.

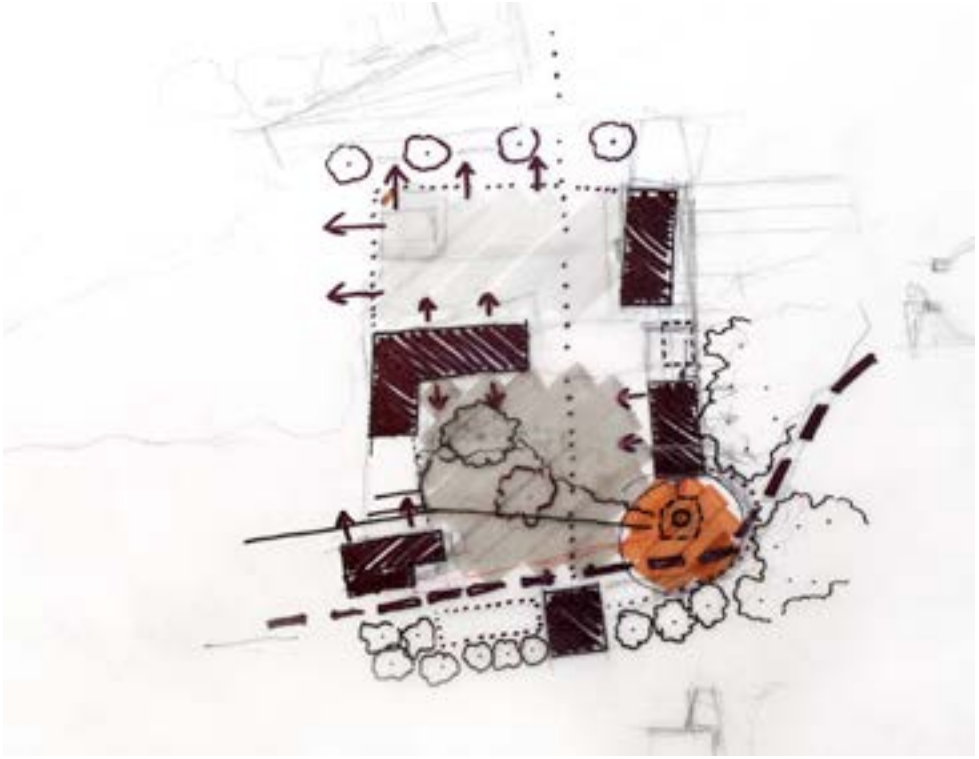


Figure 7.2. Conceptual development of plan layout and outdoor spaces. Author, 2014.

Figure 7.3. Conceptual development of plan layout and outdoor spaces. Author, 2014.

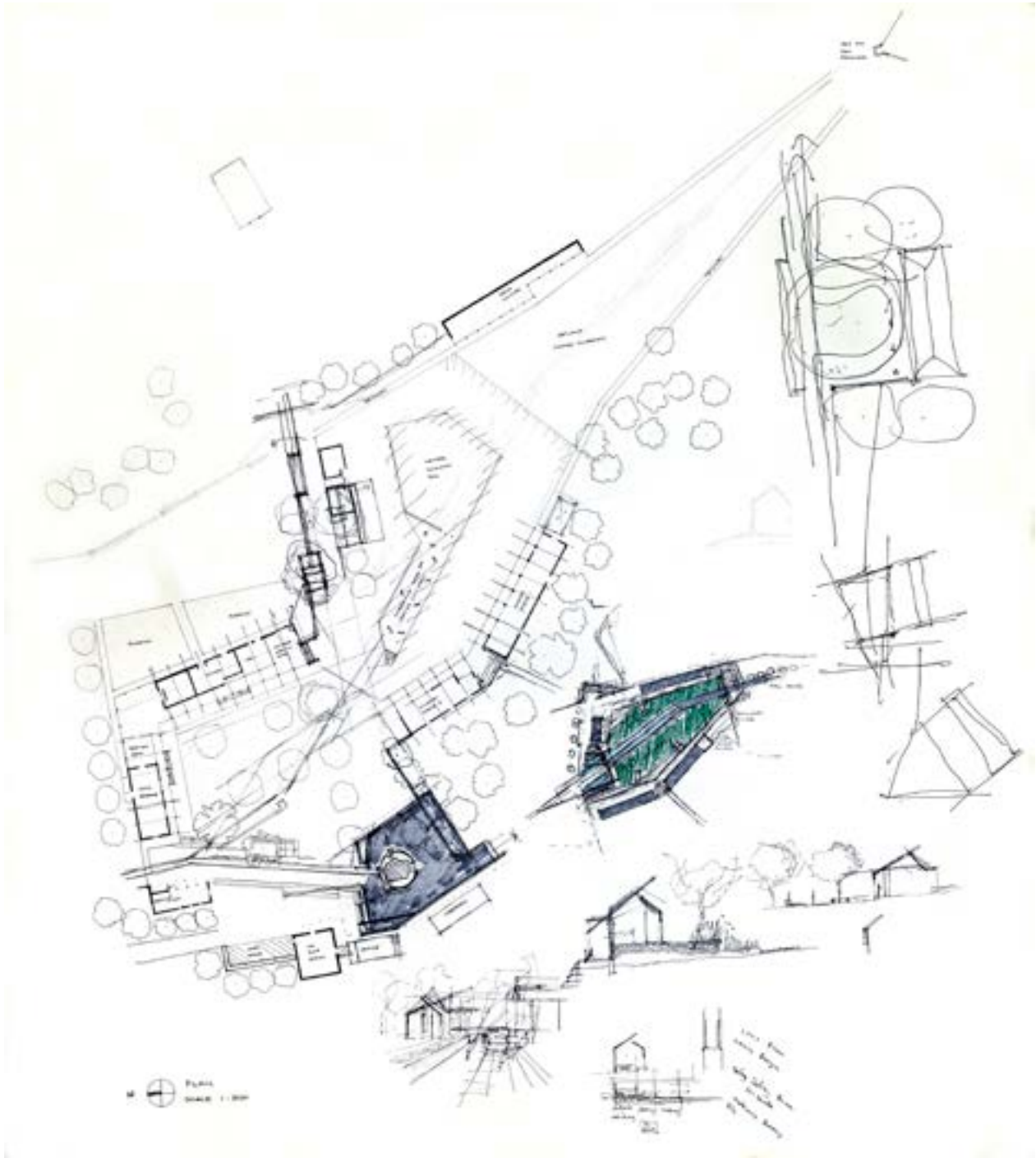


Figure 7.4. Conceptional design development - site plan. Author, 2014.

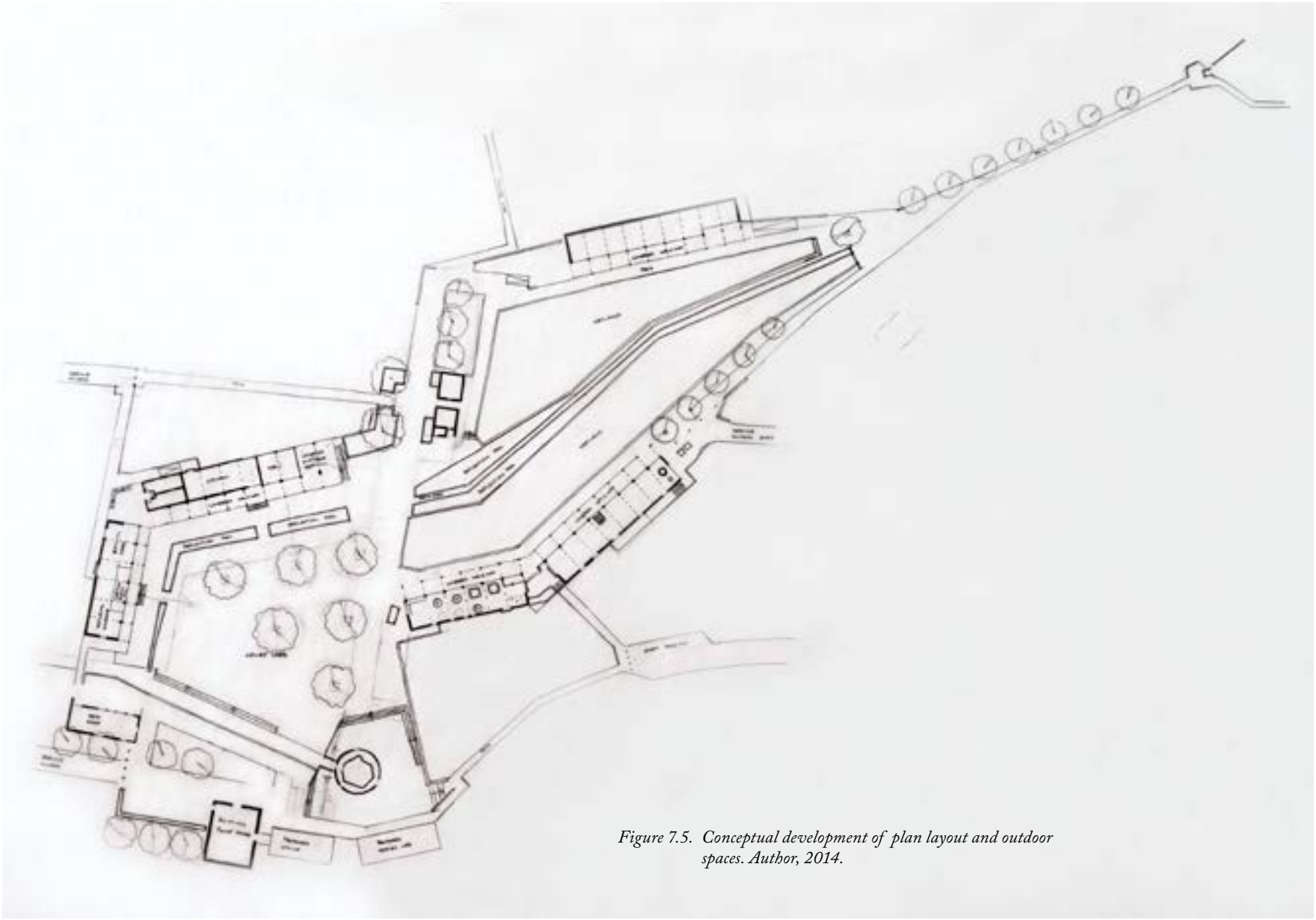


Figure 7.5. Conceptual development of plan layout and outdoor spaces. Author, 2014.

7.3 Planning

The spatial planning of the scheme is driven by the routes developed from the linking of the smaller sites and the notion of gathering around the spring. Each stage of the whiskey production process is accommodated in a separate facility, thus strengthening the idea of a production route.

Once inside the each building the spatial layout is governed by the processes involved in that part of the whiskey making process. The placement of the various equipment that is used during the production process, guides circulation. Movement follows the process of production, engaging the visitor, and giving them sense of participation.

Grain silo's, steeping tanks, malting floor, kilns and mills are group together in the first stage, as it all forms part of the grain preperation process.

The grain is transferred to the second stage were mashing, fermenting, distilling and casking is done.

The filled casks gets transferred to the maturation house for aging. This is also were the tasting room is located to marks the end of the whiskey production process. the visitor gets the chance to taste the whiskey, and after experiencing the whole production process, the visitor would a better understand and appreciation for whiskey and the water of the Fountains Valley that is used to make.

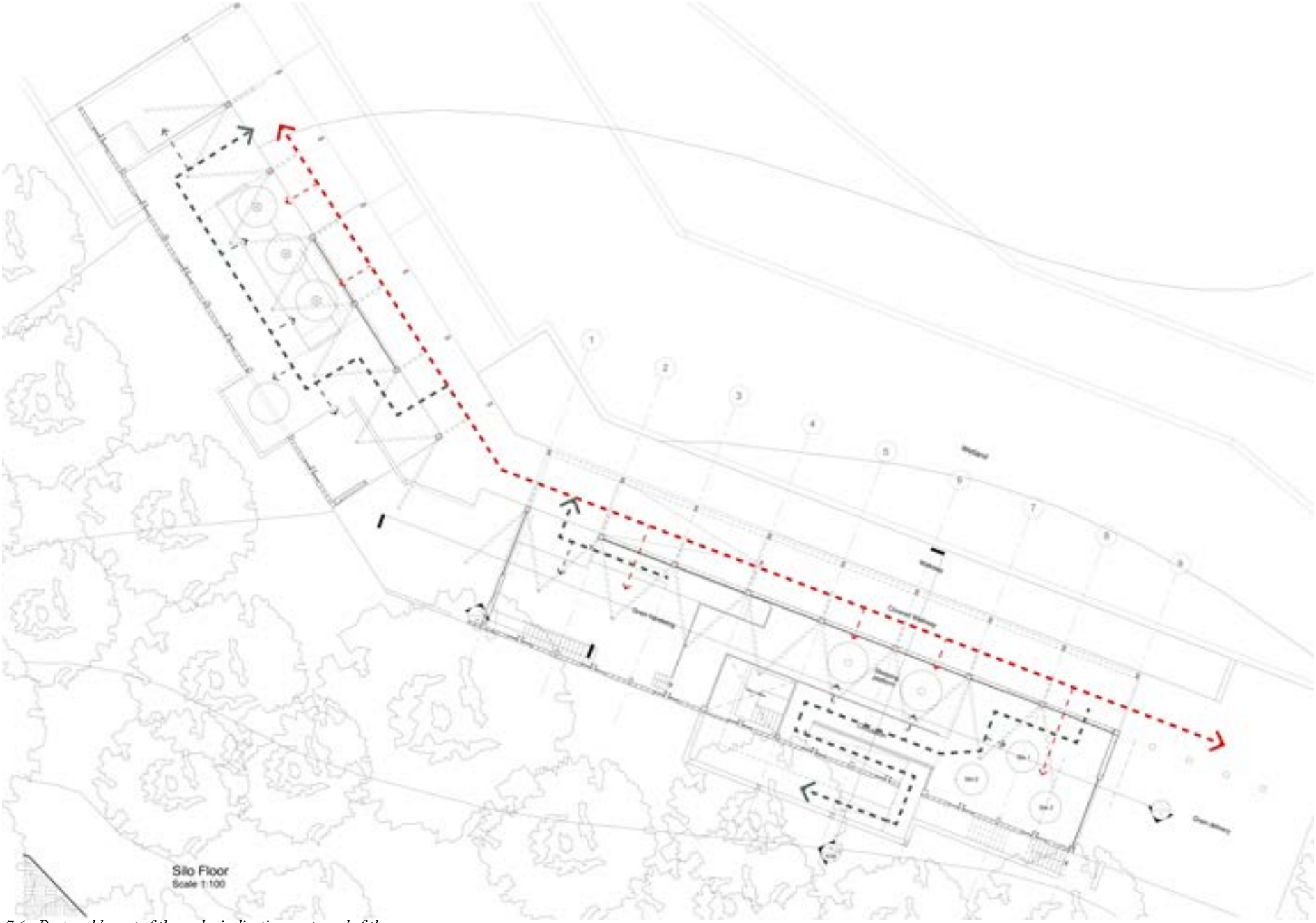


Figure 7.6. Proposed layout of the and a indication route and of the circulation and visitor interaction. Author, 2014

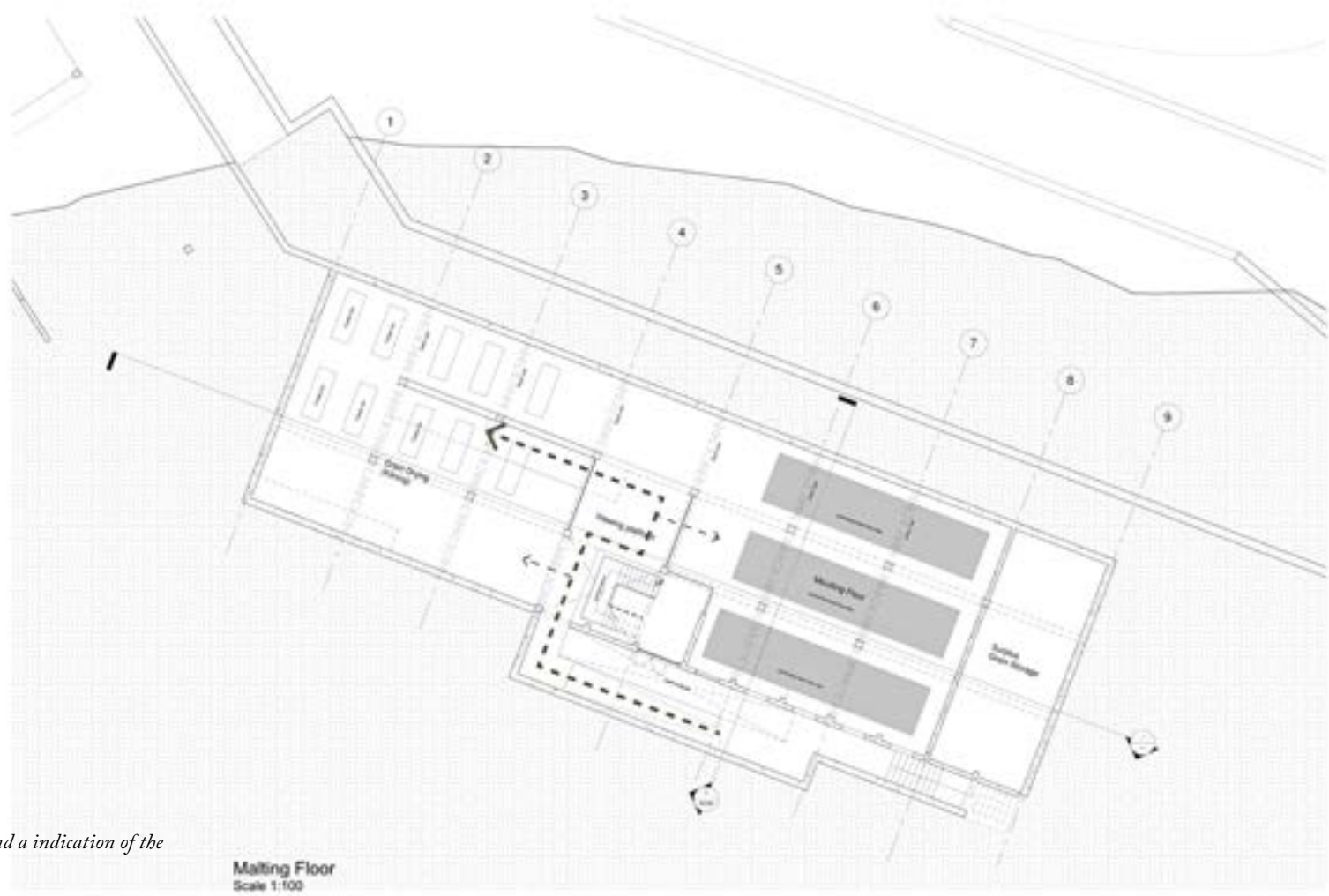
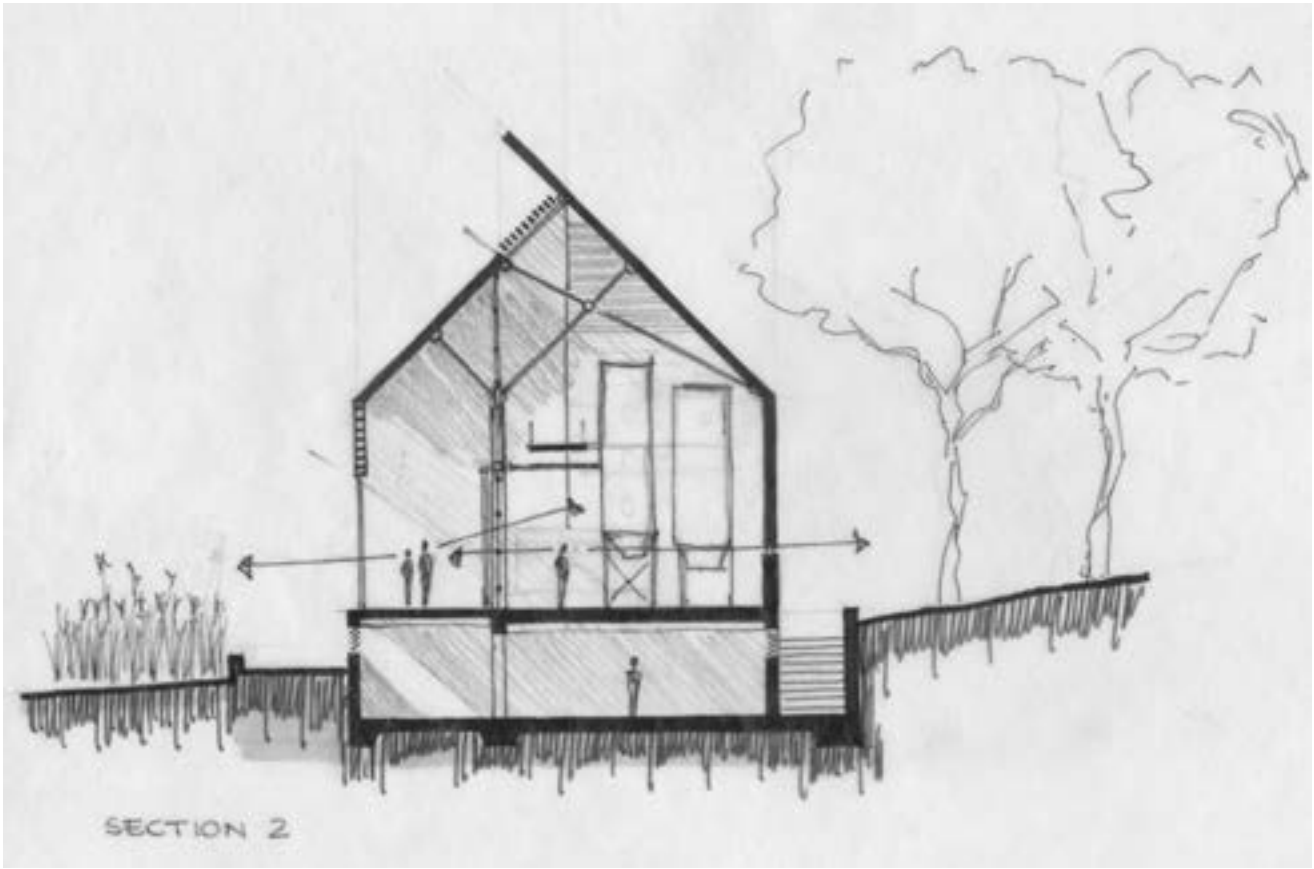


Figure 7.7. Proposed layout of Malting floor and a indication of the circulation and visitor interaction.



7.3 Sectional Development

The sectional development of the scheme illustrates the conceptual approach of architecture acting as an mediator in the (re)defining elements within the landscape.

The section tends to demonstrate the constant dialogue that is present between man, the landscape and the process of production. The architecture serves as the platform for interaction between the three entities.

The section also indicates the architectural to response to the historic context, by reinterpreting the section of the existing fabric.

Figure 7.8. Conceptional section of the Malting house, illustrating the relation to the outdoor spaces.

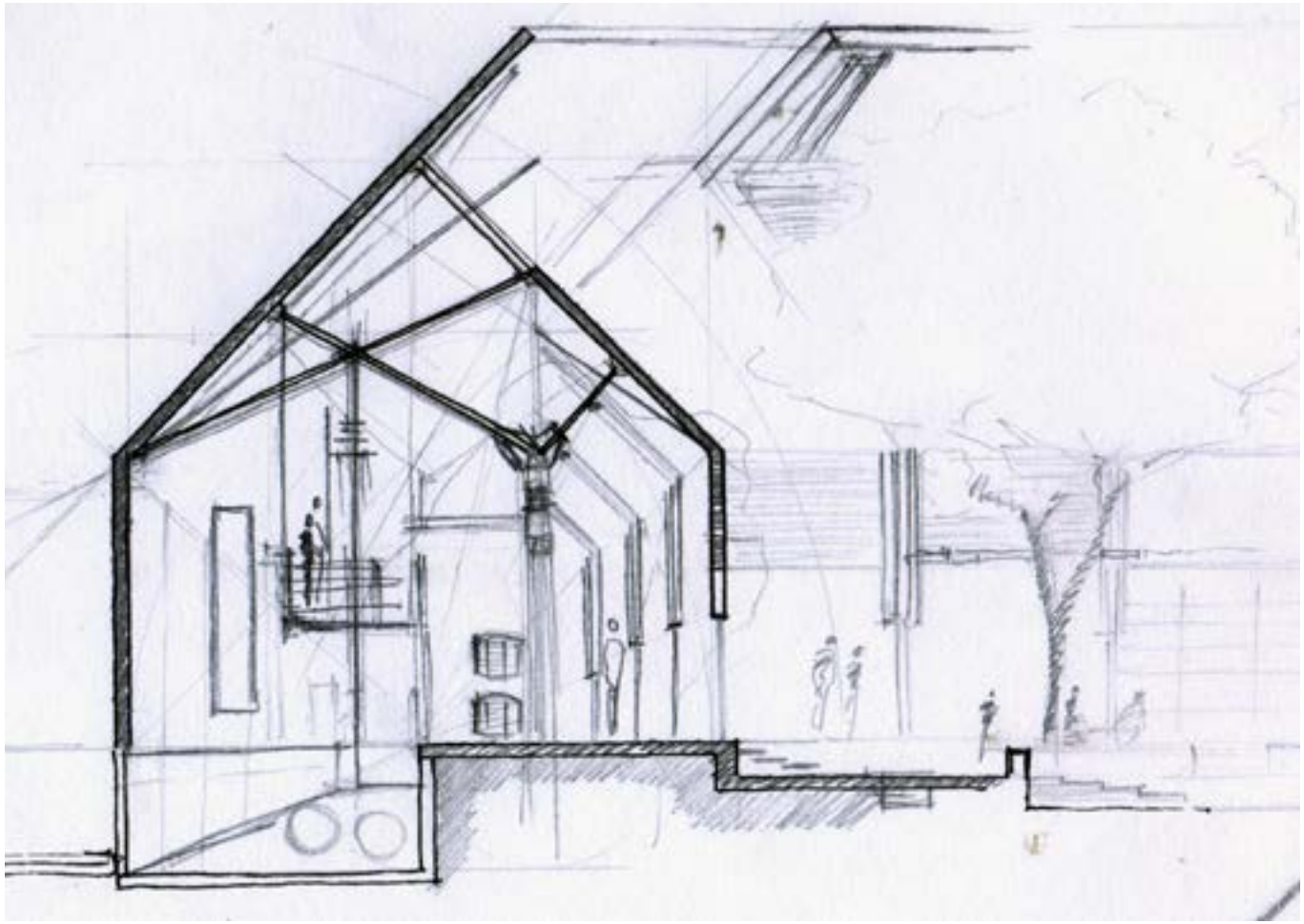


Figure 7.9. Conceptional section of the Maturation house, illustrating the relation to the outdoor spaces.

Chapter Eight - Technical Investigation

8.1 Introduction

The chapter discusses the approach towards the technical resolution of the proposed design and how it will reflect and inform concepts that led up to this point.

8.2 Tectonic concept

The tectonic concept is an extension of the theoretical and architectural concepts of defining and gathering. The intention is to through the exploration and investigation of materiality develop a architectural solution, that would manifest these concepts in a spatial experience.

8.3 Materiality

Considerations:

• One of the major consideration to be kept in mind was the fact that the intervention is located within a heritage landscape. The choice of materials and the manner in which it would be used, should be appropriate within this context, as well as be an indication as to the approach towards the existing fabric is.

• Other considerations included the program of production and that the materiality should reflect the light industrial realm that the intervention exists in. the manner in which it would be constructed, as an extension of the production process, as well as the way in which the choice of material would contribute to the manifestation of the initial intent.

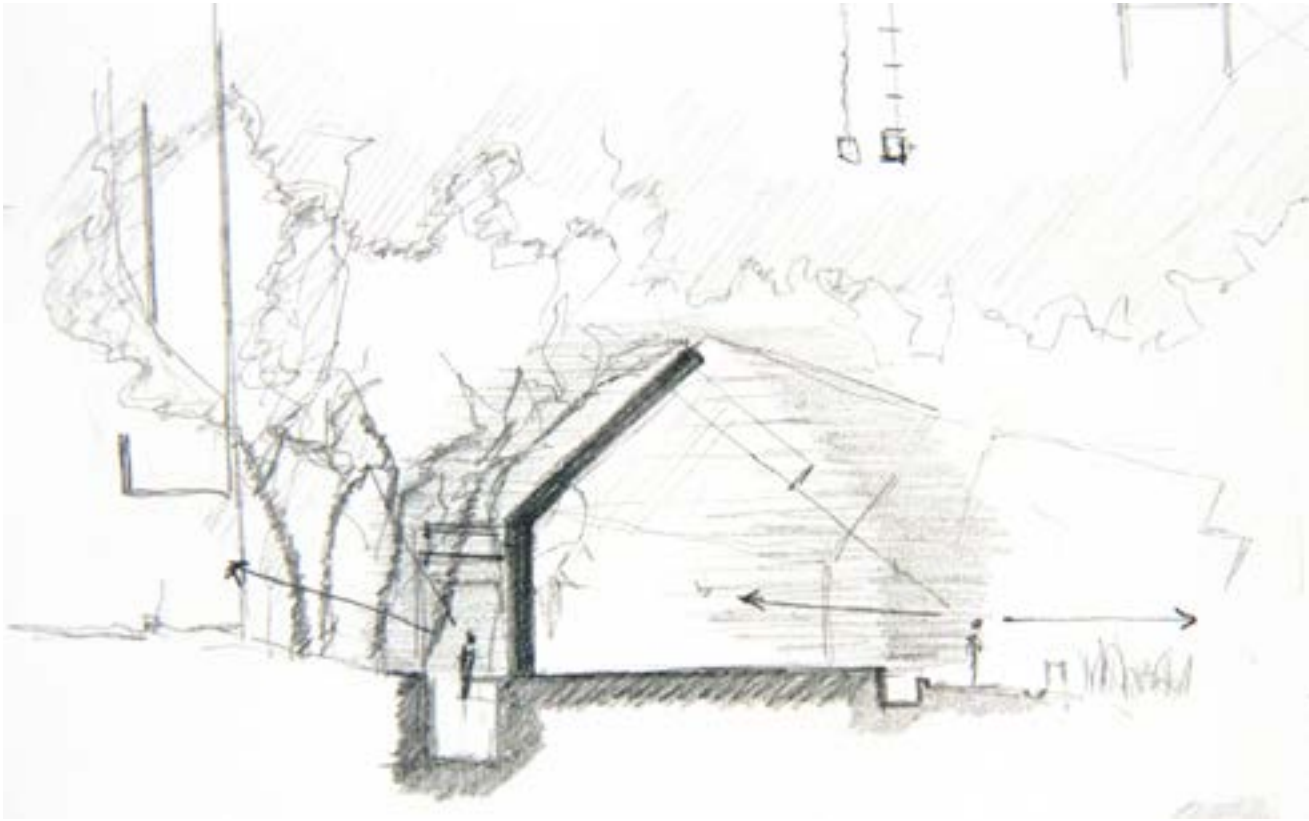
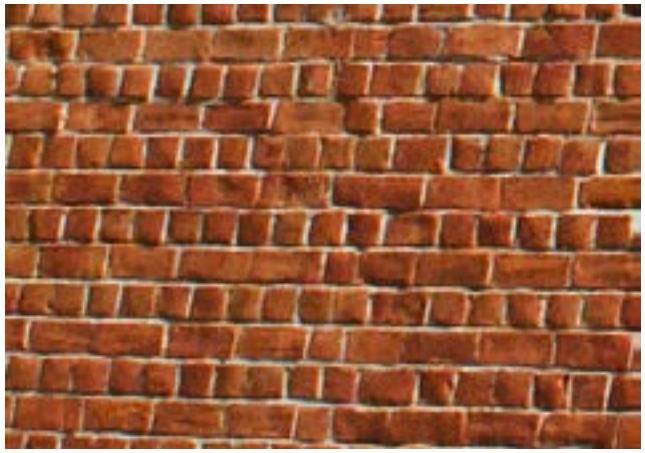


Figure 8.1. Sketch showing the tectonic concept. Author, 2014



8.4 Existing material palate

The existing material palate are mainly represented by the Old Pump Station as it is the dominant and most important of the existing built fabric on the site.

Steel

Steel is used in the roof construction. The steel elements used were likely to have been pre-manufactured and assembled on site.

Brick

Red clay bricks are used in the conventional manner for the construction of the load bearing walls.

Figure 8.2. Steel roof truss of the Old Pump Station. Photo: Author, 2014
Figure 8.3. Red clay brick wall of the Old Pump Station. Photo: Author, 2014.

8.5 Intervention Material pallet

The proposed intervention responds to the existing built fabric on site, therefore the existing material palette were used as reference in the choice of materials that would be used in the proposed interventions.

Concrete

Concrete is versatile in terms of its ability to be structural as well as acting as a finish in various interior and exterior conditions. These characteristics makes it ideal for the use in the industrial realm of the distillery.

Steel Profile Sections

Steel construction are usually associated with industrial typologies and it is for this reason that steel profile sections were selected. part of the interventions intent is to be legible in terms of its function. The joining of the steel elements are to be articulated through the use of bolted connections, emphasizing the way in with the building was constructed.

Figure 8.4. Timber shuttered concrete.
Figure 8.5. Steel profile sections.

Red Clay Bricks
The red clay bricks are used as reference to the existing built fabric. Although similar in material the application of the red brick will differ form the application . The brick walls of the Old Pump House are structural, as oppose to the new invention where it is implemented in a non structural manner.

Packed stone gabions
The packed stone gabions is again a indirect reference to the existing fabric of the stone structures that is associated with the historical water system. The gabions is implemented in the construction of low walls that serve as spaces defining elements in the landscape. Stone for the construction of the gabions are to be sourced on site.

Figure 8.6. Red clay bricks in stack bond.
Figure 8.7. Packed stone gabions.

8.6 Structure

The complex are made up from a series of buildings that all share the same tectonic approach, only varying to some degree to accommodate the separate functions housed by each of the building.

Repeating the basic tectonic concept in each building within the complex, brings forth an tectonic language that is easily understood when moving through the buildings and the landscape. The continuity in materiality further underlines the idea of the spaces that is being created and defined takes importance over the architecture itself.

Roof

The structure in its basic form are made up by steel portal frame, which serve as reference to the existing fabric of the Old Pump Station in a formalistic manner as well as to the industrial typology of the new distillery.

The intent of the structure is to act as a manifestation of the theoretical and architectural concepts of defining elements within the larger landscape. Part of the steel portal frame construction allow for a tectonic language that will consist of heavy and lighter elements. This is achieved by the use of built up section, while the other part is reduced to a singular slender element. Exposing the structure contributes to this experience of heavy and light tectonic.

Wall

The red brick wall as used as infill, and set back from the steel portal frame as to expose the steel on the interior. The fact that the brick wall is not load bearing provides the opportunity to be viewed as in horizontal extension on the roof, and contributing to as defining element.

Floor

The floor of the structure is set on a plinth that is a reiteration existing built form. The fact that the floor plane are elevated reinforces the intent of structure as space defining element within the landscape.

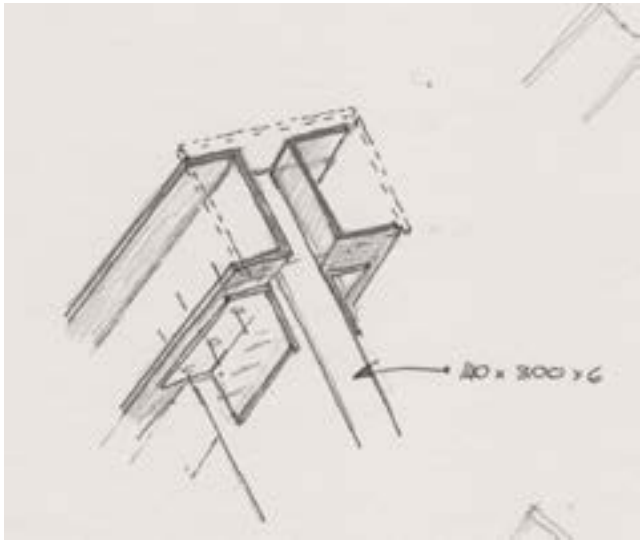
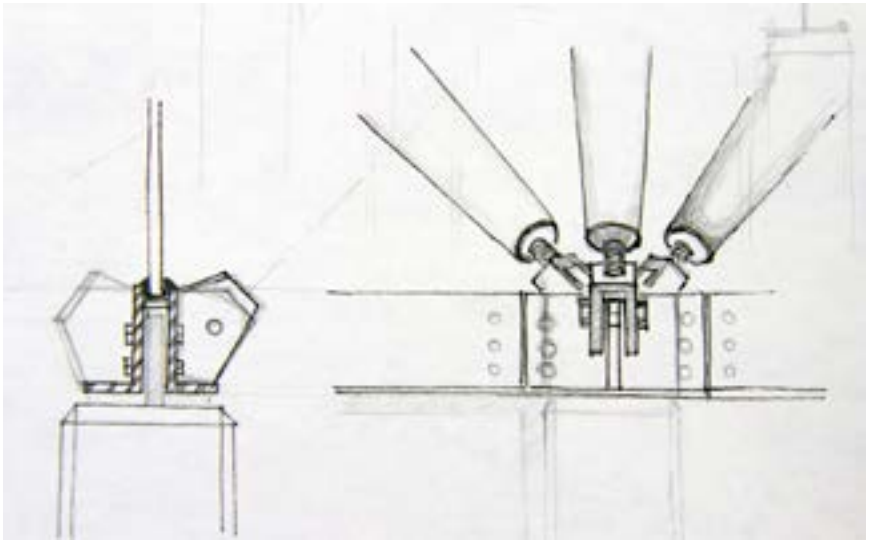
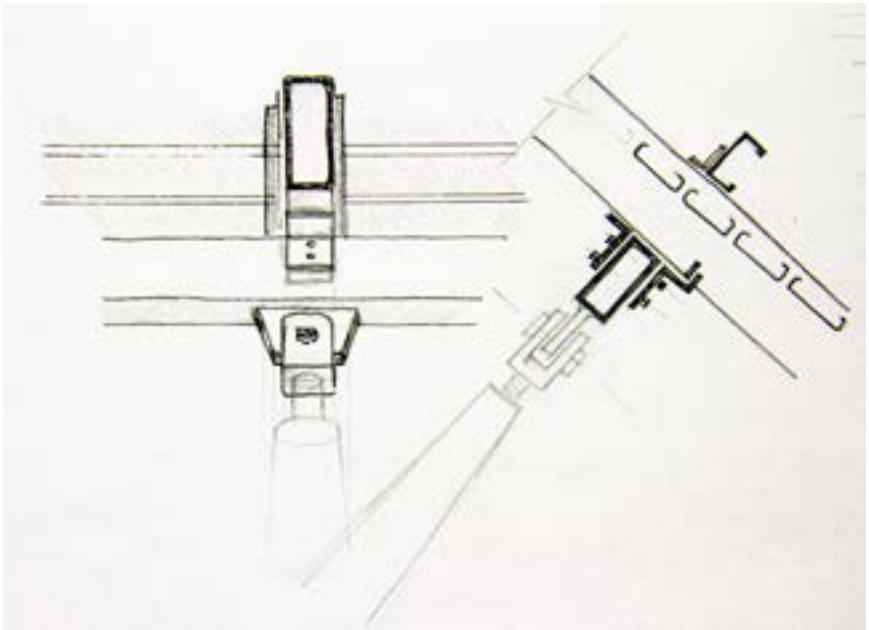


Figure 8.8. Sketch indicating the use of "lighter" and "heavier" elements in the portal frame construction. Author, 2014.

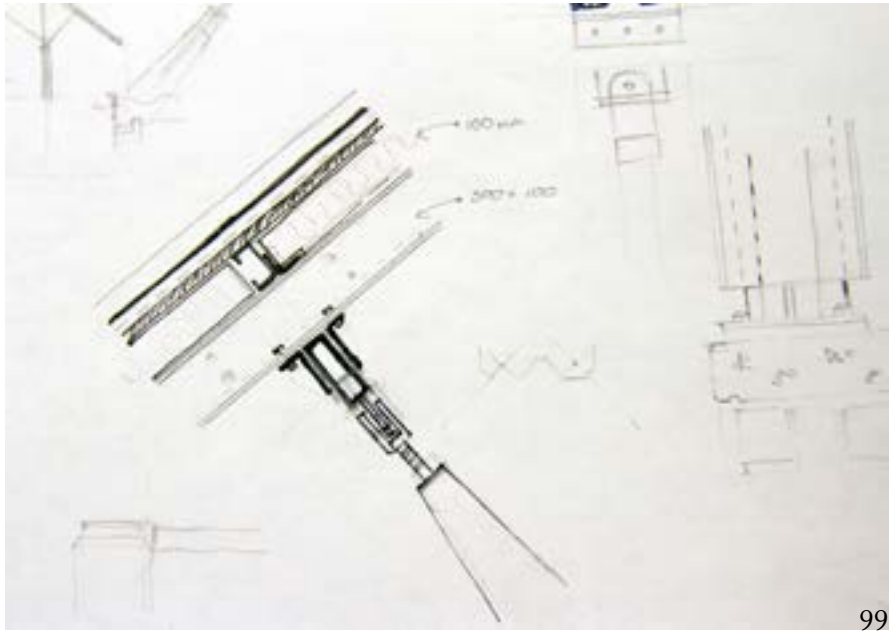




8.7 Tectonic Exploration

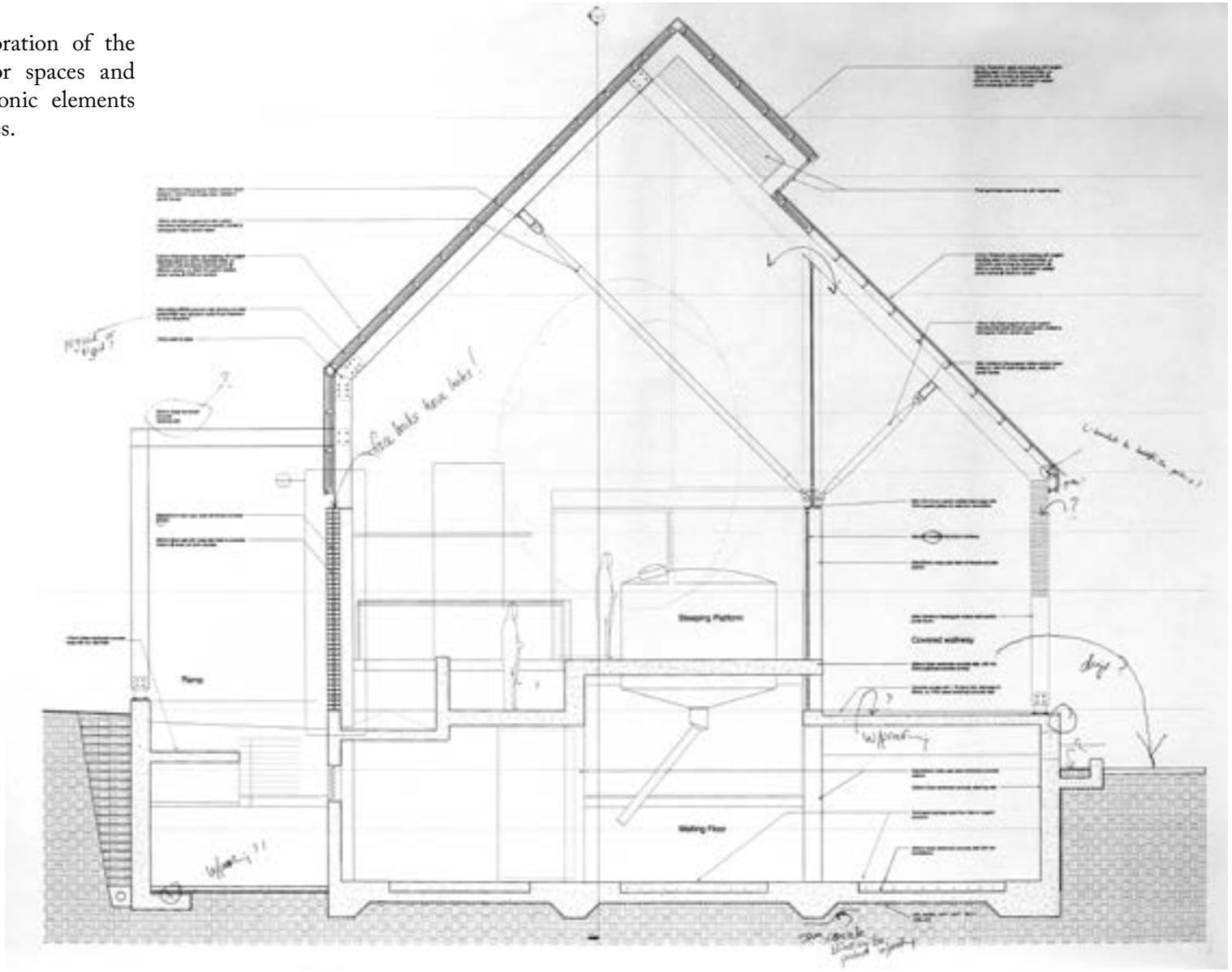
All drawings in this section should be read as exploration drawings and therefore not final.

Connection and fixing
The sketches indicate the way in which the connection of elements were explored. The intent is to portray the way in which the building is constructed, and the building being a product of a production process in its own right. Therefore relating to the program of production.



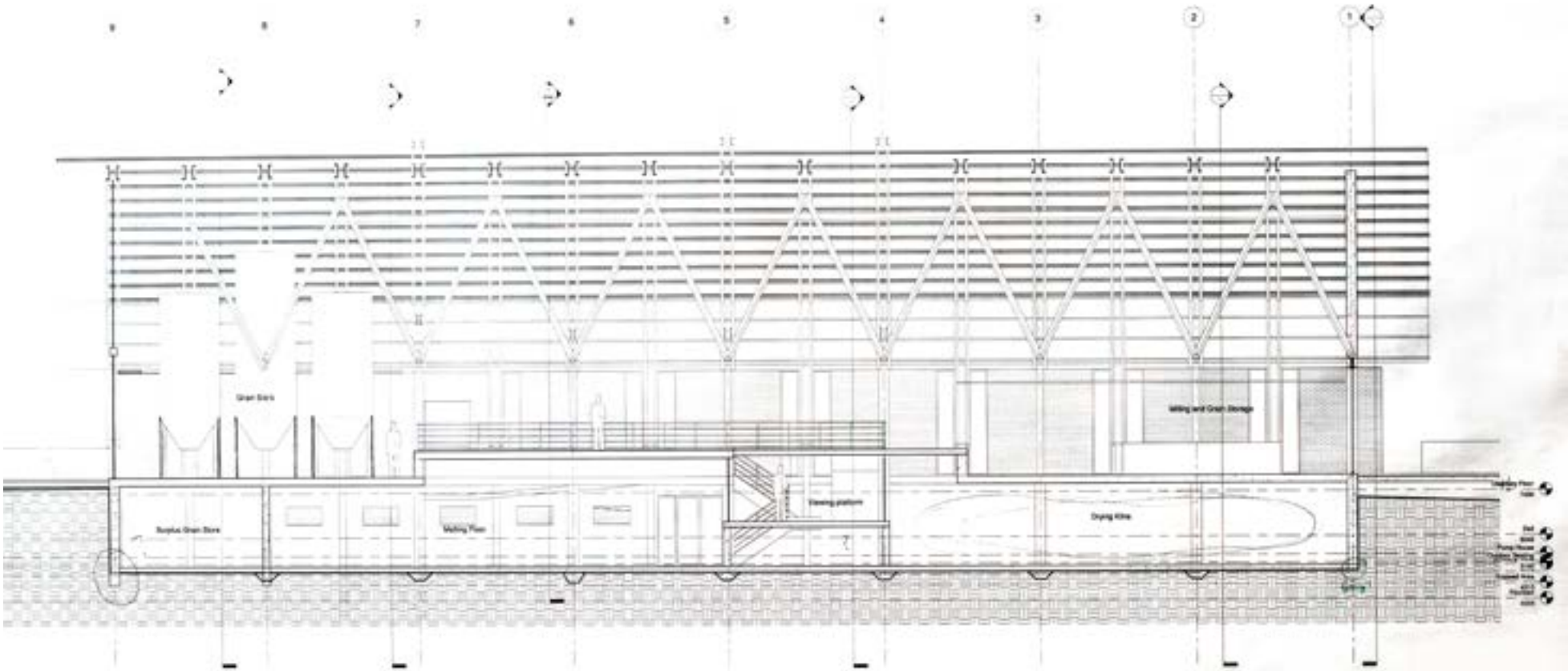
Cross Section exploration

The cross section indicates the exploration of the relation between interior and exterior spaces and indicates the way in which the tectonic elements contribute to the forming of these spaces.



Longitudinal Section exploration

The longitudinal section indicates the exploration of multiple levels as well as the manner in which the structural roof supports are organised in order to act as interior space defining elements.



8.8 Environmental Strategy

Water use

Water is intensively used during the whiskey production process. Only a small percentage of that water ends up in the bottled product, thus resulting in a large amount of water that gets discharged in the form of "waste water".

Eighty percent of the spring discharge are utilized for municipal purposes, while the remaining twenty percent are released back into the river. The water for both parts of the production processes is sourced from this 20 percent. This makes it critical to remove any contaminates from the waste water before releasing it back into the river system.

Grain Steeping

Steeping are the process of soaking the grain in water until the required moister content is reached in order to initiate the germination of the grain to produce malted grain. After the completion of the steeping process the water gets drained and filtered through a subsurface wetland. During steeping no harmful contaminants are released into the water, thus no additional water treatment is needed.

The Distilling process

During the distilling process effluent that contains a significant amount copper gets scrapped from the copper stills. The soluble copper does not get distilled into the alcohol but a quantifiable amount can be found in the 'pot ale' and the 'spent lees', these are the residue that are left in the wash still and spirit still respectively.

The effluent also contains an organic component that are made up of sugars, soluble starch, ethanol, and fatty acids. The organic component needs to be removed first before the effluent can be filtered through the wetland. This is done via an aerobic filtering system where these components gets broken down by bacteria. Once broken down the effluent is pumped to the wetland where the organic waste and heavy metals are removed.

Water Cycle
The diagram indicates the water usage cycle during the production of whiskey. Water is pumped directly from the spring to the individual

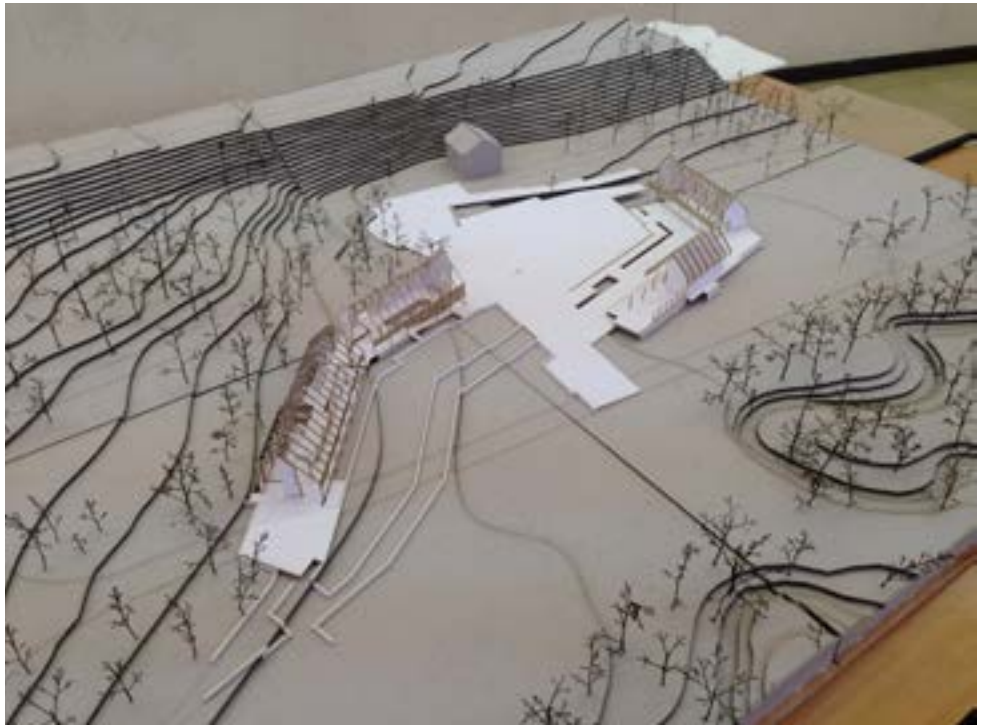
Figure 8.9. Diagram indicationg the water cycle in the different stages of production. Author, 2014.

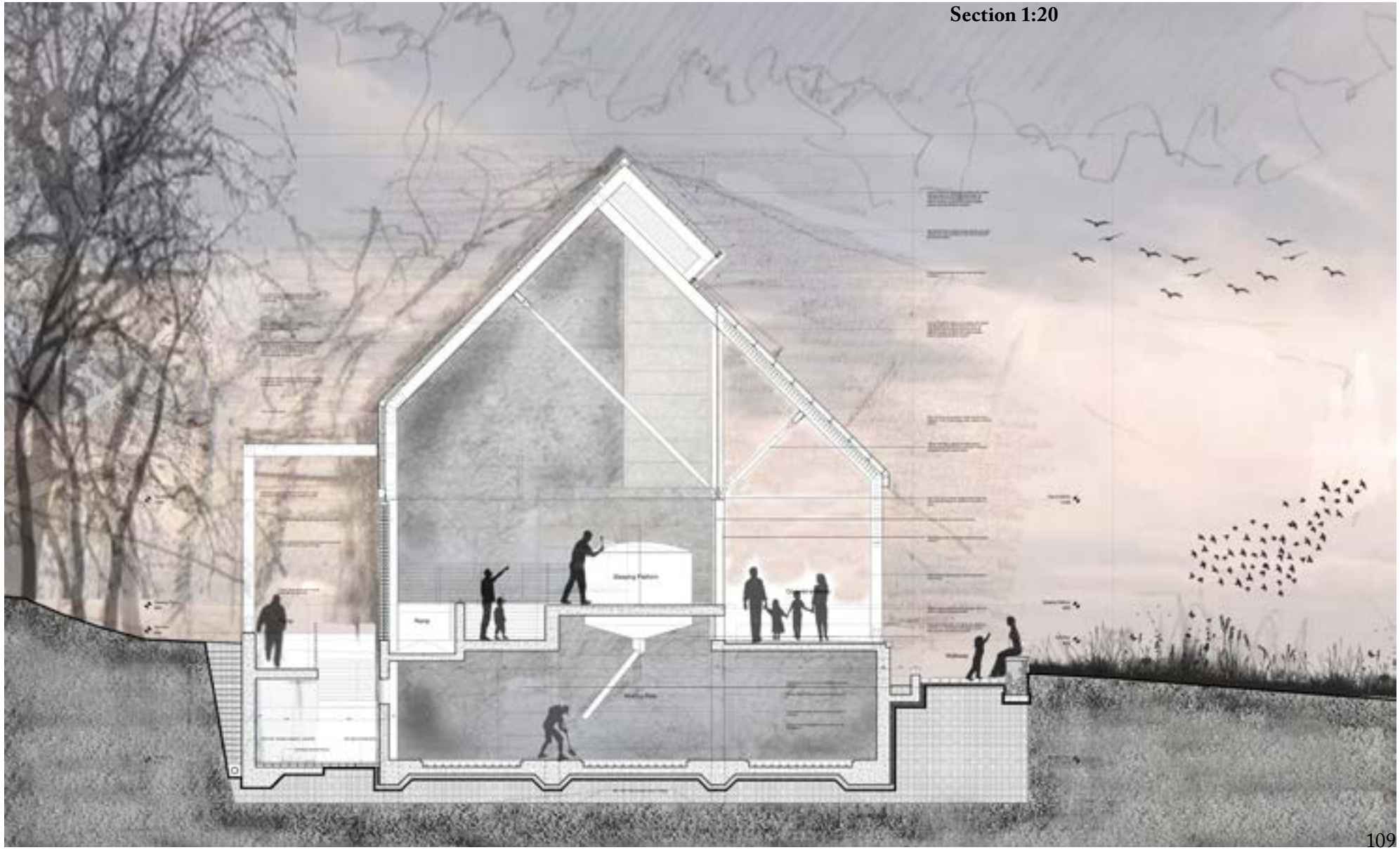
Chapter Nine - Conclusion

9.1 Introduction

The chapter is a conclusion of the dissertation in the form of images that portray the final design and tectonic responses to the initial problem statement.

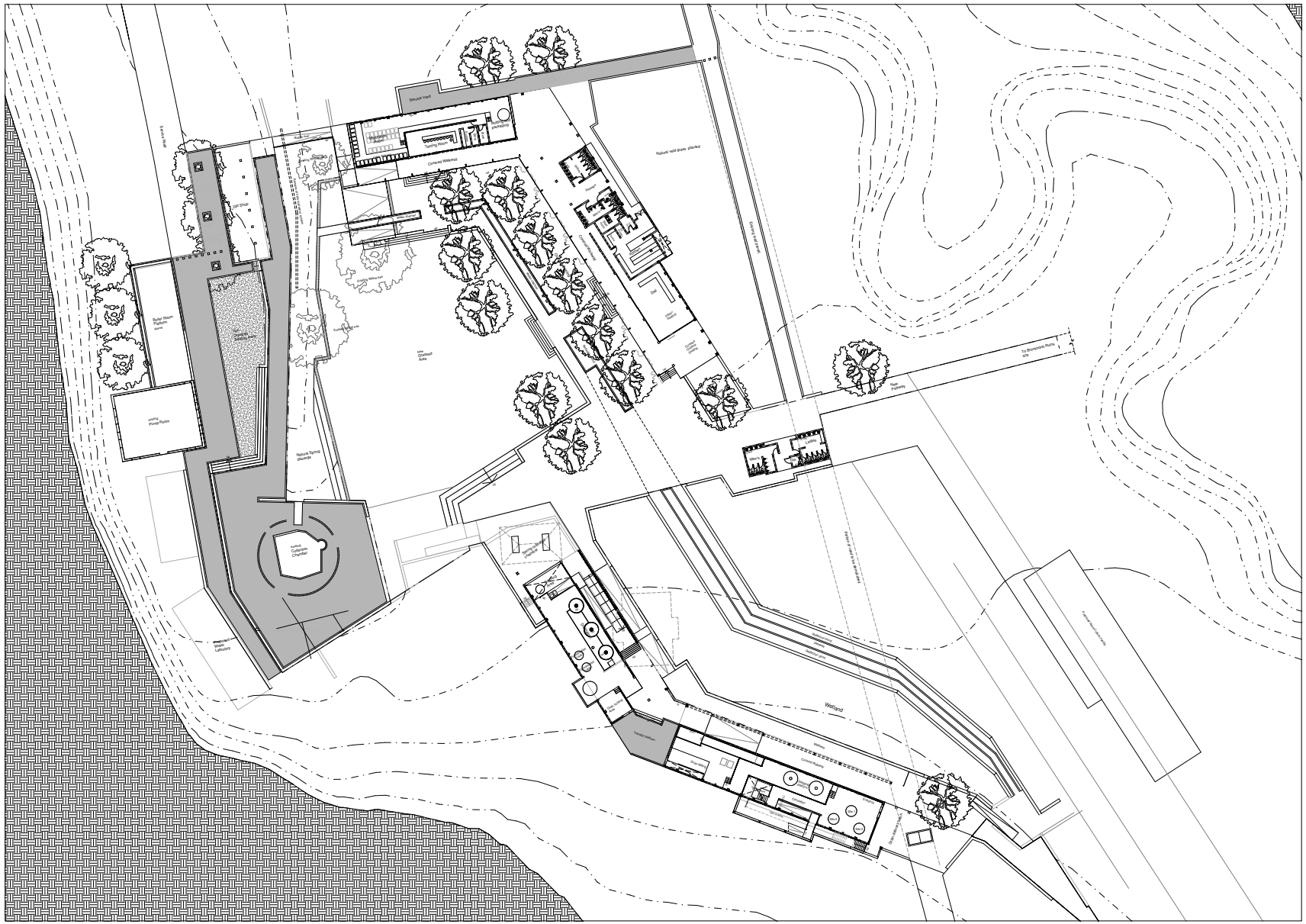
9.2 Final presentations



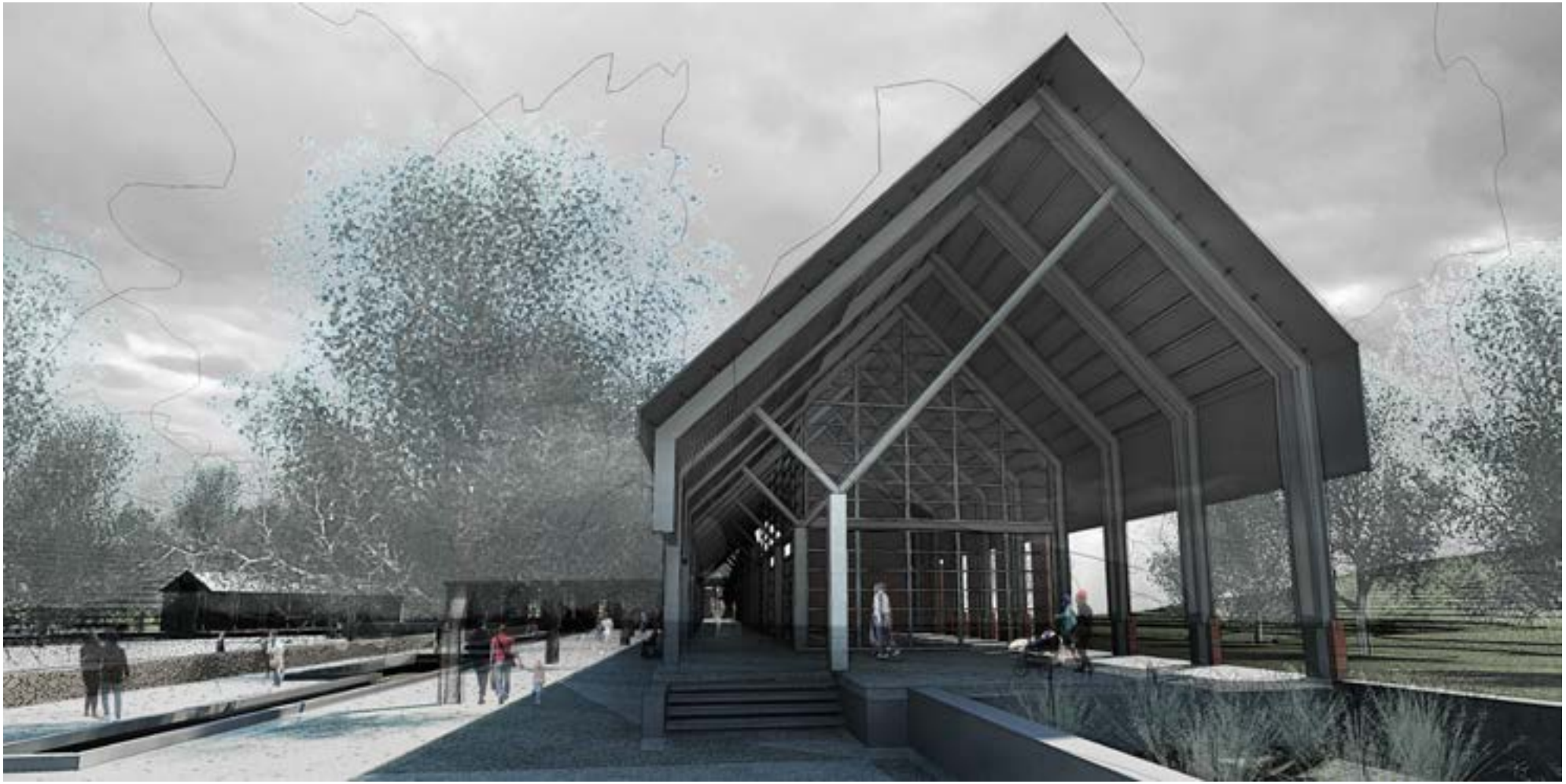


Section 1:20

Plan 1:200



Section 1:50



Perspective 1

Perspective 2

Perspective 3

Perspective 4

List of Figures

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Images

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