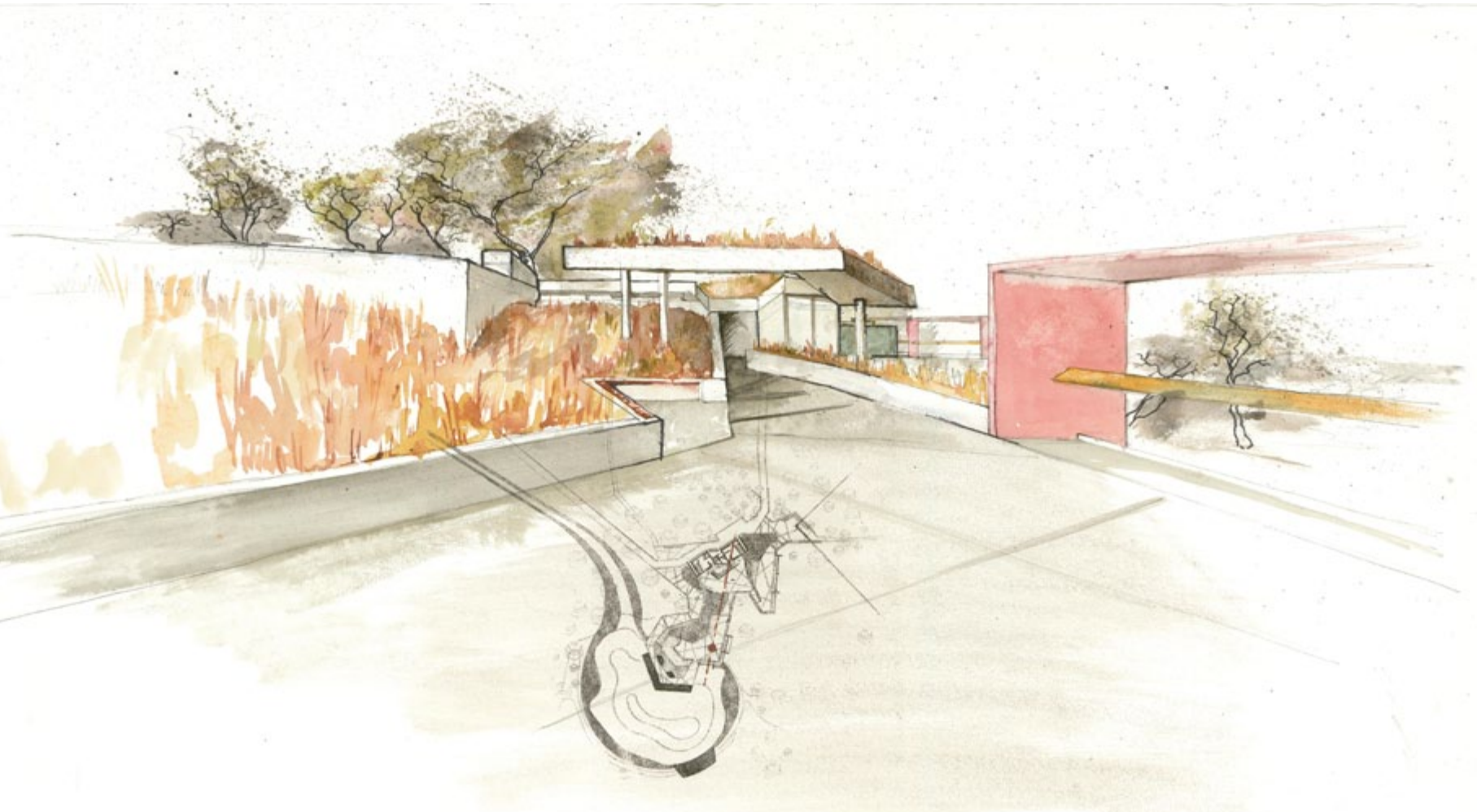

Tswaing, a Place of Commemoration and Reminiscence: Making the Natural Environment Accessible to All

by Albertus Viljoen

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Tswaing, a Place of Commemoration and Reminiscence: Making the Natural Environment Accessible to All

Submitted in fulfilment of the requirements for the degree of Masters in Landscape Architecture (Professional) in the Faculty of Engineering, Built Environment and Information Technology, Department of Architecture

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Study Leaders: Graham Young & Catherine Karusseit

Project Location: Tswaing Meteorite Crater on the farm Zoutpan on the Northern borders of Soshanguve

Research field : Universal Accessibility of Cultural Landscapes

1 Introduction

Fig. 1.1: Photograph from within the crater bowl. [Author, 2012]

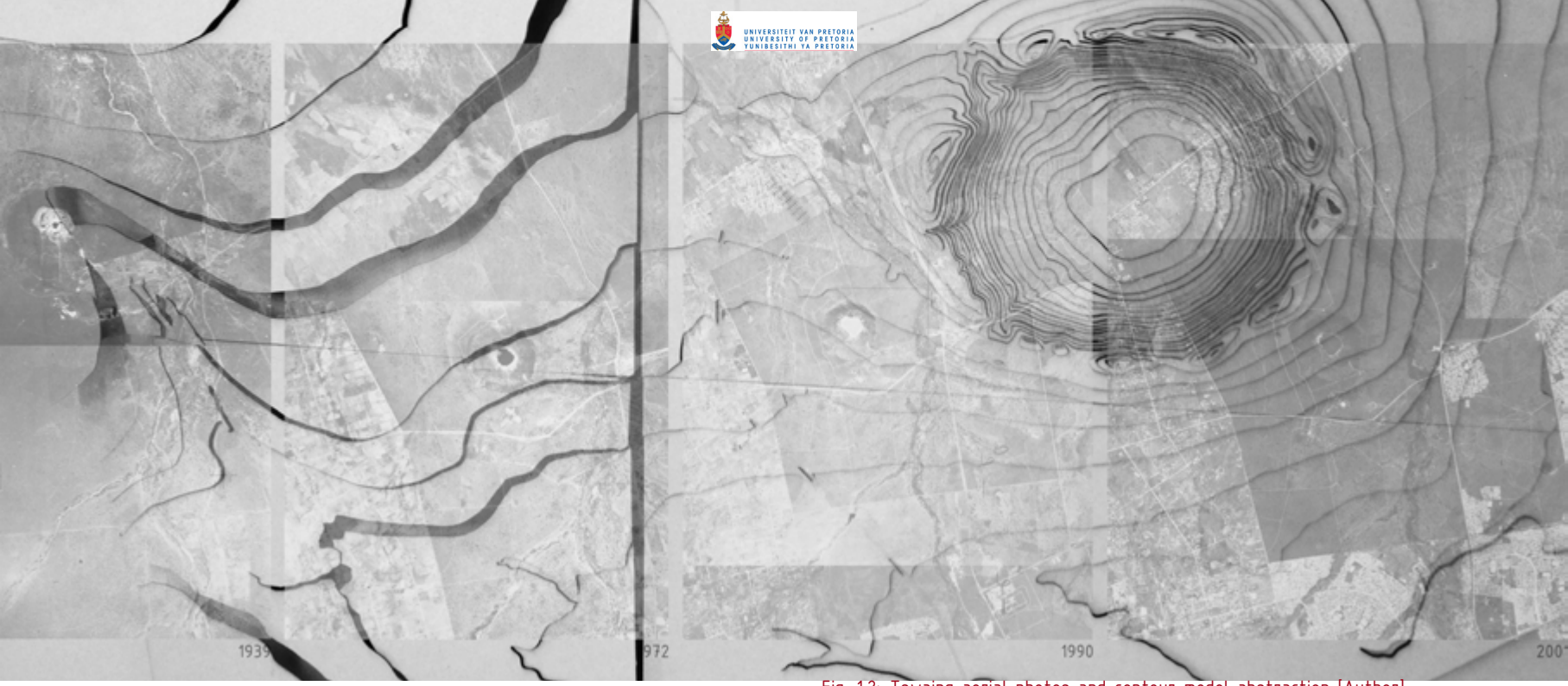

Fig. 1.2: Tswaing aerial photos and contour model abstraction [Author]

Abstract

The Tswaing Meteorite Crater, formed 220 000 years ago, on the farm of Zoutpan, (or also known as the Pretoria Saltpan), had been a topographic and geological riddle for a long period of time. The gathering of salt from the crater was its main attraction for many groups that flocked to the crater, which later became an important beacon of infrastructure, becoming the largest producer of Soda and Salt in the Transvaal in the early 1900's.

Knowledge is an intangible quality of the cultural landscape and its history which can be lost in the blink of an eye if it is not preserved, commemorated and conserved for future generations. Through the investigation of Inclusive Design and the application of its principles, the narrative which is Tswaing, can be made accessible to all by revealing the concealed narrative of the place, tangible and intangible, through time.

The afterthought or lack of design for disabled individuals can be seen in many projects. By ensuring accessibility is part of the design process from the onset of the project, valuable resources are not needlessly wasted later. As a result the cultural landscape and its secrets can be uncovered and shared with all.

Samevatting

TDie Tswaing Meteoriet krater, gevorm 220 000 jaar gelede, op die plaas Zoutpan (ook bekend as Pretoria Soutpan) was vir baie lang jare 'n topografiese an geologiese raaisel. Die taak om sout te versamel was 'n aantrekkings krag vir verskeie bevolkings groepe. Waarna die plaas 'n groot infrastruktuur baken geword het as Soda-as en sout verskaffer.

Kennis is 'n ontasbare kwaliteit van die kulturele landskap, maar dit kan in 'n oogwink verlore gaan. As dit nie beskerm of gepreserveer word vir toekomstige generasies nie. Deur die analise van universiele ontwerp en universiele toegang, kan die versteekte verhaal van Tswaing ontbloot word.

Ontwerp vir persone met 'n gestremdheid of kwaal word meer gereeld as nooit oorgesien of kom as nagedagte in die ontwerps proses en dit is opmerklik in baie projekte. Deur te verseker dat universiele toegang deel is van die onwerps, verhoed dat waardevolle hulpbronne nie gemors word nie en sorg vir 'n landskap wat voorsien vir almal se behoeftes. Gevolglike word die kulturele landskap en sy geheime beskikbaar om ontdek en gedeel te word.

Introduction

The Tswaing Meteorite Crater on the farm of Zoutpan, (or also known as the Pretoria Saltpan), had been a topographic and geological riddle for a long period of time. It was thought that it might be a volcanic phenomenon but later after extensive Soda-ash and Salt mining in the crater and further research into the composition of the crater, it was ultimately concluded the crater to have been formed because of a meteorite collision. [Brandt, De Jong, Hancox, Reimold. 1999]

Tswaing became an important culturally historic site, due to the artifacts dating back to the Middle Stone Age found at the crater vicinity. The gathering of salt from the crater was its main attraction for many groups that flocked to the crater, which later became an important beacon of infrastructure, becoming the largest producer of Soda and Salt in the Transvaal area, which was also exported. Remnants and ruins are all that remain of the the soda-ash and salt factory of which construction started in the 1918's and all mining activities came to a halt in 1961. [Reimold et al, 1999].

'Access' is a broad term that can be described as; how places, objects, circumstances and events are made available to be experienced, perceived, and utilised by everyone.

A theoretical investigation into access and accessibility of the natural environment is undertaken to establish how the natural environments and their inherent tangible and intangible properties can be made accessible to all. These properties of the natural environment include that which can be seen, touched and experienced and also that which cannot be seen, properties of the natural environment which is subject to each person's individual experience and so also the culturally historic heritage of which has lost its physical qualities in the landscape which can now only be communicated in stories, songs, poems and any other means of communication.

Knowledge is an intangible quality of a place and its history which can be lost in the blink of an eye if it is not preserved, commemorated, celebrated and handed down through the generations.

Fig. 1.3: Disability is often misunderstood only as a person in a wheelchair; in effect, disability includes all of the above and more. [Author, 2012]

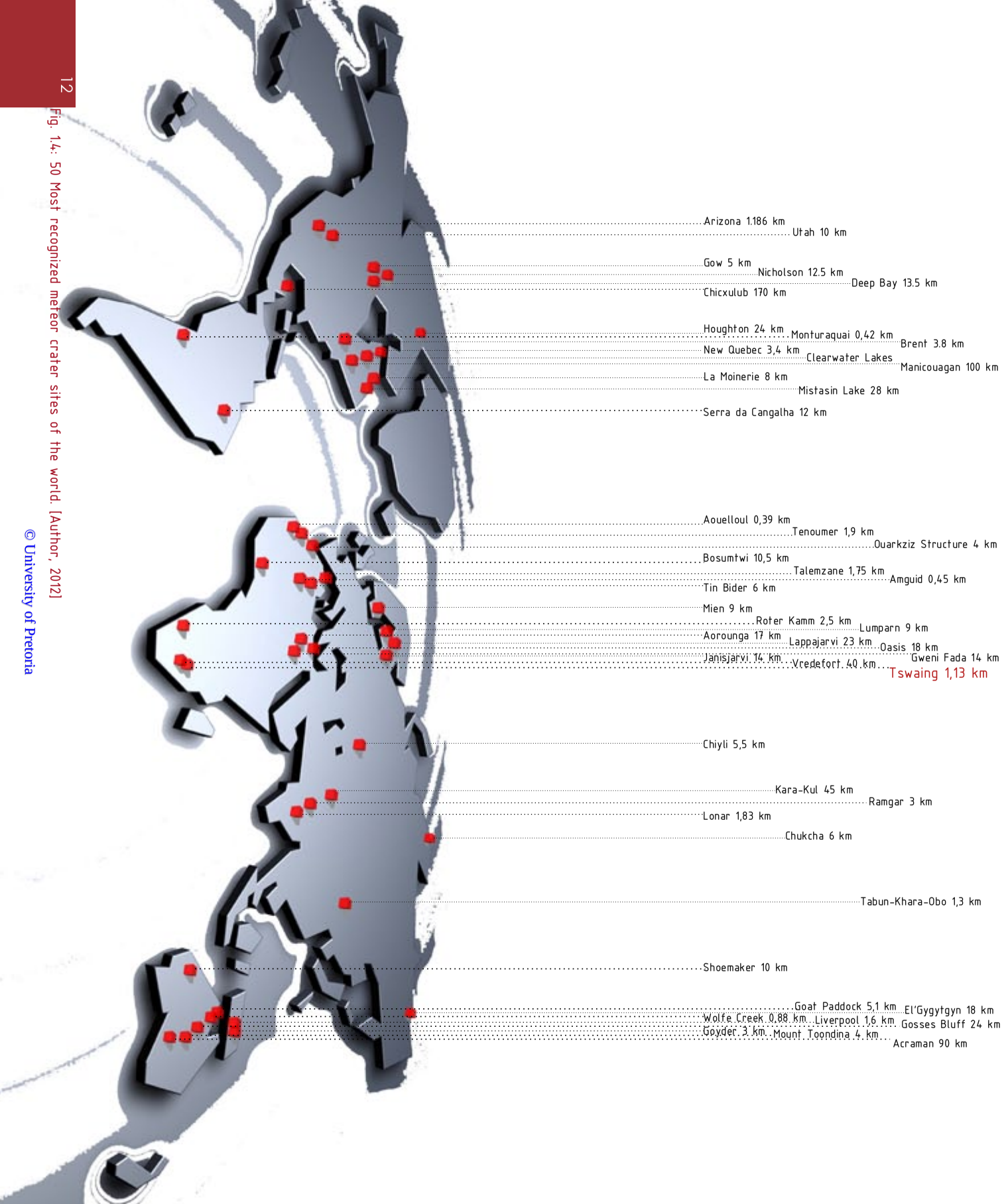

Fig. 1.4: 50 Most recognized meteor crater sites of the world. [Author, 2012]

Through the investigation of Inclusive Design and the application of its principles, the narrative which is Tswaing, will be made accessible to all by revealing the concealed narrative of the place, tangible and intangible, through time.

Real World Problem

In the past people with disabilities in South Africa were seldom integrated in everyday activities and were ostracized, invisible to most and discriminated against. Since the acceptance of our new Constitution in 1996, these issues have been addressed through the Bill of Rights and new legislation. However, despite those changes only a handful of buildings and landscapes designed and constructed have truly embraced and reflect the inclusive nature of the constitution.

Not only have disabled individuals in our communities and society been neglected but the same can be said for a number of natural environments in South Africa which have cultural and historic significance. Tswaing is one such example. The valuable lessons nature has to teach in terms of ecology and its processes, the inherent narrative of its history and culture have been ignored.

Fig. 1.5: World's prevailing attitudes towards people with disability.

In an interview with Freedom [Seabi, 2012], a community member of Soshanguve and guide at the Tswaing Nature Reserve, he stated that while some of the people of Soshanguve come to the crater for spiritual reasons (as the salty water is seen as a means for cleansing the soul), the majority of the community are unaware of the Tswaing Nature Reserve, its crater, the natural environment surrounding the crater and its history. Therefore it must be preserved to be celebrated by coming generations.

The inherent narrative which is present in the natural environment encompasses not only the physical and the material, but it includes that which has occurred and has been lost over time. The intangible quality of the place is equally important and must also be accessible to all.

Problem Statement

In new developments and projects, landscape design often neglects the needs of people with disabilities even though it is made clear in the South African constitution stated below:

"Everyone is equal before of the law. Each citizen has dignity and it may not be infringed on by anyone and should be respected by all [South Africa, 1996]. Any place, building or environment must be made accessible to everyone and individual may be discriminated against on the basis of disability." [Act no.4 of 2000]. [South Africa, 2000: 1, 7]. It does not matter what a person's race, sex, age, class, language, beliefs, culture or religion is or how much money or education a person has, or whether they are disabled, we all have the same human rights.

While a universal design may often seem unattainable, it should never justify the segregation of people with disabilities by the provision of one specific area such as 'gardens for the blind'.

While our Constitution may state that all people have equal rights on all fronts, which includes access to the natural environment, the infrastructure for a person with disabilities is lacking, as can be seen at the Tswaing Nature Reserve.

Even though Tswaing has such a rich international interest because of it being unique geological phenomenon and also one of the world's best preserved meteorite collision sites, the crater and activities associated with it, is however not being appreciated, protected nor celebrated, ignoring the rich ecological, geological and social history it posses.
In an interview with the Deputy Director, Julia Barnes, at the Tswaing Meteorite Crater Museum, she discussed what was left over after the exhibition areas were burnt down shortly after construction was completed in 2009 [Interview: Barnes], Barnes states that even though the government claims it to be a Nature Reserve, it is currently nothing more than a piece of land owned by the National Cultural History Museum.

Therefore two problems exist: the inherent, and currently undervalued, qualities of the natural environment and that the inherent cultural and ecological narratives of Tswaing are not revealed and made accessible to all.

Hypothesis

The tangible and intangible qualities of the Tswaing Nature Reserve are revealed and made accessible to all through considered design.

Research Question

1. What are the inherent tangible and intangible qualities of Tswaing?
2. How can Tswaing become a tourist destination which celebrates its cultural, ecological and geological history and value whilst being made accessible to all?
3. How can the said qualities of Tswaing be made accessible to all?

Research Methodology

This dissertation attempts to evaluate historic events which translate the narrative of Tswaing.
A literature review will investigate the theories surrounding heritage and cultural landscapes and universal access. Site analysis will be done by constant observation on site,

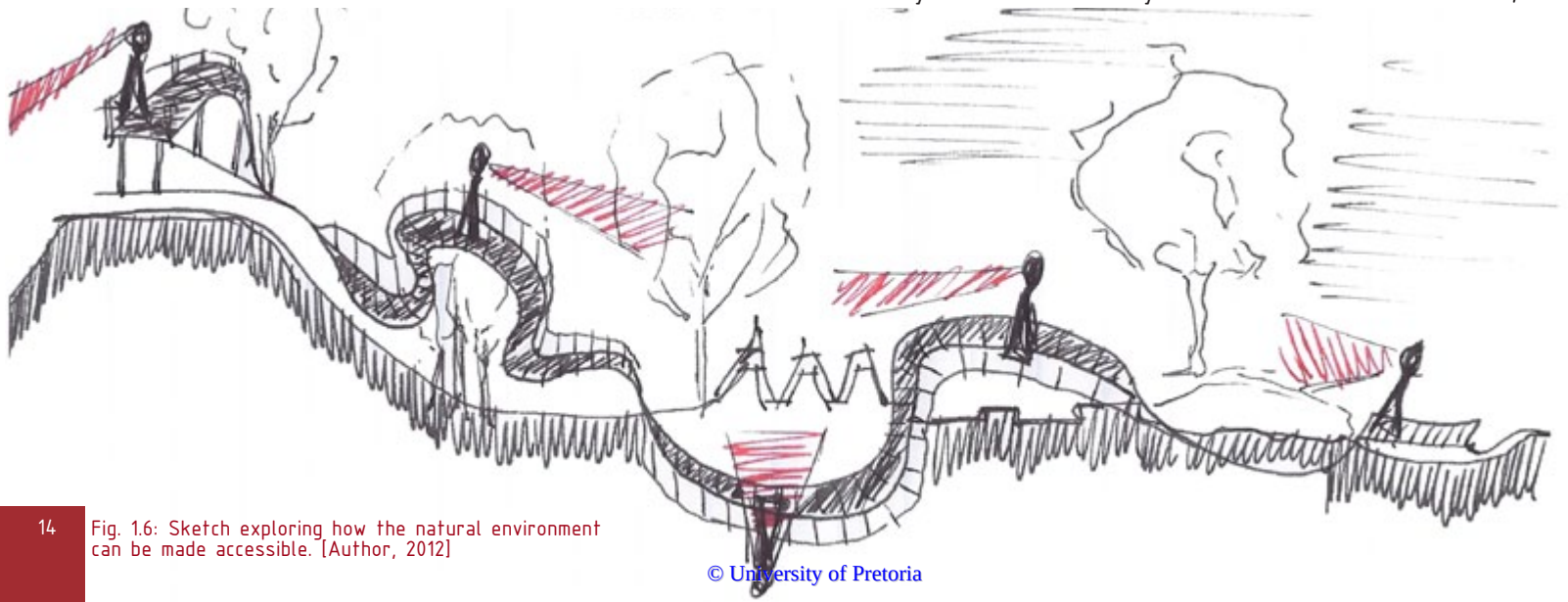

Fig. 1.6: Sketch exploring how the natural environment can be made accessible. [Author, 2012]

information gathered from published documentation and the precedent studies will be executed by observation at the project locations and from published documents, reviews and interviews.

The qualitative research method as described by Leedy and Omrod [2001: 147] will be applied. The landscape must be understood in terms of the complexities of phenomena that are present in the natural environment. The natural environment encompasses an array of layers and dimensions and must therefore be analysed in more than one way: theory, local precedents study, and site analysis and accessibility audits of local projects.

In addition to precedent studies done, access audits of the relevant precedent studies will be done to analyse the degree to which and how universal access principles have been applied. Moreover to investigate why universal access is often added as a last thought.

Definitions

Disability – the lack of opportunity to fully participate in community activities, because of environmental or attitudinal barriers, on equal basis with others. People with disability may include people with temporary and long term intellectual, physical, mental or sensory impairments hindering full community participation.
Impairment – the partial loss, complete loss or the loss of functionality of, organ or a body part, or systems.

Narrative – A narrative can be seen as a form of storytelling, which is perceived by a person's personal experience of the environment moved through or lived.

Universal Access – Accommodation offered to all, regardless of abilty or age, providing freedom of movement and choice in any environment. Accessibility provided not only to the physical environment but also to the intangible qualities of all environments, including knowledge and experience of place.

Outline of Study

Chapter 1 – Introduction
Chapter 2 – Theoretical Investigation
Chapter 3 – Context
Chapter 4 – Framework
Chapter 5 – Precedent Study and Access Audits
Chapter 6 – Design Development
Chapter 7 – Detail Design
Chapter 8 – Appendix
Chapter 9 – List Of Figures
Chapter 10 – Bibliography

Conclusion

The current trend seems to view disabled individuals as an afterthought or result in parks such as seen in the 'Gardens for the Disabled'. This in essence, further promotes segregation instead of addressing the issue of universal access and segregation. .

The lack of design for disabled individuals can be seen in many projects. By ensuring that the design process is correct, as well as keen planning from the onset of the project will ensure that valuable resources are not needlessly wasted. Small areas can be very costly to construct yet still not cater for all the needs of its users. To avoid this, an interactive consultation action must be undertaken. From the onset and throughout the entire duration of the project, the possible future users of the initiative must be kept in mind as to increase the chances of a successful outcome.

2 Theoretical Investigation

An inclusive environment is one which includes
"…people who are physically disabled, people with sensory disabilities: both hearing and sight, people with learning disabilities, people with mental illnesses, elderly people, young children, people with heavy luggage, people with dexterity problems, people with neurological problems, women who are very pregnant, people who are in a hurry and not looking where they are going, people have had an accident and are temporarily disabled, people who are not wearing their glasses that day, people who are distracted or concentrating on something else." [Osman & Gibberd 2000: 25].

Fig. 2.1: Landscape Narrative abstraction. [Photographer student, 2010]

Introduction

In this chapter the theoretical framework for the design problem is investigated. The issue of natural landscapes and heritage is considered. In particular cultural heritage is explained, with specific reference to the Burra Charter. Thereafter the notion of memory, narrative and mnemotechnics in the natural environment is expanded apon.

The theoretical basis for making the natural environment accessible to all is investigated in terms of disability and Universal and Inclusive design movements.

The Cultural Landscape

These landscapes represent the work done by nature and man. Cultural landscapes give identity and a sense of place, inherently holding the relationship of man with nature through time.

There is currently a global paradigm shift as to the perception of landscape, emphasizing the integral relation between nature and culture, and focusing on the integration of the conservation of the fabric of places and people. [Scazzosi 2004:336].

In the built environment of Southern Africa, the intangible aspect of heritage and the preservation thereof is still widely misunderstood or completely ignored. In a number of development projects of Southern Africa recognition is rarely given to the meaning and the memory of a place or environment. [Bakker, 2003]

(In-)Tangible Landscapes

An aspect of the intangible landscape can be seen as a personal lived experience - subject to each individuals interpretation, feeling or emotion. A lot of what once was, lingers at Tswaing as a residue left on the landscape, subject to each individuals unique imagination.

UNESCO [2001] has defined intangible heritage as:

> "People's learned processes along with the knowledge, skills, and creativity that inform and are developed by them, the products that they create and the resources, spaces, and other aspects of social and natural context necessary to their sustainability. These processes provide living communities with a sense of continuity with previous generations and are important to cultural identity..."

Tangible heritage can be seen as the physical and spatial aspects of nature and the environment, therefore the crater, the natural environment and the ruins constitute the main tangible heritage at Tswaing.

Through intensive qualitative fieldwork conducted at Tswaing, the intangible aspects, one of the main contributors to the narrative of Tswaing, the tangible being the other, became apparent. Through this understanding, the aspects of the intangible: memory, knowledge, lived experience and meaning of place and man's relation to the landscape and the natural environment, could then be used to translate its relation to the tangible aspects and natural fabric of Tswaing.

Ermischer [2004:380)] investigated a very interesting con-

struct that the landscape and its value is perceived by the social and cultural background, collectively with his knowledge of the landscape.

The tangible landscape and the intangible landscape cannot be one without the other as the tangible landscape is given existence by the intangible and vise-versa. The perception and understanding of the landscape help to establish that link between the physical fabric of the place and the memories, meanings and knowledge of place, all characteristics of the intangible. This link is very well interpreted by Clarke and Johnson [2003: online] :

> "The notion of landscape encompasses connections – routes, links, events, stories, traditions – that cross the 'boundary' between intangible and tangible heritage, and offers opportunities for a more holistic understanding. Landscape also has the potential to be the medium that helps in understanding the commonalities and differences in the way that indigenous and non-indigenous communities perceive cultural heritage".

Therefore, the landscape and the natural environment should be treated on the basis on which the people perceive or value the landscape, thus awareness and knowledge is essential to the conservation of the landscape. People and their views and beliefs are part of the landscape and the natural environment. Views and beliefs change and so too will the landscape change and continue changing.

Memory, Narrative and Mnemotecnics in the Natural Environment

A duality exists in the perception of the landscape. In the western world, there is predominantly visual experience and perception of the natural environment, dictating landscapes, which are mostly picturesque landscapes. [Bender 1993:1]. In communities such as Soshanguve, they experience the landscape through multiple senses: touch, olfactory exploration, social interaction, orally and through storytelling. As Franklin [2002:186] states that in this event, the visual perception is possibly not the most significant aspect. Taking this into account, I concur with Kuchler [1993:85] where he states that for such societies, the natural environment is not the engraving of memory but the "process of remembering".

Scazzosi [2004] formulated the idea that landscape must be seen as a document leading from the point of view of landscape of memory. He posits that visual perception of the landscape alone is no longer valid and that the landscape should be seen as a living document where the fabric and history of the place, are combined with what is there today.

We must be fully aware of the past to understand the present and how to address the conservation and future of place, of Tswaing and its future. From the above, I can conclude that the natural environment is a document with an array of chapters of the intangible past, fused with the tangible present.

Today, especially in the contemporary art world there are various initiatives and projects that focus on the "*art of memory*" [Muller, 2008] . In an exhibition in Australia named: "*Mnemotech: sense + scape + time + memory* [Muller, 2008], the artists were instructed to relate memory to place. The title refers to mnemotechnics which uses architectural objects of space and landscape to activate memory. [Raub & Flynn 2007]. In local initiatives this can be seen in the work of a group called "Memoryscapes" [Muller, 2008] where in which

their artworks focuses on manifesting memory through artistic representation.

Today's landscape is inevitably processual and transforming, integral to processes of objectification and the sedimentation of history, subjected to poetic and hermeneutic interpretation and a place where value and emotion coincide. [Morphy 1993:205]

& Johnson, 2003].

A narrative can be seen as a form of storytelling, which is perceived by a person's personal experience of the environment moved through or lived.
Nature: Storyteller/ Narrator
Individual: Listener/ Reader/ Viewer

Fig. 2.2: Narrative in the Landscape. [Author, 2010]

Through an anthropological investigation of the tangible and intangible in cultural landscapes Müller [2008 : 118-138] concludes that memory and landscape are inevitably interconnected via the intangible dimension, both being ever continuous and subject to change. Müller found that the tangible natural environment informs and shapes the intangible natural environment and vice versa.

The integration of intangible values (memory and meaning) into conservation practice, whether associated with place, landscape or both, will require a fundamental shift from a somewhat static view of significance to one that recognizes the dynamic and contextual nature of social meaning. [Clarke

As the natural environment and its inherent narrative is subject to each individual's personal experience and interpretation, the narrative in the landscape can be perceived as not having a set beginning nor an end.

Rakatansky [in Swaffield 2002: 136] states that: "Narrative need not to be conceived as an explicit storyline grafted onto site."

Taking into account the dynamic nature of the natural environment, due to natural processes, human and cultural practices. As according to Potteiger and Purinton [1998: 3] : Narratives of natural processes are important as they represent the

transformation of the landscape over time, similarly including the processes of ecology.

Investigation of the sites historical, ecological, and physical characteristics and context, the narrative of the landscape becomes clear. Through this obtained knowledge, guidelines for intervention and development on site become apparent.

Revealing these incorporeal qualities to all people makes the design problem even more challenging. People with disabilities and the aged, also have the desire to be close to nature and the right to have access to the natural environment and its intangible qualities so that they too might appreciate their position in relation to their heritage.

Thus Müller [2008 : 118-138] had found that the tangible elements in the landscape, those of mnemotecnic value, provide for continued understanding and memory. The value of Tswaing will be made accessible if the intangible essence of the landscape, the narrative of Tswaing is understood to enivetably manifest itself in the tangible, rendering knowledge and understanding of history and place universally accessible to all.

Universal Access and Disability

Definition of Disability

A number of organizations have their own definitions and classification on how they see disability. These were critically compared so to formulate my own understanding of the term '*disability*'. [See Appendix]

Therefore, disability is the lack of opportunity to fully participate in community activities, because of environmental or attitudinal barriers, on equal basis with others. People with disability may include people with temporary and long term intellectual, physical, mental or sensory impairments hindering full community participation.

It is clear that all people benefit from inclusive environment. However, certain groups can be identified as experiencing the greatest difficulties with the built environment: disabled people, people with Acquired Immune Deficiency Syndrome (AIDS), children and elderly people. Amongst these groups disabled people have been singled out as the group who are the most significantly disadvantaged from using the built environment.

Inclusive and Universal Design

Universal Design is an approach to designing accessible environments and products that began in the United States of America in the 1980's. Taking the notion of Universal Design further, Inclusive developed in the United Kingdom (UK) in the 1990's. Both movements are studied so as to gain a comprehensive understanding of the accessible design movement, which forms the basis for developing specific design principles for the design of an accessible environment at Tswaing Nature Reserve

Universal Design

The aim of Universal Design is to design "...products and environments that can be used by all people, to the greatest extent possible, without the need for adaptation or specialized design." (North Carolina State University 1997). Ron Mace, an American architect who had polio as a child and was wheelchair bound, was the first to start using the term when he noticed that designers tended to view the notion of accessible

design and the associated building regulations as a shackle that restricted their creativity. He concluded that designers failed to apply the regulations adequately and with understanding. They failed to recognise them as minimum requirements within which they had free range for innovative design. Ron Mace envisioned the purpose of Universal Design as a means to reduce the attitudinal and environmental barriers people with disabilities have to endure (Imrie & Hall, 2001: 14).

The Centre for Universal Design, at the University of North Carolina, took Mace's concept further and developed Seven Principles of Universal Design that can be applied to all design situations, from the built environment to product design.

Inclusive Design

Universal Design could be interpreted to promise an impossible standard and therefore Inclusive Design recognises the diversity of special needs and "…tries to break down unnecessary barriers and exclusiveness." (Imrie & Hall 2001: 18). It is defined as design that considers the potential ability of all people. The result is a built environment designed so that all people can move around and experience it as independently and as freely as they would like (Karusseit & Osman 2007: 2).

These issues need to be understood and incorporated into the design from the very beginning and throughout the design process (Karusseit & Osman 2007:3). Inclusive design attempts to include as many people as possible without denying the need for design solutions that meet the needs of specific types of impairments. It is not just a technical response or additive design. It aims to prioritise the landscape or building user's needs and values, while at the same time challenges social, institutional and technical relations of the design and building process. In this way it is not only an issue of disability, it has to do with equity and quality of life for all. (Imrie & Hall, 2001).

"…considering many varieties of special needs, inclusive design tries to break down unnecessary barriers and exclusiveness." [Imrie & Hall, 2001 :18]

Inclusive access

In the same way that Ron Mace recognised the limitations of building standards for accessible design, so too the opinion that Universal and Inclusive Design cannot be viewed as a theoretical basis for design does not hold. These two design approaches are more than simply a technical response. Evidence is found in that despite existence of Part S of South Africa's building regulations landscape projects continue to fail in creating inclusive environments. Not only were our regulations until recently grossly out-dated but presented a narrow understanding of disability (located in the medical model of disability, see appendix). Moreover, these regulations (SABS Part S 1990, SABS 0246 1993 and SANS 10400 Part S 2011) set out only to provide minimum guidelines for designing for disability. Therefore, on their own they do not provide comprehensive basis for inclusive design. (Karusseit 2012).

Unfortunately, natural environments, such as Tswaing, do not recognise the needs of everyone and is currently exclusively accessible to able-bodied hikers. Moreover, Tswaing is a heritage site, containing many sites of cultural value to different groups in South African society. Access, in this particular instance, refers not only to physical features in the landscape but all those that are incorporeal. Not only do features such

as the crater crest, bowl and viewpoint need to be accessible but so too does the inherent cultural knowledge. Specific design guidelines need to be developed so that the design achieves accessibility while not destroying the heritage importance of the natural landscape. Universal and Inclusive Design thinking provides the theoretical point of departure whereby the specific needs of the natural landscape of Tswaing and its inherent cultural significance can be made accessible without damaging these characteristics and at the same time without creating barriers for one person or another.

Ecological Design

McHarg states that the landscape consists of three layers: the physical, the biotic and the human. The design of a successful landscape takes these layers into account and uses each in an innovative way to complement the other. It is important to be aware of these layers and their interrelationship, as well as the role of narrative in understanding and subsequent design of landscapes with regard to the natural features, processes and the memories associated with them. (Vroom 2006 : 187)

Ecological Design provides links between nature and culture by providing us with three strategies: stewardship, regeneration and conservation. Van Der Ryn and Cowan define ecological design as "any form of design that minimizes environmentally destructive impacts by integrating itself with living processes." (van Der Ryn & Cowan 1996:21)

I believe that ecological design goes further than a sustainable approach to an imininent situation but extending into the sustainable development for future generations. Building on and improving the current ecological systems and biological integrity of Tswaing and its setting in the natural environment. With ecological design my aim is to enrich and conserve the biodiversity of Tswaing, identifying the natural processes and making them accessible by implementing them in the design process. Rendering these ecological systems self-sustaining, and resource generating and accessible for the continuous use for all species including humans.

Conclusion

The theory discussed above, in the context of the natural landscape, establishes the basis for grounding informed design decision making at Tswaing.

Methodology

The next step is to identify all the influential factors at play for a project such as this. A project in a very rich cultural landscape.

A vast amount of influential factors play a role in the informed decision making process at Tswaing.

The sheer amount of information lead to an intricate method of summarizing all of these factors into a structured and informed intervention within a sensitive cultural landscape. The influential factors include:

- theory
- history
- cultural landscape
- heritage
- ecology
- natural environment
- hidden narratives
- accessibility

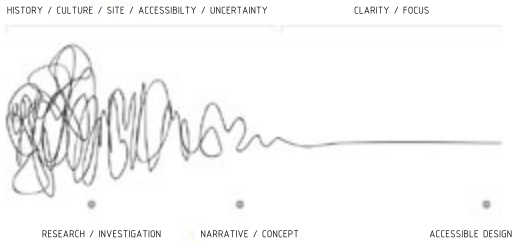

Fig. 2.3: Project formula. [Author, 2012]

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Context and Site Analysis

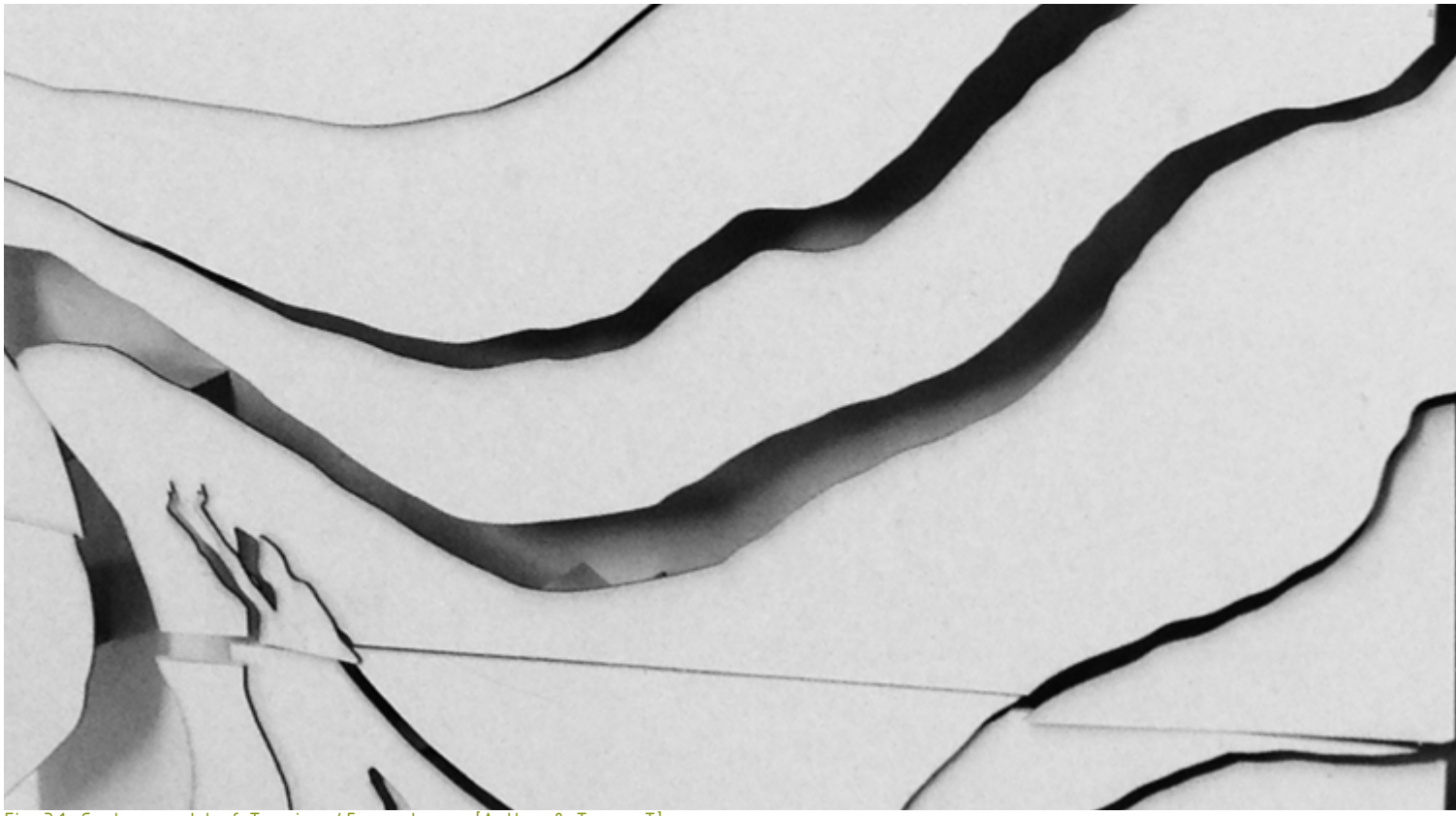
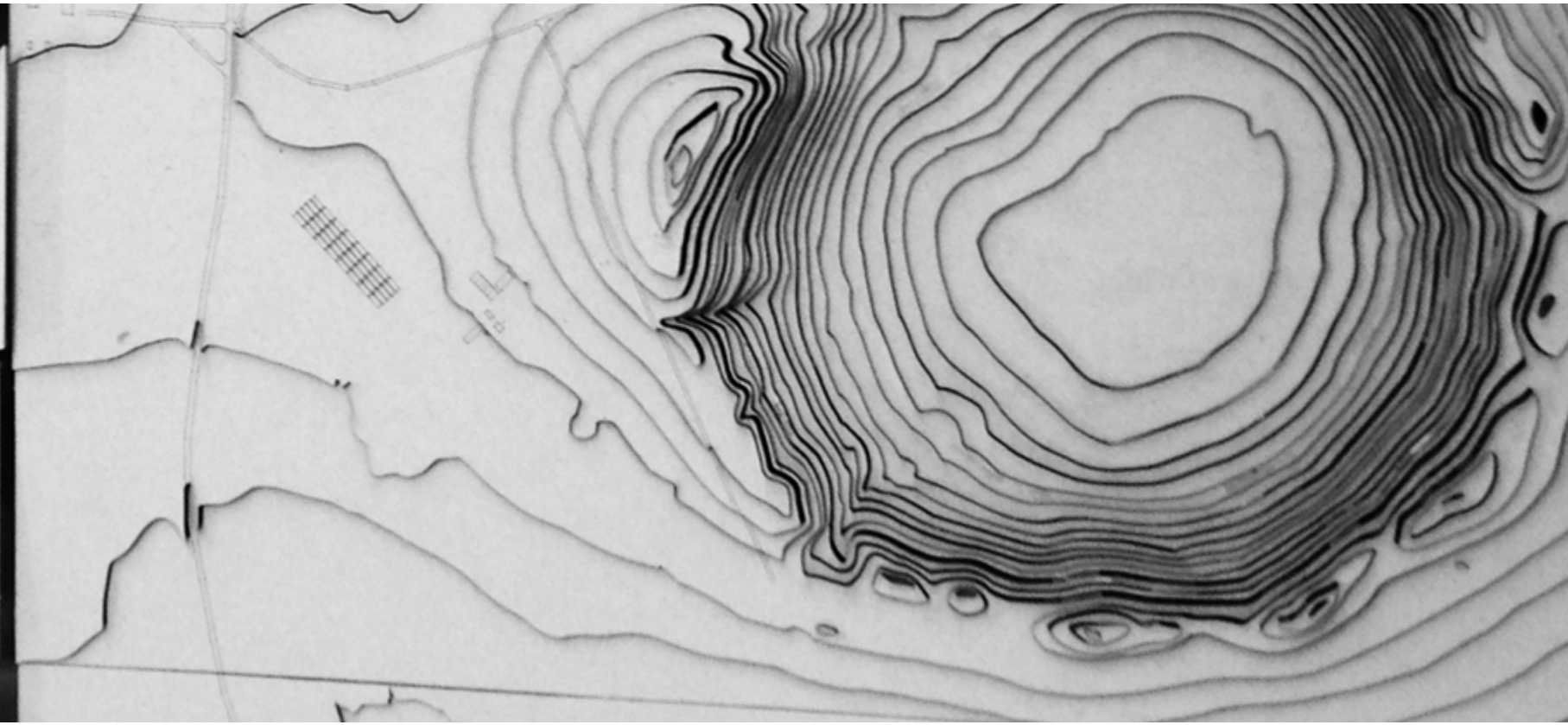


Fig. 3.1: Contour model of Tswaing. 45 man-hours. [Author & Tanea, T]



Introduction

Site analysis forms the basis for understanding and appreciating the value of Tswaing as cultural landscape.

Macro Context

Location

The Tswaing Crater Reserve is located in the North West region of Gauteng, South Africa.

Tswaing is located in the southern part of the +-2000 million year old Bushveld complex on the farm of Zoutpan 104 JR, which is approximately 40km Northwest of Pretoria, at latitude 25°24'30S and longitude 28°04'59"E.

According to McCarthy[2005], Southern Africa's Bushveld Complex is one of the worlds' most unique. The Bushveld complex is strewn with a wide variety of igneous rock. From the above mentioned rock; chromium, platinum, vanadium, and an array of other refractory minerals are mined and refined. [McCarthy & Rubidge, 2005]

Granite is very common in the Bushveld Complex. Varying from Belfast-Black which is a very dark granite also known as 'Gabbro', to Rustenburg-Red which has a pink-red colour. [Reimold et al, 1999]

Micro Context

Location

Part of the crater reserve lies on the adjacent farm Uitspan 98 JR. These two farms border the old Bophuthatswana in the North, East and West, but also on formal and informal settlements of Nuwe Eersterust, Kromkuil, Winterveld, Klippan and Mabopane, with Soshanguve located to the South.

Site Context

The Tswaing impact crater was created by a meteorite crashing into the earth's crust approximately 220 000 years ago.

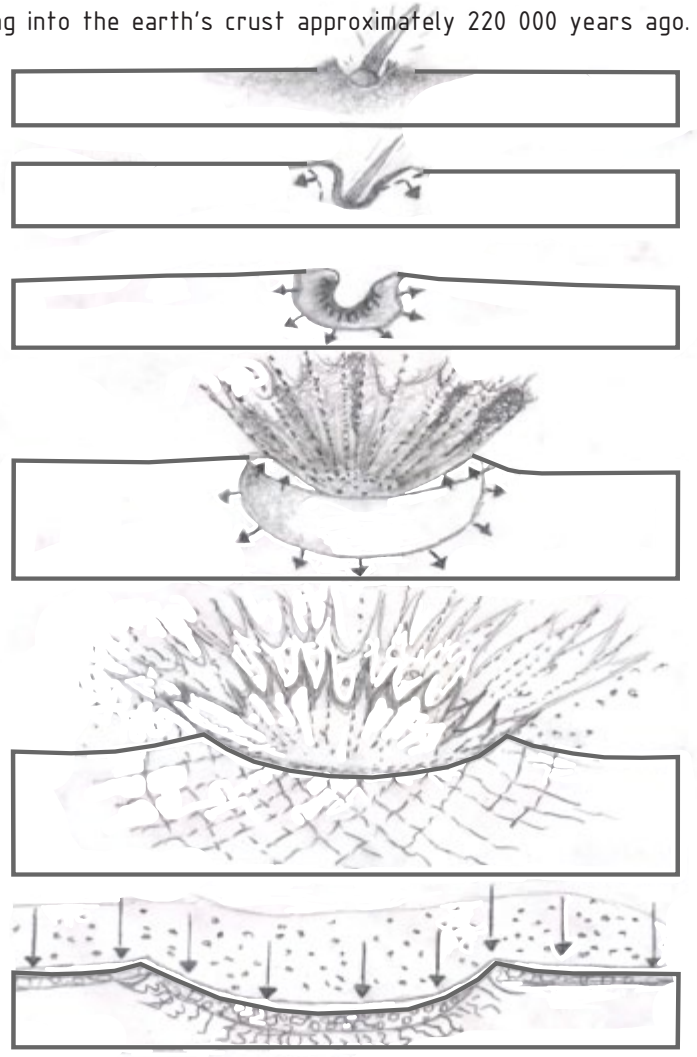


Fig. 3.2: Meteor impact and crater formation

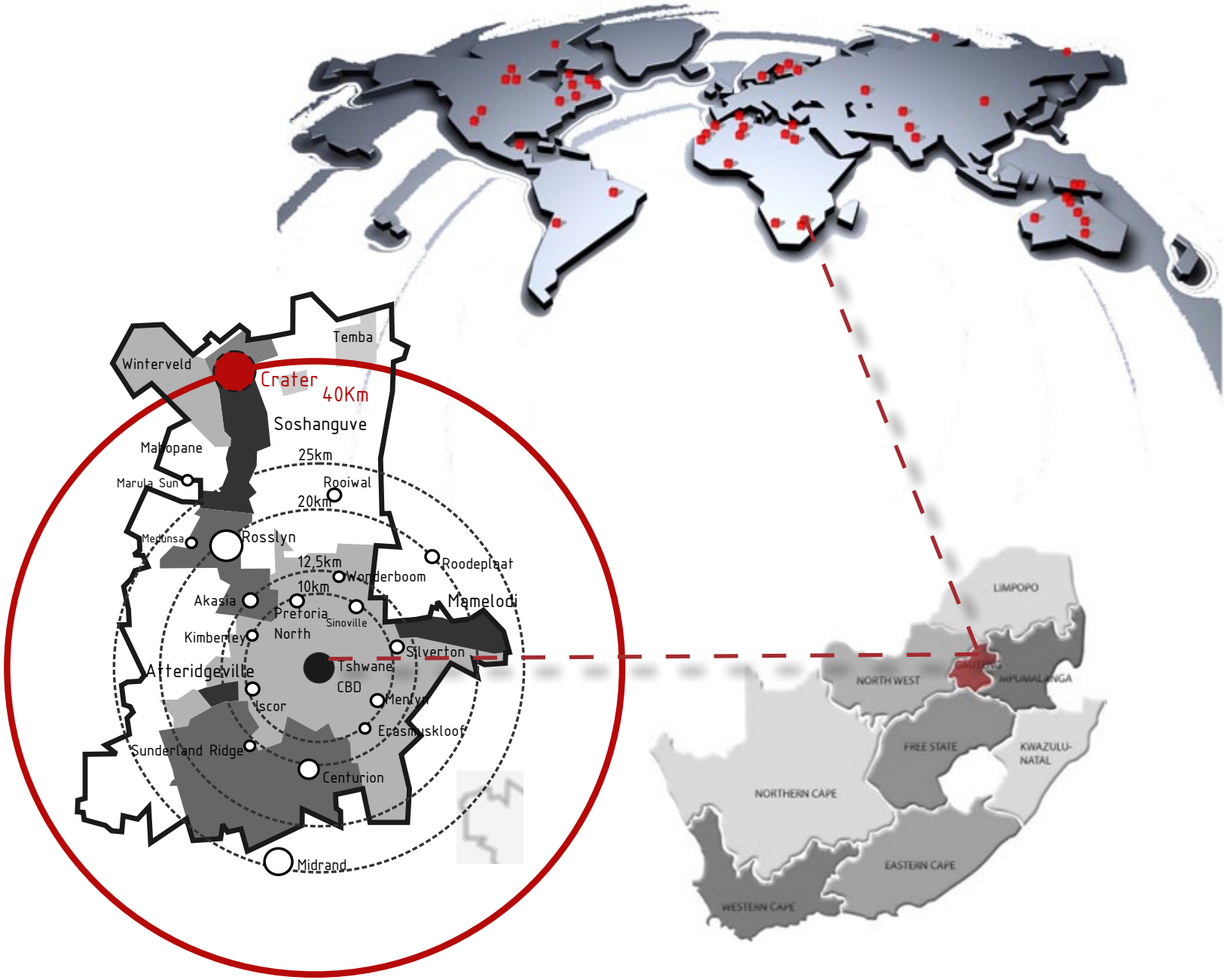
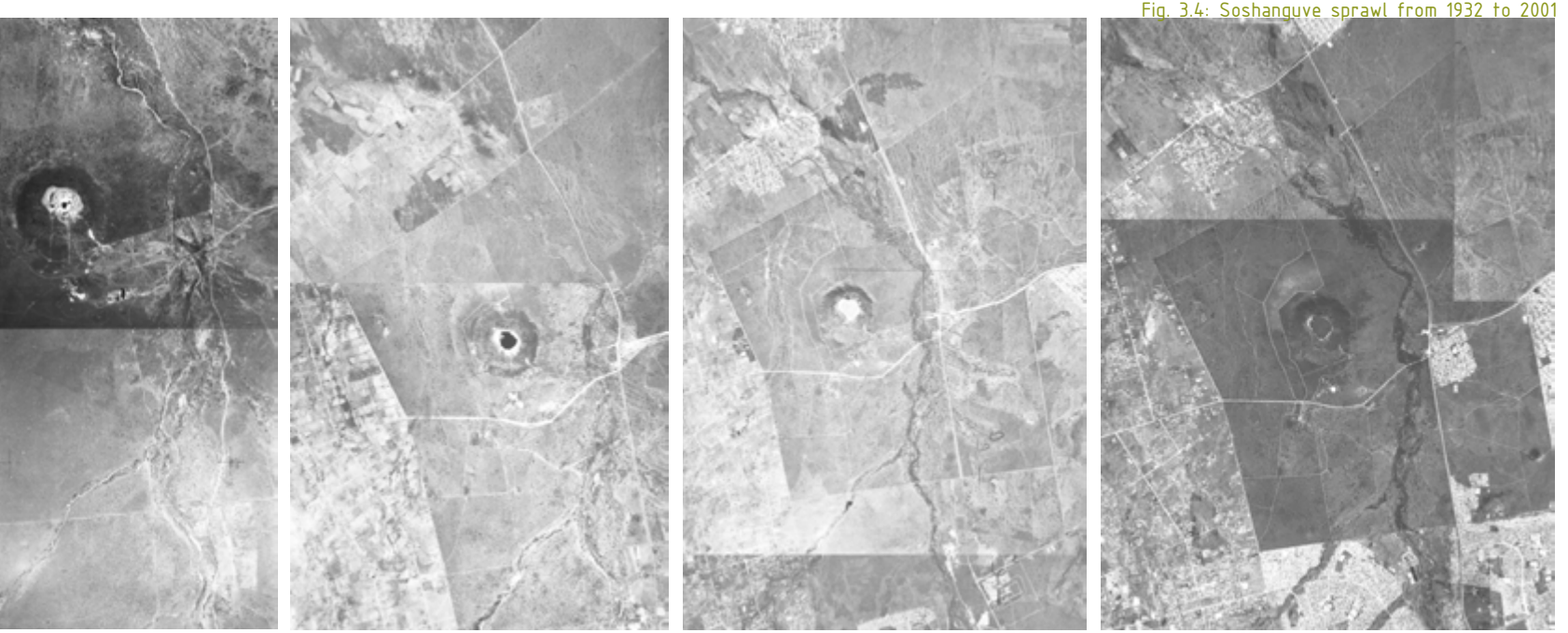


Fig. 3.3: Locality map

Fig. 3.4: Soshanguve sprawl from 1932 to 2001



1939 1972 1990 2001

History

STONE AGE

220 000 YEARS AGO – Crater Event

SHORTLY AFTER – Fauna and flora start rehabilitating

150 000 – 30 000 YEARS AGO – Regular visits to hunt and collect medicinal plants and salt

30 000 TO 2000 YEARS AGO – San Bushman inhabitants – Hunter gatherers

IRON AGE

900 TO 800 YEARS AGO – First iron age communities arrive at the crater
- 'Moloko': Sotho and Tswana speaking
- Periodcal visits from Waterberg to collect salt

1820 – Arrival of Matabele

1827 – 1837 – Mzilikazi possibly visited the crater

1837 – Voortrekkers defeat Mzilikazi in North-West

COLONIAL SETTLERS

1838 – Voortrekkers claim crater area
- Permanent settlements of Klerksdorp(1838), Potchefstroom(1838), Rustenburg(1850) and Pretoria(1855) come into being

1850 – Land divided into farms
- The crater was in the middle of the Zoutpan(Soutpan) farm

1850 – Zoutpan Surveyed

19th CENTURY – Crater as chief source of salt to the region
- Zoutpan: Government owned because of economic importance
- Great herds of animals including elephant flocked to the area
- Animals driven away by mechanised salt mining operations

UNTIL 1870 – Hunting place for boers

1896 – Rinderpest decimates animal populations

SODA AND SALT MINING OPERATIONS

WINTER MONTHS AND DROUGHTS – Large salt deposits within the crater exposed

Fig. 3.5: Timeline dramatization [Author]

1899 – 1902 – Salt collected from shallow evaporation ponds
– Ox wagon road built and is still in use today

1896 – Deep borehole sunk, discovering its a soda-pan and not a salt-pan

1912 – South African Alkali Ltd. start systematic mining

1913 – Production of calcined trona
– Haulage improved – Construction of steam powered tram line

1916 – Production peaked +– 130 workers
– Deeper excavations, could not be kept clean of mud and brine
– Experimentation lead to crater being pumped dry
– Soutpanspruit contaminated

– Protests from adjacent farmers
– Departement of mines investigate poor mining activi ties
– Research into refining soda rich mud

1917 – Extracting process refined
– Much of production exported to Japan

1918 – Production slows dramatically
– Rich trona surface deposits exhausted
– Soda from mud extraction not yet refined
– Windram Williams process refined
– W. Mauss consulting chemical engineer hired
– Mauss deemed WW process economically feasible, building a factory recommended
– WW process abandoned
– Experimentation with soda-salt brine perfected and patented
– Factory construction started
– Digging and cutting through southern crater rim known as "Mauss's cutting"

1919 – Feasibility investigation in salt and soda mining done by Inspector of mines
– SA Alkali Ltd. shareholders provide funds
– Drilling project commenced (boreholes)
– Gaylussite (Rich layer saturated with pure concen trated soda-salt liquid) found at a depth of 6 – 8m
– Same factory building used

1920 – "Mauss's cutting" replaced by pipes

1921 – First year of new operation
– Half of soda and all salt mined could not be used
– Appointment of H.R. Blumenberg (Chemical engineer)
– Blumenberg develops means by which all salt and soda can be recovered
– Clark and partner perfect Blumenberg's method





1922 – SA Alkali Ltd.'s lease set to expire in 1950
– Extraction of soda from brine began

1930 – 1940 – Marked as mine's best years
– Annual production between 2000 and 3000 metric tonnes

1937 – Production cost of 12 per tonne

1945 – Increase in cheaper rival exports
– Decrease in salt and soda obtained from brine
– Reduction in selling price

1947 – Production cost increased to 23 per tonne

1949 – Sinkholes sunk but further mining is not feasible

1950 – Resting period to see of brine might gain higher yield
– Mining lease extended

1952 – Extraction of soda from brine ended

1953 – Zoutpan surveyed into seperate areas
– Smallest area leased to SA Alkali Ltd.

1954 – Salt and soda mining suspended
– SA Alkali Ltd. changed to "Silverton Tannery Ltd.
– Leather became more feaisble buisiness
– Mining lease and factory made available to another company as mining continues for another 3 years

1956 – Mining finally ends

1958 – 1961 – Chemical engineers, Palframan and Horner at tempt to produce salt
– Pile of whitewash still remain of attempts to colour the little produced, brownish salt white

AFTER 1961 – Machinery removed and presumably sold
– Doors, roofplates, windows etc. removed from all buildings

1970 – All remaining buildings demolished

ZOUTPAN EXPERIMENTAL FARM

1953 – Land use rights for 1880 hectares, transferred to the Department of Agriculture

1954 – 1956 – Grazing camps established

1992 – Zoutpan experimental farm closes down
– National Cultural History Museum gain ownership over the area

Fig. 3.6: Timeline dramatiztion [Author]

Tswaing, meaning the "*place of salt*" in Setswana, is a 2000-hectare conservation area in South Africa. It is one of the best-preserved impact craters in the world and the only crater that is accessible by foot right down to its centre. It is therefore a very sensitive and unique conservation area with a variety of ecosystems, a wetland, and the remains of a factory that in the past produced soda ash and salt. [Reimold, et al, 1999]

Tswaing is rich in cultural and natural resources:

- Archaeoligical & Human History: +-100 000 years of human exploitation and habitation.
- Botanical: plant diversity; best remaining examples of acacia-combretum woodland.
- Climatological: sedimentary deposits - paleoclimatic and palea-environmental info for the mid-latitudes of the Southern hemisphere.
- Ecological: habitats and diversity of zoological, fauna and floral species.
- Geological: preserved crater bowl.
- Zoological terms: relaively undisturbed habitat.
  [Reimold et al, 1999]

Nature has taken back fragments of history and by doing so, making it inaccessible to most. The site of Tswaing possesse very rich historical and ecological layers which need to acknowledged, respected and celebrated, and by doing so, become a beacon on socio-economic growth for the surrounding community of Shoshanguve. "Will we muster the intelligence and love, to craft a future that all living beings can share? This is the choice each of us makes every day." [Van der Ryn, 2005 : 59]

The National Cultural History Museum has acquired the entire farm of Zoutpan 104 JR, excluding the area comprising of 1,7131 ha, on which there is a shop and a petrol station to be found, also known as "Silberman's Post". The Nature reserve of Tswaing totals to 2 106, 2750 ha. Talks between the National Cultural History Museum and the Department of Regional and Land Affairs to acquire the Uitspan 98 JR farm in addition as it forms an integral part of the Zoutpan farm. Tswaing now totals to 2 542, 3400 ha.

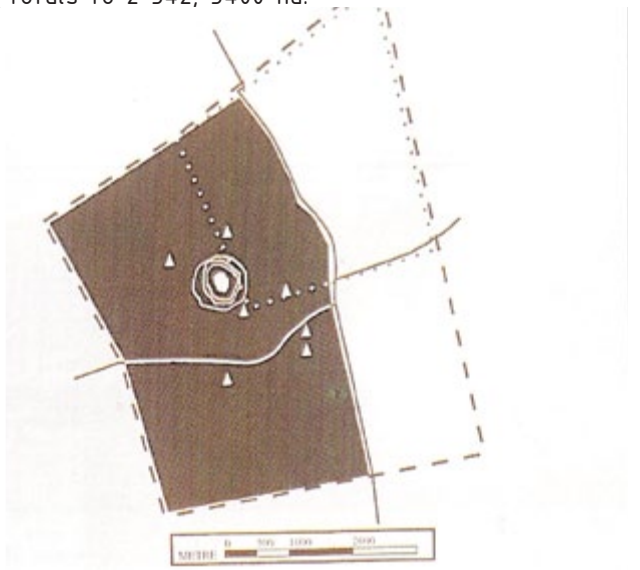


Fig. 3.7: Historical site boundaries. [Reimold, 1999]

Climate

Tswaing is in the Gauteng climatic area which is classified as part of the Temperate Eastern Plateau. Summers are warm to hot with dry air but broken with the occasional thunder storm. Hail may sometimes occur. Winter days are often enjoyable and sunny with clear cold to very cold nights.

Winds blow NE in summer and NE to NW in winter months.

- Summer Rainfall: 125mm to 375mm
- Winter Rainfall: 62mm to 250mm

- Junuary Temp. : 20°C to 25°C degrees
- July Temp. : 10°C to 15°C degrees

Macro Site Accessibility

Large airports include Oliver Tambo International Airport in Johannesburg and Lanseria Airport near Krugersdorp, both within a range of 150km from Soshanguve and Tswaing.

Vehicular site access include:

- Primary vehicular access via the M35.
- Existing dirt roads on site.

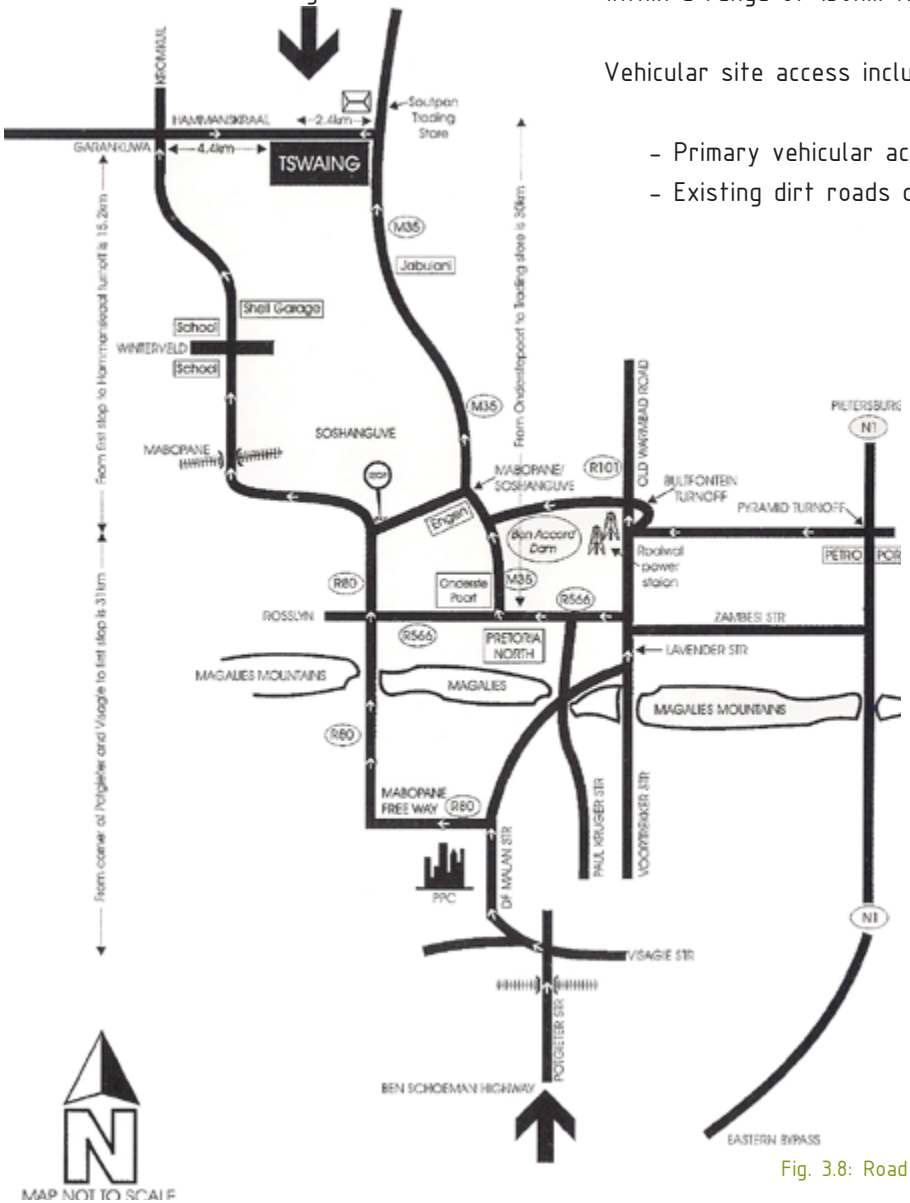


Fig. 3.8: Road map towards Tswaing. [Reimold et al, 1999]

Fig. 3.9: Salt- and Soda factory 1922 [Reimold et al, 1999]

Fig. 3.10: Photo depicting crater from its crest giving an idea of the topography [By Author]

Use

The farm Zoutpan had always been used as a cattle farm, although other parts of Zoutpan, including the crater, were the location for a saltworks which was operational on Zoutpan until 1956, it became and agricultural experimental farm in 1953 .Rehabilitation was needed because of poor farming practices. The farm is currently a nature reserve, known as the Tswaing Nature Reserve, with hiking trails, a few lookout areas, the occasional 'trance' party, with dormitories, camping and braai facilities. Administrative offices are the only remaining buildings after a man-inflicted veld fire, in 2009, destroyed the museum building, which was only just finished. Astrologists enjoy visiting the site because of it being a meteor crash site. Bird lovers often visit the wetland in the Northeast of the nature reserve because of its rich diversity of birdlife. [Reimold, et al, 1999]

Topography

The area of Tswaing is situated in the transitional zone be tween Bushveld, Bankenveld and Springbok Flats. The altitude varies between 1140m above sea level in the Southeast, to 1100 in the Northwest. The crater has a saline lake and is very close to a circular shape as its greatest diameter is 1034m. The rim of the crater peaks at an average of 60m above the surrounding landscape as the crater floor sits at about 120 m below the highest crest of the crater rim. The outer slope of the crater is rather gradual whereas the inner gradient of the crater is rather steep in some parts. The Soutpanspruit carries water throughout the year as it flows in a northerly direction feeding a large wetland system hosting and array of bird and amphibious species. [Reimold, et al, 1999]

Geology

The most common geological formation in which the crater is formed is called Nebo granite of the Bushveld Complex, age 2,05 Billion years old. This granite is covered in a layer of sandy soil. Crater rim consists of fragmented granite breccia. The crater floor is relatively circular with an approximate diameter of 432m and consist of an outer zone or colluvial apron (sand and boulders) and a central area of dark-grey saline mud, covered with a shallow lake said to be 5 times

more salty than sea water.

The crater floor is slightly below the water table, being the cause of the shallow lake, no more than 3m deep. The lake represents a phenomenon of which only a few is known world-wide. This phenomenon is characterized by varying temperatures and degree of salinity in the various water layers. The lake is rich in dissolved carbonates, mainly sodium, which led to its exploitation as a source of soda brine from 1912 until 1956. The lake at is a result of excavations on site during this mining period before which a shallow seasonal pool occupied the crater floor. [Reimold, et al, 1999]

The crater was formed by a meteorite crashing to earth after previously it was thought that it might be a volcano. Approximately 5km to the Southeast, is a smaller and shallower crater. It has been thought to be a part of the main meteorite that had broken off, although this theory has still not been

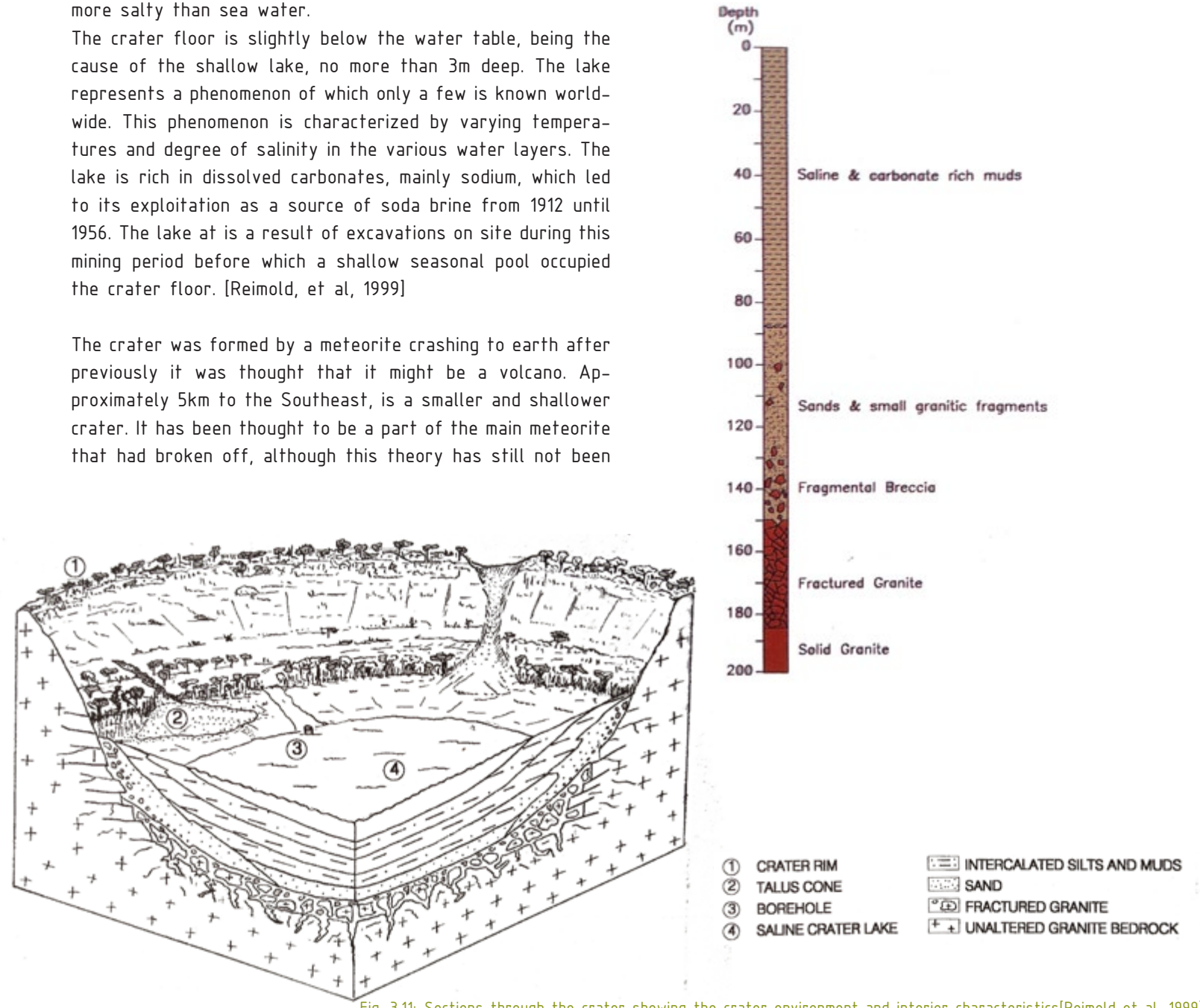


Fig. 3.11: Sections through the crater showing the crater environment and interior characteristics[Reimold et al, 1999]

verified. [Reimold, et al, 1999]

Flora

The vegetation of the crater area is influenced by the Crater Rim environment and the presence of the floodplain (wetland) of the Soutpanspruit stream just northeast and east of the crater. It has been classified into various plant communities such as marsh areas, reed marsh, dense forest, Savannah Upland bushveld, dense shrubland and mixed veld. The crater itself consists mainly of open and closed tree veld and closed grassveld. Acacia and combretum species are the dominant tree types.

All soils in the crater bowl originate from erosion of the crater rim. The soil particles have moved downhill by gravity and is deposited on and around the crater floor.

The upper parts of the crater rim are covered by broad-leaved woodland (mainly combretum trees) and the lower parts by thorny trees (mainly acacia woodland). These variations are related to differences in the slope angles (steepness) at various levels of the crater rim and the types of soils of the crater interior. The soil on the upper, steep slopes is thin (less than 20 cm) and course-grained, and here the broadleaved trees with their shallow root systems have an advantage and grow well. The soil layer of the lower slopes is thicker (70 cm) sandy and more fertile and here the thorny trees with their deeper root systems dominate.

There is a large diversity of trees (most common indicated in fig. 3.13.), shrubs, grasses and other floral species and some 480 species have been identified so far. The crater lake, as well as the water of the Soutpanspruit stream and the various boreholes, containing microscopic algae and other diatom flora. The lake also contains photosynthetic bacteria, which give the water its reddish colour. [Reimold, et al, 1999]

Fauna

Approximately 35 species of mammal are present at Tswaing, with zebra, impala and springbuck as the only remaining large mammals on site, numerous lizards and insect species. The river holds fish species such as carp and barbel also the crater lake contains zoo-plankton. Approximately 250 bird species have been identified at Tswaing. Sadly Tswaing was once home to all the large mammal species in fig. 3.12.

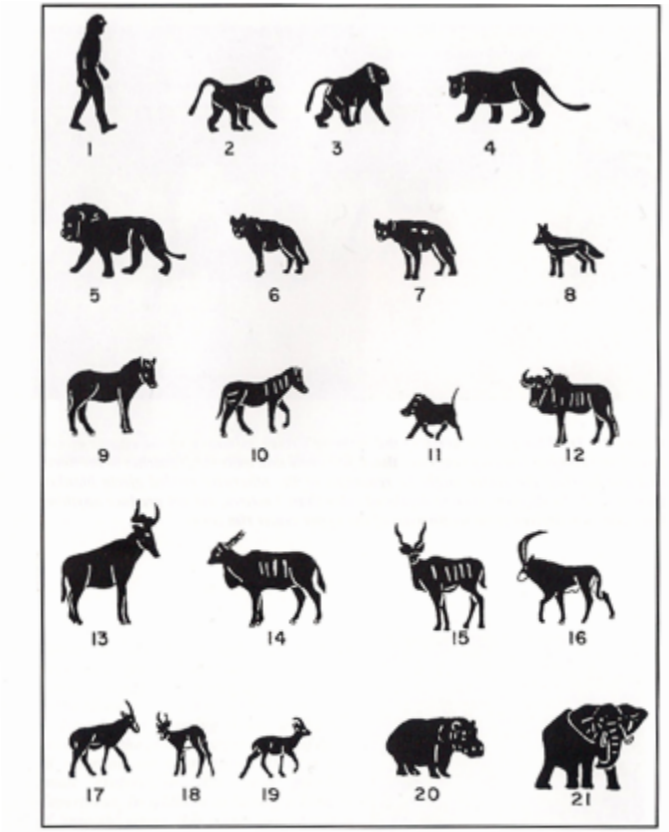


Figure 38. Silhouettes of some of the mammals in the region at the time of the impact. 1. Homo sapiens. 2. Papio cynocephalus. 3. Theropithecus sp. 4. Panthera pardus. 5. Panthera leo. 6. Hyaena brunnea. 7. Crocuta crocuta. 8. Canis mesomelas. 9. Equus capensis. 10. Equus quagga. 11. Phacochoerus aethiops. 12. Connochaetes taurinus. 13. Megalotragus priscus. 14. Taurotragus oryx. 15. Tragelaphys stepsiceros. 16. Hippotragus sp. 17. Damaliscus niro. 18. Antidorcas marsupialis. 19. Antidorcas bondi. 20. Hippopotamus amphibius. 21. Loxodanta africana.

Fig. 3.12: Mammals that once roamed Tswaing. [Reimold et al, 1999]


Ziziphus mucronata


Acacia caffra


Sclerocarya caffra


Pappea capensis


Pouzolzia africanum


Peltophorum africanum


Combretum apiculatum


Dombeya rotundifolia


Ozoroa sphaerocarpa


Combretum zeyheri


Linnea discolor


Ximenia caffra

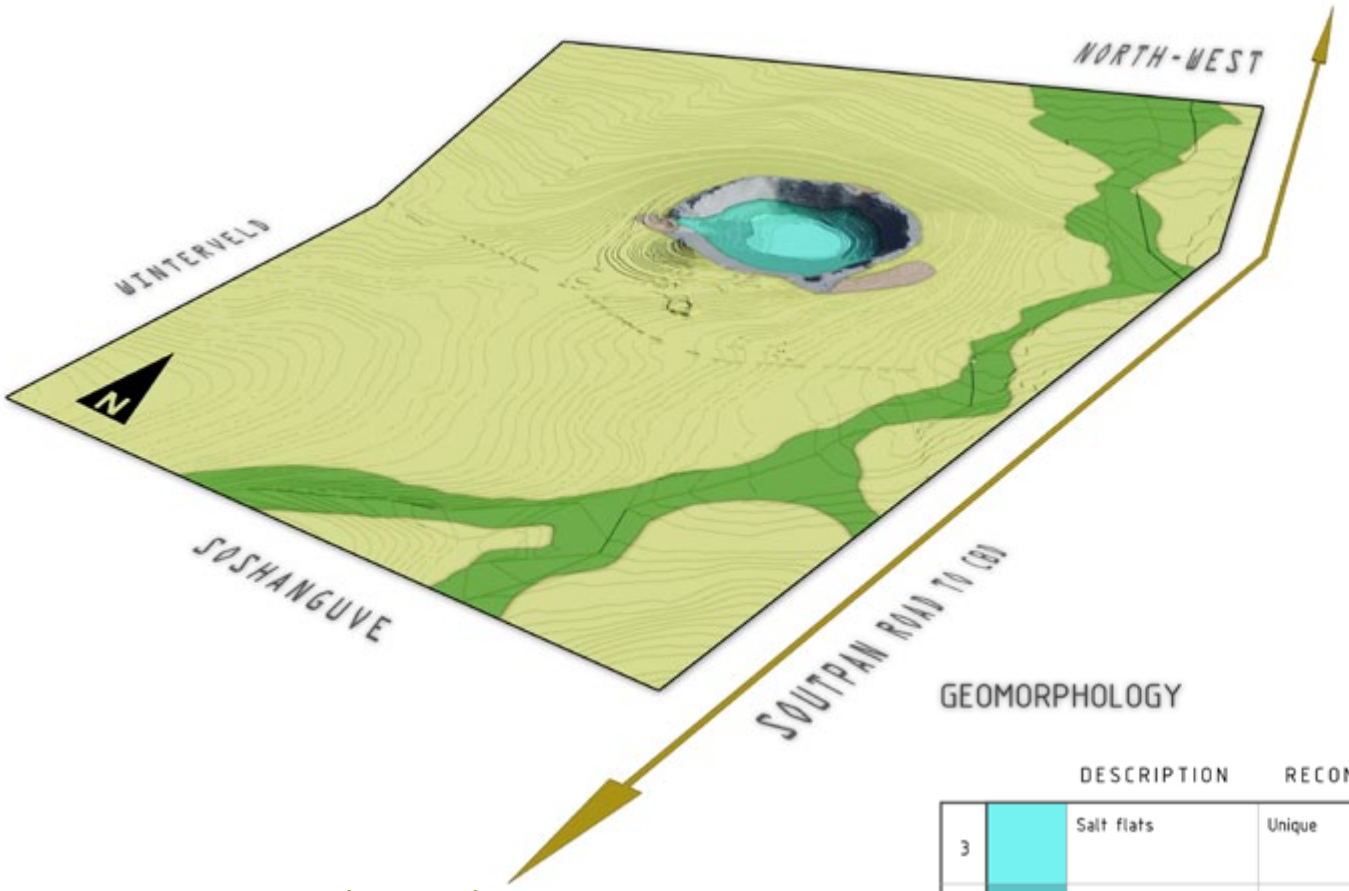

Dichrostachys cinerea


Acacia nilotica


Berchemia zeyheri


Acacia tortilis

Fig. 3.13: Common tree species at Tswaing. [Reimold et al, 1999]



GEOMORPHOLOGY

		DESCRIPTION	RECOMMENDATION
3		Salt flats	Unique
2		Colluvial deposits	Loose deposits of rocks on inner slopes
		Alluvium fan deposits	Sediment deposited by runoff, inner crater
		Talus Slopes	Slope of unstable rock debris, outer crater
		Floodplain	Course of the river with high rain
		Outcrops	Grouped ejected granite rocks
1		Pediment	Unremarkable and simple, between talus and floodplain

Fig. 3.14: Geomorphology mapping [Author, 2012]

Geomorphology

The illustration indicates the locations of the various geomorphological occurences at Tswaing with a table indicative of the conservation value ranging from 3 as high and 1 as the lowest value.

Areas with a value of 1, bordering a value of 2 is the best place for development. These areas have the lowest environmental impact when some intervention is introduced.

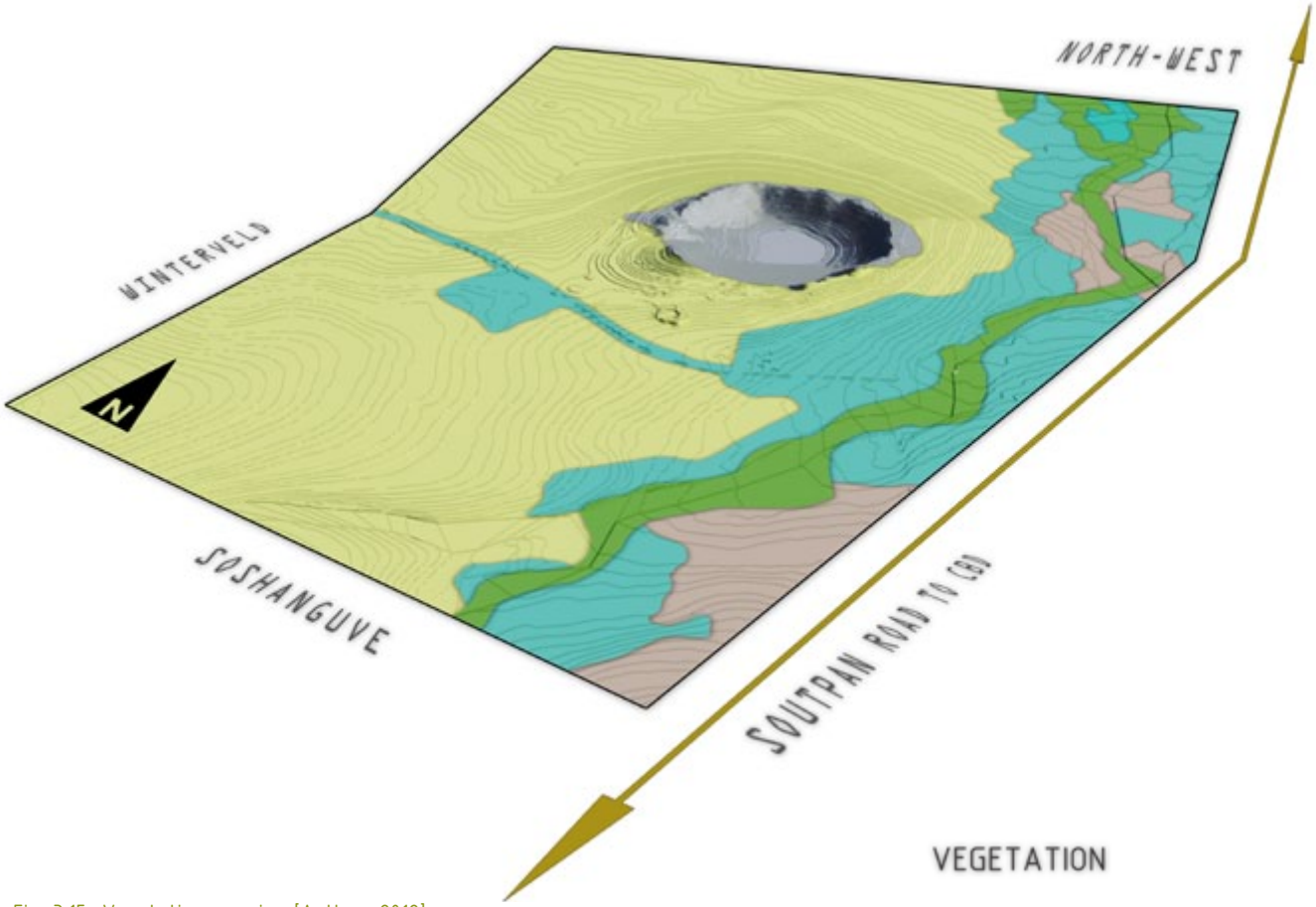


Fig. 3.15: Vegetation mapping [Author, 2012]

Vegetation

The illustration indicates the locations where certain plant communities occur with a table indicative of the conservation value ranging from 3 as high and 1 as the lowest value.

Areas with a value of 1, bordering a value of 2 is the best place for development. These areas have the lowest environmental impact when some intervention is introduced.

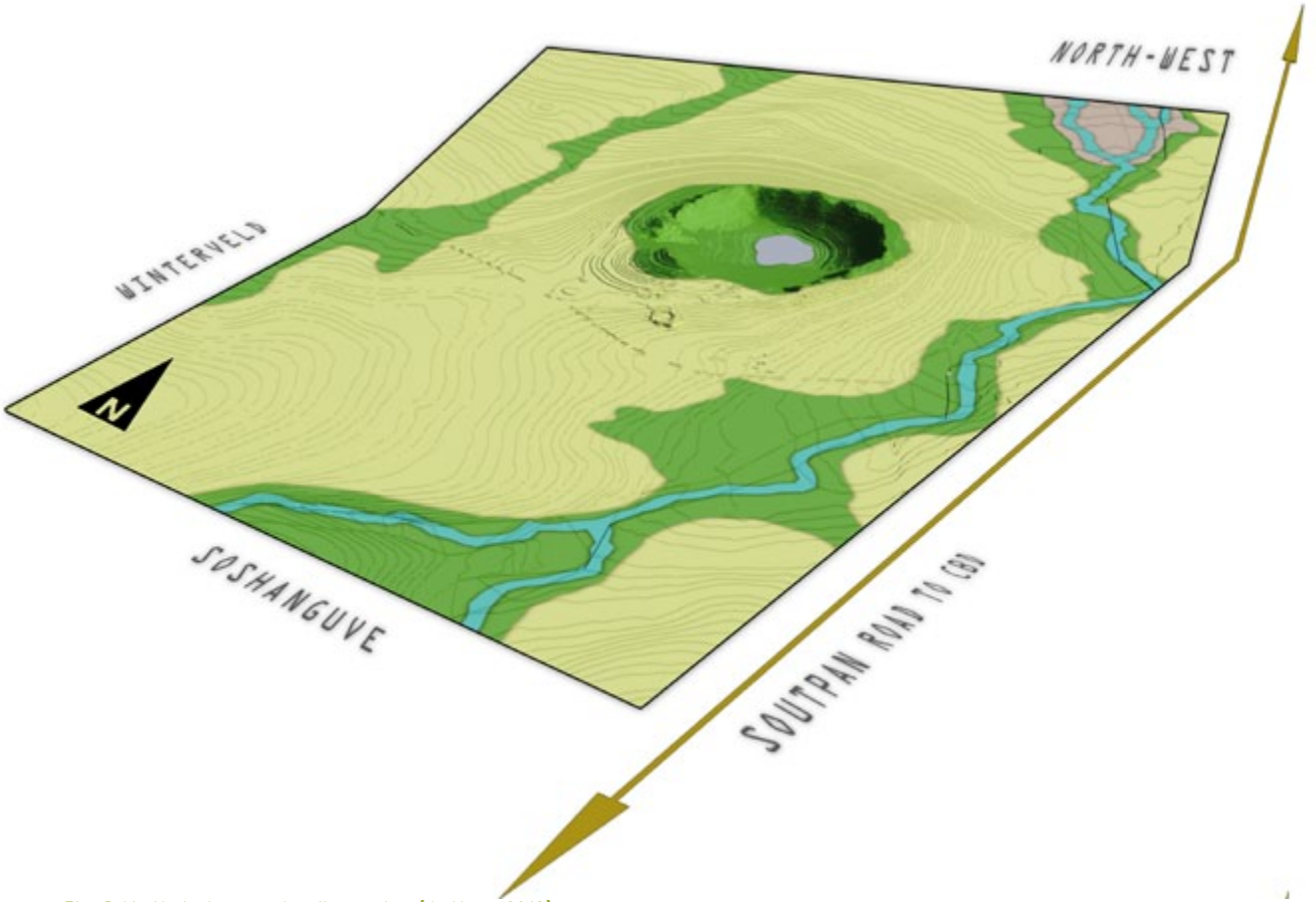


Fig. 3.16: Hydrology and soil mapping [Author, 2012]

Hydrology and Soil

The illustration indicates the areas of different soil types with a table indicative of the conservation value ranging from 3 as high and 1 as the lowest value.

Areas with a value of 1, bordering a value of 2 is the best place for development. These areas have the lowest environmental impact when some intervention is introduced.

HYDROLOGY + SOIL

		DESCRIPTION	RECOMMENDATION
3		Saltpan	Rare natural occurence
2		Perennial river and vlei	High ecological value, not safe for consumption
		Sensitive, riparian area	high clay content, prone to erosion and flooding
1		Soils suitable for development	Grassland with lower conservation value

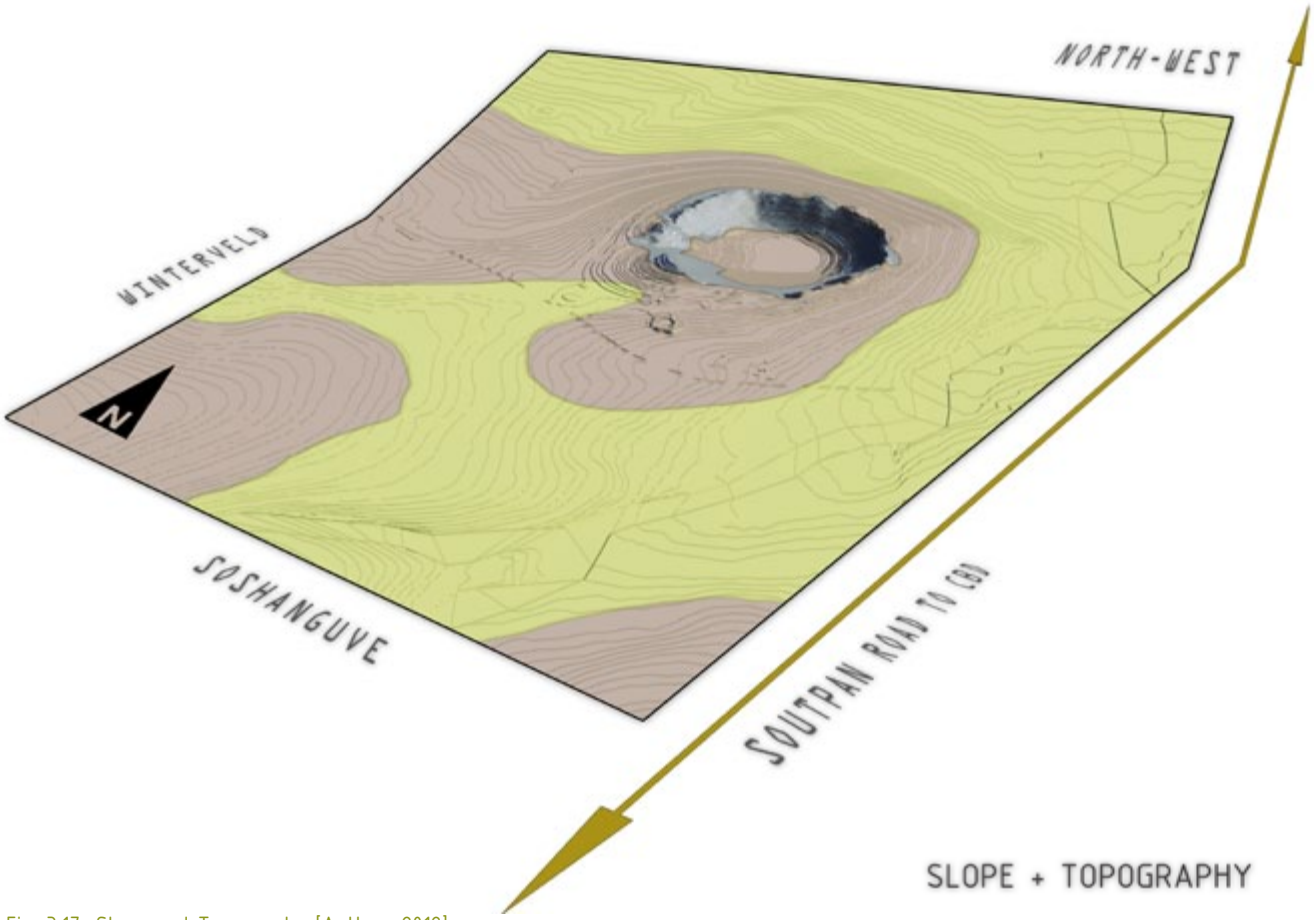


Fig. 3.17: Slope and Topography [Author, 2012]

Slope and Topography

The illustration indicates the areas with high or low gradient and which areas would provide for the best view.

Areas with a value of 3 poses the problem that these areas hold the best visiblity but also high development cost. Care should be taken when an area with the value of three is chosen in terms of a visual impact assesment.

SLOPE + TOPOGRAPHY

		DESCRIPTION	RECOMMENDATION
3		< 15% Slope	Low development costs Easy accessibility
2		Highest lying areas	Best visibility
		High lying areas	High visibility
1		Low lying areas	Low, limited visibility
		> 15% Slope	High development costs Hard accessibility

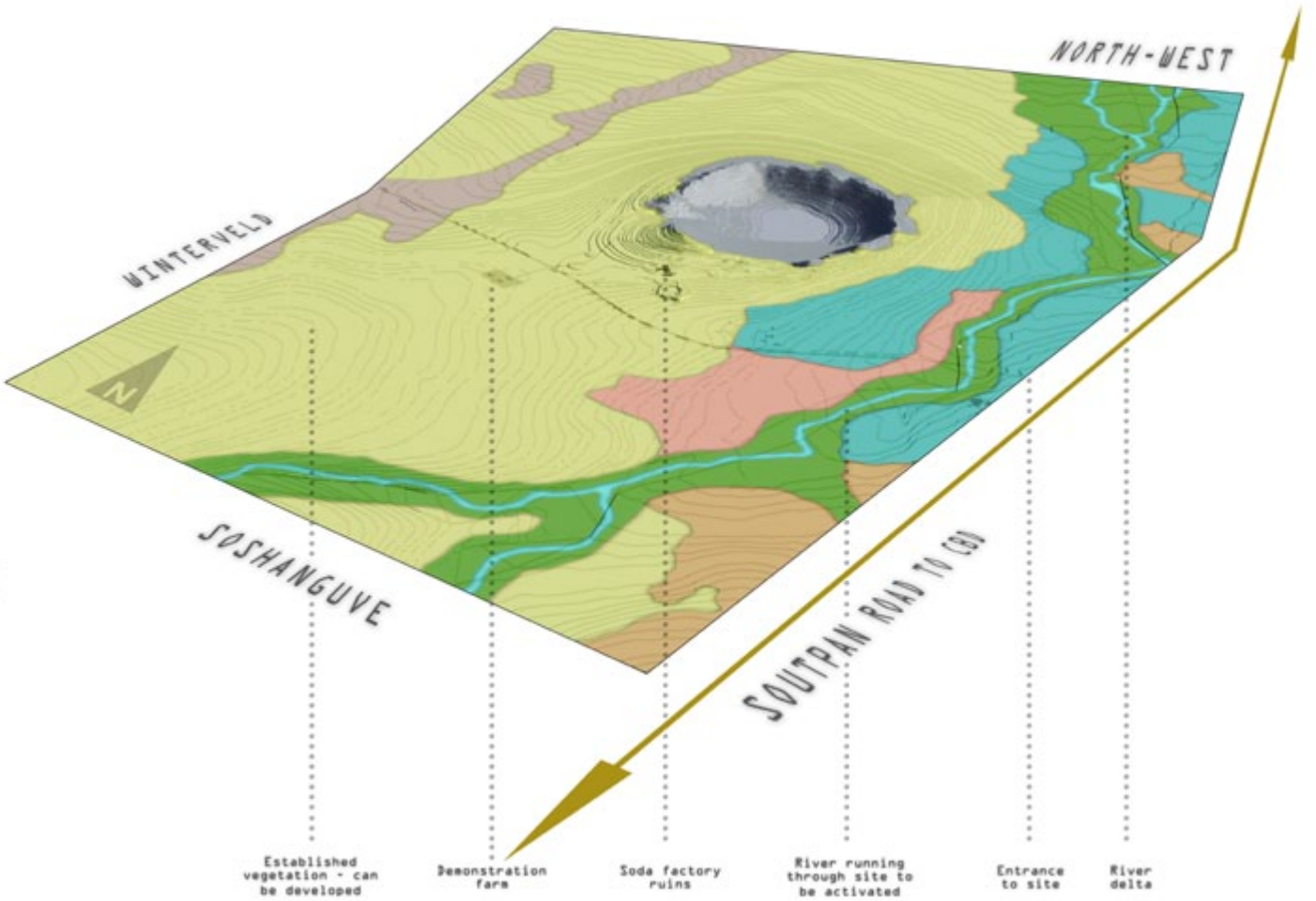


Fig. 3.18: Environmental value mapping. [Author, 2012]

ENVIRONMENTAL VALUES

	ECOLOGICAL SENSITIVITY	AESTHETIC VALUE	CONSERVATION VALUE	DEVELOPMENT COSTS
	3	3	3	3
	3	3	3	3
	3	2	3	2
	2	2	2	2
	2	2	2	1
	2	1	1 (rehabilitations needed)	2
	1	2	2	1

Environmetal Value

The illustration indicates the areas with high environmental and ecological value. These values are derived from the environmental mapping done in figure 3.14 – 3.17. The comprehensive mapping done helped decision making on where is the best areas for landscape intervention.

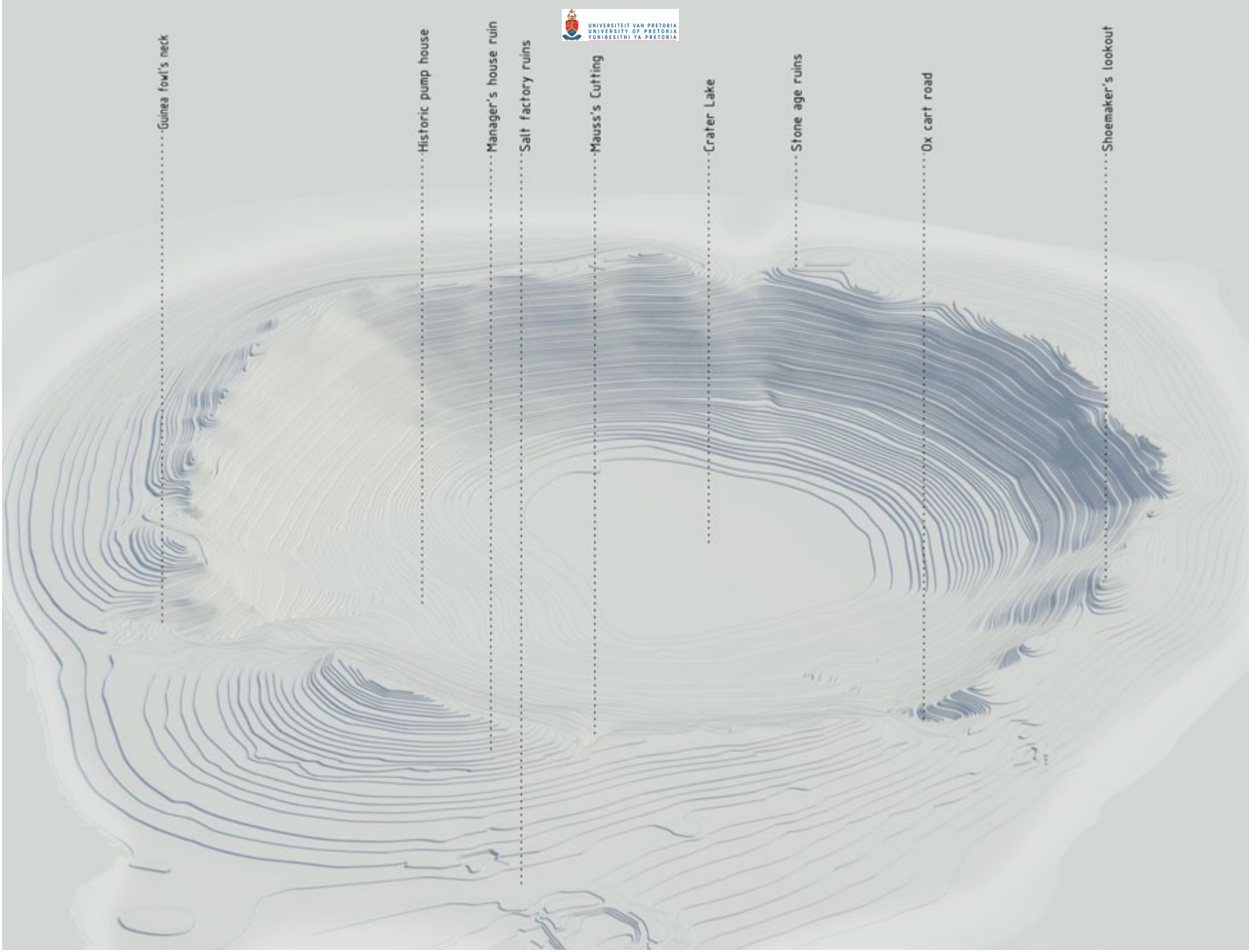


Fig. 3.19: Historical mapping of the crater. [Author, 2012]

Narrative Mapping

The natural environment of Tswaing is rich with the residue of its cultural history.

Previous generations have failed to preserve and or document the progression and development of the site through time as I then deemed it highly important to map the narrative on site as thoroughly as possible.

These mapped areas are in essence what forms the plot for the Narrative of Tswaing.

The narrative I aim to make accessible to all.

Conclusion

The diagrams on the following three pages establishes the narrative set in the landscape. The reader/visitor can with the help of these diagrams, start to unravel the plot and the mystery of the narrative embedded in this picturesque landscape.

Photographs do no justice to the beauty and experience of Tswaing.

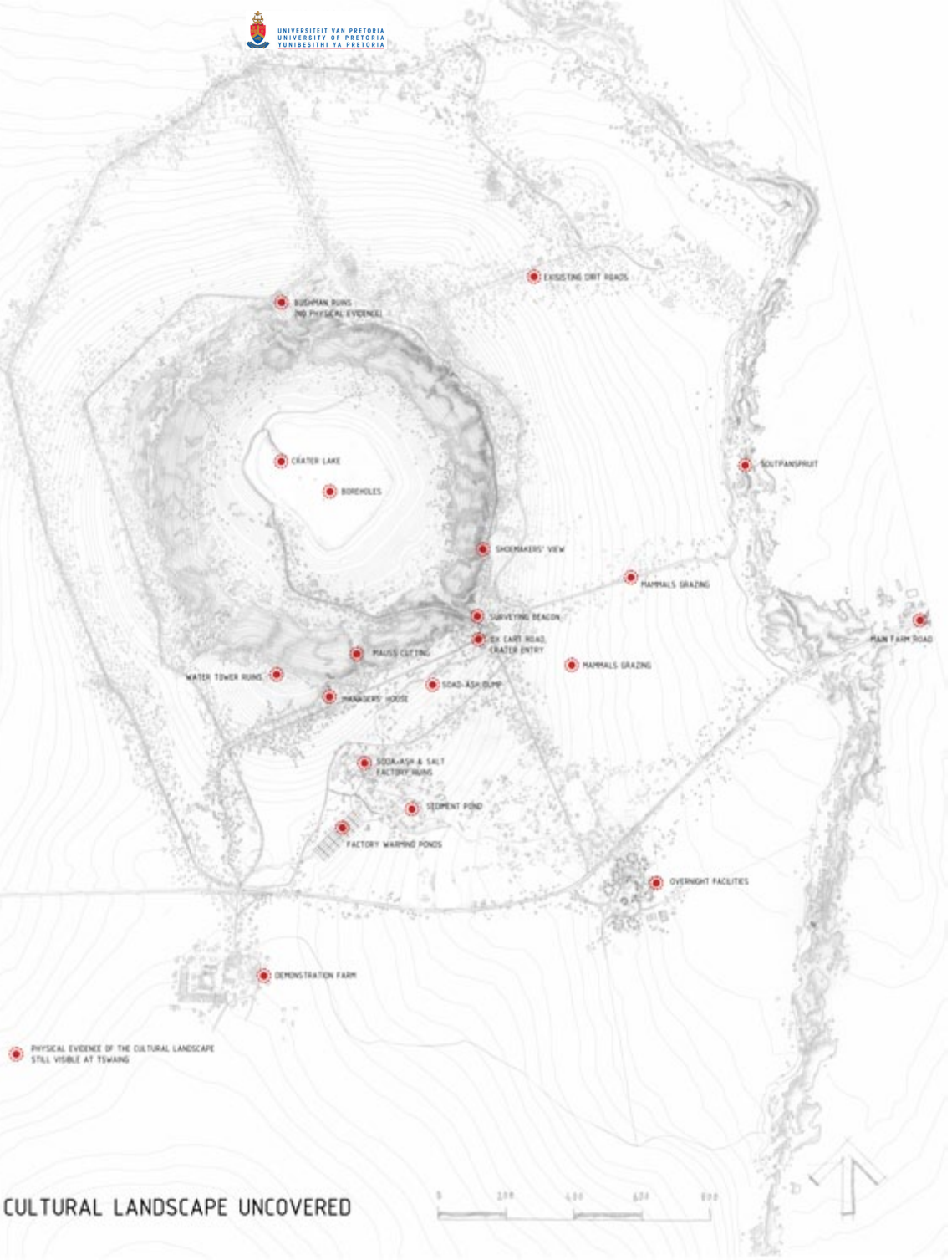


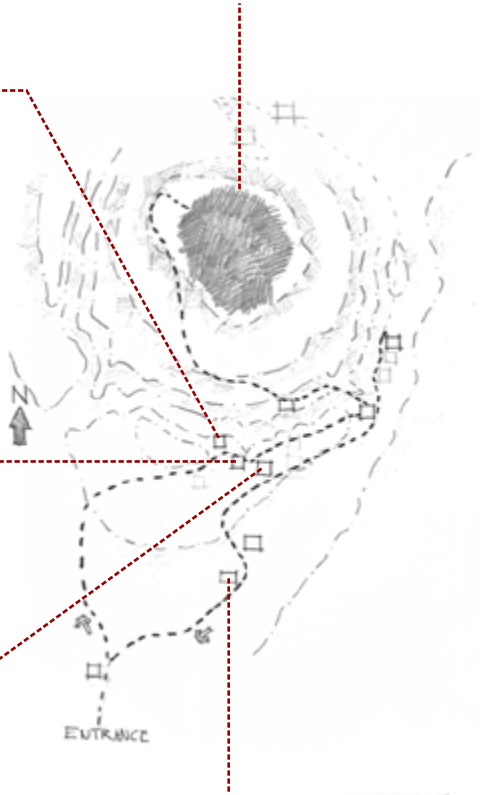
Fig. 3.20: Narrative mapping. [Author, 2012]

CRATER LAKE

Surface springs, underground water and rainwater is the origin of the water. The water is rich in dissolved carbonates and chloride salts, mainly sodium, with a sulphurous smell emanating from the bacteria in the lake.

MANAGER'S HOUSE

Foundations built for the mine manager of SA Alkali Ltd. – Company who mined salt at the crater from 1912 up until 1956. The house had a view of the crater as well as the soda- and salt factory.

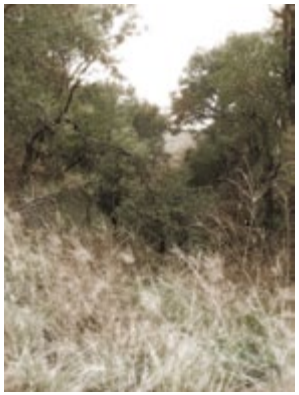


MARULA TREES

Due to changing slopes of the crater rim, soil types and nutrients, broadleaved woodland trees cover the upper slopes and the thorny trees cover the lower slopes of the crater inner rim. Marula, Combretum, Acacia, Papea ans Zizziphus trees are among the most predominant tree species at Tswaing.

MAUSS CUTTING

Crater rim cutting, named after W MAUSS who'm designed the reduction works. The cutting held the pipeline that pumped back waste liquid, remaining after soda and salt extraction, back into the lake. Today it is overgrown but a prominent line can be seen in the rim's foliage where the cutting was made.



FOUNDATIONS

One of a few foundations left on site of buildings that have been demolished in the 1970's.

RESEARCH FARM

The remains of which once was a research facility for the rehabilitation of Nguni cattle

THE CRATER

The Tswaing crater is a bowl-shaped geological phenomenon, the cause being a 50m chondrite (stone meteorite) colliding with the earth 220 000 years ago, which exploded and vaporized on impact. The crater is big enough to simultaneously host four rugby games with 500 000 spectators.

SHOEMAKERS VIEWPOINT

At this point, we are 60m higer than the surrounding landscape and 100m higher than the crater floor. The diameter of the crater is 1.13km. We are standing on large granite boulders that were ejected by the force of the meteorite impact.

GRANITE WEATHERING

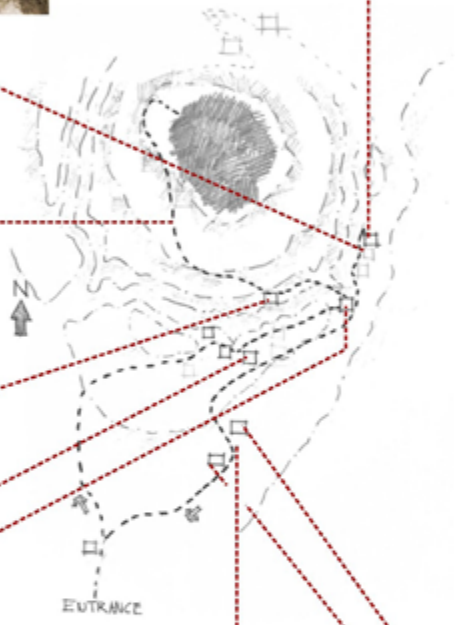
Weathering is visible on these granite boulders, the main cause being lichens (minute organisms, consisting of fungi and algae) that break down the granites structure.

OX CART ROAD

The historic road that was used to haul salt and soda-ash brine from the salt pan. The small steam track ran along the road but no evidence of this remains.

GEOLOGICAL ATTRACTION

Present before the crater event. Segments of dyke consisting of volcanic (igneous) intrusive rock known as lamprophyre.

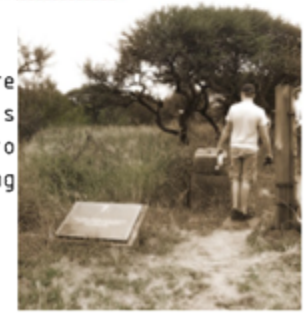


WHITEWASH MOUND

Remaining whitewash of last attempts to colour the brownish salt white, in the 1960's

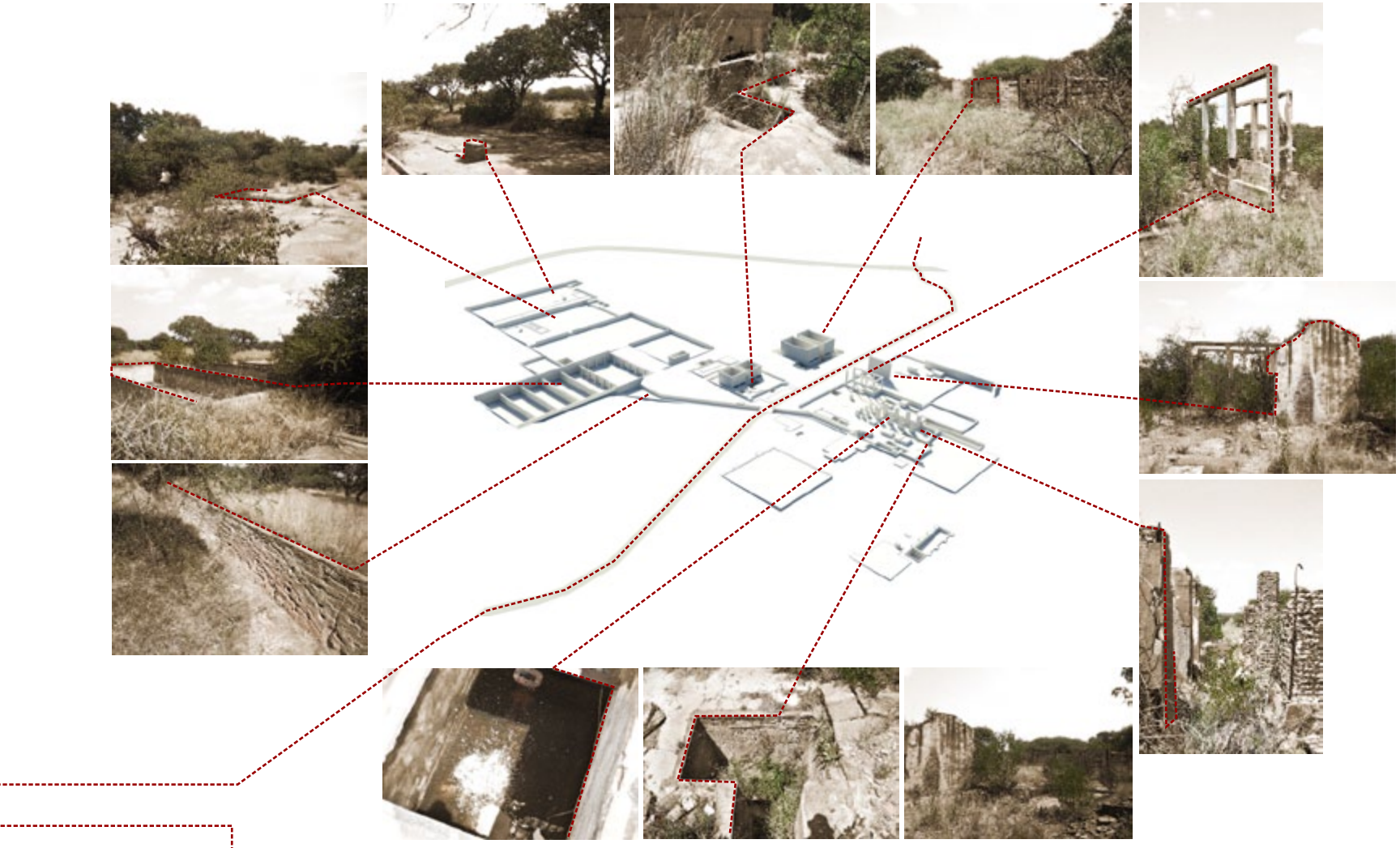
SURVEYING BEACON

One of a few concrete surveying beacons erected in 1953 to demarcate the mining area



EXCREMENT DUMP TERRAIN

A dam structure which was constructed to contain the useless liquids produced in the manufacturing of the soda-ash and salt at the factory just north of the 'dam'.



WARMING AND STORAGE PONDS

These lines in the landscape represent ponds that were once part of the reduction works, used to store and warm up ice-cold saline liquid, left over from the soda production process, before salt was extracted.

SODA-ASH AND SALT FACTORY

Ruins remaining from the soda-ash and salt works factor. Building materials including windows, doors, roofs etc. have been removed and only skeletal structures and caverns remain to be seen today.

Fig. 3.21: Mapped narrative analysis. [Author, 2012]

4
Framework

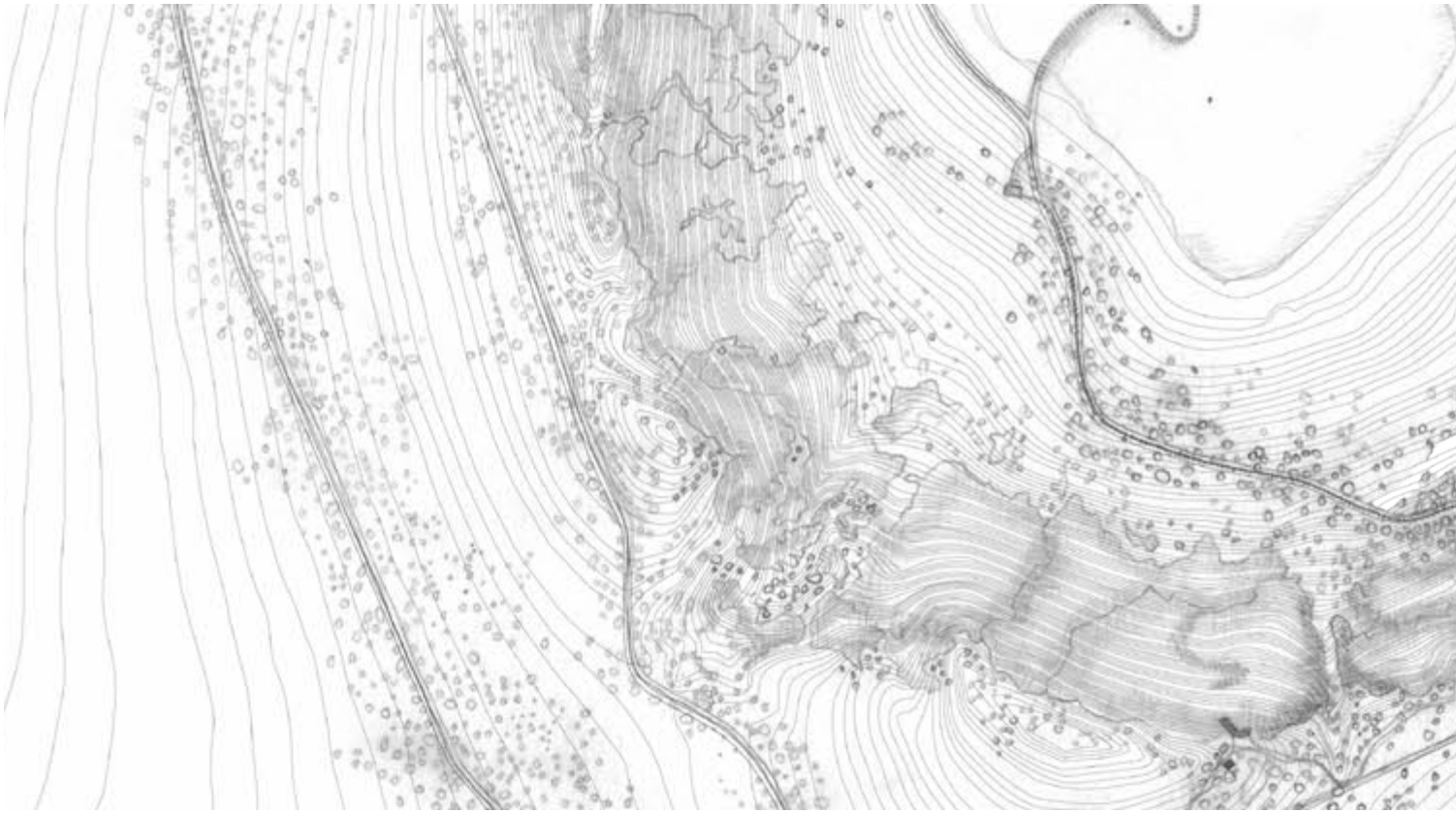
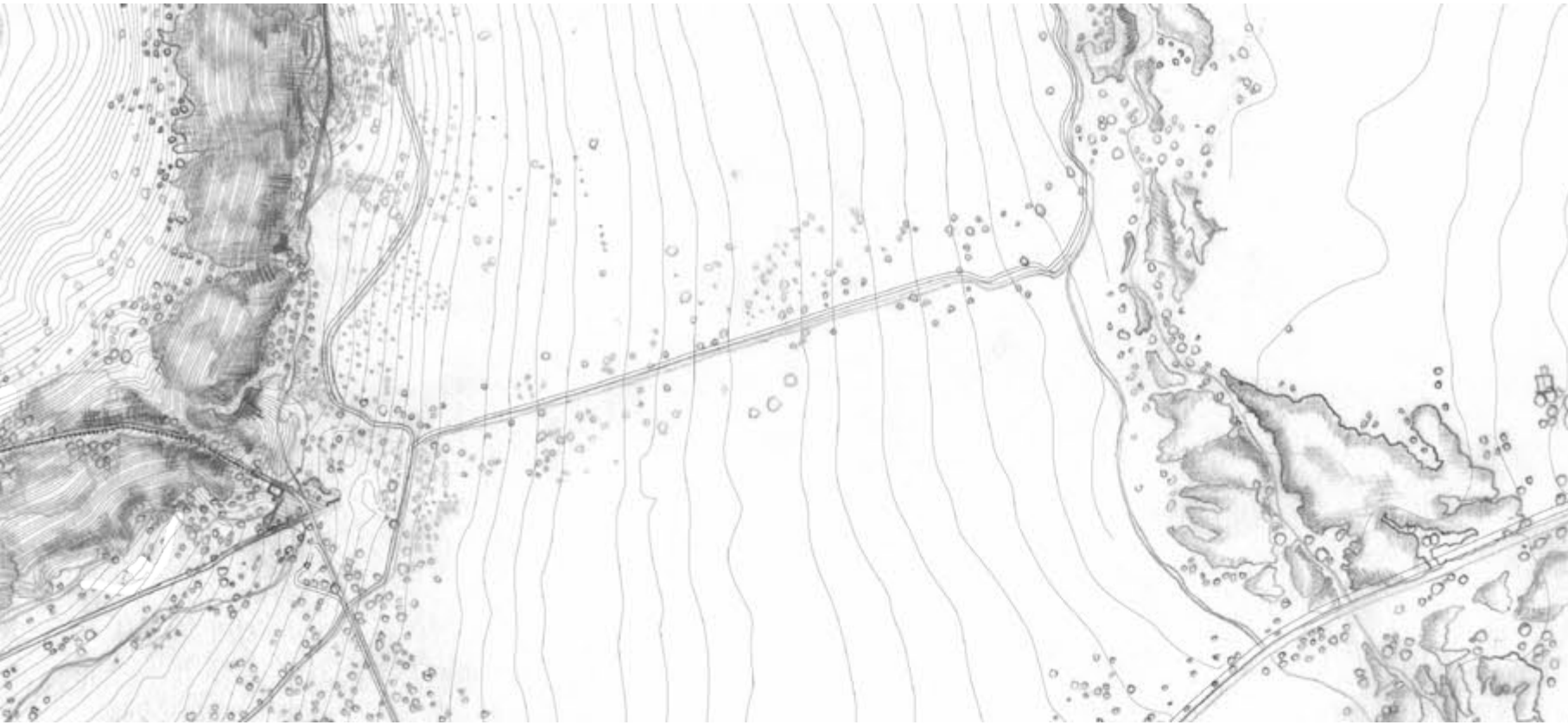


Fig. 4.1 Framework sketch development [Author, 2012]



Group Framework Development

As a group we formulated a larger framework for the Tswaing reserve and its immediate surroundings.

Firstly looking at the reserve itself, and also looking a previous frameworks, we identified places of importance.

The areas initially thought carrying the most value is indicated with larger circles and numbered. The smaller areas that add value to the larger area are indicated with smaller dots and numbered alphabetically.

We proposed to reinstate some of the programs on site which have since halted all activity, such as the burnt down museum, abandoned bush camps and the demonstartion farm.

Additionally existing footpaths on site are to be preserved and upgraded as to have no impact on the landscape by proposing new footpaths as opposed to the already existing routes. These routes will connect the nodes of historic attractions across the reserve of Tswaing.

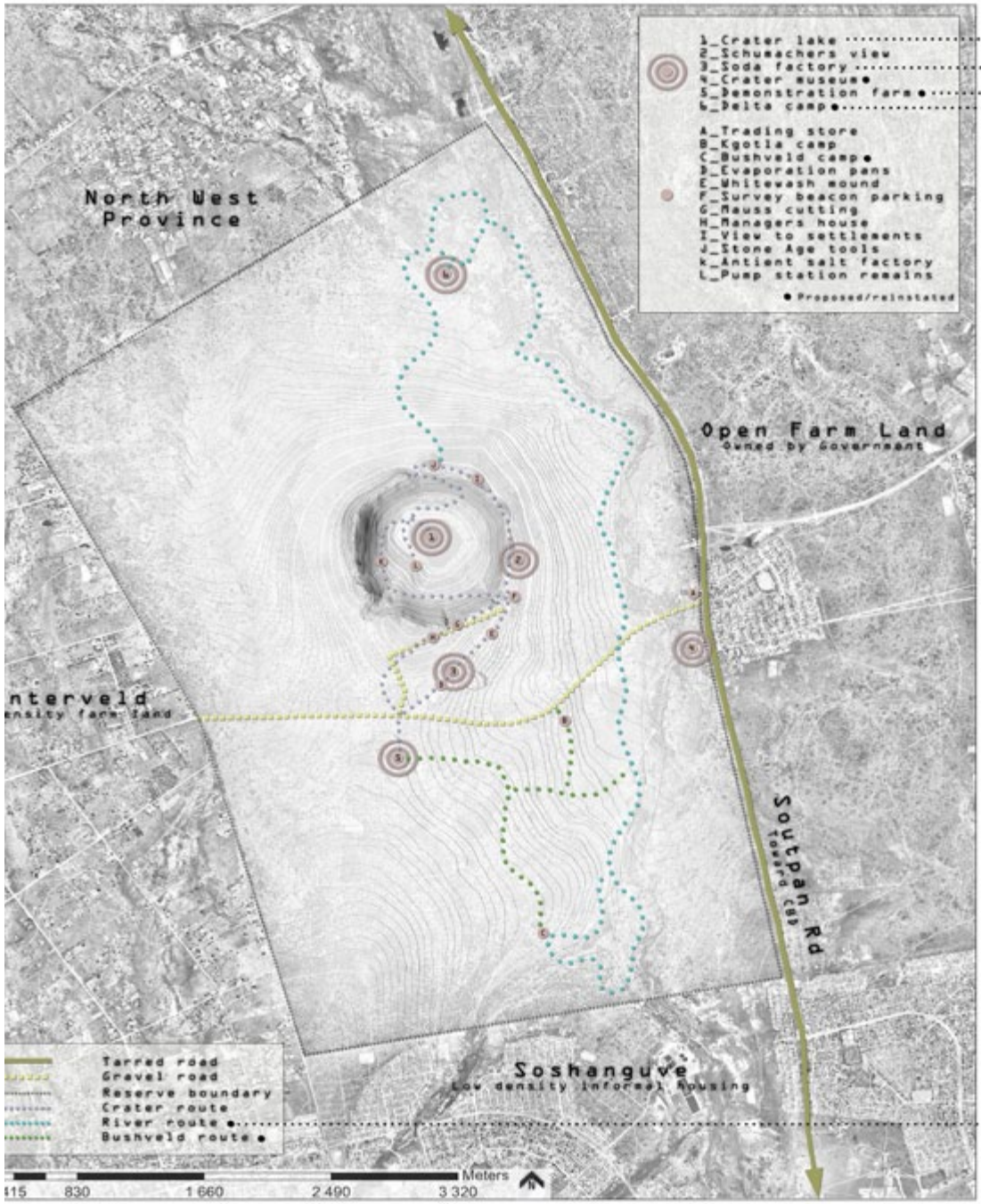
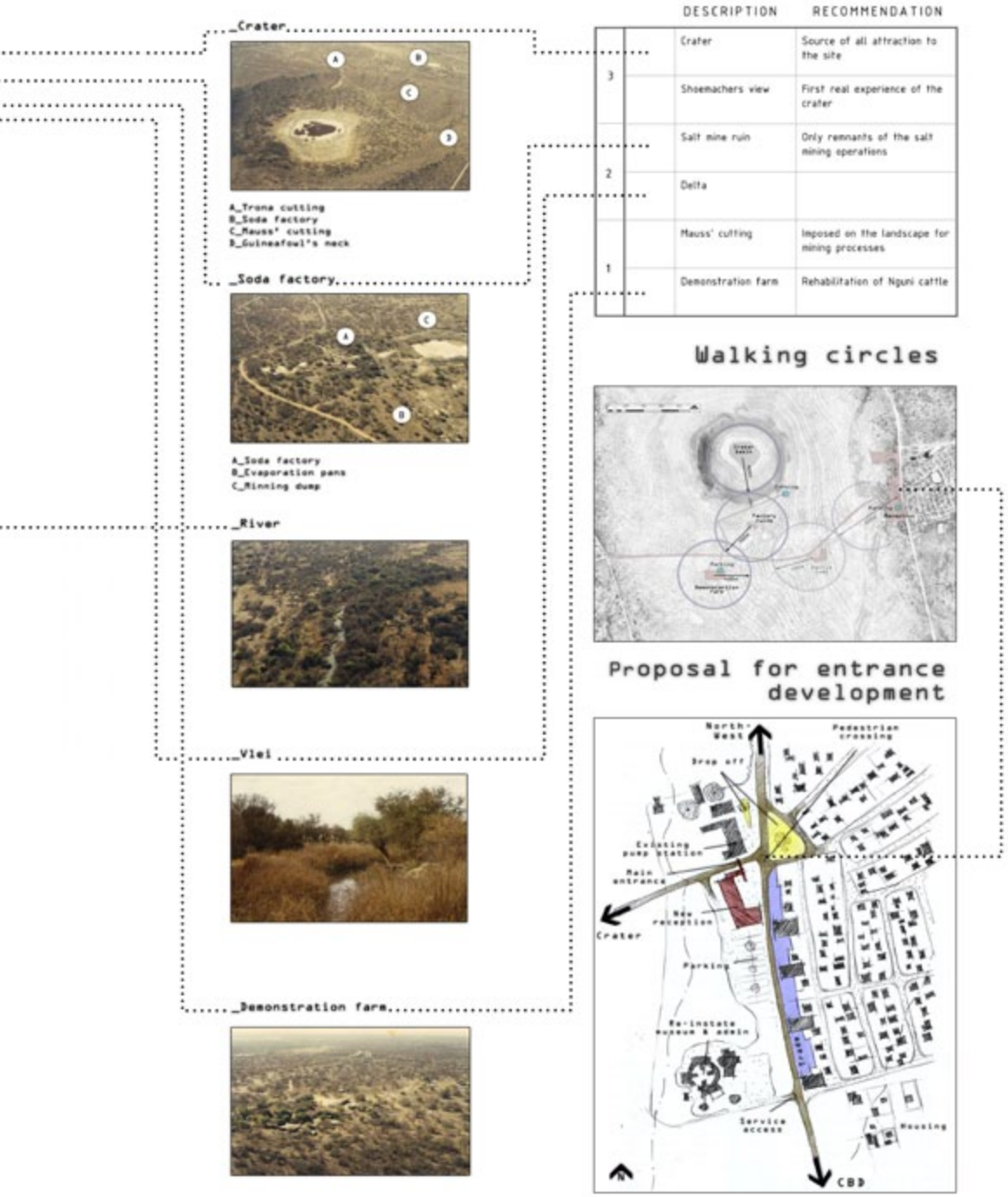


Fig. 4.2 Framework development [Author, Tanea. T, 2012]

Heritage attractions



	DESCRIPTION	RECOMMENDATION
3	Crater	Source of all attraction to the site
	Shoemachers view	First real experience of the crater
	Salt mine ruin	Only remnants of the salt mining operations
2	Delta	
	Mauss' cutting	Imposed on the landscape for mining processes
1	Demonstration farm	Rehabilitation of Nguni cattle

Walking circles

Proposal for entrance development

Nodes identified accross site are given values in the table on the left. These values are indicative of the historical and cultural value of each area. Comments regarding the value of these areas in the landscape are also stated in the table on the left.

The framework development proposed for the main road leading to the entrance of Tswaing, is graphically proposed at the bottom right. It is imperative that a landmark entrance be established, enforced by trade areas, widened pedestrian verges and also pedestrian crossings. An open green space with a drop-off area at the entrance to Tswaing will further, along with the trade nodes, help integrate the community with the possible tourist attraction Tswaing aims to become.

Community participation established already in the early planning stages of Tswaing as a tourist attraction will create a sense of ownership to the community and also hold great socio-economic value to them

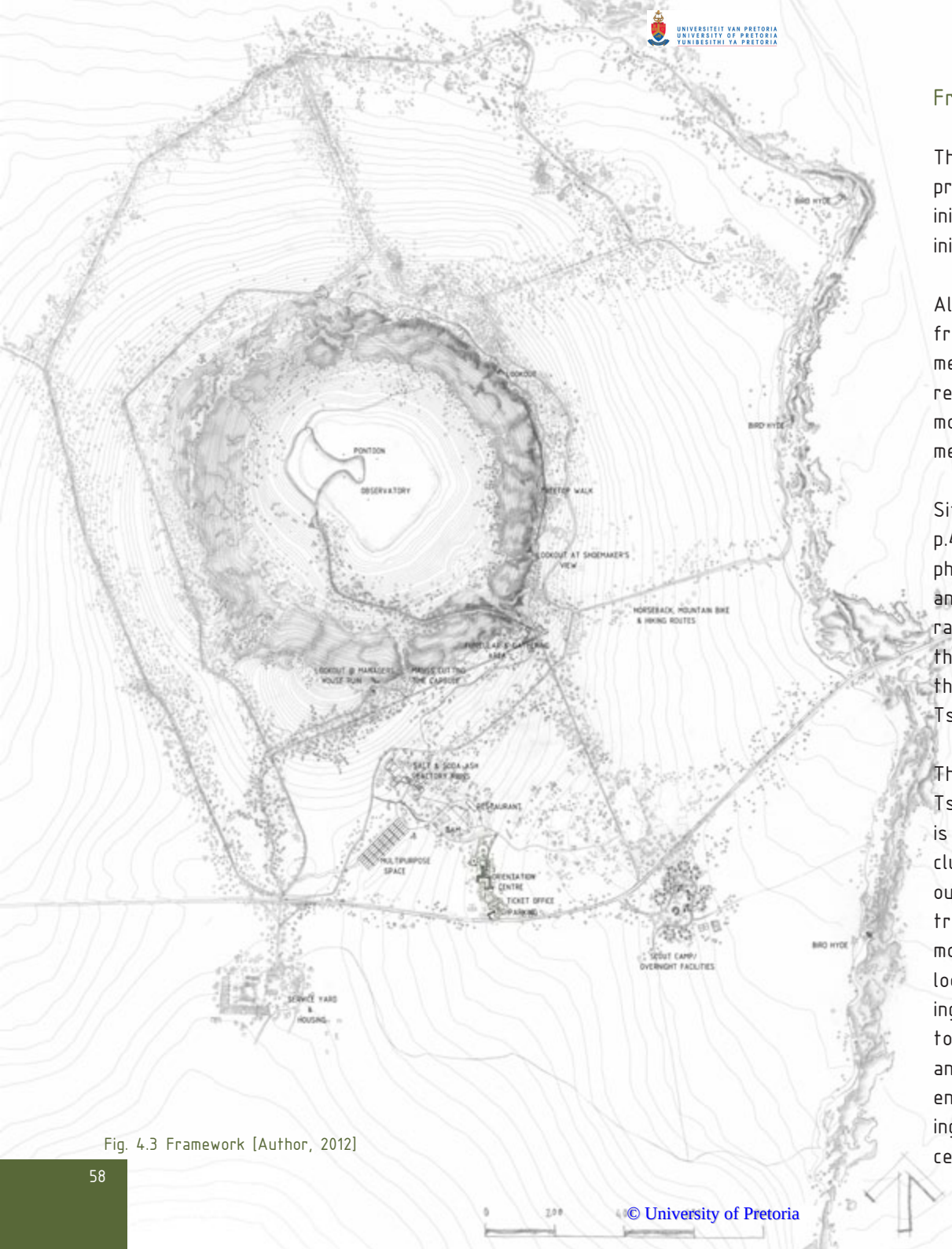


Fig. 4.3 Framework [Author, 2012]

Framework Development

The final framework proposal has progressed substantially from the initial group framework done in the initial stages of the project.

All decisions made in the group framework are still valid. After numerous site visits, site analysis and reading sources found on Tswaing, more informed and grounded development decisions could be made.

Site analysis done in Chapter 3 on p.44 to p.48 regarding the geomorphology, vegetation, hydrology, soil and topography, along with the narrative investigation was essential to the final decisions made regarding the final framework development for Tswaing.

The framework envisions to establish Tswaing as tourism destination which is accessible to all. The program includes a visitor center, restaurant, outdoor exhibition spaces, nature trails, horseback trails, hiking trails, mountain biking trails, observatory, lookouts, bird hides, overnight camping facilities for Boy Scouts and tourists, catwalks within the ruins and a time capsule in the crater, all enforced by the narrative of Tswaing whilst making the narrative accessible.

Client

FACILITIES AND USERS:

FACILITIES:	PARKING	DISABLED PARKING	BUS PARKING	DROP OFF	TICKET OFFICE	CURIOS	AMPHI	RESTAURANT	TOILETS	DIASBLED TOILETS	PARENTS ROOM	REST AREAS	SIGNAGE	OVERNIGHT FAC	GOLF CARTS	HOUSING	CAMP SITE	STARGAZING POINT	LOOKOUTS	EVENT AREAS	GUIDED TOURS	SERVICE YARD	OUTDOOR EXHIBIT	VISITORS CENTER	PICNIC LAWN
USERS:																									
TOURISTS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
SCHOOL GROUPS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
SCIENTISTS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
BIRDERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
HIKERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
LOCALS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
PHOTOGRAPHERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
HORSE RIDERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
HISTORIANS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
BOY SCOUTS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
JOGGERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
MOUNTAIN BIKERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
WORKERS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■
ARTISTS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■	■

Fig. 4.4 Client Matrix [Author, 2012]

5

Precedents and Access Audits

Fig. 5.1 Edited photograph of spiral pathway at Freedom Park [Author, 2012]

Fig. 5.2 Light reeds at Freedom Park. [Photo by Author, 2012]

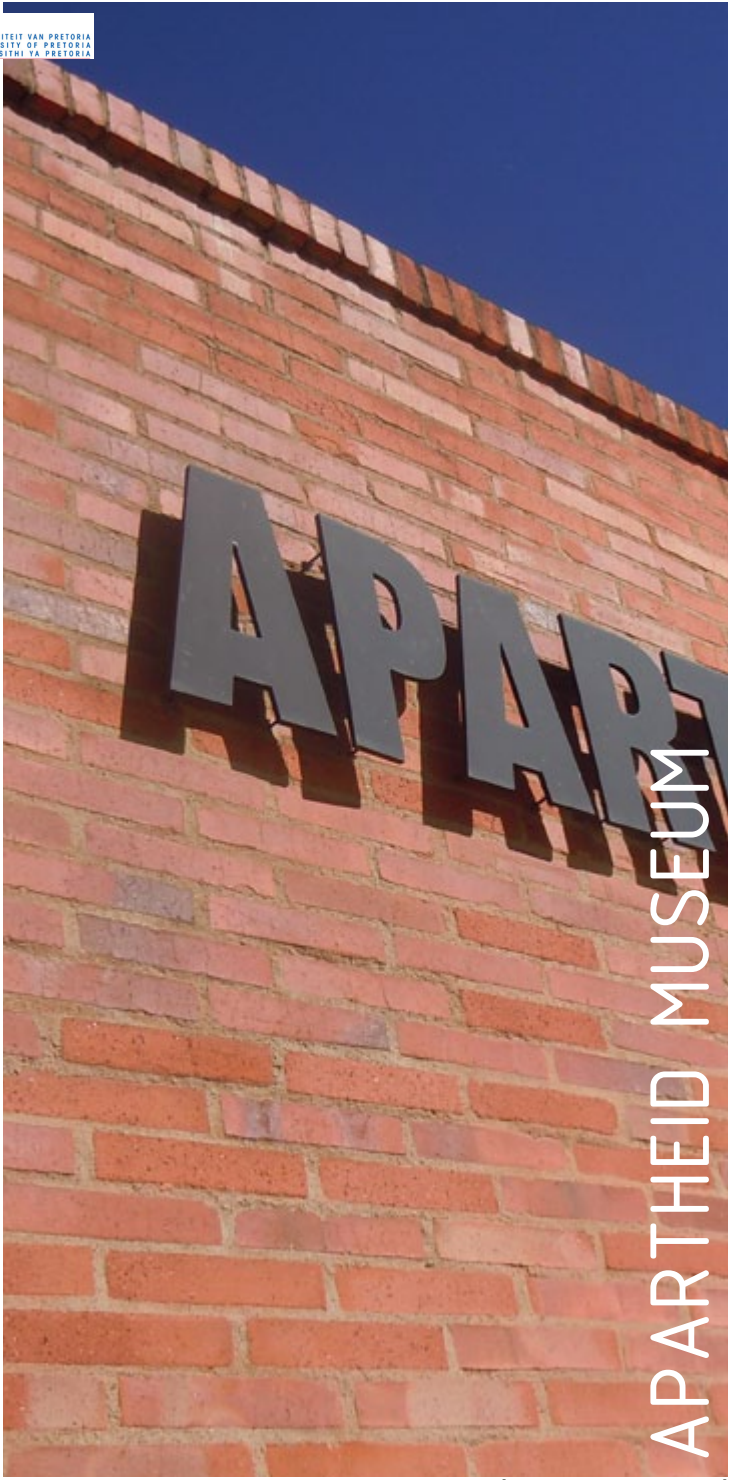


Fig. 5.3 Apartheid Museum entrance facade. [Photo by Author, 2012]

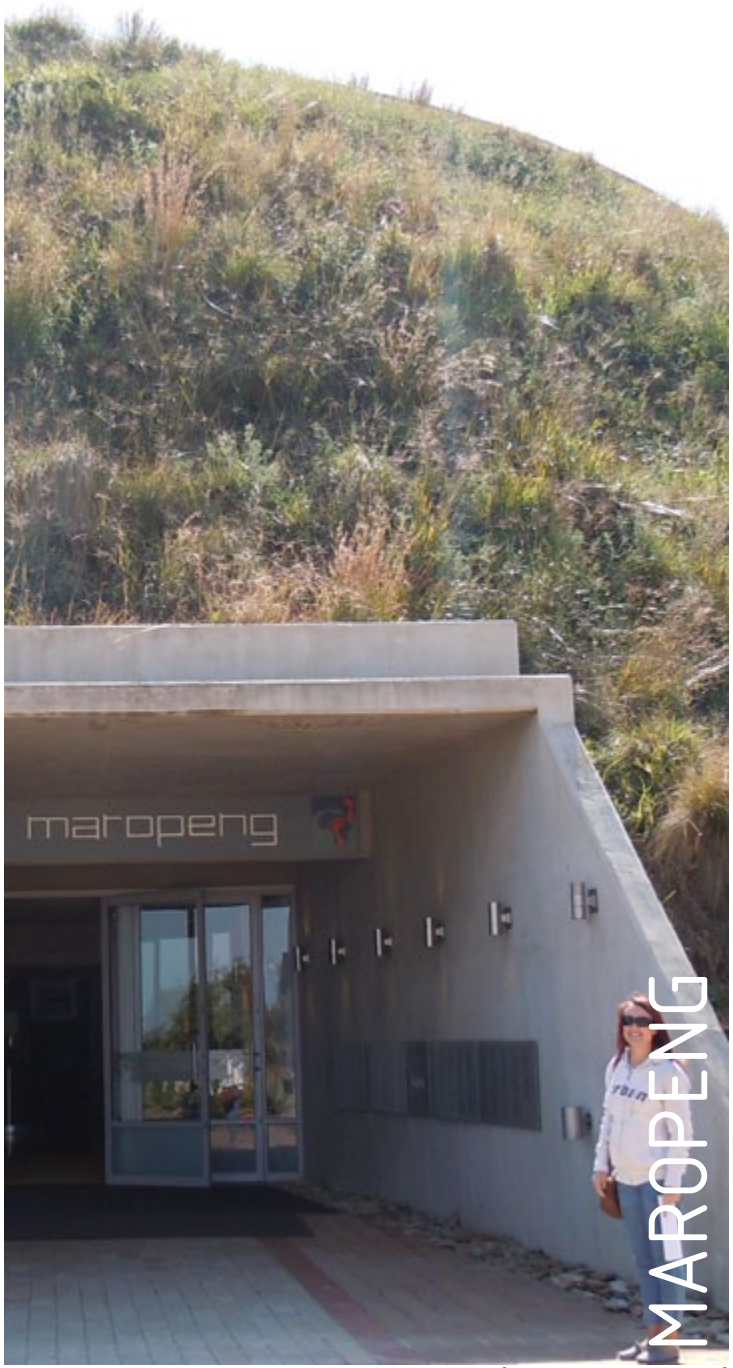


Fig. 5.4 Maropeng meseum entrance. [Photo by Author, 2012]

Introduction

The aim of the Accessibility Audit of cultural significant landscapes in South Africa is to test whether these landscapes are in fact as universally accessible as they might make us believe to be.

The criteria I will use to conduct the accessibilty of these landscapes include the accessibilty of the following:

- the journey to
- the arrival at
- reception and economic accessibilty
- facilities at
- orientation and signage from and to
- assistance and services
- knowledge shared
- materiality and gradients
- rest and rehydration

Landscape architectural projects do implement the principles of universal access, but only to the minimum regulation. Universal access is in most cases seen as a restriction to design and more often than not as an afterthought. The latter being the cause for some very unsightly elements in the landscape.

Along with this Accessibility Audit, the further aim of this audit is to identify the common shortcomings in designing a universally accessible landscape. From this I will be able to eliminate these from my design.

On the left are the three case studies undertook to ground my theory.

Fig. 5.5 Isivivane at Freedom Park

FREEDOM PARK

DESCRIPTION: Freedom Park is about the tale of what it means to be a South African. Freedom Park is the creation of a memorial that narrates the story of South Africa's pre-colonial, colonial, apartheid, and post-apartheid history and heritage, spanning a period of 3.6 billion years of humanity, to acknowledge those that contributed to the freedom of the country. [www.freedompark.co.za/]

LOCATION: Salvokop, Pretoria Latitude: S 25 45.846 Longitude: E 28 11.238

PROJECT CONSTRUCTION STARTED: June 2003

COMPLETION DATE: Expected October 2012

PROJECT: Heritage

CLIENT: Freedom Park Trust : Office of the President of South Africa

DESIGNERS: GREENinc., Newtown Landscape Architects and Mashabane Rose Associates


Fig. 5.6


Fig. 5.7

JOURNEY TO:

Travelling to Freedom Park from Johannesburg on the N14 or Pretoria via Fountains circle, Freedom Park is a beacon which sits on Salvokop hill. Actually accessing the site for the first time might be confusing as signage towards the site is limited. A beacon-like entrance would also help to identify entry.


Fig. 5.8

ARRIVAL FACILITIES:

A small parking area is allocated close to the main precinct with a larger parking area some way away but it is serviced via golfcarts, which tend to become delayed with larger amounts of park visitors.


Fig. 5.9


Fig. 5.10

RECEPTION AND ECONOMIC ACCESSIBILTY:

The reception building has a large, spatious waiting area underneath the trees outside .Currently and confusingly there is only parking for two cars. Parking your car, acquiring a ticket, brochures and maps and then driving to the parking. The reception desk is too high and does not include a dropped section for a person in a wheelchair or whom is small in stature.


Fig. 5.11

FACILITIES AND ABLUTIONS:

All of the major buildings have efficient ablution facilities catering for all. Including new mothers. All facilities and ablutions are well indicated, at regular intervals from each other and adhere to SANS specifications.


Fig. 5.12


Fig. 5.13

ORIENTATION AND SIGNAGE:

The pathways indicate direction well and logically, therefore little signage is necessary. In the cases where there is signage, it is hard to read in certain times of the day because of shiny surfaces and/or very small writing which is hard to read for visually impaired individuals, no braille is provided for blind individuals.

Fig. 5.14


Fig. 5.15

ADDITIONAL ASSISTANCE AND SERVICE:

Guided tours are provided on request and so too for larger groups such as schools. Guides also help people with disabilities to move to wherever they want to be. The park provides a dedicated website for pre-visit information. www.freedompark.co.za


Fig. 5.16


Fig. 5.17

SHARED KNOWLEDGE OF PLACE:

A variety of means are used to communicate knowledge of place. Apart from writing and boards, guides, brochures, auditoriums and an amphitheatre is utilized to communicate knowledge of place to the visitors. Understanding the meaning of the different areas might be hard without a guide. Tactile maps and signs are absent, these are important aid to visually impaired individuals .


Fig. 5.18


Fig. 5.19

MATERIALITY AND SLOPE ACCESSIBILTY:

The gradient of slopes are to specification in 90% of the intervention but in some places too steep and without rest platforms as specified in the SANS for every distance of 9m but railings are present. Surfaces are smooth and provide proper traction but poses a problem when wet. All pathways are wide anough to support two way wheeled traffic


Fig. 5.20


Fig. 5.21

REST AND REVITALIZATION:

Resting areas and water fountains are provided but might be too few in relation to the climate of Pretoria. In the warm climate, more shaded seating and rest areas with water fountains must be provided.

Fig. 5.22 Apartheid museum entrance wall

APARTHEID MUSEUM

DESCRIPTION: The Apartheid Museum opened in 2001 and is acknowledged as the pre-eminent museum in the world dealing with 20th century South Africa, at the heart of which is the apartheid story. The Apartheid Museum, the first of its kind, illustrates the rise and fall of apartheid. The museum is a beacon of hope showing the world how South Africa is coming to terms with its oppressive past and working towards a future that all South Africans can call their own [Museum brochure, 2012].

LOCATION: Ormonde, Johannesburg. Latitude: 26.2376°S Longitude: 28.0090°E

COMPLETION DATE: 2001

PROJECT: Heritage

CLIENT: The Apartheid Museum Fund

DESIGNERS: Mashabane Rose Associates


Fig. 5.23

JOURNEY TO:

The museum is located on Nasrec Show grounds and the route towards the museum is well sign posted and an additional factor adding to its relative easy to locate is the fact that it is located directly adjacent to the Gold Reef City themepark.


Fig. 5.24


Fig. 5.25

ARRIVAL FACILITIES:

The precinct is visible in the landscape as one approaches the museum. A large parking area is provided along with a sufficient amount of parking for people with disabilities, which are located right at the entrance to the museum. However, the above mentioned are not clearly indicated.


Fig. 5.26

RECEPTION AND ECONOMIC ACCESSIBILTY:

Large waiting area in front of the reception area provides for favourable waiting conditions. The reception window is too high for a person in a wheelchair.

Adults: R60.00 Pensioners, students and children: R45.00
Learners: R15.00 Teachers: R20.00


Fig. 5.27


Fig. 5.28

FACILITIES AND ABLUTIONS:

The ablution facilities are well indicated and adhere to the minimum SANS standards, although lacking baby facilities. Constant change of material towards the ablutions, from concrete to loose, gravel, to concrete blocks along with an additional threshold changes, make access confusing and uncomfortable to mobility and visually impaired.

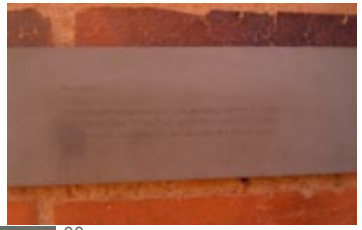

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Fig. 5.30

ORIENTATION AND SIGNAGE:

Movement in the precinct is well directed by pathways and routes. The signage boards are more successful in some place than other. Some signage offer strong contrasting letters on its background where some signage boards are very small and writing has already faded.

Fig. 5.39


Fig. 5.38

ADDITIONAL ASSISTANCE AND SERVICE:

Guided tours are available and lifts are provided for those needing help to lower levels of the museum precinct, though there is no signage facilitating independant use by a person with disability. An informative and interactive website is provide for pre-visit planning and post visit reminisence and reflection on what was experienced.


Fig. 5.37


Fig. 5.36

SHARED KNOWLEDGE OF PLACE:

Interactive and innovative ways are used to communicate a large amount of information, captivating the visitor. Audio units can be hired and activates automatically in each area, summarizing what that specific area depicts. Audio-visual auditoriums display dramatizations of historic events.


Fig. 5.35


Fig. 5.34

MATERIALITY AND SLOPE ACCESSIBILTY:

Slopes are to minimum specification but rest platforms as specified in the SANS for every distance of 9m have been omitted. A person in a wheelchair then has to be careful when descending. The concrete surface is smooth, without obstruction but not well kept in certain areas. The extensive use of gravel as a main reticulation surface is uncomfortable to walk on or wheel over.


Fig. 5.32


Fig. 5.33

REST AND REVITALIZATION:

Rest areas throughout the museum precinct is limited and sparse as if it almost dictates that the visitor visit the restaurant. A single vending machine is hidden around a corner within the museum building and the bench on the left was the only bench outside the museum other than at the restaurant. SANS specifies a rest opportunity at least every 25m.


Fig. 5.31

SUMMARY OF ACCESSIBILTY:

Knowledge of place is well preserved and communicated even though some of that knowledge is objectively communicated. Signage and facilities are implemented efficiently but materiality of place make movement hard and uncomfortable in many areas.

Fig. 5.40 Entrance threshold at Maropeng

MAROPENG

DESCRIPTION: Maropeng means: "Returning to the place of orgin"in Setswana. Maropeng is designated as the official visitor's centre of the Cradle of Humankind. The Maropeng visitor's centre visually depicts the origin of man and humankind and is situated in the centre of what is today perceived as the birthplace of humanity where the world renowned skull of Mrs. Pless has been found. [Museum pamphlet and Website : www.maropeng.co.za]

LOCATION: The Cradle of Humankind Latitude: S 25.98521 Longitude: E 27.66632

COMPLETION DATE: 7 December 2005

PROJECT: Heritage

CLIENT: Maropeng Initiative

DESIGNERS: GAPP Architects and MMA (Mphethi Morejele Architects)


Fig. 5.41


Fig. 5.42

JOURNEY TO:

As the Cradle of Humankind is a World Heritage site, a number of road signs are evident making the journey to and from Maropeng and other attractions related to the Cradle, relatively easy to locate. A landmark in the landscape also help facilitate the location of place.


Fig. 5.43


Fig. 5.44

ARRIVAL FACILITIES:

Copious amounts of parking is available to Morapeng with the SANS specified amount of parking for people with disablities closest to the entrance and also drop-off facilites and a number of bus parkings for larger tourist or school groups visiting Maropeng.


Fig. 5.46

Fig. 5.45

RECEPTION AND ECONOMIC ACCESSIBILTY:

Large waiting area in front of the reception area provides for spatious and shaded waiting conditions. Most facilities are grouped in the visitors center vicinity. Restaurant, curio shops etc. Entry to Maropeng is expensive. Adults: R125 Children: R70. Pensioners & Students: R85.


Fig. 5.47


Fig. 5.48

FACILITIES AND ABLUTIONS:

A number of ablutions are available all across Maropeng. Readily available and very well indicated with signage to visitors. Ablutions for people with disabilities adhere to the minimum SANS standards. Facilities for new mothers are however unavailable.


Fig. 5.49

Fig. 5.50

ORIENTATION AND SIGNAGE:

Orientation is simple and effective. Signage is large, clear and legible, tactile maps are erected to help people with visual impairments to establish orientation.


Fig. 5.51


Fig. 5.52


Fig. 5.53

Fig. 5.54


Fig. 5.55


Fig. 5.56


Fig. 5.57


Fig. 5.58

ADDITIONAL ASSISTANCE AND SERVICE:

Guided tours are provided on request and so too for larger groups such as schools. Guides also help people with disability to move to wherever the want to be. The park provides a dedicated website for pre-visit information. www.maropeng.co.za

SHARED KNOWLEDGE OF PLACE:

Interactive and innovative ways are used to communicate a large amount of information, captivating the visitor. Even so, some of the exhibitions are very literal and may seem as if the target audience is children. The museum itself is dark in places and certain exhibitions may hinder visually impaired individuals. Some exhibitions rely on sound and convey meaning without written explanation for deaf/hard of hearing individuals.

MATERIALITY AND SLOPE ACCESSIBILTY:

Slopes are to minimum specification but rest platforms as specified in the SANBS for every distance of 9m are absent. Even though Maropeng attracts large amounts of visitors, the spatial qualities of the place makes for comfortable mobility between different spaces.

REST AND REVITALIZATION:

An abundance of shaded resting areas are provided all over Maropeng but a sense that they are placed eratically without emphasizing certain areas of importance become aparent. Water fountains are a necessary addition.

Conclusion of Accessibility Audits

The findings I have made form the accessibilty audits underline the design decision taken. An in depth discussion follows in Chapter 6.

Influential Techtonics

The character of Tswaing is largely the crater and the natural environment of Tswaing. The mining ruins which are still evident on site started to indicate what materiality is to be used with any further interventions implemented on site.

The main materials used at the old salt mine was predominantly concrete and steel with minor traces of glass, brick and corrugated iro and woodn for concrete formwork on site.

Analysing the materials found on site, I have conducted a materiality study on the pages to follow. My study was aimed at the outcome of how these primary materials used on site, can be implemented and combined in a modern and contemporary method of construction.


Fig. 5.59


Fig. 5.60


Fig. 5.61


Fig. 5.62


Fig. 5.63


Fig. 5.64


Fig. 5.65


Fig. 5.66


Fig. 5.67


Fig. 5.68


Fig. 5.69


Fig. 5.70


Fig. 5.71


Fig. 5.72


Fig. 5.73

Fig. 5.74


Fig. 5.75


Fig. 5.76


Fig. 5.77


Fig. 5.78


Fig. 5.79


Fig. 5.80


Fig. 5.81

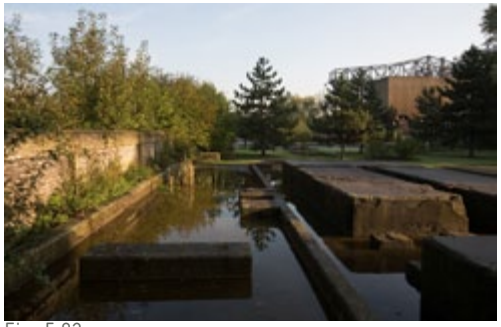


Fig. 5.82

6

Design Development

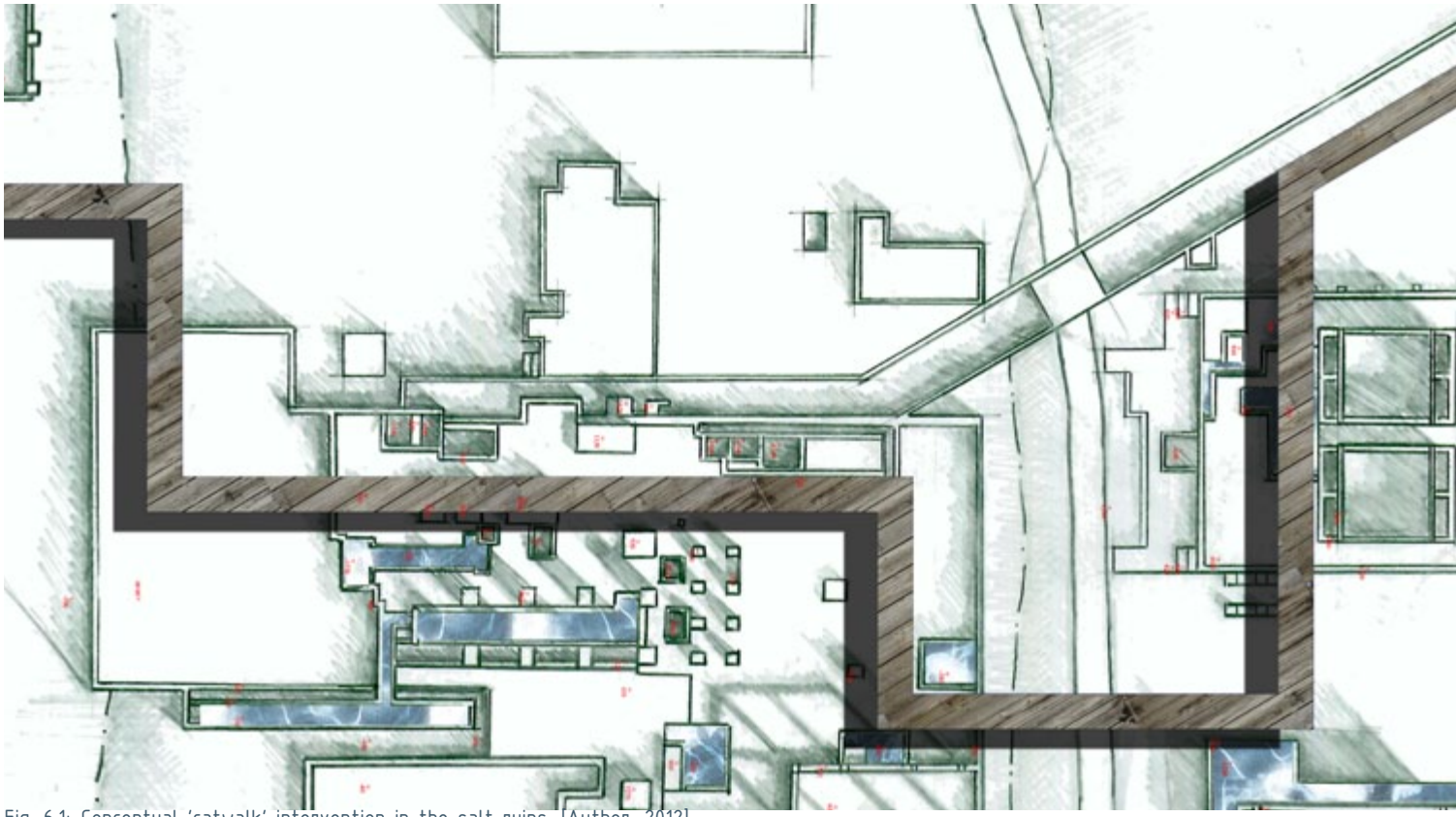
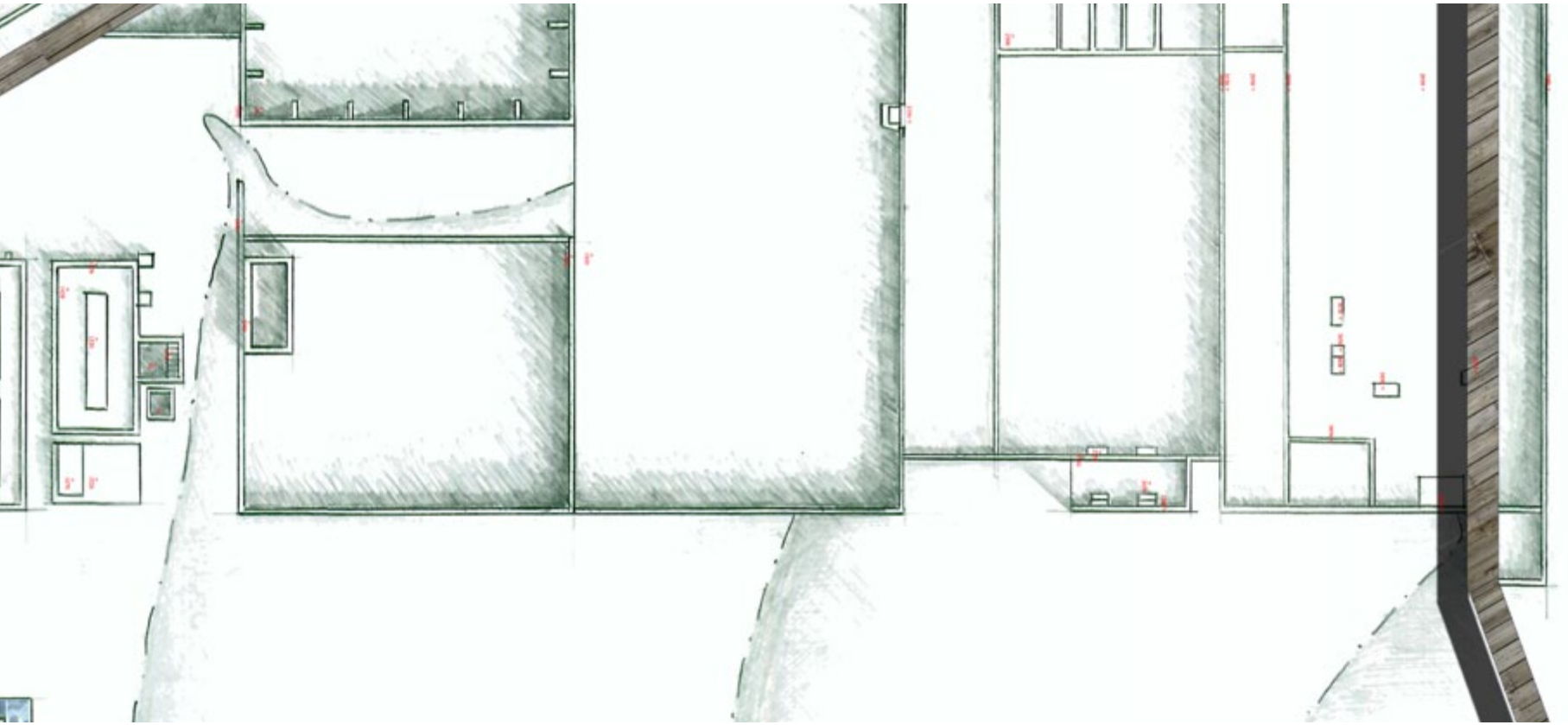


Fig. 6.1: Conceptual 'catwalk' intervention in the salt ruins. [Author, 2012]



The Burra Charter 1999

The Burra Charter will be used as governing guideline for intervention at the Tswaing Meteorite Crater reserve.

The Burra Charter is aimed at places of cultural significance. The Burra Charter advocates that a cautious approach must be taken when changes are made to the cultural landscape.

We must do as much as necessary to care for the places with valuable cultural significance and to make it useable, unless as little as possible change can be made as to retain the cultural significance of Tswaing. Conservation and preservation are two keywords within the Burra Charter where conservation is the process of looking after a place as to retain its cultural significance and preservation is the maintaining of the fabric of a place in its existing state and retarding any deterioration.

The following Articles in the charter are those which I have deemed most applicable and to be adhered to in the natural environment of Tswaing:

- Article 2: CONSERVATION AND MANAGEMENT
  Aim: Retain the cultural significance of place.

  Places of cultural significance should be safe guared and not put in risk of or left in a vulnerable state.

- Article 3: CAUTIOUS APPROACH
  Based on respect for the existing: Fabric, use, associations and meanings. Change should not distort physical or other evidence it provides

- Article 5: VALUES
  Conservation should identify and take into consideration all aspects of cultural and natural significance without unwarranted emphasis on any one value at the expense of other.

- Article 8: SETTING
  The retention of appropriate visual setting. The retention of relationships that contribute to cutural significance. Interventions that adversely affect the setting or the relationship are not appropriate.

- Article 10: CONTENTS
  Contents that contribute to the cultural significance should not be removed.

- Article 15: CHANGE
  Demolition of significant fabric of a place is not acceptable - minor demolition may be appropriate as part of conservation.

- Article 21: ADAPTION
  Minimal change to significant fabric, achieved only after considering alternatives.

- Article 22: NEW WORK
  Acceptable where it does not distort or obscure cultural significance. Should be identifiable.

- Article 32: RECORDS
  Records should be permanently archived and made publicly available. Records about history should be safeguarded and made publicly available.

Currently Article 32 is highly problematic as a large amount of the records of Tswaing have been lost.

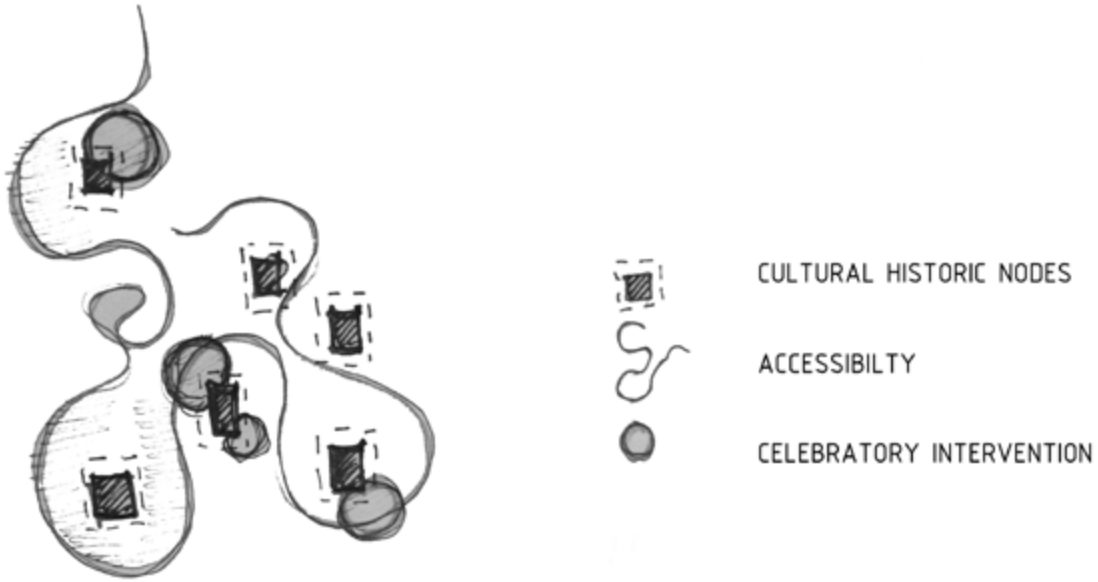


Fig. 6.2: Regarding cultural historic nodes on site. [Author, 2012]

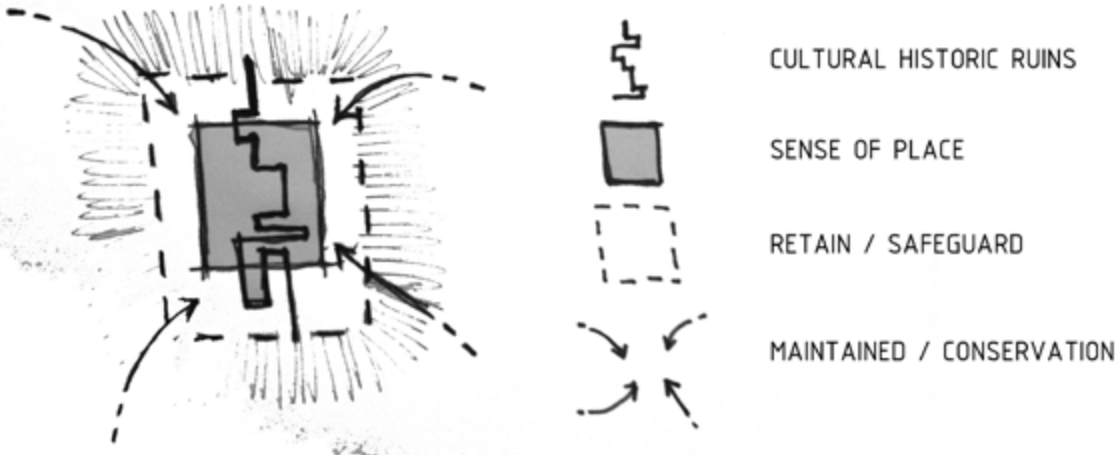


Fig. 6.3: Value of cultural historic nodes on site. [Author, 2012]

The diagrams on the left are conceptual ideas on how I will be applying the applicable articles of the Burra Charter discussed.

The first diagram explores how the different nodes of cultural significance must be identified, made accessible within the landscape and any new intervention attached or implemented in these areas must be identifiable as such.

The celebratory interventions seek to make the narrative of these culural historic nodes accessible to all.

The second diagram explores the relevance and importance of the 'sense of place' and the natural environment surrounding these cultural historic nodes.

If these areas are not safeguarded, retained, preserved, maintained and conserved, the relevance and importance of these cultural historic places will be lost to future generations. Too much has already been lost.

Revealing the Narrative

The rich inherent narrative at Tswaing is a jewel, hidden in the natural environment that is Tswaing. Various techniques exist to reveal and make the narrative accessible to all, which are as follows:

Metaphor

Value is given to objects or spaces in the landscape by giving them meaning. In the case of Tswaing, a prominent wall at a certain angle in the landscape is a metaphor for the direction at which the meteorite struck earth 220 000 years ago. [fig 6.4] Further also the shape of the planted roof at the outdoor exhibition area. The angular juxtaposed shape is informed by the geology present at Tswaing, looking at the structure of the quartzite crystals present.

Identity

Naming of spaces in the landscapes bestows identity and establishes continuity or cultural memory while instilling hopes for the future to what the place may become. [Potteiger & Purinton. 1998 : 75]. The naming of spaces establishes a identity that generates and continues the plots of stories.

Naming is a strategy I will further implement for making places and transforming lost meaning and knowledge and undifferentiated space, objects, land, trees, rocks, and ruins into known places in the narrative.

The best means of naming spaces is often to look at commemorating events, individuals, dates or unique experiences or qualities of place.

Sequencing

Establishing the narrative in the landscape can be achieved by placing certain elements in sequence to set the scene. These elements are:

- One word after the other in a sentence
- One event after the other in a story
- One element [or space] after the other in the land scape. [Potteiger & Purinton. 1998 : 110]

Time Altering Devices

Flashback - Items or elements indicative of past occurrences such as photographs, ruins etc.

Flash Forwards - Glimpses of what is to come is given in the landscape, views that come and go and signs that flash forward of what lies ahead.

Fast Motion – Ecological processes and successions presented in such a way as to make otherwise unperceivable ecological processes visible. [Potteiger & Purinton. 1998 : 113-114]

Revealing and Concealing

1. Secrets / Hidden information

A piece of information which is known but deliberately hidden for a number of reasons as to effect emotion and creating suspense. This encourages the 'reader' [visitor in the landscape] to engage with the narrative and uncover its secrets.

2. Idea of transparency

Making information and processes in the landscape visible, encourages the 'reader' to uncover and understand the processes at work.

3. Masking and unmasking information, identity and meaning. Masking and unmasking can be coupled with 'flash forwards' in the landscape.

Suspense

The creation of secrets in the landscape and further developing the sense of mystery builds suspense

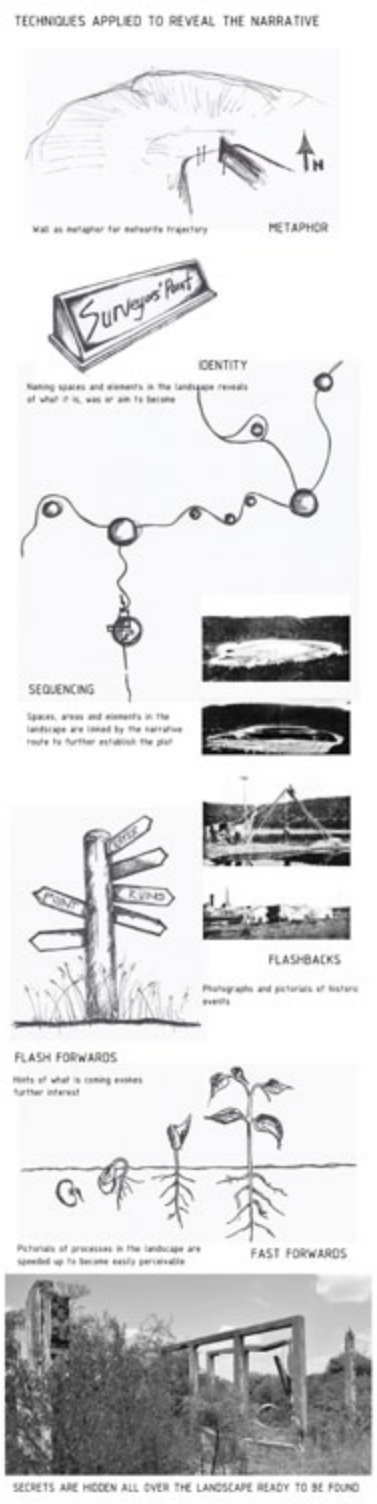


Fig. 6.4: Principles applied to aid in revealing the narrative [Author, 2012]

Design Manifesto

Accessibility is a common problem in the built environment. Regulations are the bare minimum requirements and are more often than not seen as an afterthought and a restriction of innovative designs. In most projects it is visible that these regulations were added as an afterthought. Accessibility as design tool, implemented from the onset of a project will provide for innovative design solutions, preventing costly 'afterthoughts' in a project.

Accessibility includes the physical environment and also the intangible environment, which is knowledge.

The misconception that the architect designs the building only and the landscape architect merely the exterior is a very short sighted view of the design of the built environment. The building sits in the landscape and should therefore be an extension of the landscape and so to the landscape of the building. Thus the knowledge of the environment enables the landscape architect to place a building or structure within the environment.

The landscape architect must have a very keen understanding of the environment in question and the ecological processes at work to design a successful project. An understanding of the cultural landscape is equally important. Following numerous site visits, analysis and investigation of relevant site documentation along with a well thought out concept, the designer is enabled to make sensitive, site appropriate design decisions.

Structures in the landscape should be placed in such a way as to compliment the natural environment and further create spaces to compliment and add to the experience of the landscape. These structures are functional and also sculptural in the landscape.

A successful landscape design encompasses the layering of ecological systems on site, an innovative design concept and design, which is sensitive to the quality of the place whilst introducing an aim to what the place can become in the future.

Final Framework

A keen knowledge of the landscape has been gained by numerous and constant analysis of the natural environment and the inherent narrative which was, is and is going to be Tswaing.

Main circulation routes on site connect the main intervention nodes with the smaller trails, for further exploration of the natural environment.

The main nodes offer interaction and a understanding of the natural environment, cultural landscape, and the visitors within nature. The visitors with each other and collectively so with nature. The principles of revealing the narrative, discussed in Chapter 2, is implemented to reveal the inherent narrative of Tswaing.

The orientation of these nodes are so implemented as to complement the experience of the landscape, while further taking into account the sensitivity of the natural environment and the knowledge it holds. All interventions are small, with the aim to be elements in the landscape that focus your attention on something in the landscape you would have missed otherwise.

The framework establishes social interaction and learning within the landscape with the long term aim of establishing Tswaing as a tourist destination and Tswaings' value to South Africa and the international community.

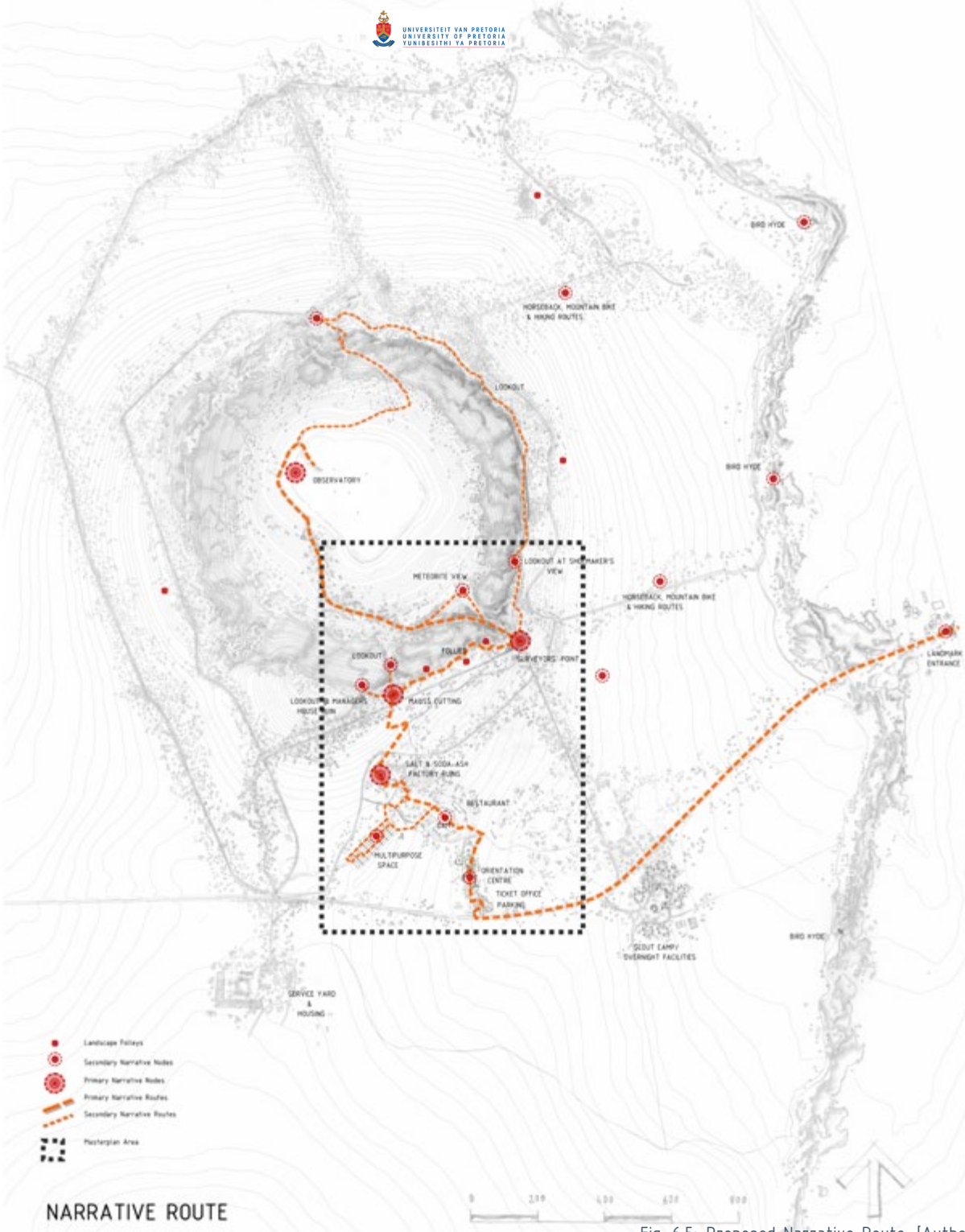
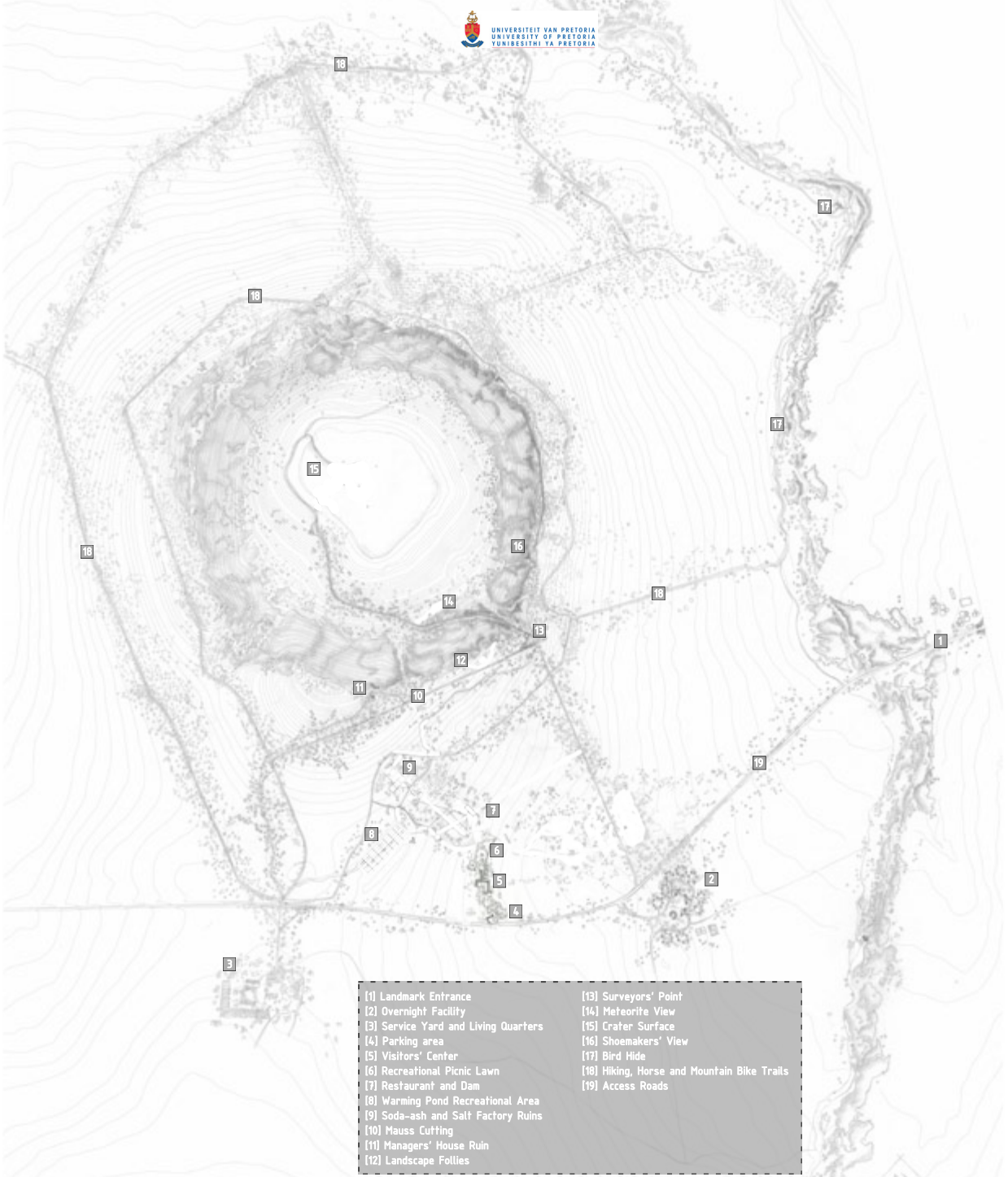


Fig. 6.5: Proposed Narrative Route. [Author, 2012]



FINAL FRAMEWORK

Fig. 6.6: Final Framework. [Author, 2012]

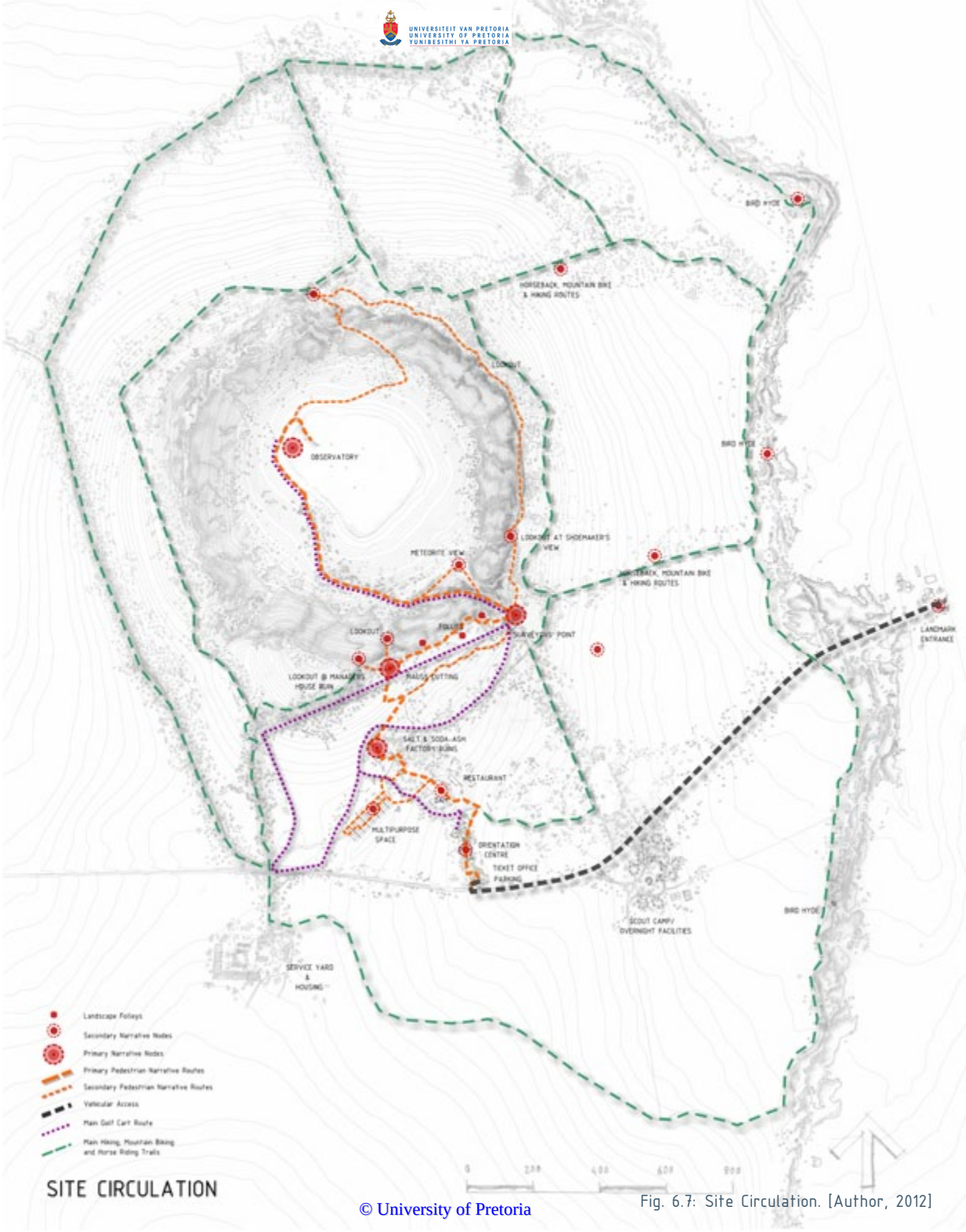


Fig. 6.7: Site Circulation. [Author, 2012]

Short explanations of each node on the framework follows:

[1] Landmark Entrance

Tswaing aims to become a tourist attraction. Along with the theory of the narrative in the landscape, a landmark in the distance creates suspense as to what is to come. The narrative of Tswaing is begun even before one physically reaches the reserve. The main road leading towards Tswaing will be enforced by market stalls and pedestrian verges, establishing community gathering nodes for the people of Soshanguve. Including the people of Soshanguve with Tswaing.

[2] Overnight Facility

Existing overnight facilities with large 'lapa' to be upgraded and additional camping facilities and recreational amenities to be added for school groups and boy-scouts.

Fig. 6.9: [2] Overnight Facilities. [Author, 2012]

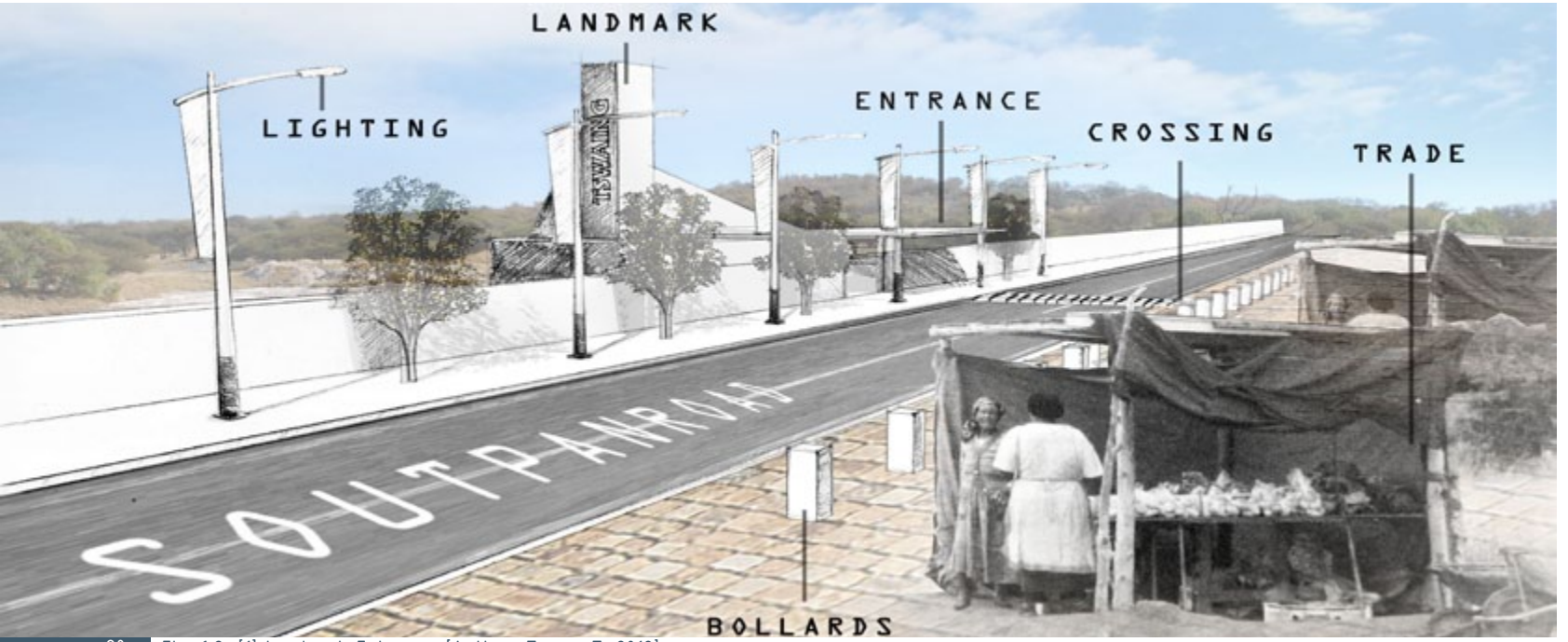


Fig. 6.8: [1] Landmark Entrance. [Author, Tanea, T. 2012]

[3] Service Yard and Living Quarters

The service yard was the historic cattle demonstration yard. This area is reprogrammed as housing for staff and storage yard for the golf carts and other service vehicles and stables for the horses. Small farming plots will be provided for the residents. The surplus vegetable yield will be used in the restaurant and deli at the visitors' centre.

[4] Parking Area

The parking layout is irregular and is woven between the trees and bushveld. 80 Parking bays are provided along with 4 bus parking bays.

[5] Visitors' Centre

The visitors' center is introduced with a waiting square and a ticket office. The visitors centre then includes a small museum of the recovered artefacts, a small deli type restaurant, orientation square, and outdoor rooms for guides to introduce Tswaing and the trail to smaller and larger groups. Facilities for hiring a golf cart, mountain bike or horse for the designated trails are provided.

[6] Recreational Picnic Lawn

A recreational lawn is provided to relax and have picnics. The lawn is proposed in a area where the veld is degraded. Soil remediation is needed to establish a lawn.

Fig. 6.10: [3] Service Yard and Living Quarters. [Author, 2012]

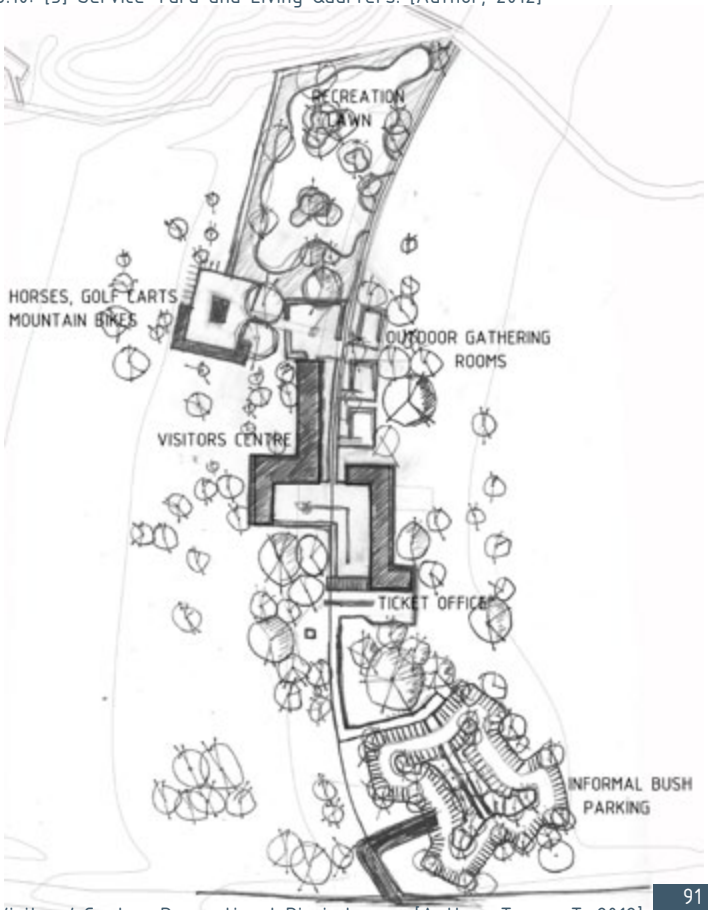


Fig. 6.11: [4,5,6] Parking, Visitors' Center, Recreational Picnic Lawn . [Author, Tanea, T. 2012]

[7] Restaurant and Dam

The historic sedimentation pond is proposed as a recreational dam with overlooking restaurant. The restaurant with accompanying viewing deck faces the dam, where animals can come and drink, and the bushveld where impala and zebra enjoy grazing.

[8] Warming Pond Recreational Area

The existing warming ponds become a recreational space and land art element in the landscape. A small existing berm provides seating underneath the trees for an impromptu amphitheater. Each pond transforms into a canvas for different materials found on site; rocks, gravel, water, the natural landscape etc. These areas connected with walkways and where existing trees are located, rest areas will be implemented. Some 'ponds' also become exhibition space for art by local artists.

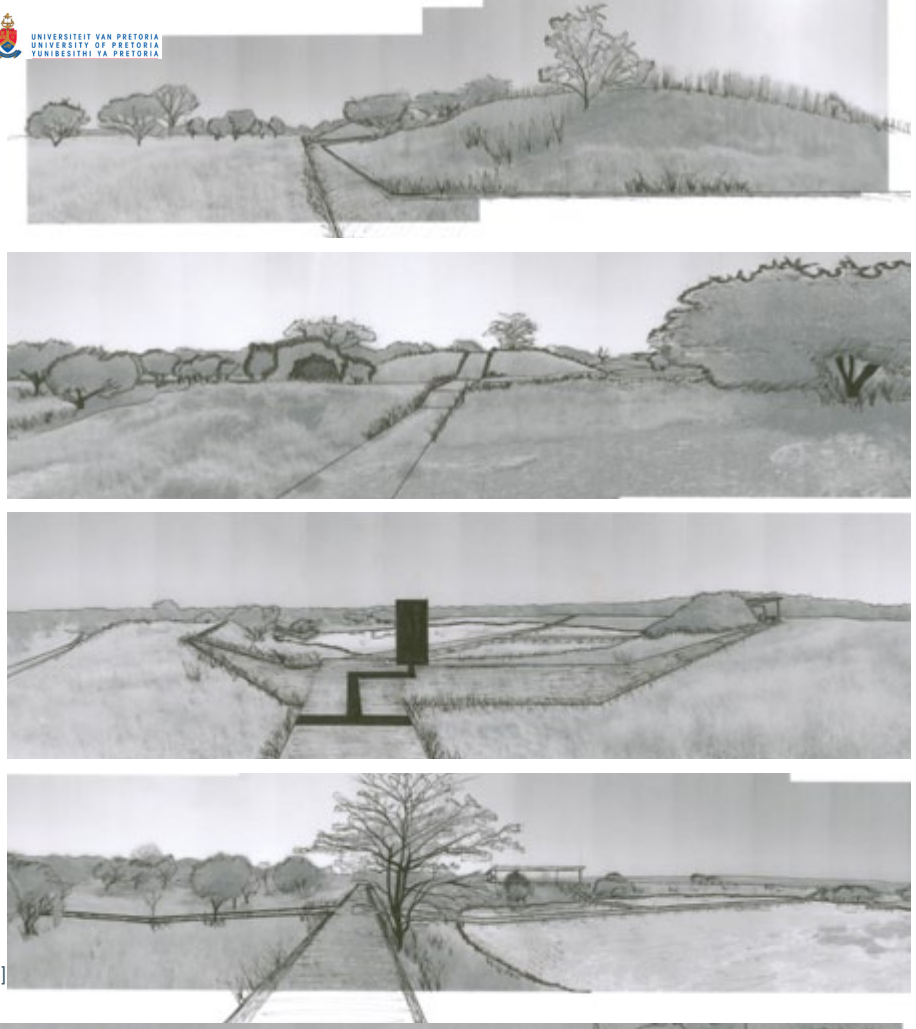


Fig. 6.12: [7] Restaurant and Dam. [Author, 2012]

Fig. 6.13: [8] Warming Pond, Recreational Area. [Author, 2012]

[9] Soda-ash and Salt Factory Ruins

The ruins are highly degraded but a very strong heir of mystery surrounds the ruins. The degraded extent of the ruins render them dangerous, still they are very alluring to visitors. The ruins are made accessible by a series of catwalks. These catwalks will be in, on and above the ruins to enhance the experience and mystery of the ruins.

Water played a large role in extracting soda-ash and salt. Multiple chambers and channels wherein the water was stored, used and transported are prominent elements in the ruins. Reintroduction of water, which is harvested on site, to these chambers and channels, aim to emphasize the use and importance of water in the factory.

Fig. 6.14: [9] Catwalks within the factory ruins. [Author, 2012]

[10] Mauss Cutting View

A small ablution facility is provided near Mauss cutting. From here one can move to three areas - The managers' house ruin, Mauss viewpoint and a walk along the crater rim towards 'Surveyors' Point'. The raised steel and wood walk moves down into Mauss cutting. The walk is built to hug the cuttings' wall and follow the existing topography. The walk provides access to the geology exposed by the impact, leading one to a viewing platform providing the first view and experience if the crater.

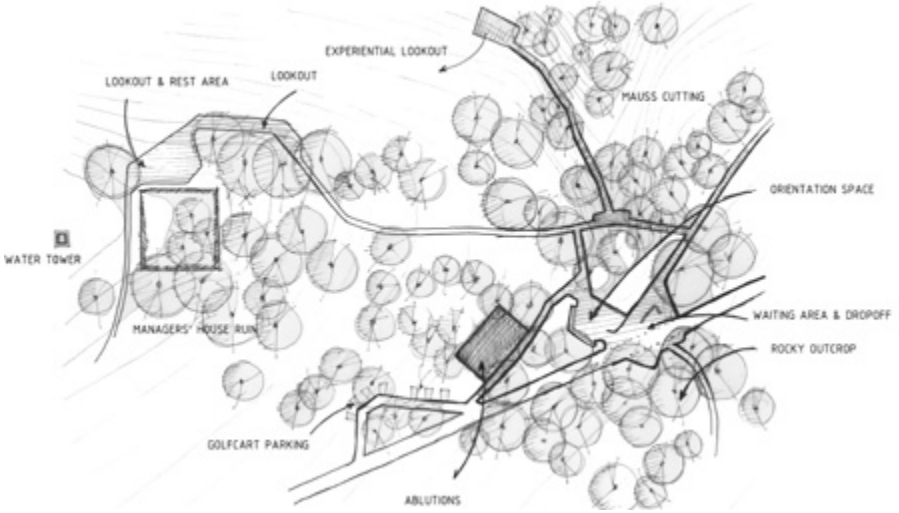


Fig. 6.15: [10,11,12] Masterplan Proposal. [Author, 2012]

From this viewpoint the whole crater bowl and rim is visible. A glimpse of 'Meteorite view', which is located a third of the way down into the crater bowl, is provided. This glimpse reveals secrets hidden in the landscape. Mystery and expectation of what is to come on the narrative route is created. Suspense is key in revealing the narrative of Tswaing.

Fig. 6.16: [10] Mauss Cutting. [Author, 2012]

[11] Managers' House Ruin and Water Tower

The managers' house ruin is a pause area where the narrative of the managers' house is made accessible along with a small viewing platform towards the managers' house and the crater. A water tower is proposed in the hillside adjacent to the managers' house, which will be filled with potable, borehole water as to service any amenities such as drinking fountains and water closets along the craters' rim. The system is gravity fed. The hydrology strategy will be looked at in depth later.

Fig. 6.17: Vision for follies on site. [Paul Bardagjy Photography, 2011]

[12] Follies

The follies form secluded nodes removed from the designated narrative pathway. Certain views into the landscape are revealed along with providing place to reflect or rest.

[13] Surveyors' Point

Surveyors' Point is one of the two main detailed design areas. This node is an outdoor exhibition space. Framed views into the landscape are accompanied with didactic pictorials of what is seen. An extensive 'green' roof is constructed over the ablution facility which is tucked into the topography of the hill with the 'green' roof is an extension of the landscape. The historic surveying beacon is celebrated here. This node is a waiting area before you go down the historic ox cart road into the crater or the trail further along the crater rim towards Shoemakers view. This node will be explained in more detail.

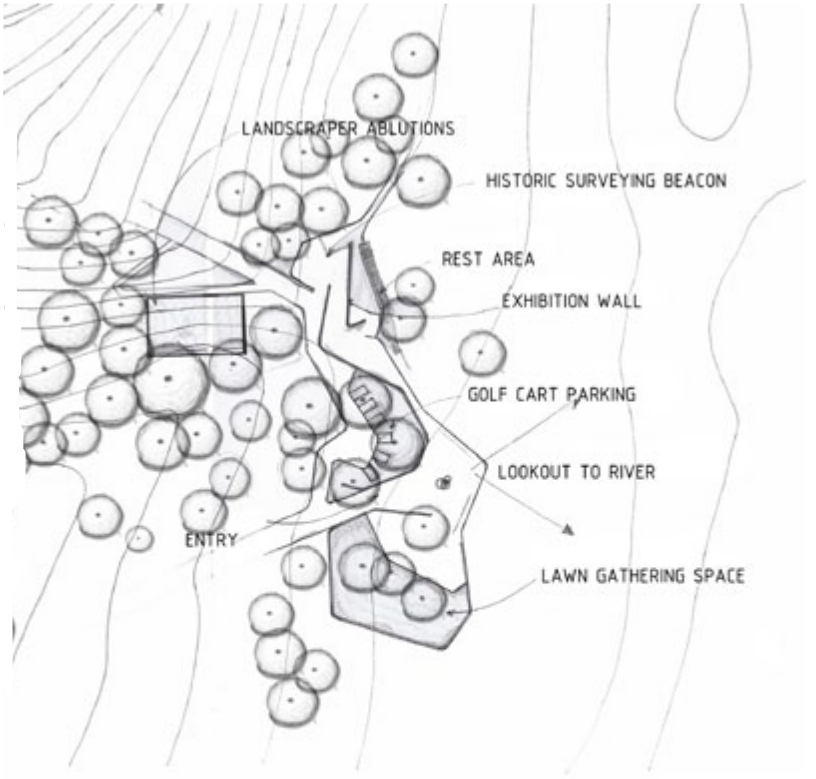


Fig. 6.18: Surveyors' Point. [Author, 2012]

[14] Meteorite View

Lookout point situated between the trees, one third of the way down into the crater. A wall dividing the space is indicative of the direction from which the meteorite came. This space is a small outdoor exhibition of all information related

to the meteorite and its collision with earth: composition, size, structure etc. This node is where the time capsule will be situated.

[15] Crater Surface

Once visitors have made their way down into the crater, a rest and recreational area is provided. Views are framed to the different interventions on the craters' rim, visible from this node. A viewing deck is extended a short way over the crater lake. The viewing platform doubles as informal stage for small performances taking place with the crater rim as backdrop.

[16] Shoemakers' View

Shoemakers view is an astounding; possibly first, view into the crater bowl. Granite boulders with lichens growing on top of them provide a valuable didactic exhibit.

[17] Access Road

Main access roads on site are exposed aggregate concrete, upgraded from the existing dirt roads. The aim for the project is to be a tourist destination for many years and therefore the roads are upgraded. The initial costs may be high but the longevity is very good and maintenance very low.

[18] Bird Hides

Bird hides provide the opportunity for hikers and birders to get close to bird species along the river system. The bird hide is also a quiet pause area.

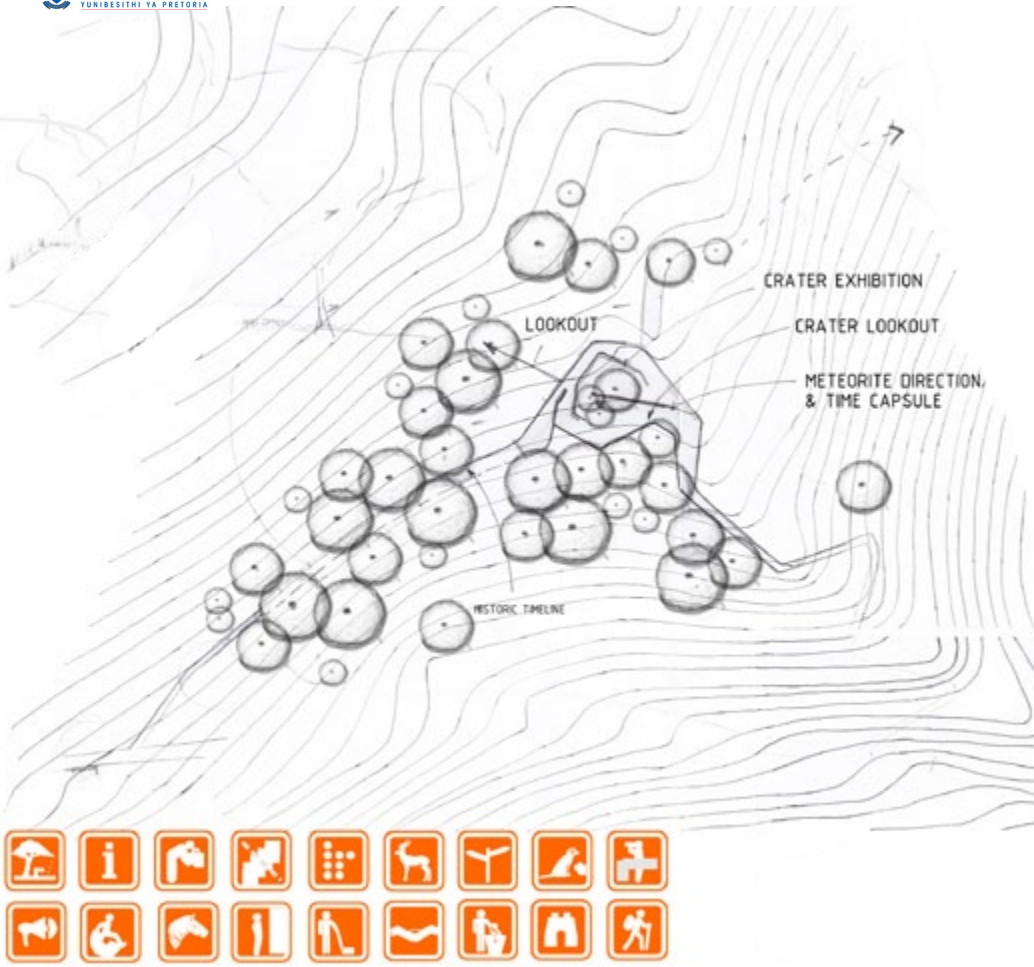


Fig. 6.19: Meteorite View. [Author, 2012]

[19] Hiking, Horse and Mountain Bike Trails

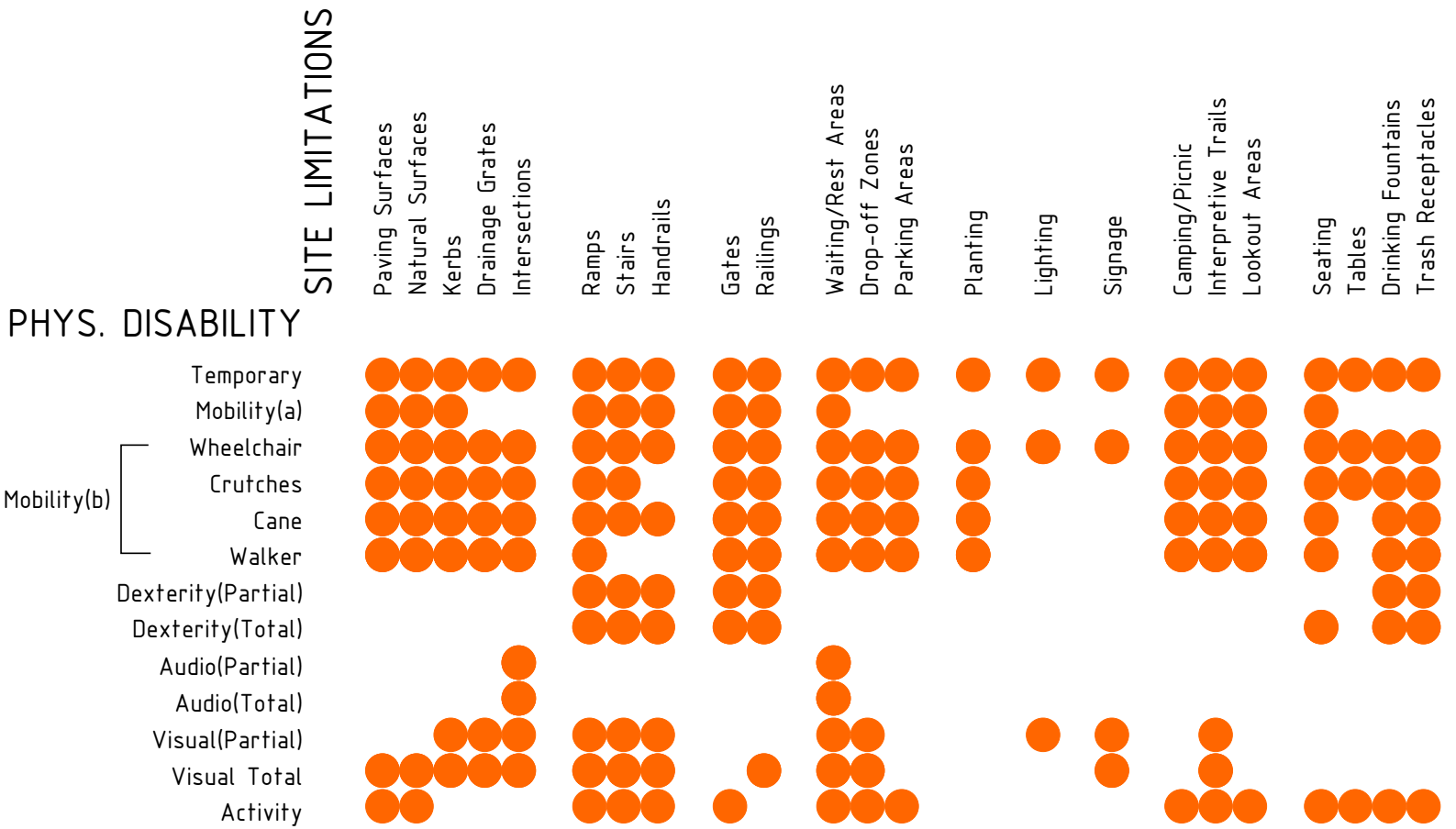
The trails proposed are all existing on site and no new trails are proposed as to conserve the ecology on site and reduce any unnecessary intervention or construction on site. These trails are present across the entire Tswaing reserve.

Materiality, Place and Form

Tswaing is owner to a collage of textures, materials, smells, forms and spaces. A friend, Jacqe, accompanied me on a site visit once and was romantisized by such an environment to close to the city. He was highly disappointed when he was unable to capture the experience, views and grandeur of the place with a camera.

The experience of Tswaing cannot be communicated successfully by photographs or the like, emphasizing the importance of capturing, conserving and celebrating the Tswaing. An analysis of the materiality and form is undergone to formulate a pallette of materials best suited for any new construction proposed.

Design Considerations influential to Accessibility



**Mobility(a): Partial paralysis not compensated for by ambulatory aids

**Mobility(b): Ambulatory aids

Fig. 6.20: Landscape elements regarding disabilities' matrix. [Author, 2012]

Design Guidelines for Accessibility

The accessibility audit has made it possible to identify it is important that:

- Signage be clear, simple or logical. Good contrast between lettering plus background, simple font it letter size. Use of tactile lettering and braille on signs that can be reached. Signage be regularly available. Signage conveys information about way-finding, facilities available, what to do in emergency and information about the site.
- Interactive plus innovative ways are used to convey information about site. That these appeal to a variety of senses.
- Floor surface must be even and non-slip in all weather. Gradient of ramped pathways are critical. Optimum 1:15 or 1:20, must include railings kerb and level landings.
- The journey to site be clearly sign posted and accommodate for both public and private transport.
- Sufficient designated parking for people with disabilities be provided and that these are located close to reception.
- Reception have a dropped section of the counter and that reception staff be trained to assist people with a variety of needs.
- Sufficient ablutions be provided for women (able bodied), unisex wheelchair available WC, as well as a family WC with facilities for nappy changing, and breast feeding. That the layout at wheelchair WC is critical and laid out according to standard.
- Resting areas must be provided at regular intervals and should be shaded. Seating, with space for wheelchair, pram and located off of path or trail.

Different levels provide for the opportunity for overlooking rather than being overlooked. The idea of platforms promotes sensory interaction and exhilaration at that level. Not only the notion of empowerment brought with the levels, the element of choice by making different pathways providing for the mindset of whichever individual moving through the landscape.

People will discover serendipity, taking great pleasure in finding, exploring and investigating an array of different textures, shapes, sounds, colours smells and feelings of awe and power when experiencing space and others from different heights and angles. Broadening their perspective of the environment and their surrounds.

The natural environment is rich with textures, and all individuals, especially the case with those individuals with visual impairments, rely on these attributes of nature to interpret and understand the natural environment, as an indication, these can include, the texture of leaves, trees, bark, soil, sand, rock, wind, water, bright coloured flowers and the smell of all of these collectively, simply touching on the prickles nature has for our senses.

Main paths must have a certain demarcating texture and as result, the sub-paths will have a different texture as to promote orientation and direction, further so indicating the change of a path's direction or the change of the path's slope (indicating an incline or a decline). Even though the seating and bins will be designed in a 'colourful' way, they must be recessed from the pathways as not to cause obstruction.

Low, raised flower beds also form a good way of directing people and also by doing so making plants easily accessible to all, to touch, smell and even taste. Nothing must restrict

a person's access to plants. Plants can be labeled in braille but in addition also in large lettering with high contrast as only ten percent of visually impaired people are braille readers. (Spurgeon, T & O'Connel, J. p30).

Walkways, trails and pathways should be slip resistant, firm, fixed of a textured material and maintained well. Water drainage and the removal of obstacles such as rocks, roots, branches and washed up soil and sand is important as to keep the trail as accessible as possible. Demarcation of edges of these paths must be indicated clearly and also be of differing colour and texture for optimal movement and directory indicators. Footpaths changing slope must have accompanying kerbs or at the extreme a handrail and where a hazard might be adjacent to the path, a rail of sort must always be present. Handrails, which must be maintained regularly and rigorously supported, as people tend to lean against them and hold on to them as they walk past or linger to look at and admire whatever is being crossed.

Textured paving is often used as a underfoot signal for visually impaired people to warn of a hazard, or change of direction, but people with artificial legs, wheelchair or crutch users can find textured paving difficult to use.

The benefits of improving access go beyond meeting legal requirements. It is an opportunity to attract new audiences, increase the likelihood of repeat visits and improve the quality of experience for all visitors.

An inclusive approach recognises everyone as a potential visitor. The challenge is to ensure that each visitor has an equally satisfying experience.

Simply following design regulations will not result in inclusive sites and facilities. Specifications are a starting point, but common sense and a creative approach are required to find solutions that work best within a historic landscape.

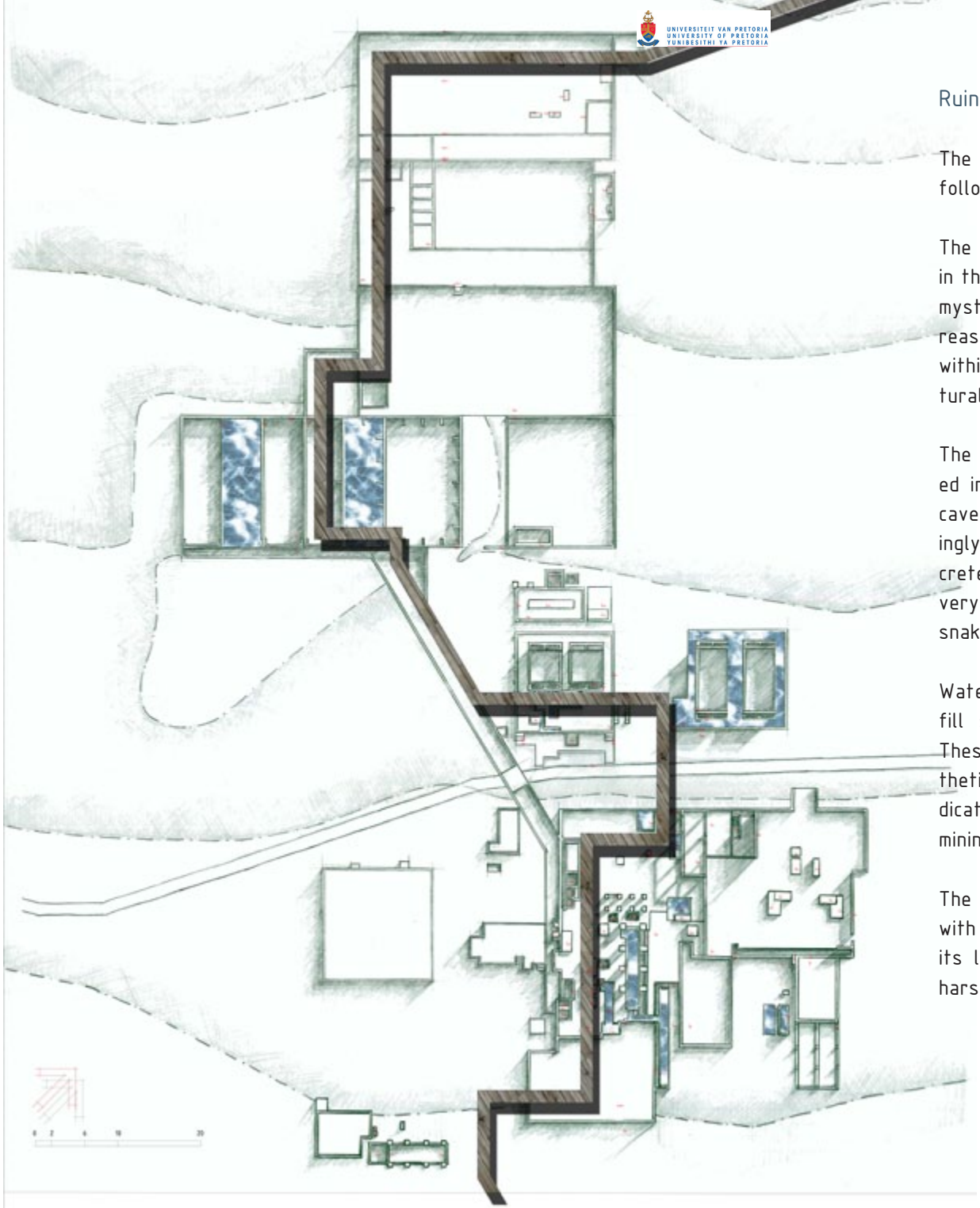
Of key importance is to achieve a balance between improving access and conserving the historic character and fabric. The focus is on enhancing the visitor experience, which may be achieved through low-key improvements and without major intervention.

The potential benefits of improving access need to be balanced with maintaining the integrity and authenticity of the historic landscape.This requires an understanding of the significance of the historic landscape. For example, its design and features, architecture, archaeology, historic and cultural associations, scientific or wildlife interest and role as an amenity.The aesthetic qualities of the historic landscape are equally important.

Access improvements should be in context with the design and qualities of a historic landscape, and major interventions should aim to be valued as features in their own right in the future. Conservation principles do not imply or rule out working in historic styles but do require respect for the significance of the historic landscape.

Masterplan Develpment

The Masterplan development now follows from which the detail design area is indicated. Diagrams indicating design decisions and spatial allocations conclude Chapter 6. Chapter 7 then initiates the detailed design of these chosen areas.



Ruin Catwalk Intervention Development

The catwalk meandering through the ruins follows the grid on which the ruins is built.

The catwalk does not extend to each area in the ruins as to promote the secrecy and mystery the ruins now have to offer. The reasoning for the catwalk type structure within the ruins is because of the structural integrity of the ruins itself.

The structure of the ruins is very degraded in some areas and hidden underground caverns pose a danger to anyone unknowingly walking over a piece of fragile concrete. The ruin and broken concrete create very favourable hiding place for poisonous snakes which enhabit Tswaing.

Water harvested on site will be used to fill some of the, still intact, chambers. These chambers will be used as an aesthetic appeal in the ruins but also to indicate the historic use of water in the mining process.

The catwalk is a lighweight steel structure with composite decking used because of its longevityand low maintenance and the harsh conditions of Tswaing.

Fig. 6.21: Ruin catwalkconceptual development (not to scale) [Author, 2012]

Masterplan

The masterplan focuses to reveal the narrative of Tswaing. The most important narrative nodes were identified in Chapter 3 and the Masterplan area chosen is the area where the most important or prominent plots of the narrative can be found.

To strengthen the narrative, smaller nodes along the route are proposed revealing smaller narratives present. Smaller nodes which may reveal certain plant species, exposed granite boulders or a hidden view into the crater or an expanse opened towards the communities of Soshanguve.

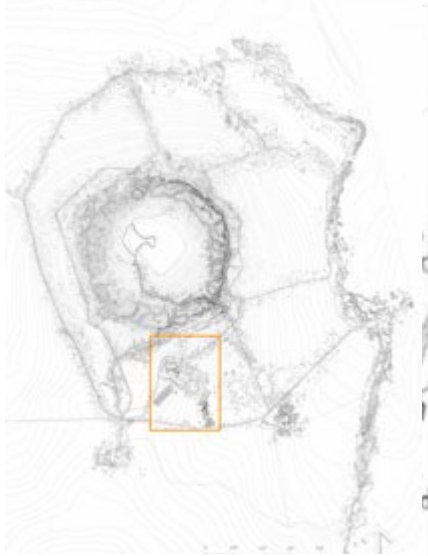


Fig. 6.22: Masterplan (not to scale) [Author, 2012]

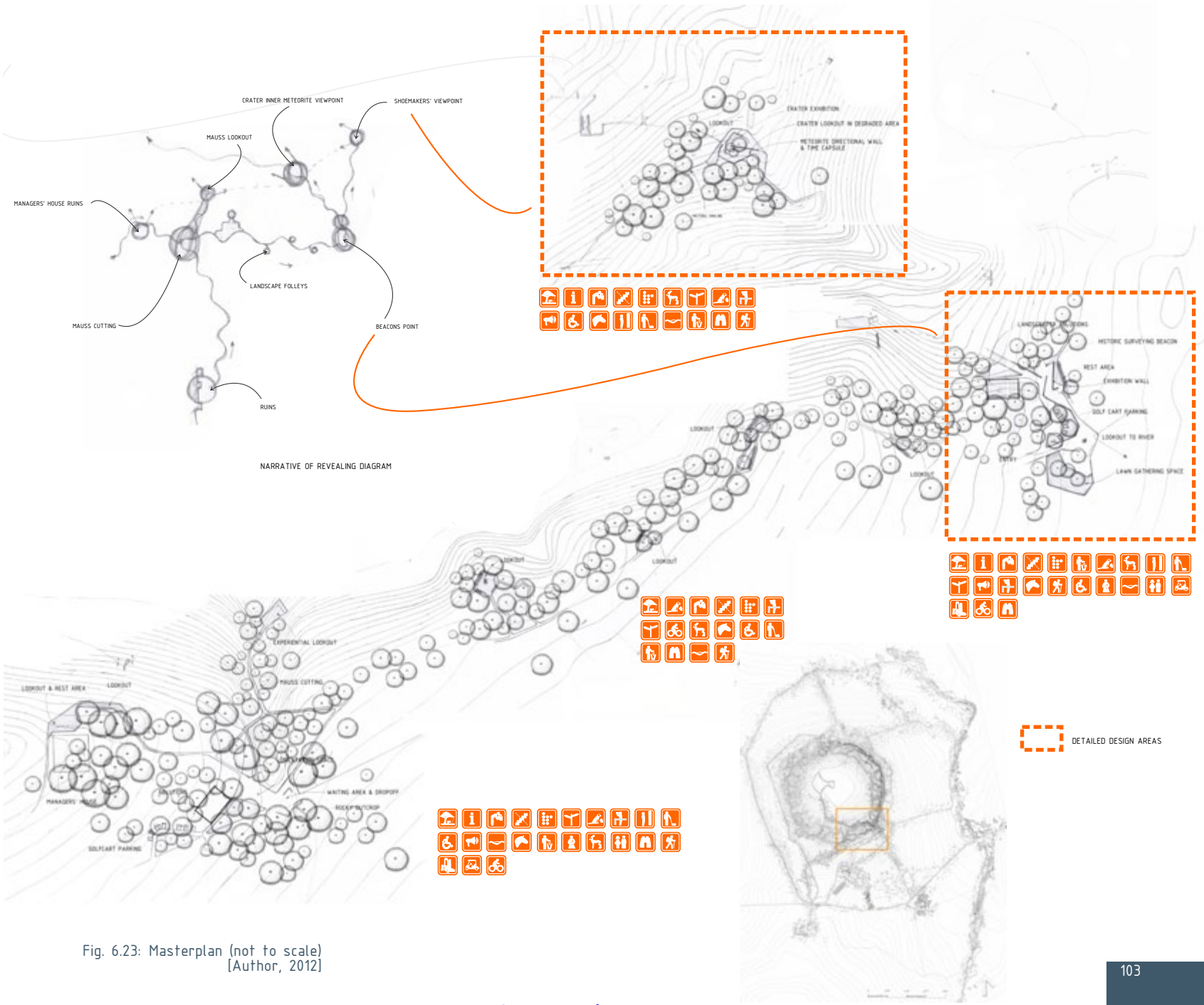


Fig. 6.23: Masterplan (not to scale)
[Author, 2012]

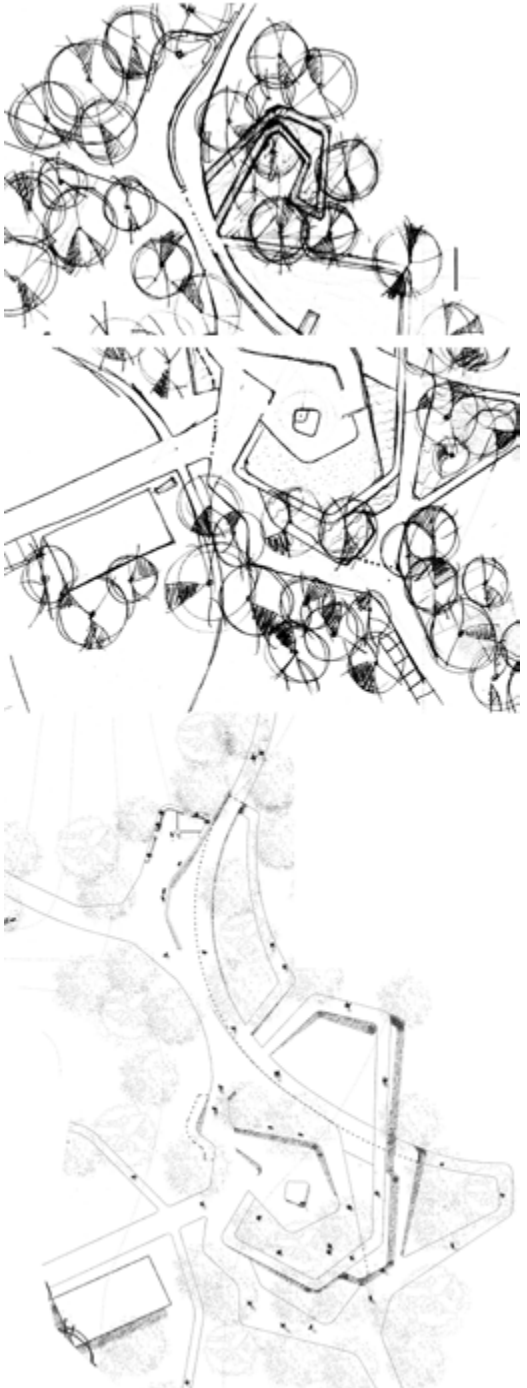


Fig. 6.24: Design exploration [Author, 2012]

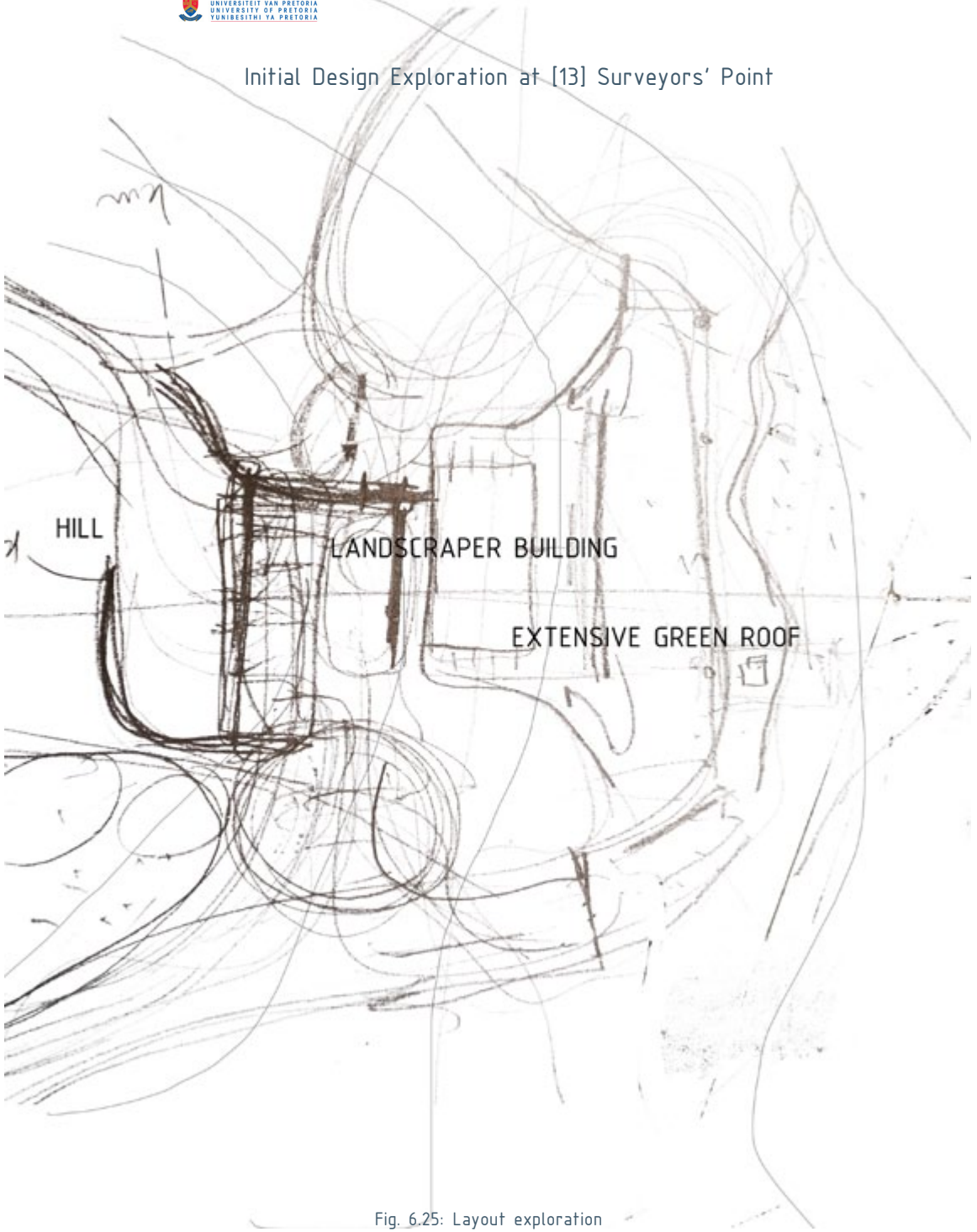


Fig. 6.25: Layout exploration

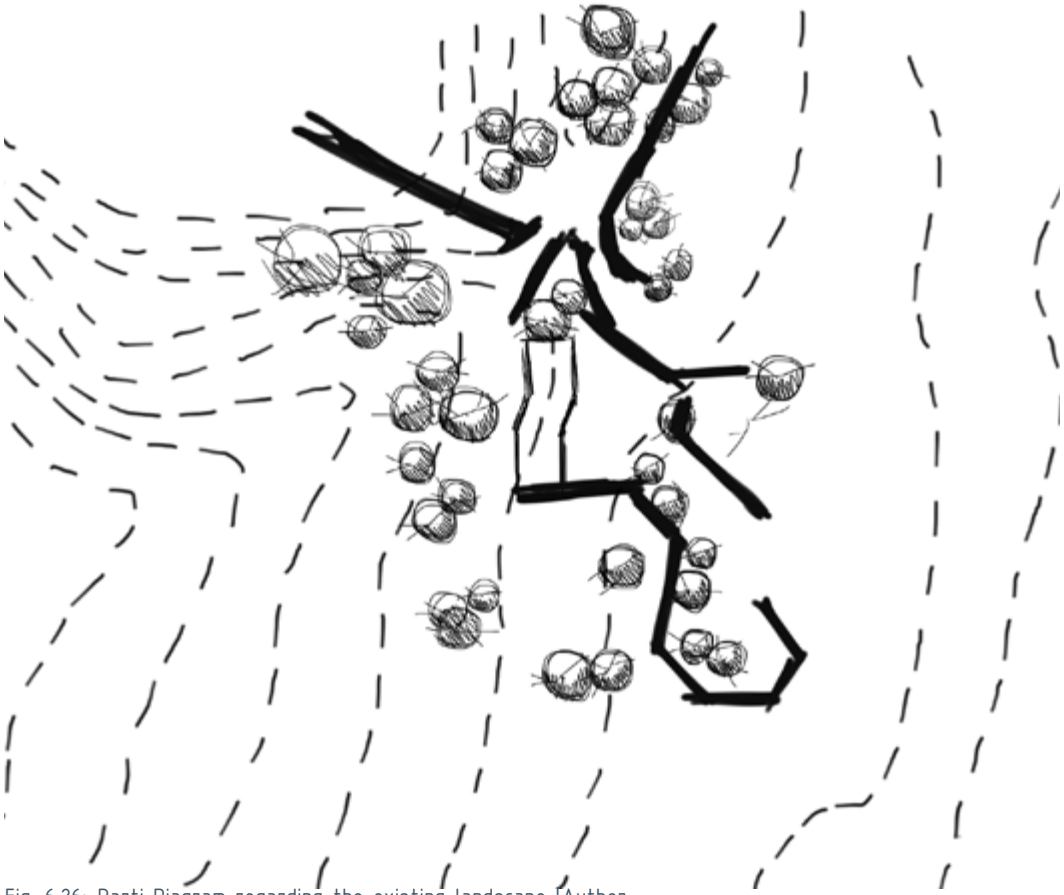


Fig. 6.26: Parti Diagram regarding the existing landscape [Author, 2012]

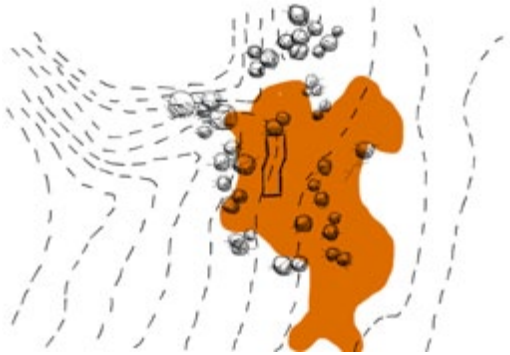


Fig. 6.31: Degraded Landscape [Author, 2012]

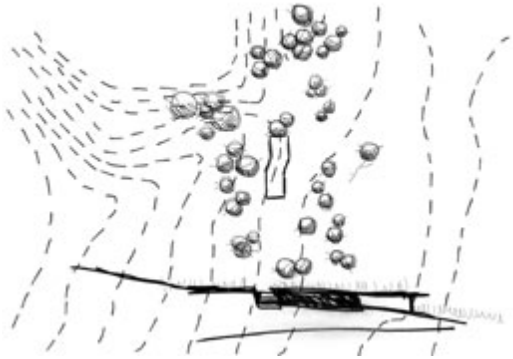


Fig. 6.30: Topography: Pulling the landscape over the building [Author, 2012]

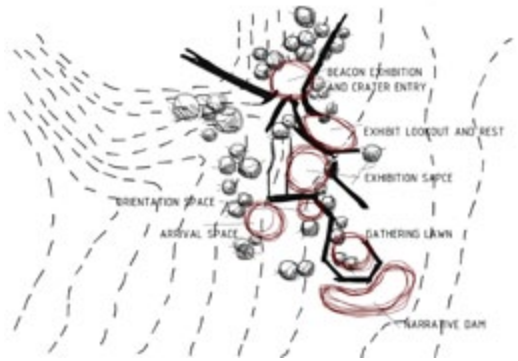


Fig. 6.27: Spaces created by a combination of nature, the green roof and hard landscaping [Author, 2012]

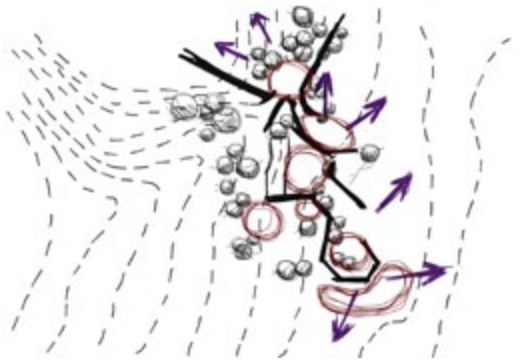


Fig. 6.28: Views into the landscape [Author, 2012]

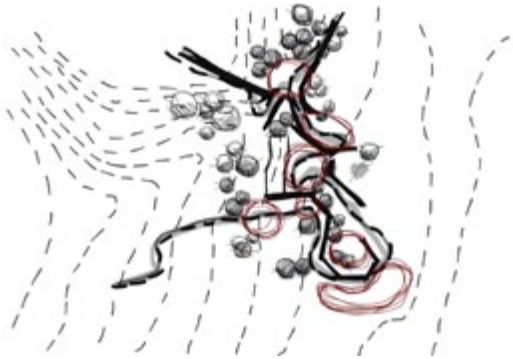


Fig. 6.29: Parti Diagram [Author, 2012]

Fig. 6.32: Design manifestation [Author, 2012]

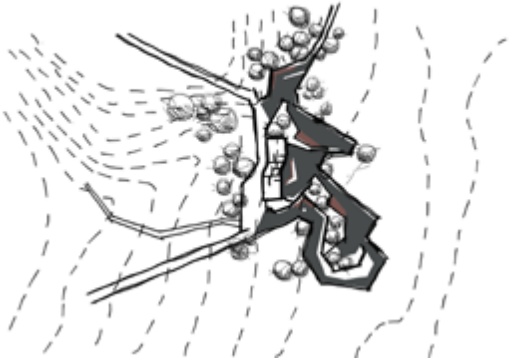


Fig. 6.37: Paving changes indicating movement or lingering [Author, 2012]

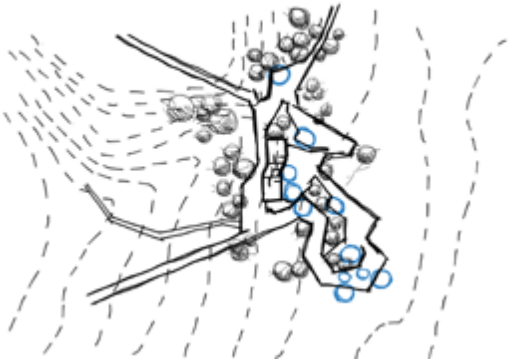


Fig. 6.36: Rest areas [Author, 2012]

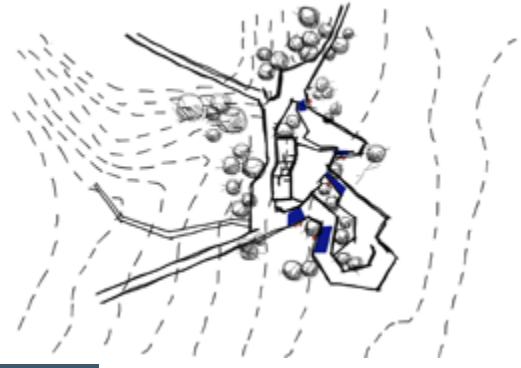


Fig. 6.33: Level changes [Author, 2012]

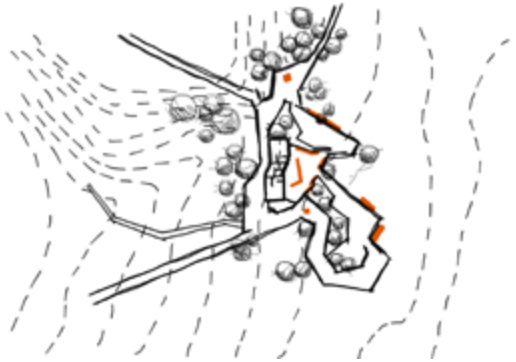


Fig. 6.34: Exhibition areas [Author, 2012]

Fig. 6.35: Planters with endemic plants [Author, 2012]

Fig. 6.38: Roof planting [Author, 2012]

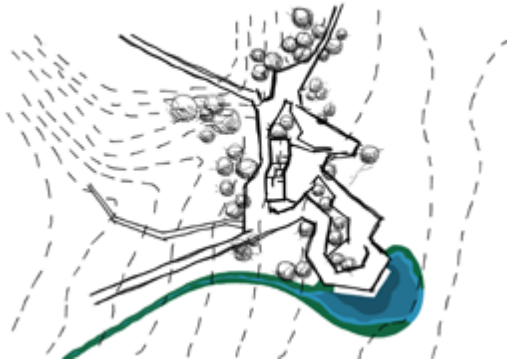


Fig. 6.39: Dam and Soutpans river narrative [Author, 2012]

Form Generators

The above diagrams are indicative of the positioning of the detail design area.

Cultural reasons are that this area is where the historic entrance to the crater lay and also the surveying beacon from which the farm was divided. The beacon is also the naming agent of this node within the narrative route. Hence :

''Surveyors' Point".

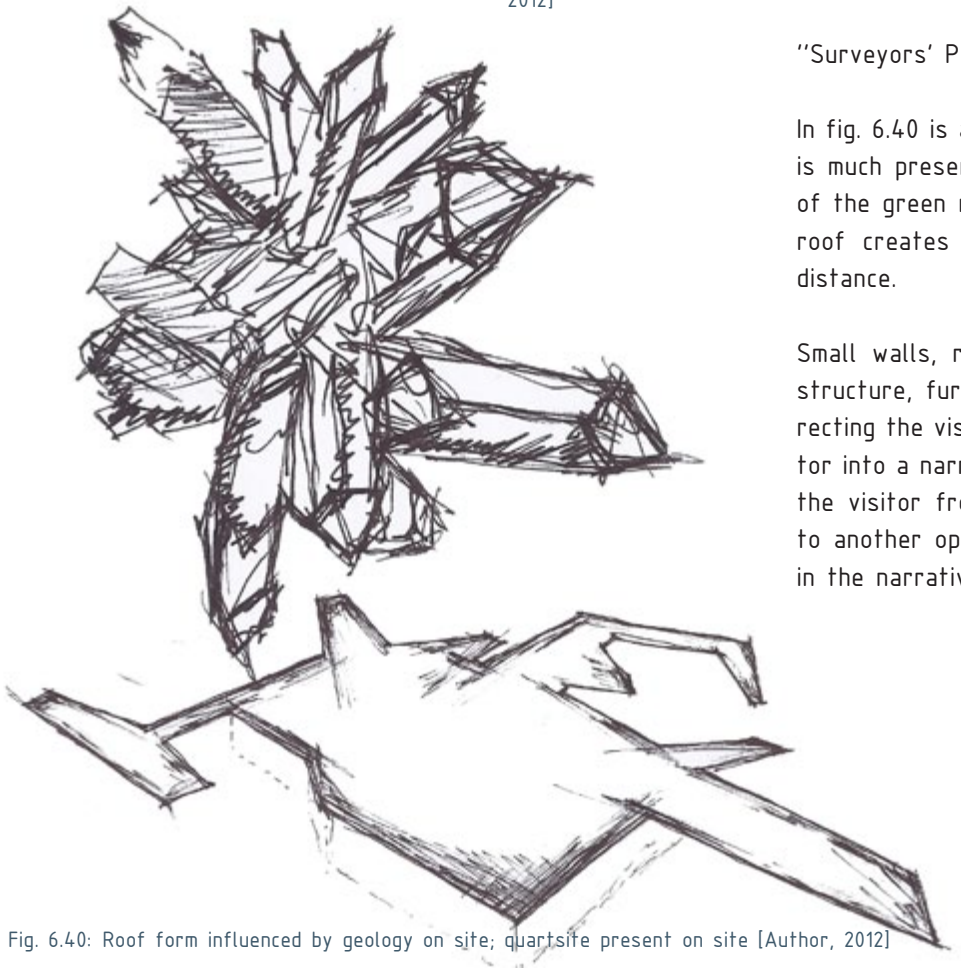


Fig. 6.40: Roof form influenced by geology on site; quartsite present on site [Author, 2012]

In fig. 6.40 is a drawing of a quartsite crystal, of which there is much present in the granite composition on site. The form of the green roof is derived from the crystal structure. The roof creates gateways into spaces and is inviting from a distance.

Small walls, retaining walls along with the aid of the roof structure, further enforces the narrative by leading and directing the visitor. One example of this is to channel the visitor into a narrowing pathway when the roof slants down over the visitor from which the pathway then suddenly opens up to another open space. By so creating supsense and tension in the narrative.





HISTORIC TECTONICS

MATERIAL PALETTE

1. Exposed aggregate concrete with fly-ash (reducing carbon footprint) chosen for pathways and roads. Granite on site will be used as aggregate. Initial costs are justified by its life span and virtually no maintenance required.
2. Composite decking will be used for catwalks within the ruins and decked areas as well as a seating material. The harsh conditions on site seeks to promote materials less fragile to the forces of nature. The composite decking has a long lifetime and barely any maintenance is necessary. Readily available.
3. Mild steel is applied in a number of ways. Screening, signage, bollards, paving inlays etc. The steel is left untreated and allowed to rust to blend into the tectonics of Tswaing. A main material historically used at Tswaing.
4. Broom textured concrete used in seating areas to clearly distinguish between rest and lingering areas and the main pedestrian circulation route.
5. Smooth unsealed concrete for main circulation routes in the Surveyors' Point main design area.
6. Grinded concrete used in sloped (min 1:15) areas to establish grip when moving up or down.
7. Wood off-shutter concrete proposed for all vertical structures and walls made of concrete. Historically most of the structures, specifically in the salt mine ruins, all concrete structures used interesting materials, such as corrugated iron as off-shutter material. I opted to use a more natural material for this purpose and it creates an alluring texture behind.
8. 'Pink' Nebo granite tiles. Nebo granite is the granite present on site. The tiles will be used as an edging material and also between surface changes.
9. 'Red' pigmented concrete is used for the lookout platforms, as a frame to the canvas (landscape) it is framing

PLANTING STRATEGY

All plant species chosen are endemic to the area and form part of the Springbokvlakte biome. Alien vegetation are to be removed and effected areas rehabilitated to establish a pristine environment. The species chosen promote a planting scheme which is simply and extension of the surrounding environment which is sustainable and requires very little maintenance.

A. Combretum microphyllum - creeper used to soften the edges and visual impact of the extensive Green roof.
B. The trees are all existing trees and if a tree had to be planted, one of the following endemic trees would be planted : Combretum *apiculatum*, Acacia *nilotica*, Acacia *tortillis* or the Ziziphus *mucronata*.
C. Aloe zebrina. Small flowering aloe endemic to the area, used to soften the edges of the extensive green roof and planters. Flowering in winter when the veld grass on the roof is cut.
D. Aloe greatheadii. Small flowering aloe endemic to the area, used to soften the edges of the extensive green roof and planters. Flowering in winter when the veldgrass on the roof is cut.
E, F, G, H. Endemic veld grass which encompasses a large part of the planting proposal in combination with aloes and combretum microphyllum mentioned. Cymbypgon *excavates*, Hypparrhenia *tamba*, Melinis *nerviglumis* and Melinis *repens*

7

Technical Investigation

Fig. 7.1: Water colour exploration. [Author, 2012]

Fig. 7.2: Sketchplan 1:200 on A1. [Author, 2012]

Surveyors' Point

The area chosen as my detail design area is the historic crater entry and the historic cornerstone-surveying beacon where the farm of Zoutpan was resurveyed in 1953. Hence my naming of this area as Surveyor's Point. This point will in many cases be the visitor's first glimpse of the crater itself.

The aim was to establish surveyors point as an exhibition space that reveals the natural environment and cultural landscape, thereby heightening the visitor's experience. The archi-

tecture acts as a framing device: highlighting important elements, both tangible and intangible, in the landscape.

When designing Surveyer's Point keen attention was paid to the topography and existing trees. The area was found to be degraded and formed a small plateau suitable for the intended intervention.

The proposed ablutions cut into the landscape, the roof of which forms an extension of the hill vegetation it cuts into. The roof's angular shape is a metaphor for the abundance of quarts crystals in the nebo granite on site. The structure then further creates dynamic spaces and gateways to other spaces at Surveyors' point.

The supporting elements act further as the exhibition space.

The landscape of Tswaing is naturally undulating and at times quite severe changes in level are encountered. The pathways follow the natural gradient where comfortable for all visitors. While in areas that are too steep: the pathway is constructed so as to ensure gradients of 1:20 up to 1:15. This specifically takes into consideration people in wheelchairs.

Between the various look out points, rest areas are introduced at regular intervals along the path. As well as in nodes such as Surveyer's Point, these are designed so as to allow both ambulatory and wheeled visitors

Fig. 7.3: Sketchplan 1:100 on A1 [Author, 2012]

Fig. 7.4: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.5: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.6: Section A-A. [Author, 2012]

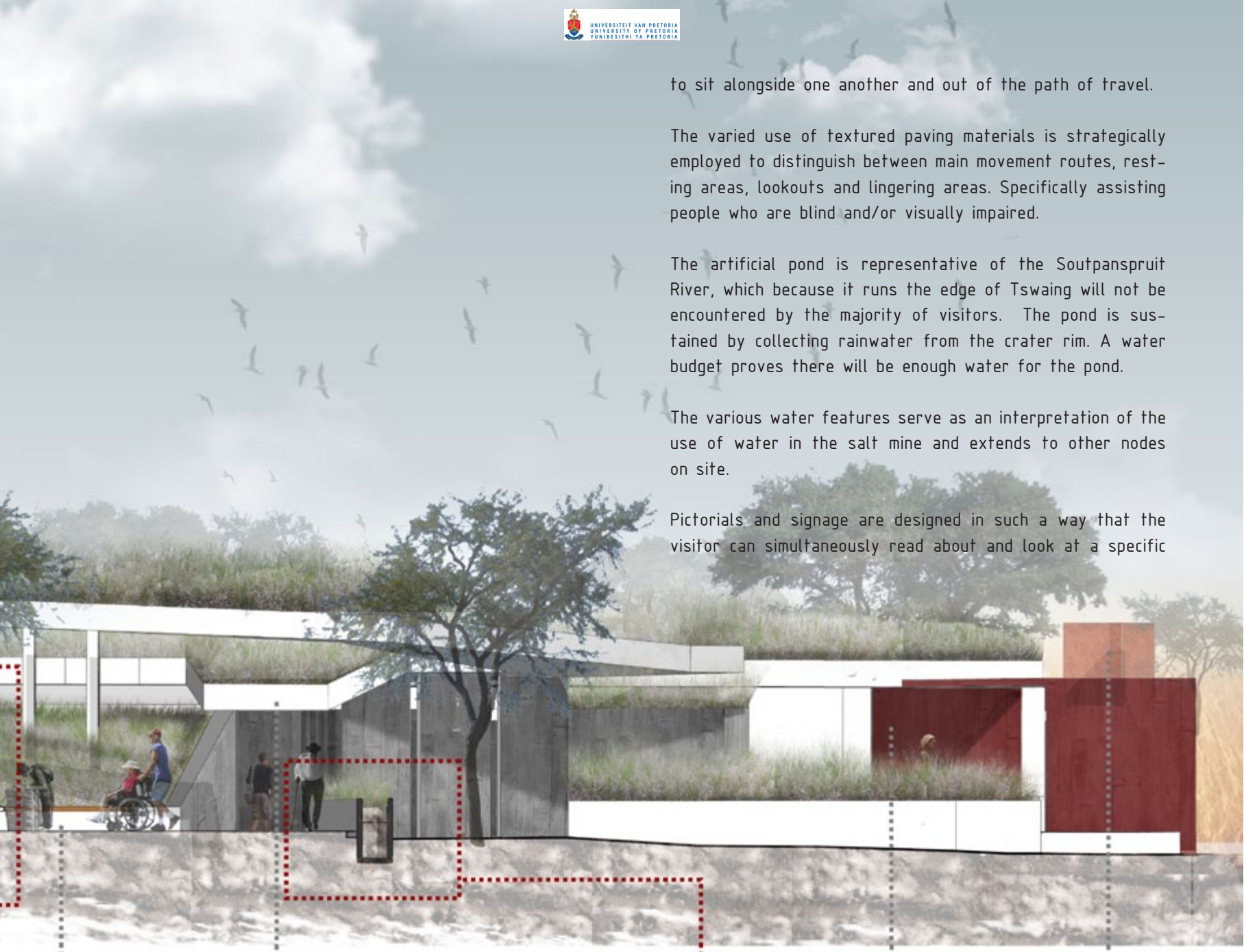
to sit alongside one another and out of the path of travel.

The varied use of textured paving materials is strategically employed to distinguish between main movement routes, resting areas, lookouts and lingering areas. Specifically assisting people who are blind and/or visually impaired.

The artificial pond is representative of the Soutpanspruit River, which because it runs the edge of Tswaing will not be encountered by the majority of visitors. The pond is sustained by collecting rainwater from the crater rim. A water budget proves there will be enough water for the pond.

The various water features serve as an interpretation of the use of water in the salt mine and extends to other nodes on site.

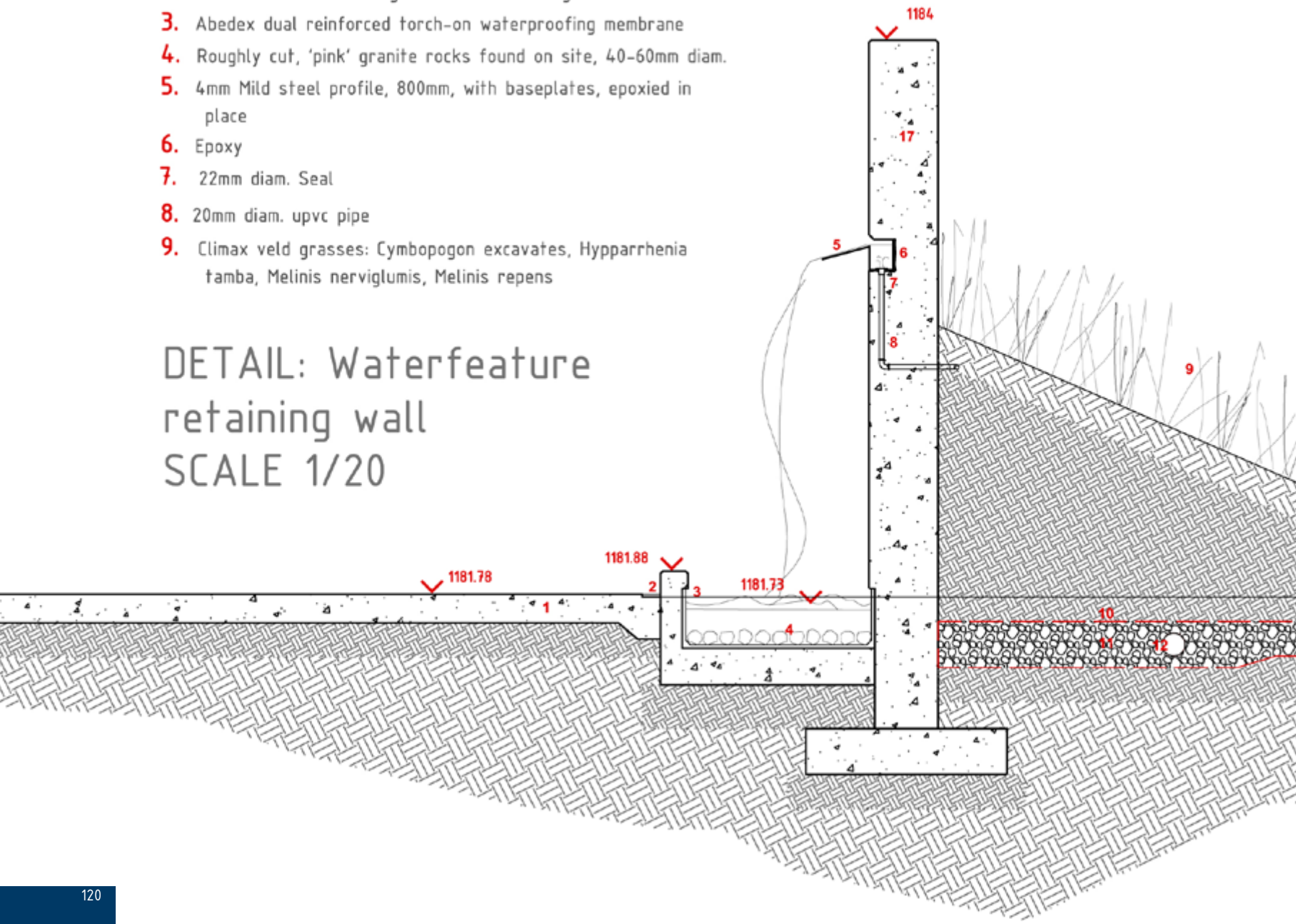
Pictorials and signage are designed in such a way that the visitor can simultaneously read about and look at a specific



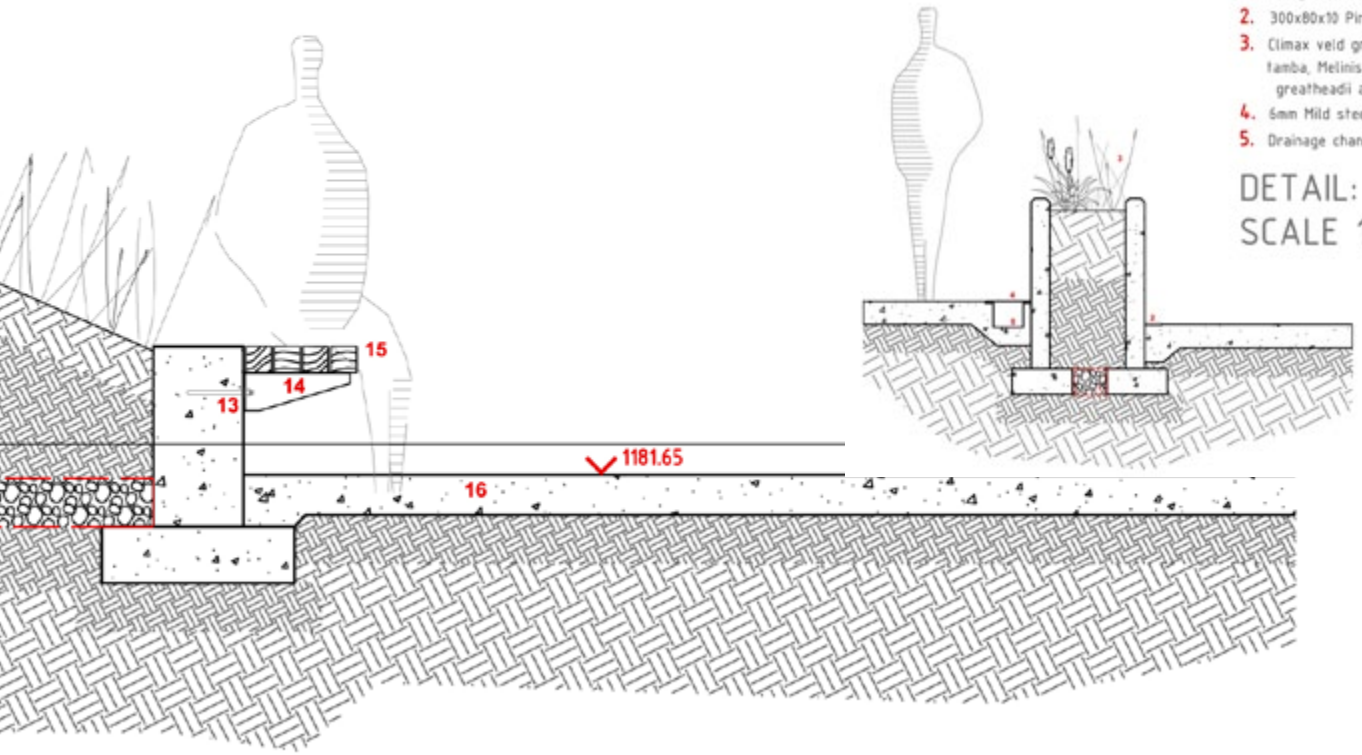
DETAIL: Planter

1. 125mm Cast in-situ concrete paving with smooth, raw finish
2. 300x80x10 'Pink' Nebo granite tile with rough finish
3. Abedex dual reinforced torch-on waterproofing membrane
4. Roughly cut, 'pink' granite rocks found on site, 40-60mm diam.
5. 4mm Mild steel profile, 800mm, with baseplates, epoxied in place
6. Epoxy
7. 22mm diam. Seal
8. 20mm diam. upvc pipe
9. Climax veld grasses: Cymbopogon excavates, Hypparrhenia tamba, Melinis nerviglumis, Melinis repens

DETAIL: Waterfeature retaining wall
SCALE 1/20



10. Geotextile
11. Course stone and gravel
12. 100mm diam. Geopipe
13. Cast in-situ bolt cage, 16mm diam.
14. 4mm Flanged steel angle
15. 80x80x1500mm EcoWood, light grey, composite wood
16. 125mm Cast in-situ concrete paving with exposed aggregate finish
17. 300x2400 Wood off-shutter retaining wall to engineer specification. Rough wood grain finish



1. Rough stone and gravel wrapped in a geotextile
2. 300x80x10 Pink granite tile with rough finish
3. Climax veld grasses: Cymbopogon excavates, Hyparrhenia tamba, Melinis nerviglumis, Melinis repens. Small Aloes: Aloe greatheadii and Aloe zebrina
4. 6mm Mild steel mild steel drainage grit, cut to profile
5. Drainage channel

DETAIL: Planter
SCALE 1/20

 Fig. 7.7: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.8: 3D Views [Author, de Swardt. J, 2012]

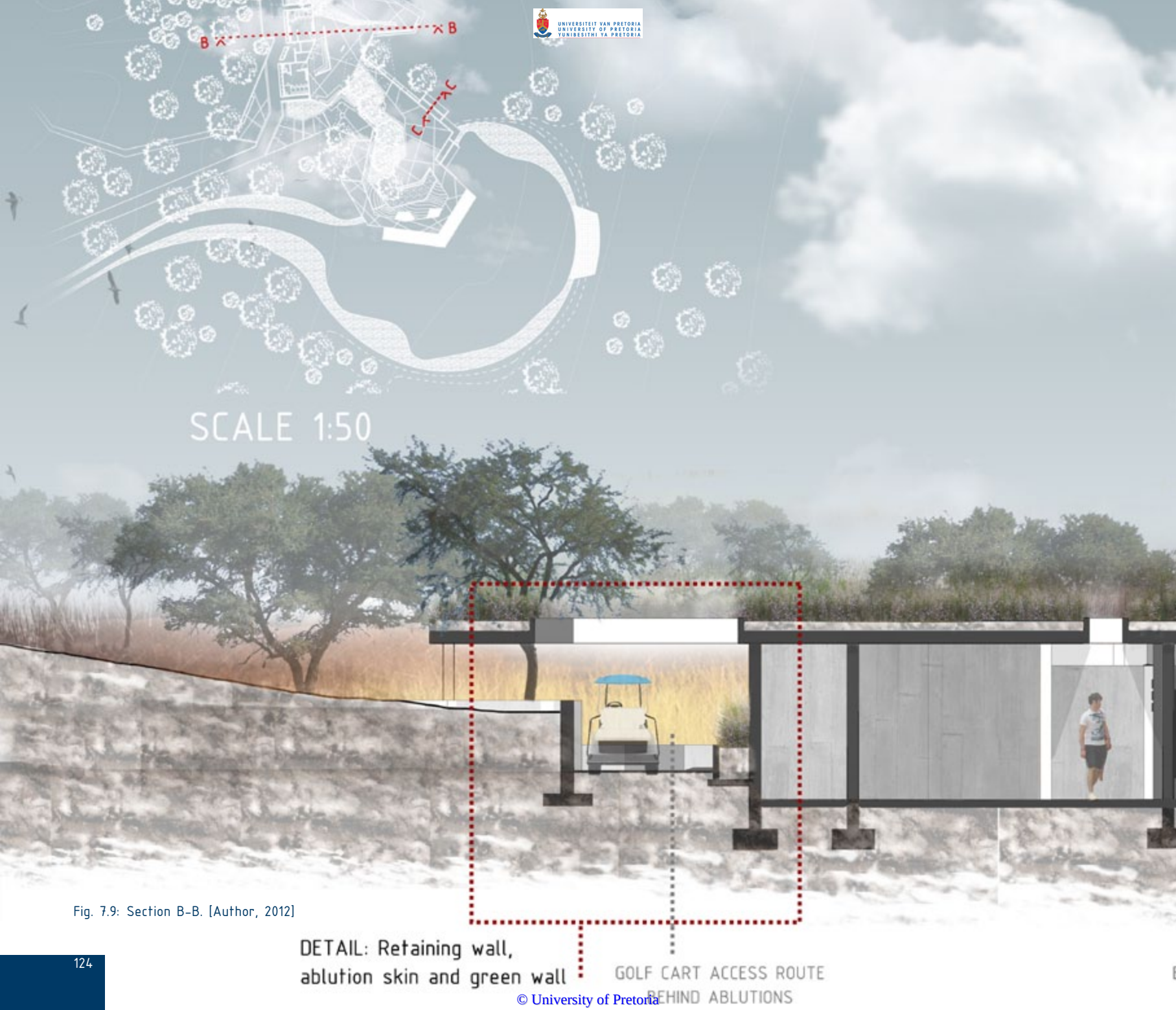
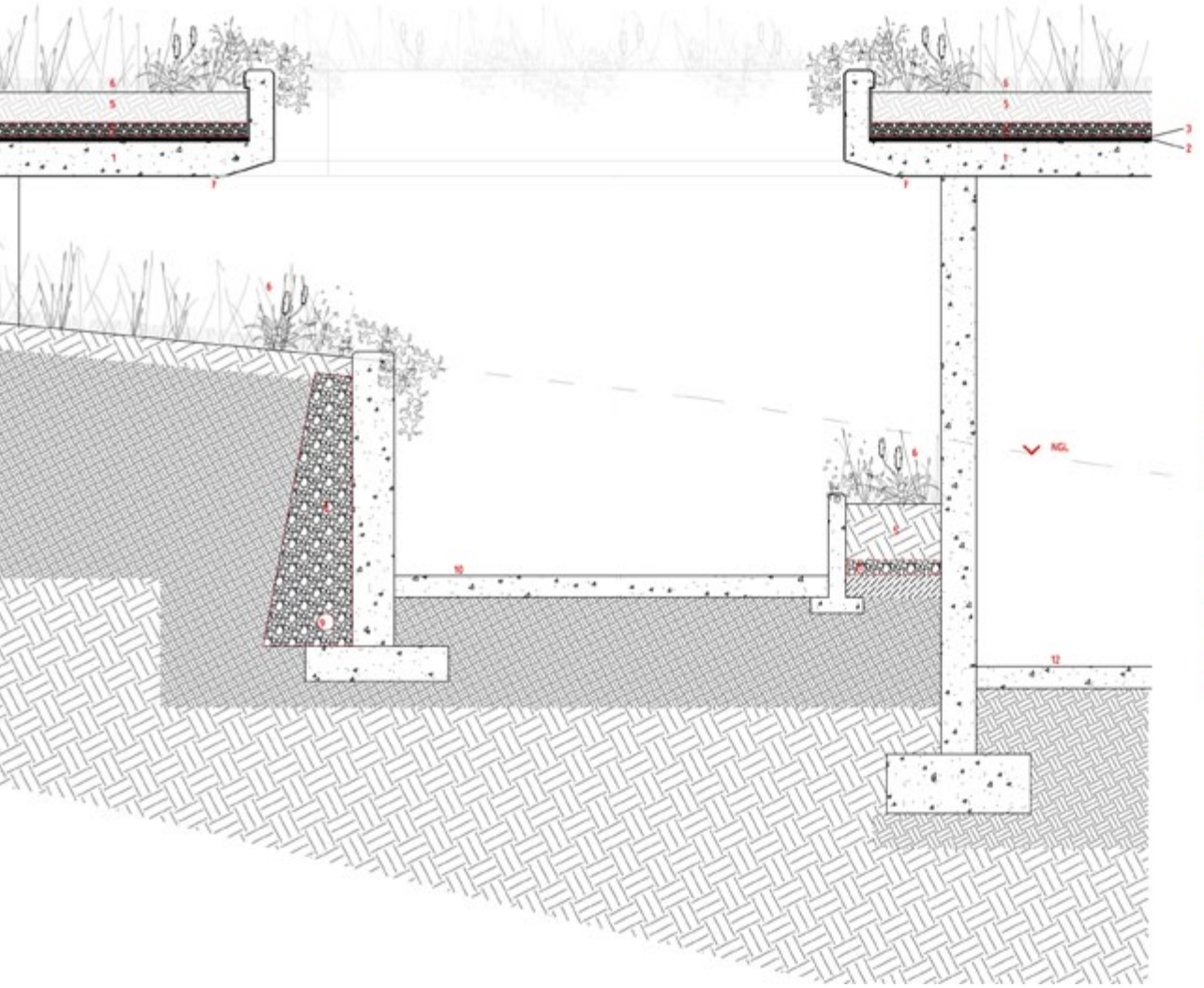


Fig. 7.9: Section B-B. [Author, 2012]

feature in the landscape. The mild steel signage panels will be engraved as ink or laminated signage weather, moreover rendering the signage tactile for visually impaired readers. Braille is added for blind visitors.

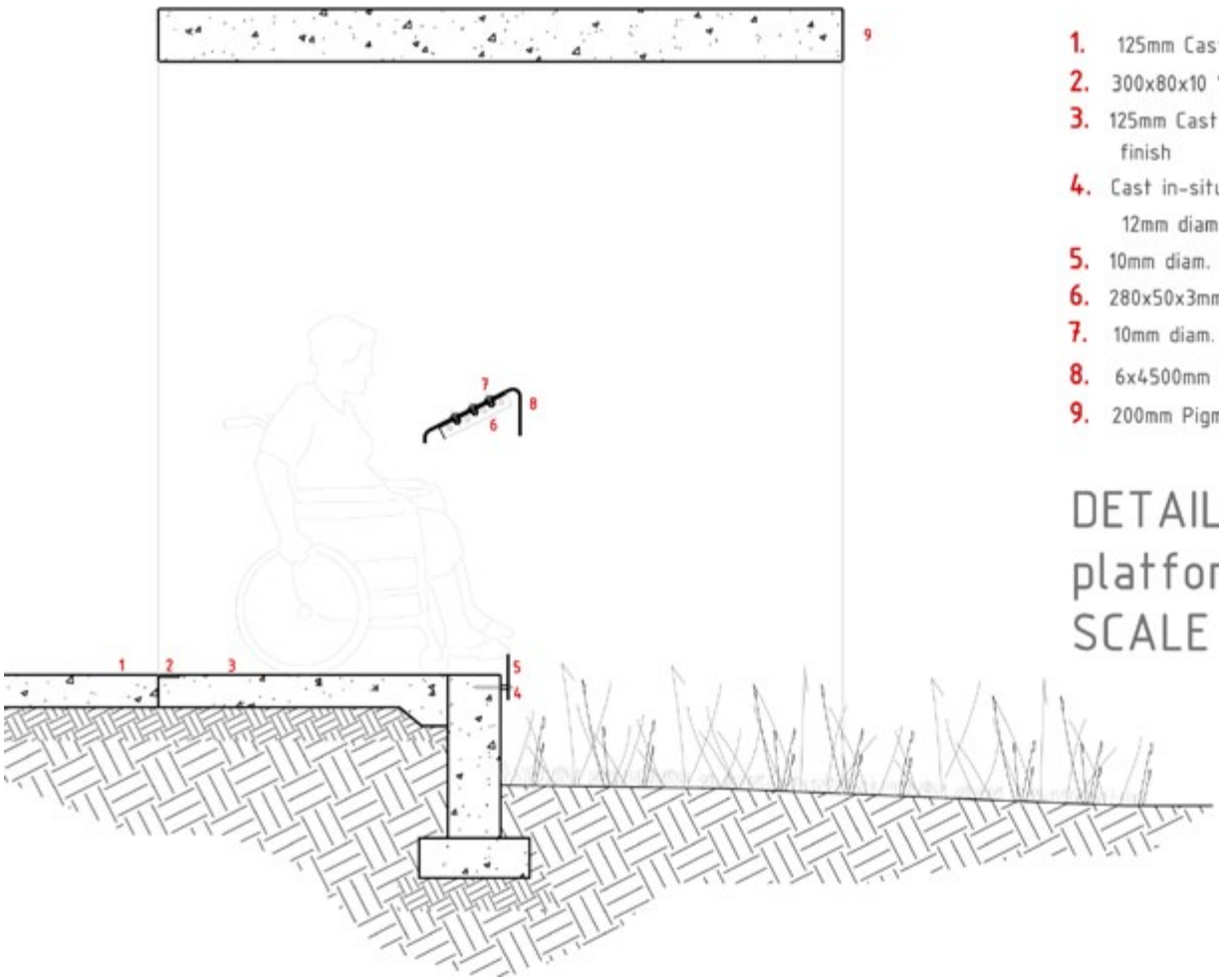
Planting is low maintenance and simply an extension of the endemic, surrounding plant species. Plants are planted in planters and seating beds making the plants comfortably accessible to all.

Planting on the roof is predominantly the endemic veldgrass accompanied with a 800mm edge around, made up of small aloes, such as the greatheadii and zebrine in combination with the combretum microphyllum woody creeper. The reason being the veldgrass that has to be cut in winter which alone will leave the roof bare and to soften the roofs' edge.



1. 200mm Reinforced concrete slab
2. Cement screed to slope min. 2% to full bore
3. Abedex dual reinforced torch-on waterproofing membrane
4. 75mm Drainage blanket of 19mm gravel wrapped in a geotextile
5. 200mm min planting medium with expanded vermiculite
6. Endemic veld grasses: Cymbopogon excavates, Hyparrhenia tamba, Melinis nerviglumis, Melinis repens. Small Aloe species, Aloe greatheadii, Aloe zebrina
7. 10mm Drip line
8. Rough stone and gravel wrapped in a geotextile
9. 100 mm diam. Geopipe
10. 125mm Cast in-situ concrete paving with exposed aggregate finish
11. Rough stone and gravel wrapped in a geotextile
12. 125mm Cast in-situ concrete floor with smooth, raw finish

DETAIL: Retaining, ablution skin and green roof B-B
SCALE 1/20



1. 125mm Cast in-situ concrete paving with smooth, raw finish
2. 300x80x10 'Pink' granite tile with rough finish
3. 125mm Cast in-situ concrete paving with exposed aggregate finish
4. Cast in-situ bolt cage, 10mm diam. 30mm mild steel spacer, 12mm diam.
5. 10mm diam. Bolt with rounded head
6. 280x50x3mm Mild steel angle
7. 10mm diam. Bolt with rounded head
8. 6x4500mm Mild steel profile hot rolled to specification
9. 200mm Pigmented (red) wood off-shutter concrete

DETAIL: Pictorial lookout platform C-C
SCALE 1/20

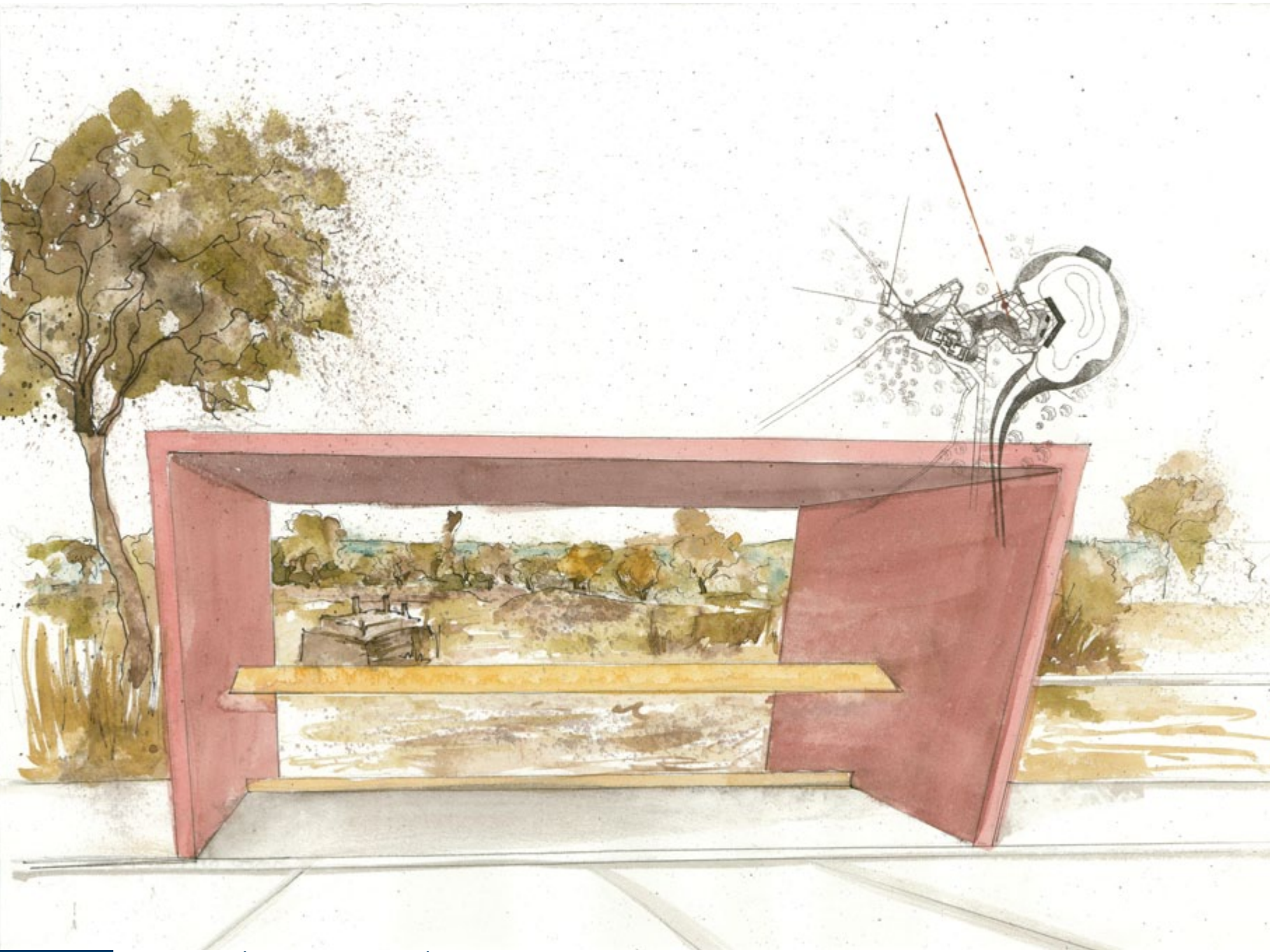


 Fig. 7.10: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.11: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.12: Section D-D. [Author, 2012]

A golf cart drop-off area and road runs at the back of Surveyors' point, minimizing vehicular and pedestrian interaction. Bicycle racks are also stationed at the golf cart dropoff: Surveyer's Point being where the cycling path and the hiking trail meet with the general walking trail.

A pocket size Senheizer (guideport): a device that enables you to listen to an audio version of the narrative is also available. These devices are easy to use and activates itself when moving into different spaces. These devices can be used by all, but are specifically available for visually impaired and blind visitors.

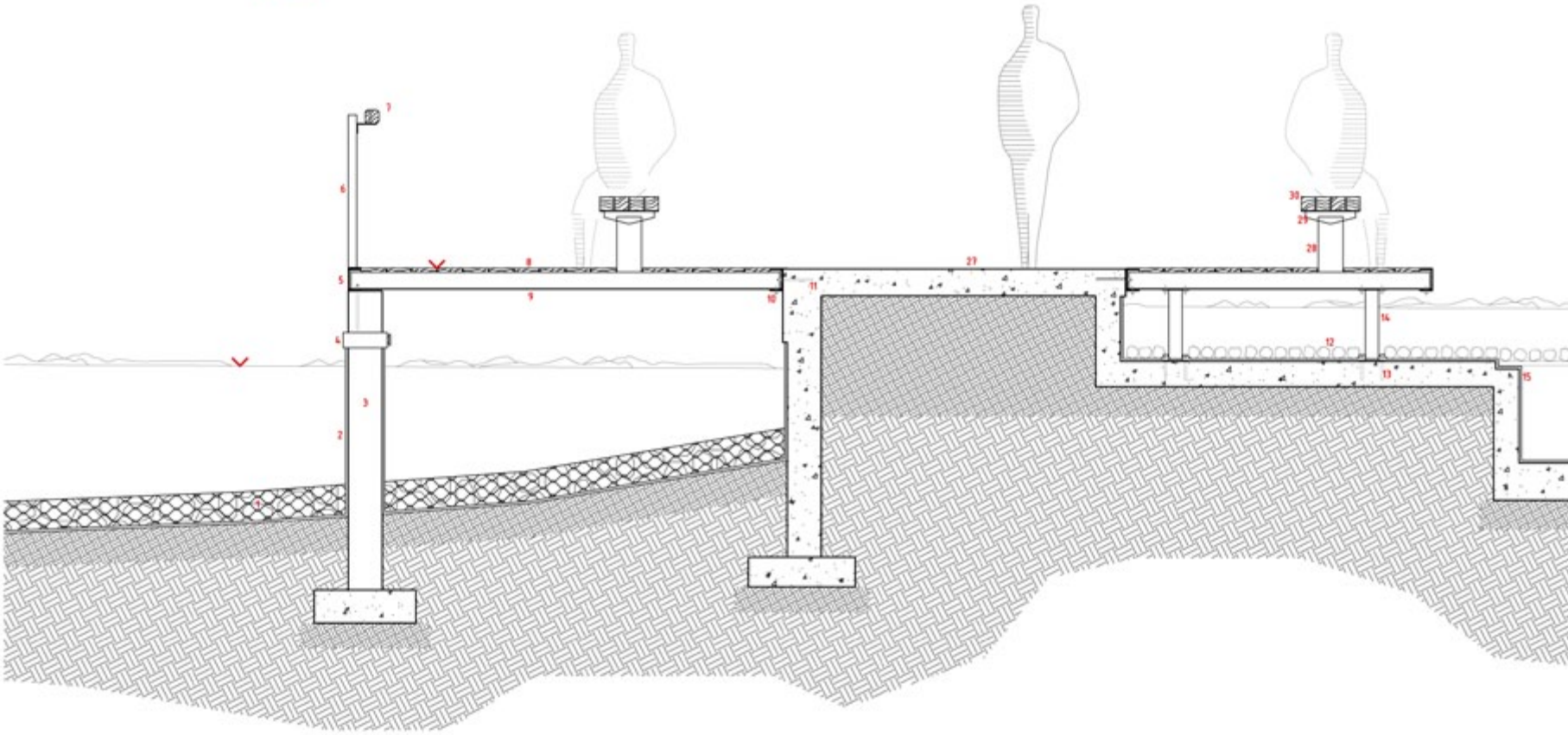
The surveying tower sits on top of the historic beacon, enforcing the idea of a beacon in the landscape whilst the history and pictorial of the beacon is engraved on the mild steel structure.

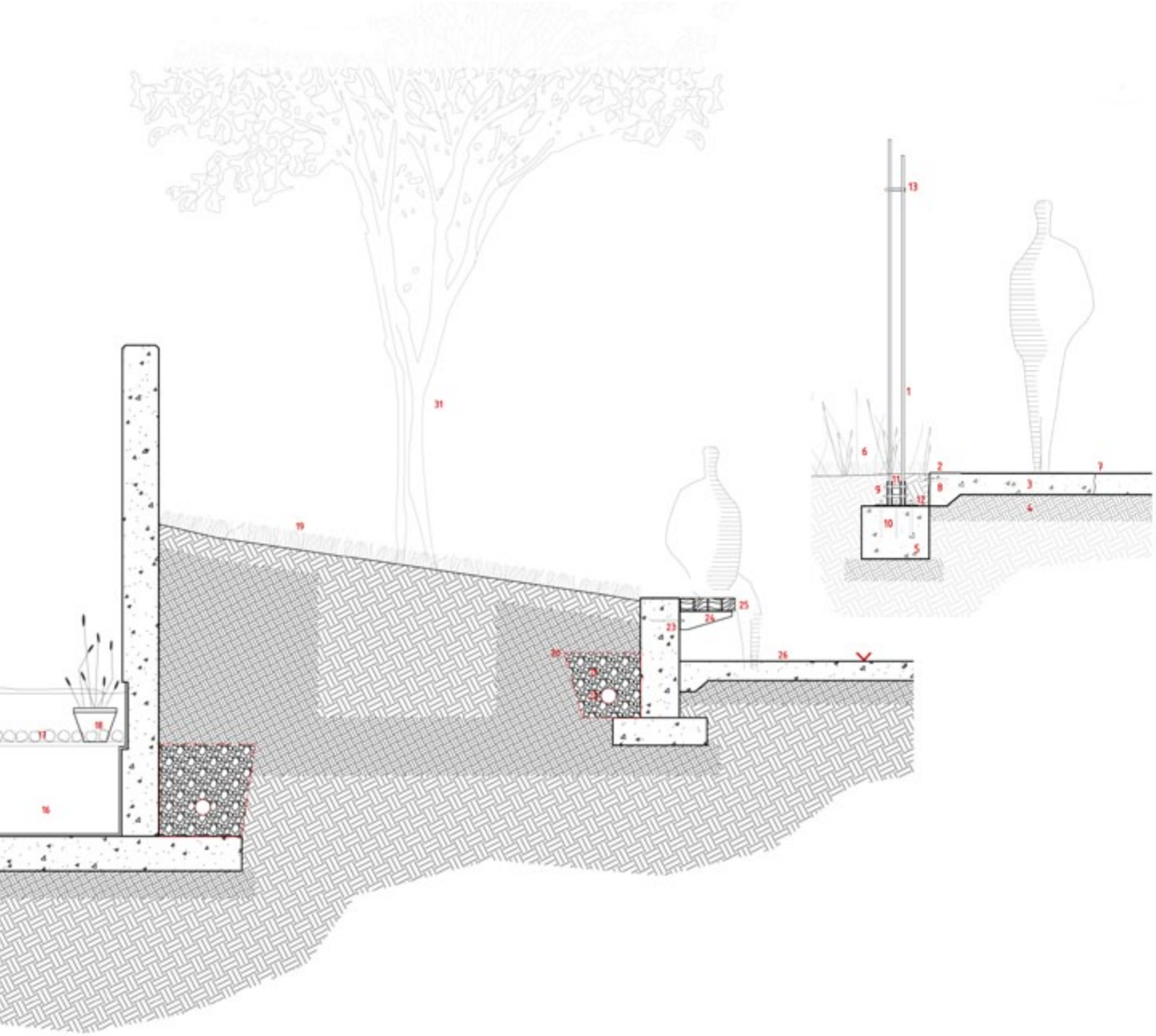
The mild steel radials in the paving are indicative of the actual historic division of the farm in 1953.

Once you have made your way through Surveyer's Point, past the Surveying Beacon, the visitor can then continue on to the crater or venture along the crater rim, further unraveling the mystery of Tswaing.

1. 170x3000x2000mm Reno-mattress, min 100mm crusher stone, max 200mm crusher stone.
2. Enviromat
3. Concrete column, 200mm diam.
4. Stainless steel clamp, 190mm min diam.
5. 150PFC hot rolled mild steel channel profile, untreated
6. 75TFC hot rolled mild steel channel profile with 3mm basplate, welded to 150PFC, untreated
7. 80x80x1500 rounded corner, EcoWood, light grey, composite wood, fixed with 5mm galvanized wood srews to 3mm mild steel angle, untreated
8. EcoWood light grey(Riverine) composite deck : 146x1500x23mm
9. 100x50x25x3 Top-Hat steel profile
10. Bolt, 16mm diam
11. Cast in-situ bolt cage, 18mm diam.
12. Roughly cut, 'pink' granite rocks found on site, 40-60mm diam.
13. Cast in-situ bolt cage, 16mm diam.
14. 80x80x400 steel profile with a 150x150 baseplate welded onto each end
15. Abedex dual reinforced torch-on waterproofing membrane
16. Pump chamber
17. 1200x1200x300 steel grid
18. Juncus effusus in a pot
19. Cynodon dactylon lawn
20. Geotextile
21. Course stone and gravel
22. 100mm diam. Geopipe
23. Cast in-situ bolt cage, 16mm diam.
24. 4mm steel angle with a flange
25. 80x80x1500mm EcoWood, light grey, composite wood
26. 125mm Cast in-situ concrete paving with exposed aggregate finish
27. 125mm Cast in-situ concrete paving with smooth, raw finish
28. 146x60x320x4mm mild steel profile welded to top-hat deck frame
29. 4mm mild steel angle cut to profile, bolted to rectangular mild steel (tube) profile
30. 80x80x1500mm EcoWood, light grey, composite wood
31. Combretum *apiculatum*

DETAIL: Dam and water channel edge conditions
SCALE 1/20 D-D



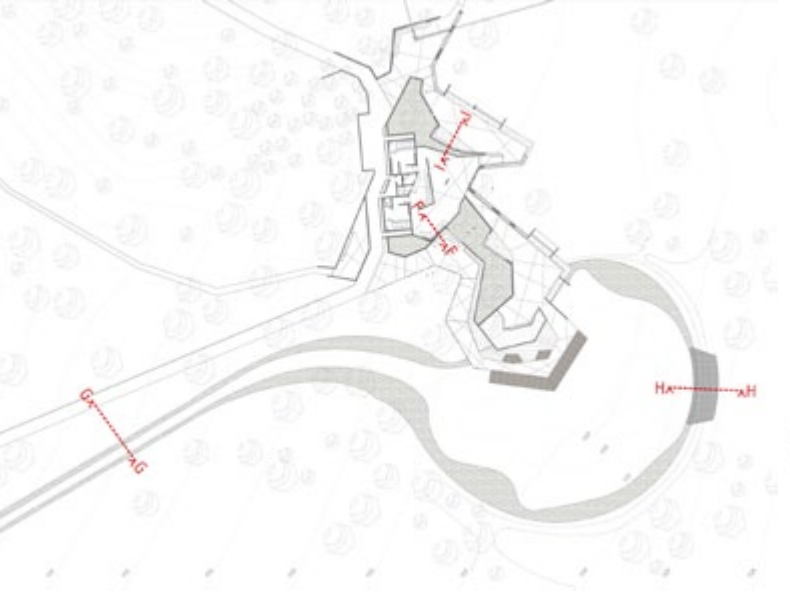


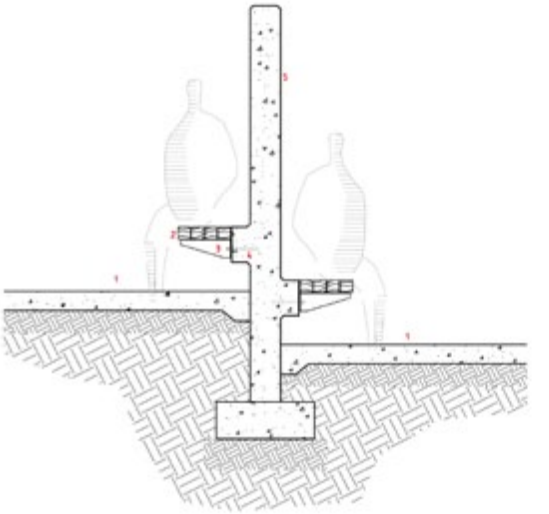
1. 16mm Untreated mild steel profile,
2. 3x180x2000mm Untreated mild steel profile cast into concrete
3. 125mm Cast in-situ concrete paving with smooth, raw finish
4. Compacted layer works
5. Concrete foundation on compacted layer works
6. Existing vegetation: endemic veldgrass
7. In situ cast movement joint: creates the angular pattern in the walking surface
8. Expansion bolt 10mm diam.
9. Bolt 10mm diam.
10. Bolt cage cast in-situ
11. 75mm mild steel spacer, 16mm diam.
12. Custom mild steel profile, fixed to bolt cage, to fix mild steel profiles
13. 10mm Bolt with 75mm mild steel spacer, 16mm diam.

DETAIL: Paving to mild steel screening edge condition E-E
SCALE 1/10

 Fig. 7.13: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.14: 3D Views [Author, de Swardt. J, 2012]

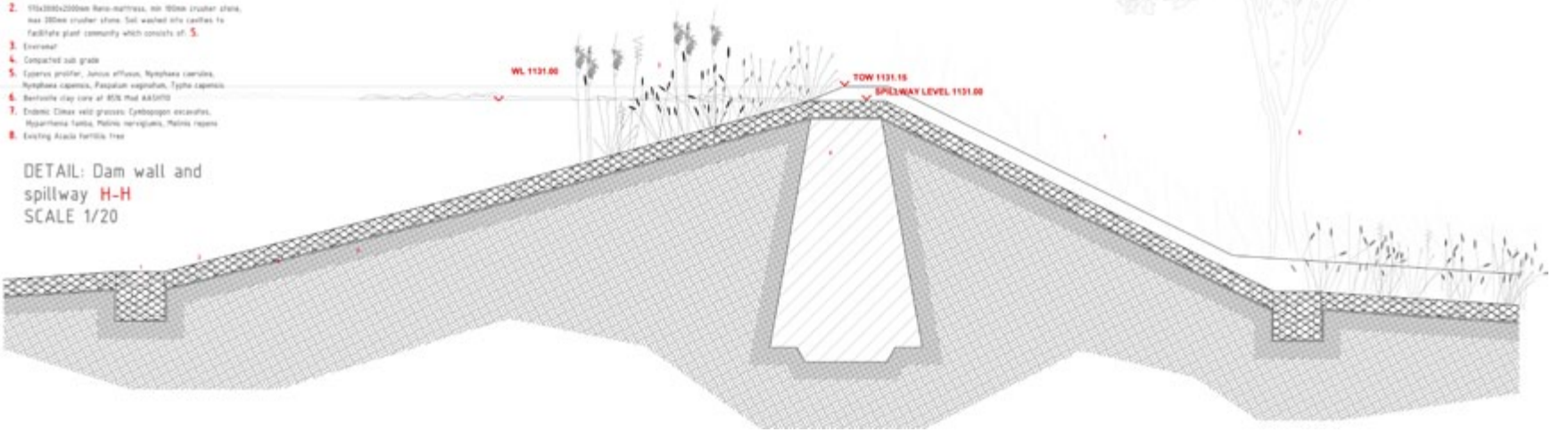




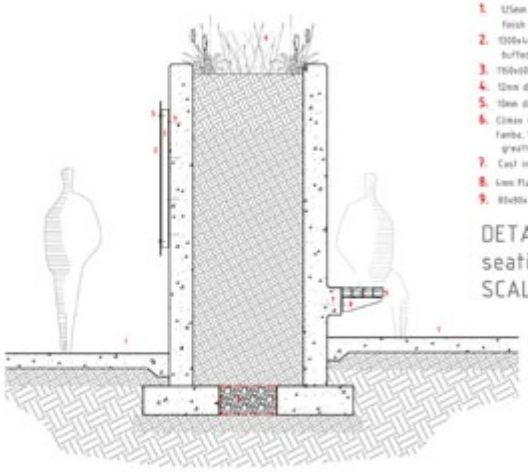
1. 125mm Cast in-situ concrete paving with exposed aggregate finish
2. 80x80x1500mm EcoWood, light grey, composite wood
3. 4mm Flanged steel angle
4. Cast in-situ bolt cage, 16mm diam.
5. 200x2400 Wood off-shutter retaining wall to engineer specification. Rough wood grain finish

DETAIL: Seating Wall F-F
SCALE 1/20

1. 500x500x500 Gabion anchor
2. 170x3000x2000mm Reno-mattress, min 150mm crusher stone, max 200mm crusher stone. Soil washed into cavities to facilitate plant community which consists of: 5.
3. Enviromat
4. Compacted sub grade
5. Cyperus prolifer, Juncus effusus, Nymphaea coerulea, Nymphaea capensis, Paspalum vaginatum, Typha capensis
6. Bentonite clay core at 85% Mod AASHTO
7. Endemic Climax veld grasses: Cymbopogon excavatus, Hyparrhenia tamba, Melinis nerviglumis, Melinis repens
8. Existing Acacia Xanthlea tree



DETAIL: Dam wall and spillway H-H
SCALE 1/20

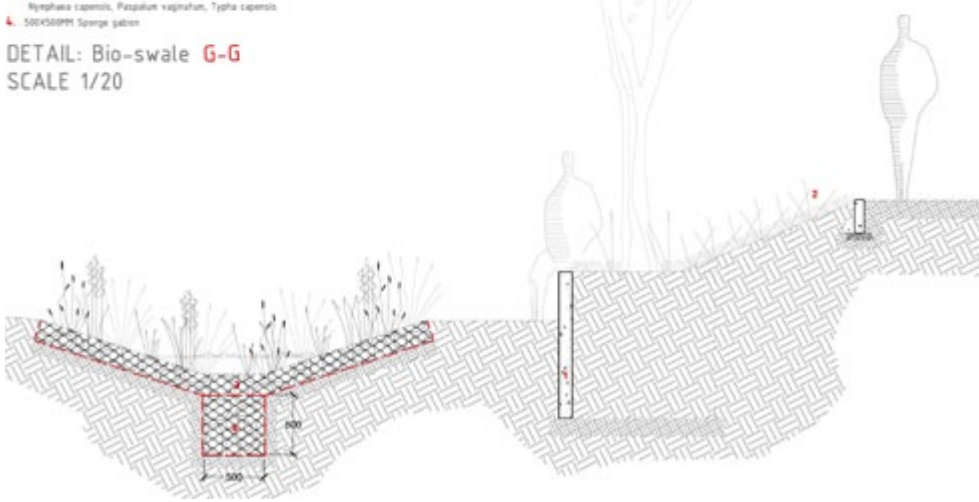


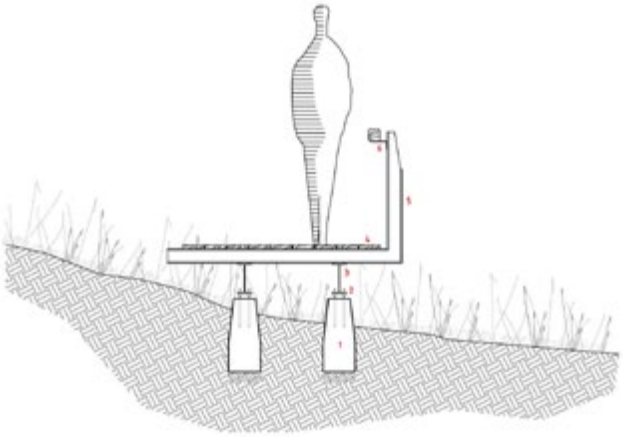
1. 125mm Cast in-situ concrete paving with exposed aggregate finish
2. 1300x4mm Mild steel panel as signage to be engraved and buffed, fixed to u channels
3. 150x60x3mm Mild steel cold rolled channel profile
4. 12mm diam. Expansion bolt
5. 10mm diam. Bolt with rounded head
6. Climax veld grasses: Cymbopogon excavatus, Hyparrhenia famba, Melinis nerviglumis, Melinis repens. Small Aloes: Aloe greatheadii and Aloe zebrina
7. Cast in-situ bolt cage, 16mm diam.
8. 6mm Flanged steel angle
9. 80x80x1500mm EcoWood, light grey, composite wood

DETAIL: Signage and seating retaining wall I-I
SCALE 1/20

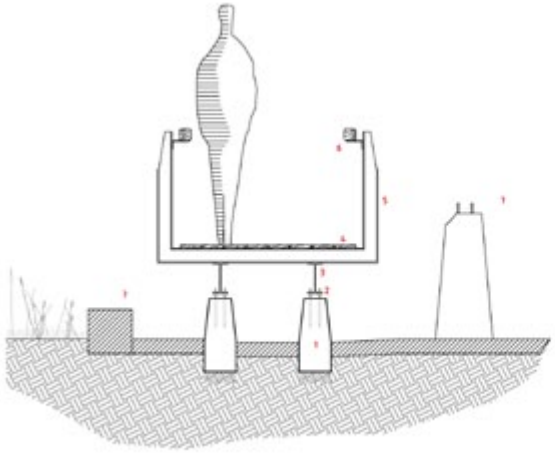
1. 1370(h)x2180(w)x1300(w)x150mm ROCLA Rectangular Portal Culver
2. Climax veld grasses: Cymbopogon excavatus, Hyparrhenia famba, Melinis nerviglumis, Melinis repens
3. 150x3000x2000mm Reno-mattress, min 100mm crusher stone, max 200mm crusher stone. Soil washed into cavities to facilitate plant community which consists of: Cyperus prolifer, Juncus effusus, Nymphaea caerulea, Nymphaea capensis, Paspalum vaginatum, Typha capensis
4. 500X500MM Sponge gabion

DETAIL: Bio-swale G-G
SCALE 1/20





DETAIL: Catwalks through hard to manage areas
SCALE 1/20



1. Concrete column, base at 220mm diam. to 150mm diam. to p
2. Cast in-situ bolt cage, 16mm diam.
3. IPE200 I-beam at 4500mm sections
4. 80x80x1500 rounded corner, EcoWood, light grey, composite wood, fixed with 5mm galvanized wood screws to 3mm mild steel angle, untreated
5. 150PFC hot rolled mild steel channel profile, untreated
6. 80x80x1500 rounded corner, EcoWood, light grey, composite wood, fixed with 5mm galvanized wood screws to 3mm mild steel angle, untreated
7. Existing concrete ruins

DETAIL Catwalks through ruins
SCALE 1/20

 Fig. 7.15: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.16: Hydrology Strategy [Author, 2012]

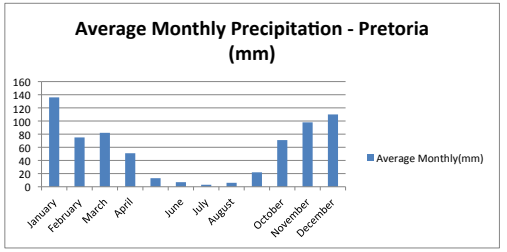
 Fig. 7.17: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.18: 3D Views [Author, de Swardt. J, 2012]

Stromwater Harvesting : Calcultating Reservoir Capacity

Pretoria Climate Data - Precipitation

Month	Average Monthly (mm)
January	136
February	75
March	82
April	51
May	13
June	7
July	3
August	6
September	22
October	71
November	98
December	110
Year	**674**



The water calculations indicate that my catchment at the moment will produce more than enough water for the dam and irrigation throughout the year.

The drinking fountains and WC will receive potable borehole water via gravity, as water was historically pumped up to the hill and stored so I will reintroduce this method. Rain-water for the dam will be harvested via small berms and bio-swales as indicated in fig. 7.12

Yield = PxAxC

Yield = PxAxC

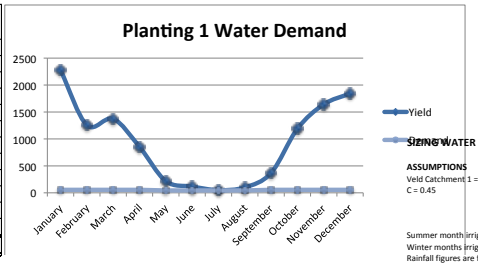
Yield					0,136	0,075	0,082	0,051	0,013	0,007	0,003	0,006	0,022	0,071	0,098	0,11
AREA	**Catchment Area (m^2)**	**Runoff Coefficient**	**Total (A x C)**	**Total**	**Y_Jan**	**Y_Feb**	**Y_Mar**	**Y_Apr**	**Y_May**	**Y_June**	**Y_July**	**Y_Aug**	**Y_Sept**	**Y_Oct**	**Y_Nov**	**Y_Dec**
C2	2117170	0,45	952727	952727	129570,804	71454,4875	78123,573	48589,0515	12385,4445	6669,0855	2858,1795	5716,359	20959,983	67643,5815	93367	104799,92
C1	36083	0,45	16237	16237	2208,2796	1217,80125	1331,4627	828,10485	211,08555	113,66145	48,71205	97,4241	357,2217	1152,85185	1591	1786,1085
Roof	385	0,55	212	212	28,798	15,88125	17,3635	10,79925	2,75275	1,48225	0,63525	1,2705	4,6585	15,03425	20,7515	23,2925
Paving	385	0,8	308	308	41,888	23,1	25,256	15,708	4,004	2,156	0,924	1,848	6,776	21,868	30,184	33,88
					Y_Jan	**Y_Feb**	**Y_Mar**	**Y_Apr**	**Y_May**	**Y_June**	**Y_July**	**Y_Aug**	**Y_Sept**	**Y_Oct**	**Y_Nov**	**Y_Dec**
				Dam Area Totals:	2278,9656	1256,7825	1374,0822	854,6121	217,8423	117,2997	50,2713	100,5426	368,6562	1189,7541	1642,1958	1843,281

Water Demand per Plot Type

Planting Area	Planting Area per Plot (m^2)	Irrigation Depth/ Month (m/month)	Evaporation (m/month)	Irrigation depth + Evaporation (m/month)	Total Water Demand (m^3/month)
Planting Area 1 (summer)	623	0,06	0,03	0,09	56
Planting Area 1 (winter)	623	0,04	0,03	0,07	44

Planting Area Water Demand

Time Period	Yield (m^3)	Total Water Demand (m^3)	Water Balance
January	2279	56	2223
February	1257	56	1201
March	1374	56	1318
April	855	56	799
May	218	44	174
June	117	44	74
July	50	44	7
August	101	44	57
September	369	56	313
October	1190	56	1134
November	1642	56	1586
December	1843	56	1787
Annual	11294	673	10621



SIZING WATER STORAGE TANKS

ASSUMPTIONS

Veld Catchment 1 = 36 083 m^2 C = 0.45

Paving Catchment = 7m^2 C = 0.8

Green Roof Catchment = 385m^2 C = 0.55

Veld Catchment 2 = 250 428 m^3 C = 0.45

Summer month irrigation requirement = 0.06m/month, say translates to 102m^3/month if 623m^2 is irrigated
Winter months irrigation requirements = 0.0.4m/month, say translates to 80m^3/month if 623m^2 is irrigated
Rainfall figures are fictional

Year 1 starting with no top-up

	RAINFALL m	IN m^3	IRRIGATION OUT m^3	REMAINING IN TANK m^3
J	0,136	**2278,97** 0,00	56	2222,90
F	0,09	1256,78 **3479,68**	56	3423,61
M	0,082	1374,08 **4797,69**	56	4741,62
A	0,051	854,61 **5596,23**	56	5540,16
M	0,03	217,84 **5758,00**	56	5701,93
J	0,01	117,30 **5819,23**	44	5775,62
J	0,005	50,27 **5825,90**	44	5782,29
A	0,02	100,54 **5882,83**	44	5839,22
S	0,03	368,66 **6207,87**	56	6151,80
O	0,071	1189,75 **7341,56**	56	7285,49
N	0,098	1642,20 **8927,68**	56	8871,61
D	0,11	1843,28 **10714,90**	56	10658,83

Year 2 starting with left over from Year 1

IN m^3	IRRIGATION OUT m^3	REMAINING IN TANK m^3
2278,97 **12993,86**	56	12937,79
1256,78 **14194,57**	56	14138,50
1374,08 **15512,59**	56	15456,52
854,61 **16311,13**	56	16255,06
217,84 **16472,90**	56	16416,83
117,30 **16534,13**	44	16490,52
50,27 **16540,79**	44	16497,18
100,54 **16597,72**	44	16554,11
368,66 **16922,77**	56	16866,70
1189,75 **18056,45**	56	18000,38
1642,20 **19642,58**	56	19586,51
1843,28 **21429,79**	56	21373,72

Fig. 7.19: Water budget calculations [Author, 2012]

1. SITE SELECTION Select locations to preserve existing resources and repair damaged systems			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
1.1 Limit development of soils designated as prime farmland, unique farmland and farmland of statewide importance	Req	✔	
1.2 Protected floodplain functions	Req	✔	
1.3 Preserve Wetlands	Req	✔	
1.4 Preserve threatened or endangered species and their habitats	Req	✔	
1.5 Select brownfield or greyfields for development	5-10	7	
1.6 Select sites with existing communities	6	5	
1.7 Select sites that encourage non-motorized transportation and use of public transit	5	3	
Sub Total	21	15	

2. PRE-DESIGN ASSESSMENT AND PLANNING Plan for sustainability from the onset of the project			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
2.1 Conduct a pre-design site assessment and explore opportunities for site sustainability	Req	✔	
2.2 Use an Integrated site development process	Req	✔	
2.3 Engage users and other stakeholders in site design	4	3	
Sub Total	4	3	

3. SITE DESIGN - WATER Protect and restore processes and systems associated with a site's hydrology			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
3.1 Reduce potable water use for landscape irrigation by 50% from established baseline	Req	✔	
3.2 Reduce potable water use for landscape irrigation by 75% from established baseline	2-5	5	
3.3 Protect and restore riparian, wetland and shorelines	3-8	6	
3.4 Rehabilitate lost streams, wetlands, and shorelines	2-5	5	
3.5 Manage stormwater on site	5-10	8	
3.6 Protect and enhance on-site water resources and receiving water quality	3-9	8	
3.7 Design rainwater/stormwater features to provide a landscape amenity	1-3	3	
3.8 Maintain water features to conserve water and other resources	1-4	3	
Sub Total	44	38	

Select locations to preserve existing resources and repair damaged systems			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
1.1 Limit development of soils designated as prime farmland, unique farmland and farmland of statewide importance	Req	✔	
1.2 Protected floodplain functions	Req	✔	
1.3 Preserve Wetlands	Req	✔	
1.4 Preserve threatened or endangered species and their habitats	Req	✔	
1.5 Select brownfield or greyfields for development	5-10	7	
1.6 Select sites with existing communities	6	5	
1.7 Select sites that encourage non-motorized transportation and use of public transit	5	3	
Sub Total	21	15	

2. PRE-DESIGN ASSESSMENT AND PLANNING Plan for sustainability from the onset of the project			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
2.1 Conduct a pre-design site assessment and explore opportunities for site sustainability	Req	✔	
2.2 Use an Integrated site development process	Req	✔	
2.3 Engage users and other stakeholders in site design	4	3	
Sub Total	4	3	

3. SITE DESIGN - WATER Protect and restore processes and systems associated with a site's hydrology			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
3.1 Reduce potable water use for landscape irrigation by 50% from established baseline	Req	✔	
3.2 Reduce potable water use for landscape irrigation by 75% from established baseline	2-5	5	
3.3 Protect and restore riparian, wetland and shorelines	3-8	6	
3.4 Rehabilitate lost streams, wetlands, and shorelines	2-5	5	
3.5 Manage stormwater on site	5-10	8	
3.6 Protect and enhance on-site water resources and receiving water quality	3-9	8	
3.7 Design rainwater/stormwater features to provide a landscape amenity	1-3	3	
3.8 Maintain water features to conserve water and other resources	1-4	3	
Sub Total	44	38	

6.1 Promote equitable site development	1-3	3	
6.2 Promote equitable site use	1-4	3	
6.3 Promote sustainable awareness and education	2-4	4	
6.4 Protect and maintain unique cultural and historical places	2-4	4	
6.5 Provide for optimum site accessibility	3	3	
6.6 Provide opportunities for outdoor physical activity	4-5	4	
6.7 Provide views of vegetation and quiet outdoor spaces for mental restoration	3-4	4	
6.8 Provide outdoor spaces for social interaction	3	3	
6.9 Reduce light pollution	2	2	
Sub Total	32	30	

7. Construction Minimize effects of construction-related activities			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
7.1 Control and retain construction pollutants	Req	✔	
7.2 Restore soils desturbed during construction	Req	✔	
7.3 Restore soils disturbed by previous development	2-8	6	
7.4 Divert construction and demolition materials from disposal	3-5	4	
7.5 Reuse or recycle vegetation, rocks and soil generated during construction	3-5	5	
7.6 Minimize generation of greenhouse gas emmissions and exposure to localized air pollutants during construction	1-3	3	
Sub Total	21	18	

8. Operations and Maintenance Maintain the site for long-term sustainability			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
8.1 Plan for sustainable site maintenance	Req	✔	
8.2 Provide for storage and collection of recyclables	Req	✔	
8.3 Recycle organic matter generated during site operations and maintenance	2-6	4	
8.4 Reduce outdoor energy consumption for all landscape and exterior operations	1-4	3	
8.5 Use renewable sources for landscape electricity needs	2-3	3	
8.6 Minimize exposure to environmental tobacco smoke	1-2	2	
8.7 Minimize generation of greenhouse gasses and exposure to localized air pollutants during landscape maintenance activities	1-4	4	
8.8 Reduce emissions and promote the use of fuel-efficient vehicles	4	4	
Sub Total	23	20	

9. Monitoring and Innovation Reward exceptional performance and improve the body of knowledge on long-term sustainability			
Prerequisites & Credits	**Possible Points**	**Points Achieved**	**Notes**
9.1 Monitor performance of sustainable design practices	10	8	
9.2 Innovation in site design	8	7	
Sub Total	18	15	

TOTAL	250	209

SUSTAINABLE SITES INITIATIVES ATTERIDGEVILLE URBAN AGRICULTURE SUMMARY	
CATEGORIES	
1. SITE SELECTION	71
2. PRE-DESIGN ASSESSMENT AND PLANNING	75
3. SITE DESIGN - WATER	86
4. SITE DESIGN - SOIL AND VEGETATION	80
5. SITE DESIGN - MATERIALS SELECTION	81
6. SITE DESIGN - HUMAN HEALTH AND WELL-BEING	94
7. CONSTRUCTION	86
8. OPERATIONS AND MAINTENANCE	87
9. MONITORING AND INNOVATION	83
SCORE :	83

A sustainable sites initiative was executed, in the table above, to roughly test the sustainability and a solid score of 83 could be achieved.

Fig. 7.20: Sustainable sites initiative [Author, 2012]

 Fig. 7.21: 3D Views [Author, de Swardt. J, 2012]

Fig. 7.22: 3D Views [Author, de Swardt. J, 2012]

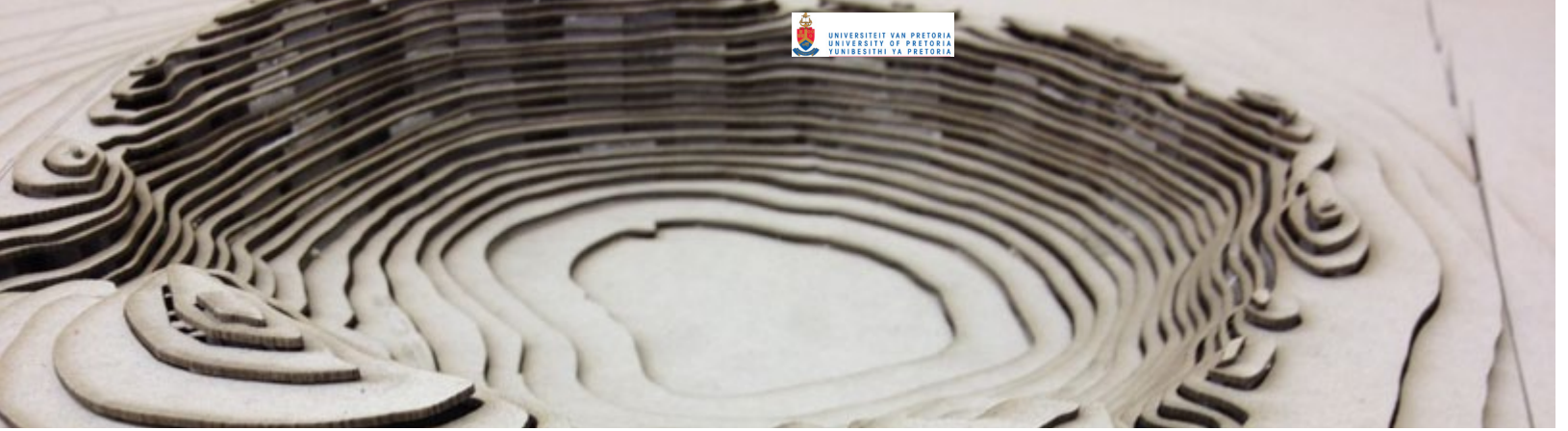
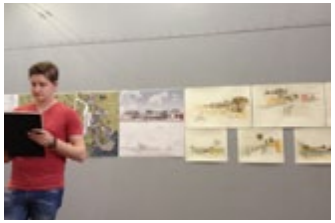
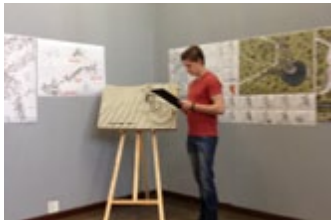
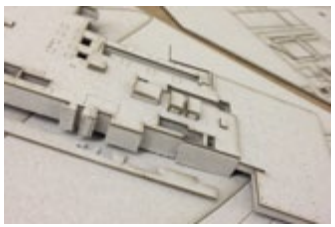
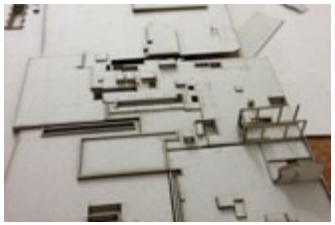


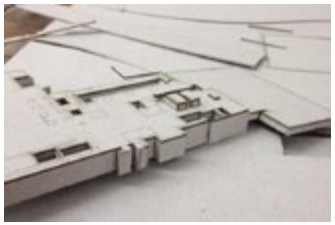
Fig. 7.23: Models and crit photos [Author, 2012]

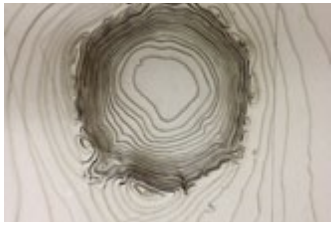












Models and Crit

8 Appendix

Definitions of Disability

World Health Organisation (WHO): *...any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being."*

British Council of Organisations of Disabled People (BCODP): *"The disadvantage or restriction of activity caused by contemporary social organizations which takes no or little account of people who have physical Impairments and thus excludes them from the mainstream of social activities."*

The Americans with Disabilities Act (ADA) has a three-part definition of disability: *"Under ADA, an individual with a disability is a person who: (1) has a physical or mental impairment that substantially limits one or more major life activities; OR (2) has a record of such an impairment; OR (3) is regarded as having such an impairment."*

Disabled People International (DPI): *"The loss or limitation of opportunities to take part in the normal life of the community on an equal level with others due to physical and social barriers."*

United Nations Convention on Disability (UN): *disability as a result of "...the interaction between persons with impairments and attitudinal and environmental barriers that hinders full and effective participation in society on an equal basis with others." Furthermore, it states that people with disabilities "...include those who have long term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others."*

Part S of SANS 10400: adopted The UN definition as South Africa's definition of people with disabilities.

Medical and Social Models of Disability

The investigation of the medical model of disability and the social model of disability enabled me to understand the reason why people living with disabilities have been ostrasized and discriminated against and how that way of thinking has changed and developed.

Medical Model

The medical model of disability frames the historical view on disability. It saw disabled people as being ill and different from the able bodied in society and in need of care. [De Villiers, 1997: 10]. Today, the failure of the medical model of disability is quite apparent as it did not cater nor take into consideration the social needs of people with disabilities. People with disability were subsequently rejected from society, ostracized and institutionalized and be cared for by non-disabled people. (Holmes-Siedle, 1996 :5) As a result, people with disabilities and their families have experienced isolation from their communities.

The medical model has created a dependence that disempowers people with disability, hindering them from accessing social political and economic rights.

Social Model

The social model of disability portrays the current world thinking on disability.

The focus of the medical model was to be totally redirected, where previously impairment was seen as the cause of disability. Now disability is seen as a socially caused phenomenon. [Swain et al, 2004: 21] Emphasizing disability as a human rights and development issue. [De Villiers, 1997: 11]

People with disabilities not only struggle to access fundamental rights, they are also removed and exluded from communities and society. In most common cases it is the disadvantaged groups of Southern Africa who'm are most vulnerable. Vulnerability to disability is increased in poverty stricken groups. At the same time disability furthers poverty.

Thus, the social model of disability focuses on two things: the limited view society has of disability and the capabilities and abilities of a person with disability. On a personal level, the social model has great empowering effect : "It has enabled a vision of ourselves free from constraints of disability (oppression) and provided a direction for our commitment to social change. It has played a central role in promoting disabled people's individual self worth, collective identity and political organisation .[Crow, 1996: 207]

As a result our approach should be to provide for a more diverse and inclusive environment.

Who Are The Disabled

There are two instances when disability may occur. The first can be seen in individuals who have been born with impairment or have acquired it through illness or an accident. Secondly, which most of us will experience, is age related and acquired impairment. Most of us will lose some sort of mobility and or sensory impairment, as we get older. *"Older people may not consider themselves disabled but can experience many of the same barriers through reduced stamina, mobility, sight and hearing."* (ref needed) Therefore, every single individual will benefit from the principals of inclusive design, as they are incorporated into the design of the natural environment.

The misconception exists that all people with disabilities are in wheelchairs. This idea is disproved in statistics that indicate the largest group of people with disabilities have a mobility impairment of sorts (eg. a limp, a cane, crutches or a walker), followed by people with hearing impairments and visual impairments. [StatsSA, 2011]. Individuals that have HIV and the aged are seen as equally disabled [StatsSA, 2011]. Collectively the people with disability in our communities consist a diverse group, from which people in wheelchairs encompass a small number.

Preliminary External Examiner Comments

The comments below were critically analysed and addressed accordingly.

General:

- Clear and elegantly resolved design, however suffers from a lack of conceptual and theoretical substance.

Strengths:

- The design is elegantly simple, good formal resolution.

- The document layout and design is very accessible and easy to navigate (section lines indicated on plans, scales noted etc.).

- The primary intervention (Surveyor's point) is extensively illustrated with crisp clear illustrations.

- The design of Surveyors point responds well to / incorporates the existing trees

- The design of Surveyors point is dynamic / spatially rich.

Shortcomings:

- Access is framed in a relatively narrow sense, leaving the project not as conceptually strong as it could have been. Should access(ibility) not be a requirement in all design? If so, then in what way has inclusive design (universal access) been explored to a degree that stretches beyond what would be required in any responsibly approached design?

- What is the rationale for the choice to focus on accessibility, and what is the link between the project's focus (accessibility), and this specific site? What makes the Tswaing site uniquely suited to a design exploration into accessibility?

- Design decision-making (management of informants) should be more precisely / specifically described, the text generally addresses design intention but the way it is actually applied is elusive, e.g: How is the 'Sequencing' on pg. 84 actually applied to the development of the framework and masterplan? e.g.: On pg. 58 the paragraph, 'Site analysis…' refers to the final decisions made re the framework, what were / are those decisions? e.g.: Pg.86 'The orientation of these nodes…', it would be good to reveal how the nodes were implemented to maximise experience. This intention is stated but the mechanisms, techniques, approaches to get it right are not discussed / illustrated. e.g.: How was the actual position of the route through of the Catwalk ruin determined?

Aspects that need clarification (see also above):

- The design exploration of surveyors point (pg. 104-107) should be more

thoroughly described to better reveal the design decision-making.

- The descriptions on pg.'s 90-95 focus on programme (use / utility), the

experiential design informants for clarifying, articulating and celebrating the

narrative should also be discussed.

Relevance of project:

- The importance of accessibility is highlighted through the project; however the

Verbal Presentation

Main points of discussion

· Problem statement: The cultural landscape and its inherent qualities; tangible and intangible are not accessible to all.

· Living in a democratic society, everyone has the fundamental right to access the cultural landscape and the natural environment.

· It has been argued that because accessibility is a Standards requirement for all design that it cannot form a theoretical premise, however, the literature study of inclusive design found access to be more than a just technical response. Moreover, evidence, in particular the case studies conducted for this thesis, found that despite Part S landscapes in South Africa continue to fail at creating inclusive environments.

· Tswaing Nature Reserve in Soshanguve, just north of Pretoria, sets the scene for the hypothesis. It is the site of a meteorite impact, dating back 220 000, which unearthed valuable minerals, and became the location for the largest salt mine and exporter in Africa in the early 1900's.

· Tswaing is a cultural landscape that currently lies largely forgotten, unexplored and inaccessible to most. Its value as cultural, ecological and internationally recognized geological phenomenon is not celebrated.

· For these reasons Tswaing is chosen as site for investigation of how the heritage value of a natural landscape, with all its inherent environmental barriers, can be made accessible to all.

· Both the physical characteristics and the inherent narrative of Tswaing were identified and understood through a literature review, interviews and physical documentation through repeated visits to the site.

· As part of this investigation and due to a lack of comprehensive information on the cultural historic environment of Tswaing, the site was thoroughly analyzed and the mine ruins surveyed with dumpy levels from scratch.

· The existing natural and man-made features of the site, as well as the harsh climatic conditions, served as cues for choices of materials. The ruins from the salt mine informed the primary use of steel and concrete for new interventions.

· The design interventions are limited and aim to enhance the visitor's experience of the existing landscape by focusing their attention on specific views and revealing the narrative, which would otherwise remain lost or forgotten.

· To develop the concept of the landscape as a narrative, the following design techniques were used: the use of metaphors, sequencing, flash-forwards and flashbacks, naming of spaces, keeping suspense and then revealing 'secrets' were most important.

· The proposed framework views Tswaing as an important tourist destination, for both local and international visitors and should therefore be designed inclusively. A few of the framework explorations were :

· The masterplan is located in the area with the richest cultural historic value.

· You will realize that the areas with proposed intervention directly speak to the narrative that was mapped thereby collectively making the narrative of Tswaing accessible.

· The area chosen as my detail design area is the historic crater entry and the historic cornerstone-surveying beacon where the farm of Zoutpan was resurveyed in 1953. Hence my naming of this area as Surveyor's Point. This point will in many cases be the visitor's first glimpse of the crater itself.

· The aim was to establish surveyors point as an exhibition space that reveals the natural environment and cultural landscape, thereby heightening the visitor's experience. The architecture acts as a framing device: highlighting important elements, both tangible and intangible, in the landscape.

· When designing Surveyer's Point keen attention was paid to the topography and existing trees. The area was found to be degraded and formed a small plateau suitable for the intended intervention.

· The proposed ablutions cut into the landscape, the roof of

which forms an extension of the hill vegetation it cuts into. The roof's angular shape is a metaphor for the abundance of quarts crystals in the nebo granite on site. The structure then further creates dynamic spaces and gateways to other spaces at Surveyors' point.

· The supporting elements act further as the exhibition space.

· The landscape of Tswaing is naturally undulating and at times quite severe changes in level are encountered. The pathways follow the natural gradient where comfortable for all visitors. While in areas that are too steep: the pathway is constructed so as to ensure gradients of 1:20 up to 1:15. This specifically takes into consideration people in wheelchairs.

· Between the various look out points, rest areas are introduced at regular intervals along the path. As well as in nodes such as Surveyer's Point, these are designed so as to allow both ambulatory and wheeled visitors to sit alongside one another and out of the path of travel.

· The varied use of textured paving materials is strategically employed to distinguish between main movement routes, resting areas, lookouts and lingering areas. Specifically assisting people who are blind and/or visually impaired.

· The artificial pond is representative of the Soutpanspruit River, which because it runs the edge of Tswaing will not be encountered by the majority of visitors. The pond is sustained by collecting rainwater from the crater rim. A water budget proves there will be enough water for the pond.

· The various water features serve as an interpretation of the use of water in the salt mine and extends to other nodes on site.

· Pictorials and signage are designed in such a way that the visitor can simultaneously read about and look at a specific feature in the landscape. The mild steel signage panels will be engraved as ink or laminated signage weather, moreover rendering the signage tactile for visually impaired readers. Braille is added for blind visitors.

· Planting is low maintenance and simply an extension of the endemic, surrounding plant species. Plants are planted in planters and seating beds making the plants comfortably accessible to all.

· Planting on the roof is predominantly the endemic veldgrass accompanied with a 800mm edge around, made up of small aloes, such as the greatheadii and zebrine in combination with the combretum microphyllum woody creeper. The reason being the veldgrass that has to be cut in winter which alone will leave the roof bare and to soften the roofs' edge.

· A golf cart drop-off area and road runs at the back of Surveyors' point, minimizing vehicular and pedestrian interaction. Bicycle racks are also stationed at the golf cart dropoff: Surveyer's Point being where the cycling path and the hiking trail meet with the general walking trail.

· A pocket size Senheizer (guideport): a device that enables you to listen to an audio version of the narrative is also available. These devices are easy to use and activates itself when moving into different spaces. These devices can be used by all, but are specifically available for visually impaired and blind visitors.

· The surveying tower sits on top of the historic beacon, enforcing the idea of a beacon in the landscape whilst the history and pictorial of the beacon is engraved on the mild

steel structure.

· The mild steel radials in the paving are indicative of the actual historic division of the farm in 1953.

· Once you have made your way through Surveyer's Point, past the Surveying Beacon, the visitor can then continue on to the crater or venture along the crater rim, further unraveling the mystery of Tswaing.

· I will discuss a few details that make surveyors point unique:

Water channel and spout

Mild steel panelling

Planted roof

The use of steel

Thank you.

List of Figures

Bibliography

BIBLIOGRAPHY

Holmes Siedle, 1994, *Barrier-free Design: a manual for building designers and managers*. Holmes

Bakker, K. A. (2003). Preserving Intangible Heritage Resources: Examples from South Africa, in ICOMOS International Scientific Symposium *"Place, memory, meaning: preserving intangible values in monuments and sites"*, Sub Theme C, Section 2C, Victoria Falls, Zimbabwe. Retrieved 18 April 2012, from ICOMOS online database.

Barnes, J. *Interview with Deputy Director at Tswaing Meteorite Crater* on 2nd of March 2012, Soshanguve

Bender, B. (Ed). (1993). *Landscape Politics and Perspectives*. Oxford: Berg Publishers.

Blom, N. 2011. *The Narrative of a Sanctuary: A Didactic Design Approach for the Cultural and Biophysical Heritage of Wonderboom Fort and Nature Reserve*, Pretoria, South Africa. ML(Prof) Dissertation, University of Pretoria, Pretoria.

Clarke, A. & Johnston, C. (2003). Time, Memory, Place and Land: Social Meaning and Heritage Conservation in Australia, in ICOMOS International Scientific Symposium *"Place, memory, meaning: preserving intangible values in monuments and sites"*, Sub Theme B, Section 3B, Victoria Falls, Zimbabwe. Retrieved 20 April 2012, from ICOMOS online database.

Crow, L. 1996. *Including all of our lives: Renewing the Social model of disability*, in C. Barnes and G. Mercer (eds), Exploring the Divide: Illness and Disability. Leeds: The Disability Press.

De Villiers, S. *1997. Integrated National Disability Strategy: White Paper*. Cape Town : Rustica Press

Eckbo. G, Treib. M. *Modern Landscape Architecture : A critical review*. 1992. P53-57. University of California Press

Ermischer, G. 2004. *Mental landscape: landscape as idea and concept*. Landscape Research, 29:4, 371 – 383.

Frank, A. April 1996. *Learning Curves.* Landscape Design, p22-25.

Franklin, A. 2002. *Nature and Social Theory*. London: Sage Publications.

French, JA 2009, *A memorable landscape : creating a landscape using ecological design and landscape narrative principles in the Faerie Glen Nature Reserve*, ML(Prof) dissertation, University of Pretoria, Pretoria

Imbert. D, Treib. M Marc Treib : *Modern Landscapes for living*. University of California Press

Imrie, A. 1996. *Disability and the City*. London : Paul Chapman Publishing.

Ito, N. 2003. Intangible cultural heritage involved in tangible cultural heritage, in ICOMOS International Scientific Symposium *"Place, memory, meaning: preserving intangible values in monuments and sites"*, Sub Theme A, Section A3, Victoria Falls, Zimbabwe. Retrieved 20 April 2012 from ICOMOS online database.

Kuchler, S. (1993). *Landscape as Memory: The Mapping of Process and its Representation in a Melanesian Society*. In B. Bender (Ed), Landscape Politics and Perspectives, (pp85 – 106). Oxford: Berg Publishers.

Leedy, P.D. & Ormrod, J.E. 2001. *Practical Research: Planning and Design*. 7th edition. New Jersey: Prentice-Hall, Inc.

McCarthy. T, Rubidge, B. 2005. *The Story of Earth and Life*. Cape Town: Struik Publishers.

O'Connel, J. 1996. *Gardens for all*. Landscape Design, p29-33

Potleiger. M, Purinton. J. 1998. *Landscape Narratives : Design Practices for Telling Stories*. New York : John Wiley & Sons, Inc.

Rakatansky, M. 1992. *Spatial Narratives. Strategies in Architectural Thinking*. Edited by J. Whiteman et al. Chicago : Chicago Institute for Architecture and Urbanism.

Reimold, W.U, Brandt.D, De Jong. R, Hancox. J. 1999. *The Tswaing Meteorite Crater : An introduction to the natural and cultural history of the Tswaing region including a description of the hiking trail*. Wits University : Counsil of Geoscience.

Ricoeur, P. 1981. *Narrative Time. In On Narrative*. Edited by W.J.T Mitchell. Chicago : University of Chicago Press

Rottle, N. & Yokom, K. (2010). *Ecological Design*. Switzerland: AVA Publishing SA.

Scazzosi, Lionella. (2004). *Reading and assessing the landscape as cultural and historical heritage, Landscape Research*, Vol. 29:4, pp. 335 – 355.

Siedle, J. *Butterworth Architecture*, Oxford, 1996

Swaffield, S.(editor).2002. *Theory in Landscape Architecture : A Reader*. Pennsylvania : University of Pennsylvania press.

The City of Tshwane Environmental Planning Section (compiler). 2006. Tshwane Open Space Framework: Executive Summary (TOSF).

UNESCO (2005) Operational Guidelines for the Implementation of the World Heritage Convention[1]. UNESCO World Heritage Centre. Paris. Page 83

Van Oudtshoorn, F. 2004. *Guide to Grasses of Southern Africa*. Pretoria: Briza Publications.

Vroom, MJ. 2006. *Lexicon of Garden and Landscape Architecture*. Basel Birkhauser.

Van Der Ryn. S, Cowan, S. 1998. *Ecological Design*. Washington : Island Press.

INTERNET

http://www.architizer.com/en_us/projects/view/the-windmill-house/29443/?sr=1

http://www.architizer.com/en_us/projects/view/gatekeepers-venray/31913/?sr=1

http://www.landezine.com/index.php/2010/12/potemkin-post-industrial-meditation-park-by-casagrande-rintala/

http://www.landezine.com/index.php/2011/10/solberg-tower-rest-area-by-saunders-architecture/

http://www.landezine.com/index.php/2011/08/post-industrial-landscape-architecture/

http://www.landezine.com/index.php/2011/02/volcano-pavilion-and-water-gardens-of-s-vicente-by-global-landscape-architecture/

http://www.landezine.com/index.php/2011/03/tudela-club-med-restoration-in-cap-de-creus-by-emf-landscape-architecture/

http://www.landezine.com/index.php/2010/10/askvagen/

http://www.landezine.com/index.php/2010/12/pedra-tosca-

http://www.cs.virginia.edu/~evans/pictures/za2010/0622_freedom-park/IMG_0164_6490-weath.JPG

http://www.flickriver.com/places/United+States/Virginia/Arlington/Rosslyn/

http://www.freedompark.co.za/cms/index.php?option=com_joomgallery&func=detail&id=1501&Itemid=121

www.sugarandspicegraphicdesign.com/portfolio-brochures-flyers.php&usg

http://www.maropeng.co.za/index.php/gallery/entry/16/

http://www.wilrotours.co.za/our-services/sightseeing-tours/

http://www.apartheidmuseum.org

http://www.maropeng.co.za

http://www.apartheidmuseum.org

barnsley.gov.uk

http://www.reedsenviroliving.com/images/reedsstatus/Model-House-20.jpg

http://www.reedsenviroliving.com/gallery6.html

https://asunews.asu.edu/20100218_dvrac

https://asunews.asu.edu/20100726_hopilecture

http://www.flickr.com/photos/gabodiazm/4854301697/

sizes/m/in/photostream/

http://asla.org/awards/2008/08winners/117.html