

ZOO INVERSO

An investigation of landscape architecture as an instrument to convey experience, habitat and beauty within a zoological garden enclosure.

by Marissa Engelbrecht

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Abstract

This dissertation explores the experiential quality of zoological garden enclosures and the threshold between man and animal. This exploration manifests within the context of man's act of demarcation represented in zoological gardens.

The National Zoological Gardens in Pretoria situated on the periphery of the Central Business District form the proposed context of this study. The zoological gardens provide a platform to explore the ill-defined threshold between man and animal, the lack of experiential levels and the quality of the enclosures as habitat.

The study investigates landscape design as a medium for design intervention to enhance the experience of zoo enclosures for both the visitor and animal.

Through a methodological approach, the dissertation aims to establish design stratagems grounded in theory of landscape architecture, zoo design theory and case study review. The stratagems will serve as catalyst to challenge current zoo design principles in order to determine a new set of principles for landscape intervention. The design will follow a hypothetical process that implements the principles as spatial explorations, followed by pragmatic considerations.

The outcome will demonstrate on a spatial and experiential level how landscape design can combine ecology and aesthetics to create a hybridised interactive experience with nature, animals and humans in a detail enclosure design. Technical and programmatic requirements will test and refine the final proposal of the enclosure design.

Samevatting

Hierdie verhandeling ondersoek die ervaringsgehalte van dieretuinhokke en die drumpel tussen mens en dier. Hierdie navorsing vind plaas binne die konteks van die mens wat diere inkamp en afskort, soos in "n dieretuin.

Die Nasionale Dieretuin in Pretoria, geleë op die rand van die Sentrale Besigheidsdistrik, vorm die voorgestelde konteks van hierdie studie. Die dieretuin voorsien die platform waarvan die swak gedefinieerde drumpel tussen mens en dier, en die gebrek aan ervarings- en habitatskwaliteit van die hokke, ondersoek kan word.

Die studie ondersoek landskapontwerp as "n ingrypingsmiddel wat die ervaring van dieretuinhokke vir beide die besoekers en diere kan bevorder.

Die ondersoek poog om deur middel van "n metodiese toenadering strategieë, gegrond op die teorie van landskapsargitektuur, dieretuinontwerp en gevallestudies, daar te stel. Die strategieë sal as katalisator dien om huidige dieretuinontwerpbeginsels uit te daag ten einde nuwe beginsels vir landskap intervensies te skep. Die ontwerp sal "n hipotetiese proses wees wat die beginsels van ruimtelike verkenning sowel as pragmatiese oorwegings volg.

Die uitkoms sal op "n ruimtelike- en ervaringsvlak demonstreeer hoe landskapontwerp ekologie en estetika kan kombineer om binne "n dieretuinhok "n interaktiewe ervaring tussen mens, dier en natuur te skep.

Tegniese- en programmatiese vereistes sal die finale voorstel van die dieretuinhok ontwerp toets en verfyn.

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L_1.
Bruegel's two
monkeys painting
by Pieter Bruegel
the Elder
(Bibliokept 2012).

11 *Bruegel's two monkeys*

-Wislawa Szymborska (1923-2012): translated from the Polish by Stanislaw Baranczak and Clare Cavanagh

This is what I see in my dreams about final exams:
two monkeys, chained to the floor, sit on the windowsill,
the sky behind them flutters,
the sea is taking its bath.

The exam is the history of Mankind.
I stammer and hedge.

One monkey stares and listens with mocking disdain,
the other seems to be dreaming away --
but when it's clear I don't know what to say
he prompts me
with a gentle clinking of his chain.¹

1.2 *Prologue*

Breugle's poem is unsettling in that it simultaneously makes animals seem more human and humans more animal.

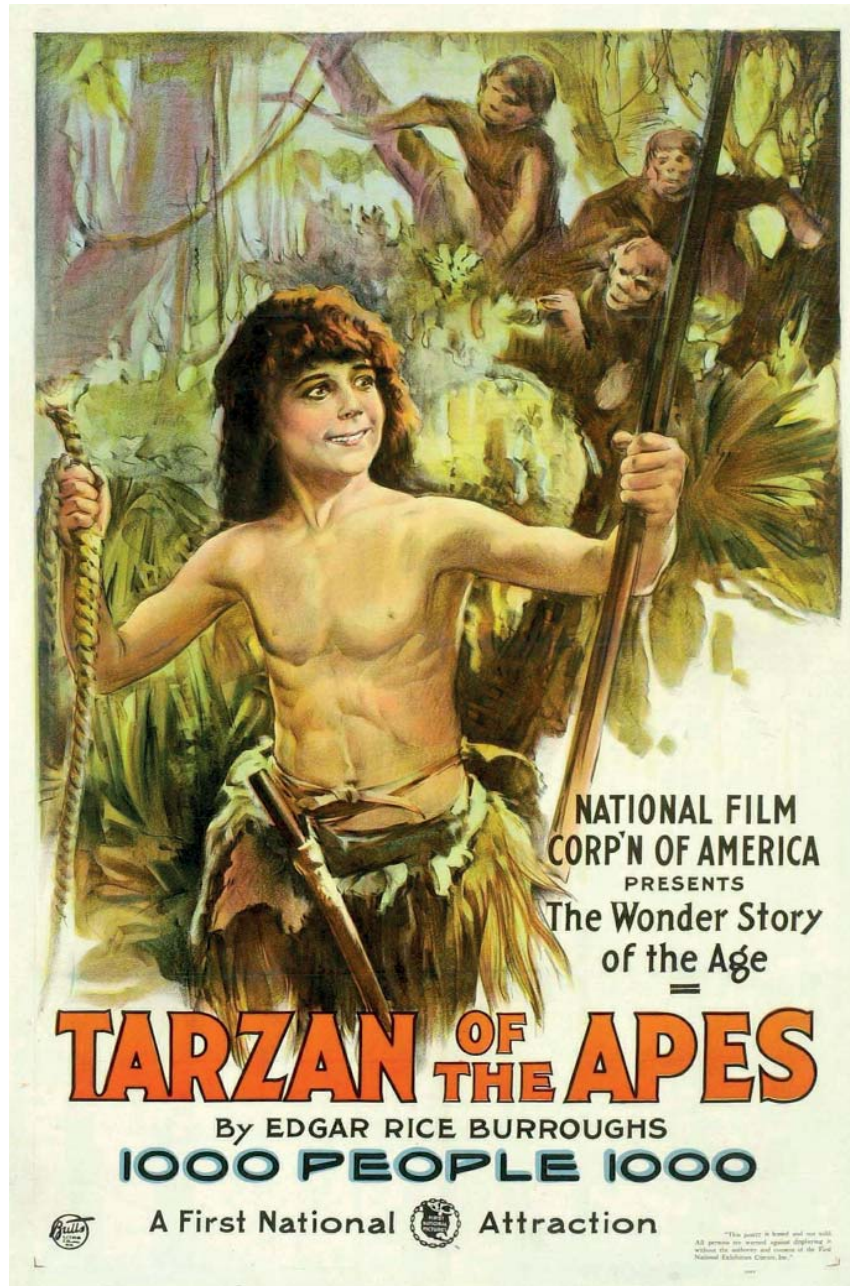
Two monkeys are chained to a window sill overlooking the Antwerp city. Their freedom has been bought for a hazelnut. It is not the monkeys that have lost their freedom. It is the men who chained and captured them. The juxtaposition of the chains and the picturesque landscape laughs at the absurdity of human actions. The monkeys dream of the freewheeling forest in Africa.

The author reminisces of the zoo that shaped her ideas of man and animal. In the zoo her thoughts would be taken far beyond the barrier between her and the chained monkey. She realises that man chained the monkey to chain his inner beast. She sees that to understand nature man captured it, analysed it, felt it, tasted it.

She reflects, questions, and chains herself in order to relinquish the pain of being human.

1.3 *Zoo inverso*

in the zoo
man is the spectator, always and everywhere.
man looks at and never out of.
man chains and captures.
arrange and decay
re-arrange
man decays
man is the spectacle
zoo inverso



I.2. Gilles Aillaud:
Cage Vide-1971.
Representation of man's
mastery over nature

Anthropomorphism: A literary device that can be defined as a technique in which a writer ascribes human traits, ambitions, emotions or entire behaviour to animals, non-human beings, natural phenomena or objects (Literary Devices 2014).

Beauty: The combination of qualities which affords keen pleasure to the other senses (e.g. hearing) or which charms the intellectual or moral faculties through inherent grace, or fitness to a desired end (OED 2008).

Biozone: An area constituting a natural ecological community with characteristic flora, fauna and environmental conditions, and is bounded by natural rather than artificial borders (www.TheFreeDictionary.com 2014).

Ecozoology: Contemporary paradigm of zoological developments encompassing the projects that mix performative elements with visual interest to create a hybridised, experiential interaction with nature and animals (Kallipoliti 2012).

Enclosure: An area surrounded by fences or walls, like a pen or a cage in a zoological garden (Cambridge Advanced Learner's Dictionary).

Experience: As described by Corner (2002), the experience in landscape does not offer opportunity to wander or turn away from ___ such as paintings or novels. Spatially, it is all enveloping and surrounds us, flooded with light and atmosphere. Irreducible, the landscape controls our experience extensively; it permeates our memory and consciousness.

Hyper-nature: Existing in or formed by nature (opposed to artificial) used as a device by Meyer (2008) as a way to recognise art in the landscape.

Immersion: Placing visitors inside the habitat landscape and extending the complexity of the animal's environment into areas where visitors walk, stand or sit (Bierlein 2003).

In situ: "In place" in Latin, refers to the natural habitat or "wild" setting of an animal (Nuttall 2004:94).

Performance: Meyer (2008:10) uses "perform" and "performance" to mean "something it provides" or the "accomplishment of a task" as in "parks perform in two ways". Meyer's writing on aesthetics and ecological design includes understanding of "performance" as not only ecological function, but also as emotional or ethical revelation, where beauty and aesthetics affect our understanding and concern for sustainable design and an ecological design agenda.

Spectacle: Something exhibited to view as unusual, notable, or entertaining; especially an eye-catching or dramatic public display (Merriam-Webster 2014).

Tarzan-esque: A new design vernacular coined by Hancocks (2012:1) as superficial, and a peculiar distortion of the natural world type of zoo design.

Threshold: The boundary beyond which a radically different state of affairs exists. Thresholds form the links between the in-between and the paradoxical. This threshold can also be explored as a dualistic interface. Thresholds are the brink where transformations begin, where exchanges between unlinked and contradicting concepts take place, where identities are determined and declared (Berrizbeita 2003:82).

Unzoo: A place where the public learns about wild animals, plants and ecosystems through interaction with and immersion in original or recreated natural habitats (Coe 2005:1).

Zoo: A park displaying live animals ... from different parts of the world ... kept in cages or enclosures for people to come and see, and where they are bred and studied by scientists (Coe 2005:1).

Zoogeography: Distinct areas devoted to representative fauna and flora of zoological regions of the world (Graetz 1995).

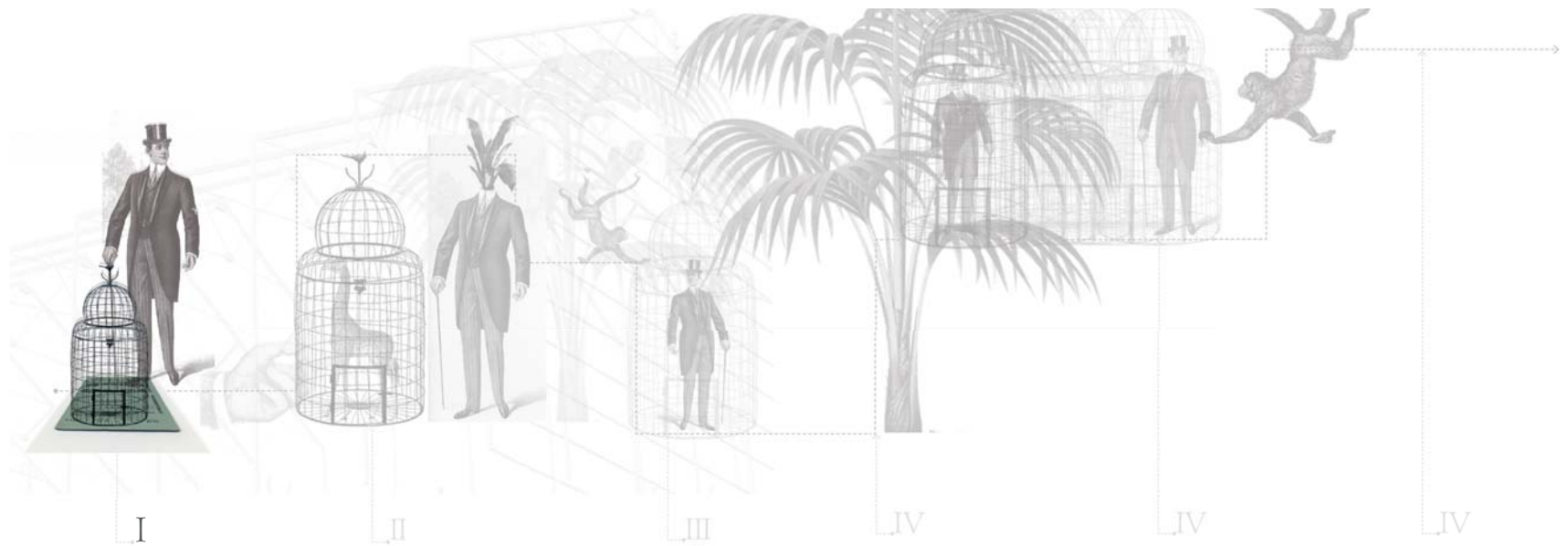


*I_3. Gilles Aillaud:
Cage Vide-1971.
Representation of man's
mastery over nature*

CHAPTER I

THE TAMED PLATFORM

An introduction to: the zoological garden



The tamed platform

1.5 Introduction

The separation between humans and nature has implications for subsequent environmental values, attitudes and behaviour (Vining, *et al.* 2008:1). As a result, negative attitudes develop towards animals living in captivity.

The author suggests, however, that animals in captivity have the capacity to restore and refocus our views of wild animals and wild places. Hancocks (2001:xv) argues this concept by stating that “zoos can encourage a new understanding of nature”.

Human beings need the wild and endlessly seek it out. Animals in captivity symbolise the intentions and actions of human societies towards wildlife and nature.

The zoo brings the various aspects of society’s relationship with nature into focus. The zoo becomes a physical exemplar of the disintegrated threshold between man, animal, culture and nature. The animal-human relationship can be observed through the bars of a zoological garden. Nuttal (2004:79) explains that the “repulsion and fascination, man’s impulse to appropriate and the progressive recognition of the complexity and specificity of the diverse forms of life are among these aspects. To tour the cages of the zoo is to understand the society that erected them”.

The Tamed Platform will focus on the conceptual and concrete problem statement within the context of South Africa. This chapter introduces the proposed site, client and users. It will state the focus, aims and delimitations of this dissertation.

1.6 *Problem in context*

In an interview by Jordan Schaul (2012), David Hancocks argues that conventional zoos are “fundamentally unchanged”. Hancocks believes that a generation ago zoos might have been static and two-dimensional and that today’s living collection of zoos is not far removed from this statement. Zoos can still be described as being fairly homogenous, although, “they do not represent the vast number of imperilled species on Earth and tend to exhibit mega-fauna, often missing an opportunity to adequately represent the diversity of life on the planet (*ibid.*)” Hancocks further asserts that zoos in general are still under the impression that “without traditional animals, such as an elephant or a lion, people will stop visiting” (*ibid.*).

The general spaces that exist within modern zoos are criticised

as too small, and while it may look green, the animals have little contact with living vegetation that exists within their original habitat. “The difference between the old barren cages and the modern zoo exhibitions is simply a new look, which is essentially superficial and can be criticised as a distortion of nature (*ibid.*)”. Hancocks branded this look as a new design vernacular for zoos, called *The Tarzanesque*, a resemblance of a Hollywood version of Africa on a B-movie set (Hancocks 2012:1). Historical zoo typologies, *The Tanzanesque* and proposed future zoo design principles will be investigated and challenged throughout this dissertation. This dissertation will aim to reconsider zoo design and create a new type of enclosure that will address a sustainable zoo design typology. As a result, an alternative model for zoo design will be proposed that can be applied and implemented throughout the entire existing zoo enclosures.

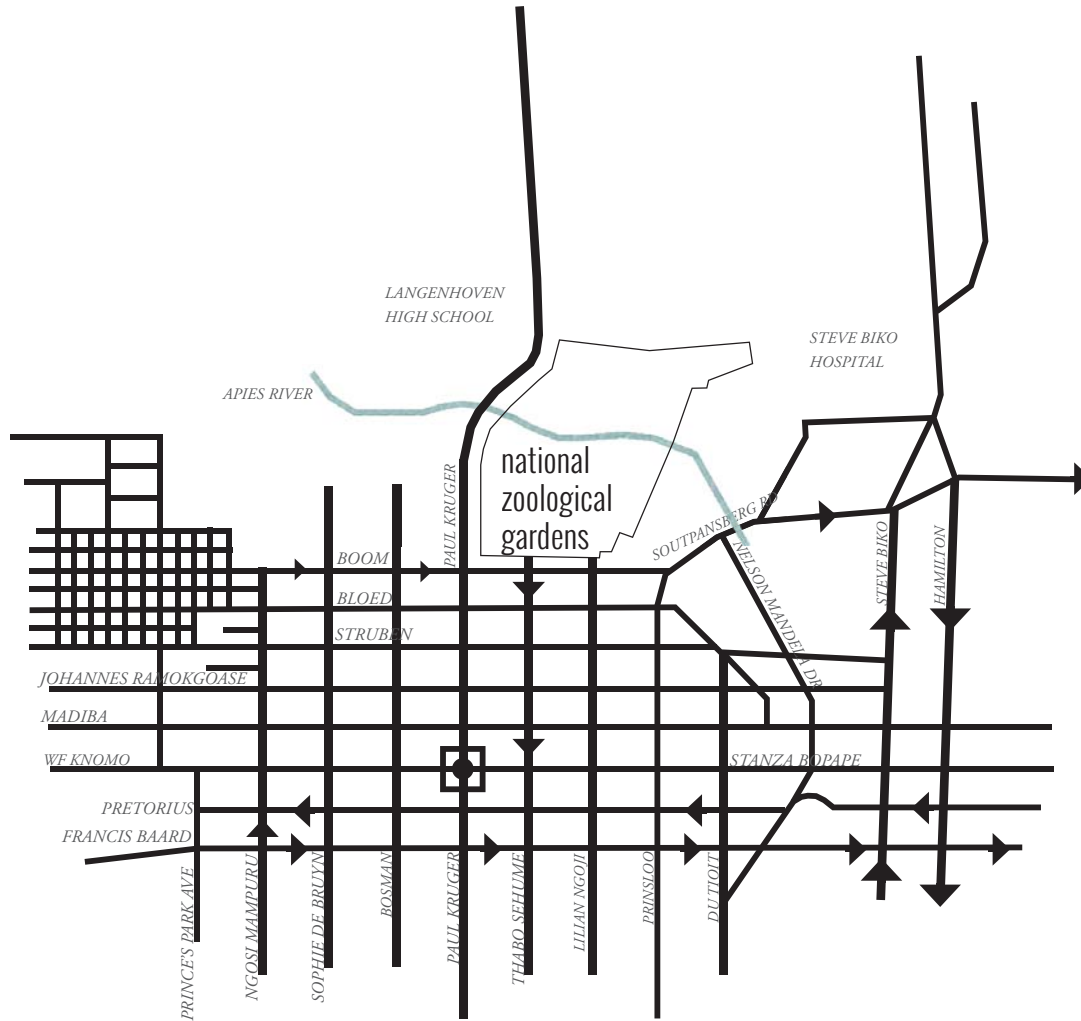


I_4. NZG within the
Tshwane metropolitan
(Author 2014).

1.7 *Study area*

The study area is located on the periphery of the Central Business District (CBD) of Pretoria within the Metropolitan City of Tshwane. Refer to figure 4 on page 24.

The National Zoological Gardens of South Africa (henceforth, referred to as NZG) are situated within the Northern precinct of the CBD and form the proposed research platform of this dissertation.



1.5. Location of NZG
in context of CBD of
Pretoria (Author 2014)

1.8 *Problem statement*

The NZG represent a platform that illustrates the ill-defined threshold between man and animal. The current zoo enclosures lack experiential quality and are unaccommodating to both man and animal. As a result, zoo enclosures are still a product reminiscent of previous design paradigms where the threshold between man and animal was pertinently undisguised.

This leads the author to the following question: Can the spatial design of landscape architecture become an instrument to convey experience within a zoological garden enclosure?

“In a rapidly changing world, zoos are in danger of declining into irrelevance while boasting about great achievements” (Hancocks 2012:2).



I_6. Aerial photograph of site location (Author 2014).

1.9 *Hypothesis*

The current zoo enclosures provides a certain experience to the user. This experience has the potential to restore and refocus our views of wild animals and wild places. The author argues that landscape design can become a medium for intervention that mediates the experience of zoo enclosures with the visitor. This dissertation aims to prove how landscape architecture can establish a new set of design principles to enhance the *confined* experience and simultaneously become a threshold between man and his attitude towards nature. This threshold will become a design opportunity to provide an *extruded* experience for both the visitor and the animal. The outcome of the study will result in the application of these new set of principles to culturally, ecologically and experientially inform the future design of the NZG and its enclosures.

Chapter overview

- I *The Introduction to the Tamed Platform* will focus on the conceptual and concrete problem statement within the context of South Africa. This chapter introduces the proposed site, client and users. It will state the focus, aims and delimitations of this dissertation.
- II *Nature in captivity* provides background to the National Zoological Gardens as a metaphor of man's dominion over nature. Chapter II serves as an in-depth understanding of the character of zoos and provides baseline knowledge of the study area to the reader.
- III *The theoretical encounter* argues for landscape design architecture as an instrument to renegotiate and reconcile the threshold between man and nature. The investigation will lead to a theoretical concept to take further in design synthesis.
- IV *Confined experience* is a synthesised concept which is explored and in which all design generators are incorporated to make the concept concrete, resulting in a master plan.
- IV *Extruded experience* includes a description of the site selection and design development.
- IV *Technical spectacle* is the technical investigation of the theoretical and programmatic requirements of the enclosure design intervention.



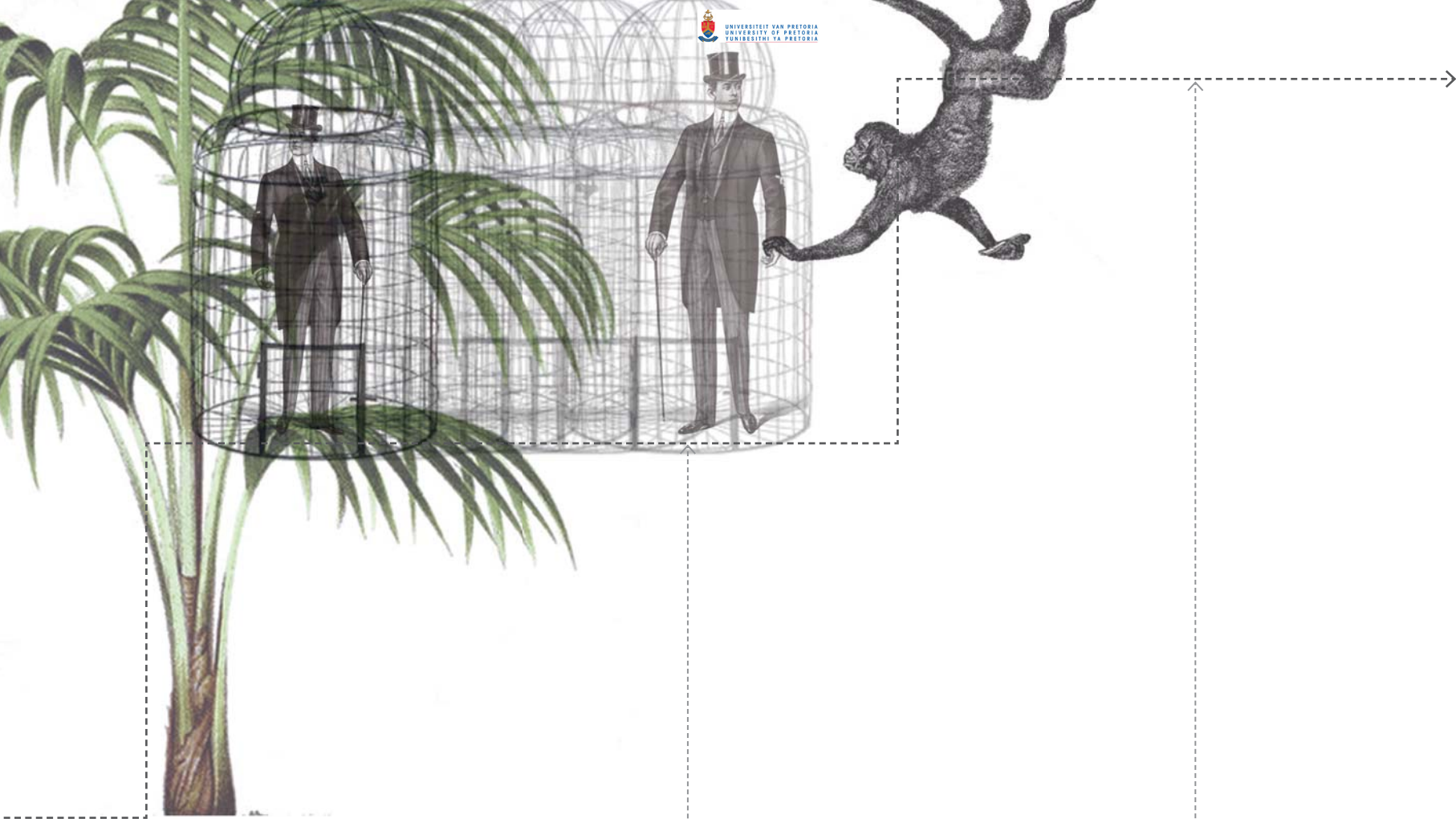
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II



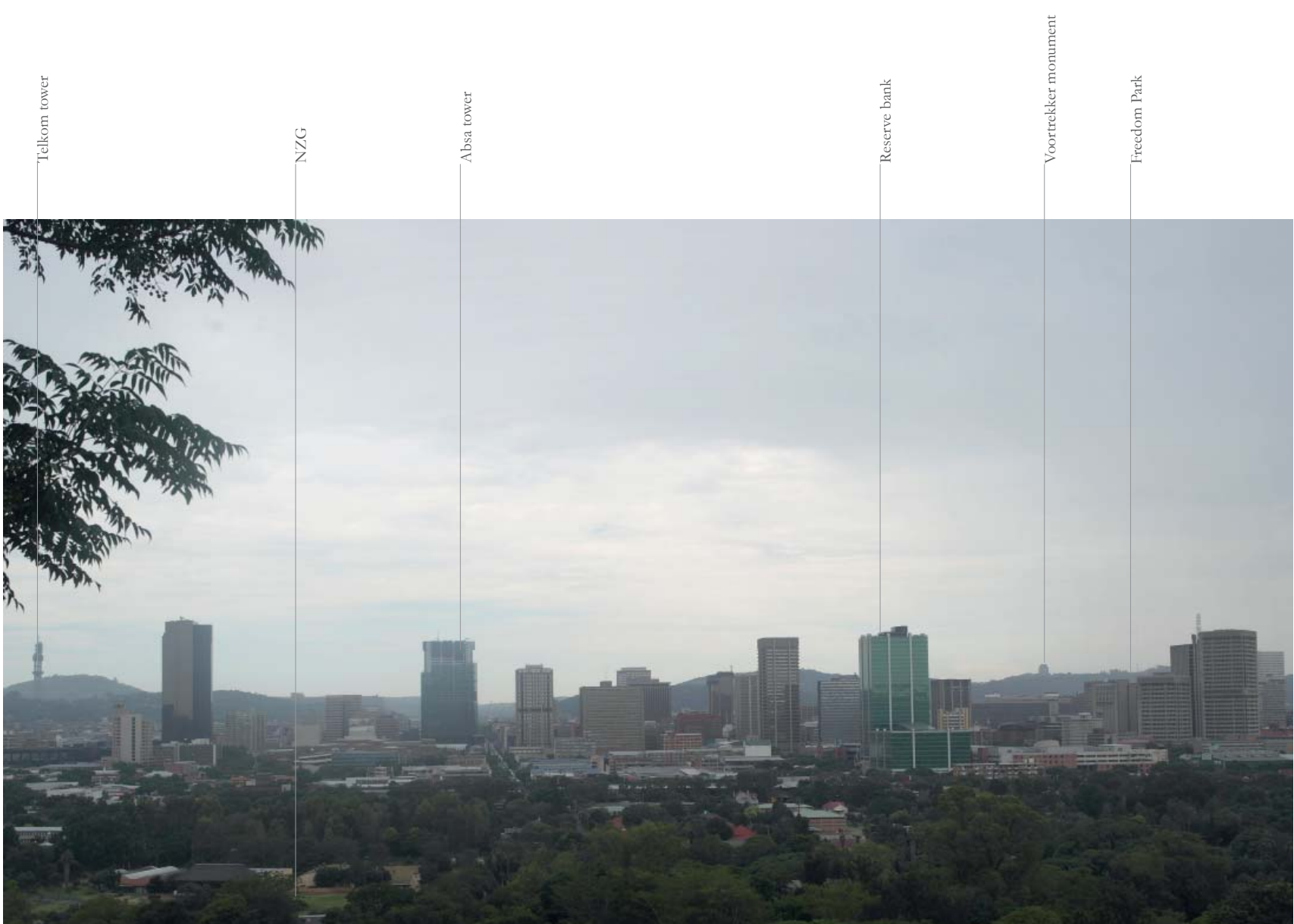
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.IV

.IV

.IV



Research questions

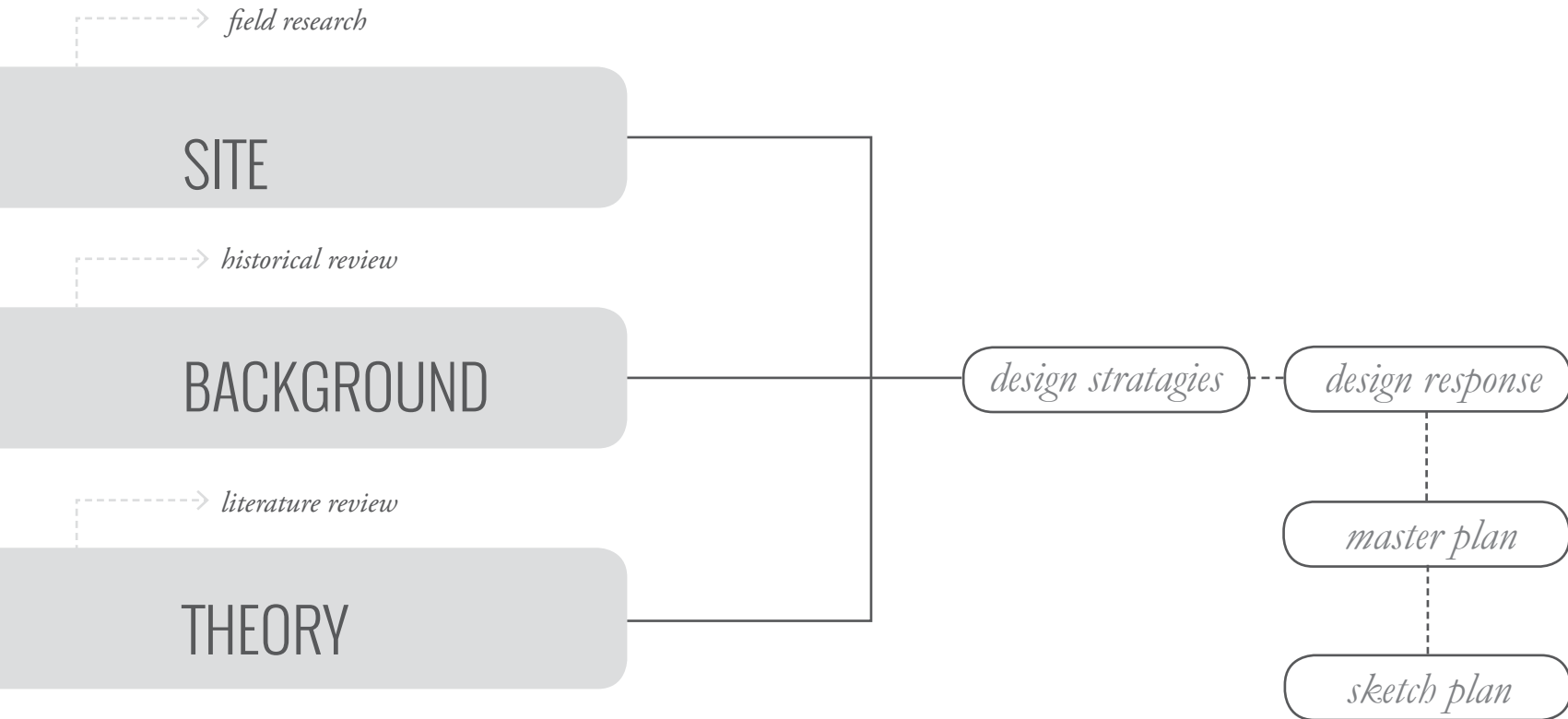
1. How landscape design can inform the current zoo design principles to determine a new set of principles.
2. How the transformation of current zoo enclosures can be implemented to support this new set of principles.
3. How can landscape design can combine ecology and aesthetics to create a hybridised interactive experience with nature, animals and humans, whilst acknowledging historical and cultural significance of the NZG.



L.8. Location of NZG in context of Pretoria, current and historical (Author 2014).

This dissertation will aim to investigate landscape design as a medium to challenge current zoo design principles in order to determine a new set of principles.

An analytical review of existing zoo conditions relating to design, ecology, character and experience will be conducted. This review will refer directly to the unique relationship between man and animal. The current revolution of International Zoo Design exhibitions will be explored to demonstrate opportunities for landscape intervention to evolve. This result will be applied to both the NZG master plan scale and a new enclosure scale. The new set of principles will argue landscape design decisions and become guidelines considering a future approach for zoo design, and more particular, within the context of the NZG.



1.9. Diagrammatic representation of methodological approach (Author 2014).

Methodology

Quantitative and qualitative field research

The current conditions of the NZG will be analysed in relation to its existing enclosures, animal catalogue and experiential value. Current site problems, opportunities, informal interviews and brief behavioural analyses of certain animals will be used as conductive material.

Historical overview/ context

An analysis of the physical, ecological and cultural history of zoos in general and specifically the NZG will be conducted.

The intentions will be to:

1. establish an in-depth understanding of the character of zoos;
2. identify opportunities for landscape design response;
3. validate the arguments expressed in this dissertation;
4. illustrate the significance of the study; and
5. establish baseline knowledge of the study area.

Literature review

Literature studies will be conducted on the following subjects in support of the argument:

1. Theoretical issues general to the discipline of landscape architecture. Landscape design will guide spatial, regenerative and ecological initiatives by means of a theoretical and practical approach.
2. Theoretical issues specific to zoological garden design.

Case studies

Examples of local zoo enclosures will be critically analysed in order to establish current typological characteristics, both positive and negative. International examples of zoo design will be discussed to illustrate global trends, theories and design approaches. International examples of zoo design will be discussed to illustrate global trends, theories and design approaches.

Assumptions and delimitations

This dissertation will not attempt to redesign the full extent of the zoo, but will rather focus on an identified area for detail enclosure design and thereby aim to establish a model that can be implemented in the future development of zoological garden design in general and specifically the NZG.



*II_1. The Lion-Trainers,
1985, by José García y
Más (Baratay 2002).*

CHAPTER II

Background of Zoological Gardens: a metaphor



Nature in captivity

NATURE IN CAPTIVATION PROVIDES BACKGROUND OF ZOOLOGICAL GARDENS AS A METAPHOR OF MAN'S DOMINION OVER NATURE. CHAPTER II SERVES AS AN IN-DEPTH UNDERSTANDING OF THE CHARACTER OF ZOOS AND PROVIDES BASELINE KNOWLEDGE OF THE STUDY AREA.



2.1 *Introduction*

As defined by Sauer (1963:315), cultural landscapes are the cause and effect of cultural values, cultural institutions and human behaviours which interact with the natural environment. Chapter II defines zoological gardens as a cultural landscape. Through the development and history of the National Zoological Gardens, man's paradigm becomes parallel and connected to the manner in which animals are exhibited. Whatmore (2002) describes the zoological gardens as “hybrid spaces” of the cultural and the natural world. The National Zoological Gardens of South Africa serve as an investigation to the above research statement.

2.1.1 *“A ‘Natural’ Landscape on Human Terms”*

According to Mullan and Marvin (1999), “the zoological garden typology has changed to reflect progressive cultural values”. Zoological gardens have always been and remain to be cultural landscapes. A landscape “culturally contrived by and for humans, inserted as representations of ‘the natural’ into the built landscape”. This representation of the natural engenders a particular way of looking at animals, both literally and figuratively (*ibid.*:24). Zoological gardens are dual spaces of cultural and natural construct. Man constructed this platform in an attempt to satisfy his yearning for nature.

The historical development of zoological gardens has undergone three distinct realms:

“Pre-modern, i.e. from ancient times to 1750 AD;

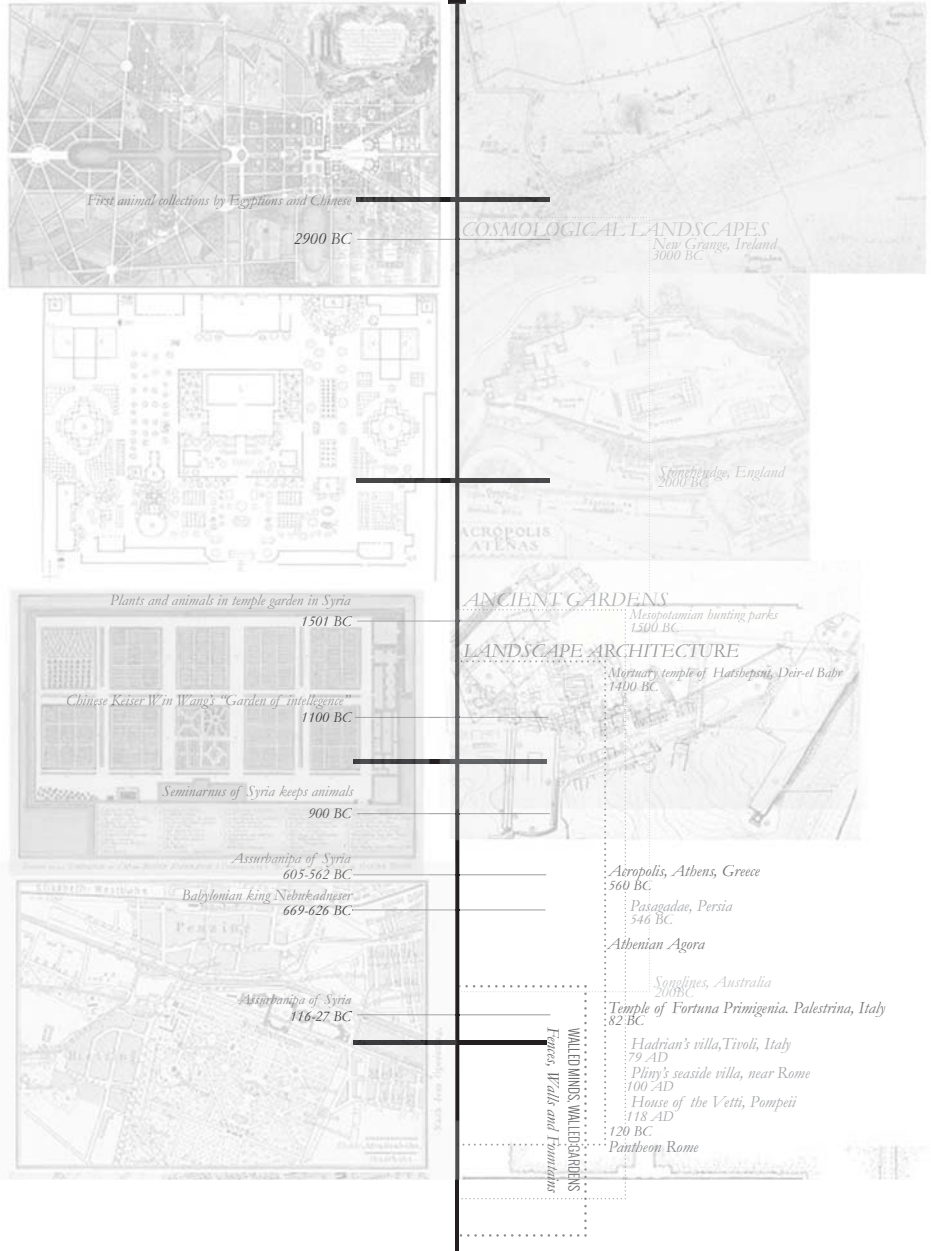
Modern, i.e. from 1750 to 1950; and

Post-modern, i.e. 1950 until the present period” (*ibid.*).

These distinct realms initiate a world-view understanding of humans toward animals and run parallel to the paradigm of the society of the era.

The chapter will focus on the relationship between man, animal and the landscape over time. In addition to this, the flux in paradigm and typological consequence within an international and local context will be investigated.

The study will focus on the relationship between man, animal and the landscape over time. In addition to this, the flux in paradigm and typological consequence within an international and local context will be investigated.



PREHISTORY TO 6TH CENTURY

6TH TO 15TH C
MIDDLE AGES

The Passion for 'Collecting'
(1500s to 1700s)

*animals are a display of imperial power and princely sovereignty
landscapes, pavilions and enclosures were designed to stage the narrative of nature as a
controlled, theatricalised reality.*

2.1.1.1 *Victorian savagery and nobility*

Pre-modern: ancient times – 1750 AD

Animal collections from the ancient times are typically described as menageries. The term *menagerie* can be defined as any small collection of exotic animals. The main purpose of these animal collections was to provide private amusement to the elites.

According to Graetz (1995), “the menageries tended to follow the proclivities of the rulers who established them, whether it be sport or spectacle”.

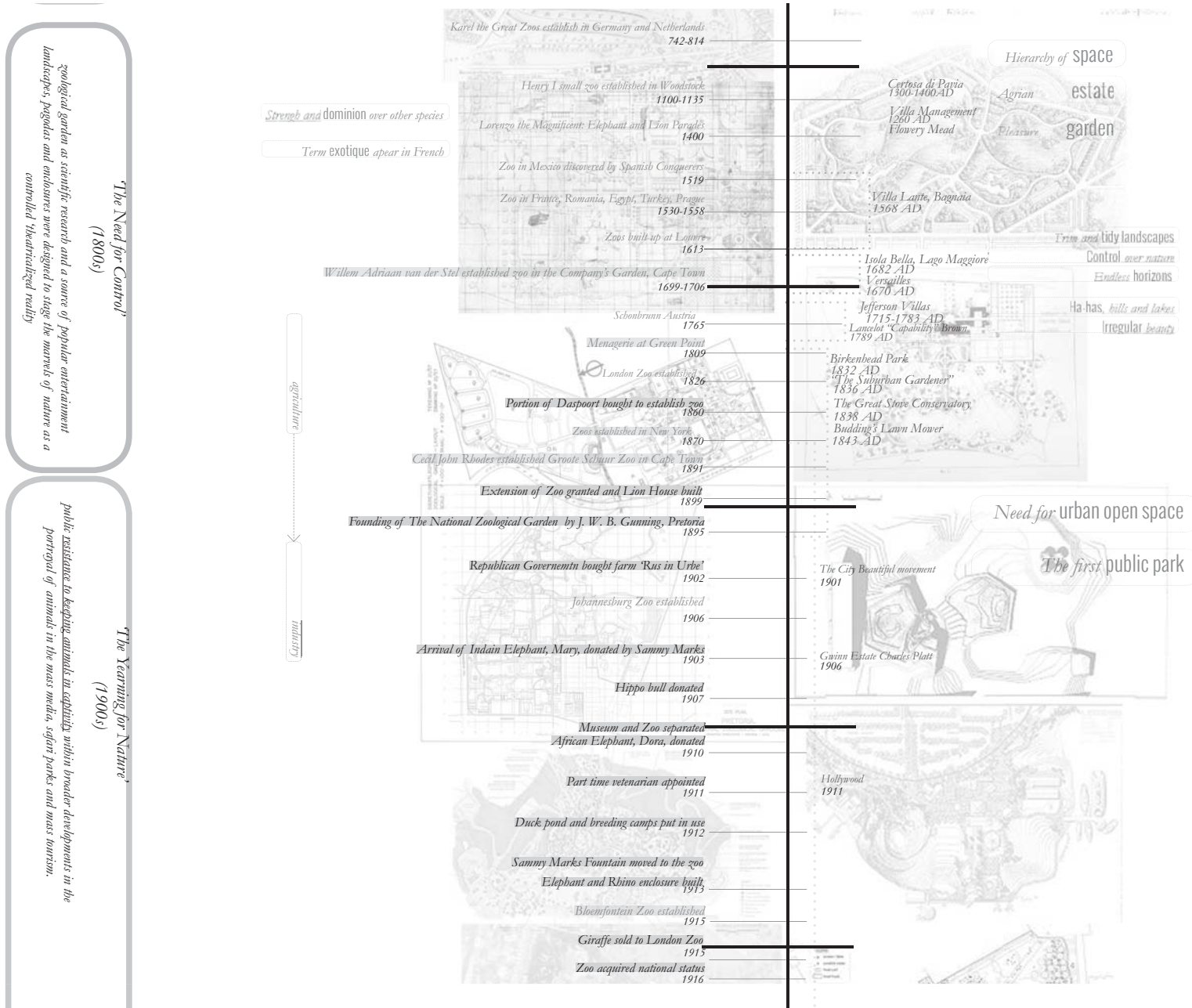
Hancocks (2001:57) explains that enclosures were designed in such a manner that the animals were far below the visitor, which implied enhanced “notions of human dominance over these now controlled and conquered representatives of nature”.

Human control and manipulation was therefore evident, where animals were lured to areas of plain sight by means of food. This setting provided the user with an entertaining experience. Information on species, habitat or behaviour was seldom provided.

The physical construction of fences ensured that the wild would be controlled and successfully put under man’s reign. The barrier became a metaphor for the distinction between “us” and “them” and, more importantly, a “‘mini-triumph of human mastery’ over both beast and nature (Wirtz 1997:74)”.

Zoos of this era followed a parallel trend of the display of the mastery over nature: ethical exhibits intended to instruct and inspire. According to Coe (1995), both these attitudes converged in the Victorian era. Expressions of power among the elites and animals as entertainment among the bourgeois grew parallel to the interest in the natural world. These stances led to the development of the “Age of Reason”. The collection of animals evolved into specimens for study rather than amusement, leading to the first scientific establishment of zoos in the modern world.

After the French Revolution of 1789, the naturalist Cuvier reorganised the collection on scientific principles and it was transferred to the *Jardin des Plantes*. France’s legacy was led by Rousseau’s call to spiritual refreshment through a return to nature (Graetz 1995).



- 16TH C: Transition to the modern era Renaissance Villas
- 17TH C: The age of reason
- 18TH C: English "Natural" Pastime urban, public, and Romantic
- 19TH C: The Victorian Rule

2.1.1.2 *The return to nature*

Modern times: 1750 – 1950

During this era, the term “zoo” was established. Zoological gardens were perceived as living natural museums that focused on educating the public by exhibiting ecological relationships between habitat and species (Mullan 1999:15-25).

A philosophical lineage of contemporary zoo design can be identified from the “return to nature” philosophy through to the Romantic Movement in literature and art. This is evident in the words of Wordsworth, Thoreau and Emerson, along with the wilderness ethic expressed in conservation and the establishment of national parks (Graetz 1995). The former gave rise to the animal welfare philosophy and respect for nature.

The Romantic Movement also contributed to the modern development of zoos. This contribution was executed through the informal park design of Olmstead and Brown.

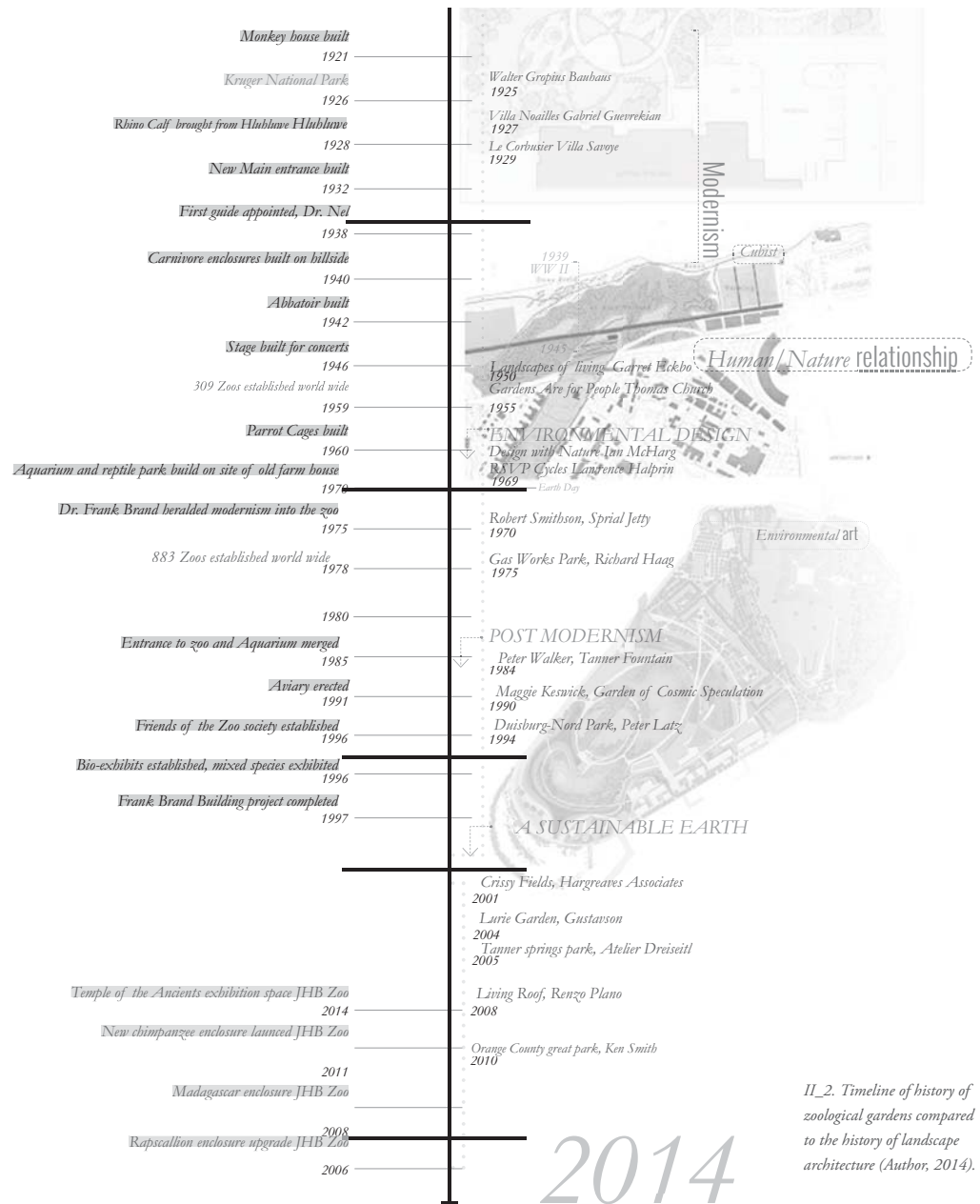
The next great development is contradictory to the above and falls back to the element of man’s control over nature rather than the stewardship. This development was coined in the establishment of the London Zoological Society’s Zoo in Regent’s Park and the Hagenbeck Zoo in Hamburg. Man’s power over nature was seen as knowledge, and expressed by the Victorian philosophy, “Knowledge is Power”.

The social nature of zoos became evident in the London Zoo, as a need for many simultaneous views by a large populace emerged.

Pregill and Volkman explain in *Landscapes in History: Design and Planning in the Western Tradition* (1993) that “the public no longer found relaxing naturalistic environments sufficient for recreation. They demanded entertainment, organised activity and variety. As the nineteenth century progressed, park administrators increasingly dealt with demands for new amenities. Favoured features included conservatories, bandshells and, most disruptive of all to landscape parks, menageries that usually grew into full-scale zoos .”

According to Graetz (1995), the “progress in planning of zoos lagged behind that of parks”. Landscape design provided a model for zoo planning until zoo design took on its own conceptual framework.

Carl Hagenbeck, however, did not follow the model of landscape design and became a unique innovator in the development of zoo design. Hagenbeck updated animal husbandry and display methods and presented them to the Hamburg Zoo. The holding of animals “allowed Hagenbeck to formulate his ideas about animals, including the testing of jumping distances for his moat barrier designs” (Graetz 1995).



II_2. Timeline of history of zoological gardens compared to the history of landscape architecture (Author, 2014).

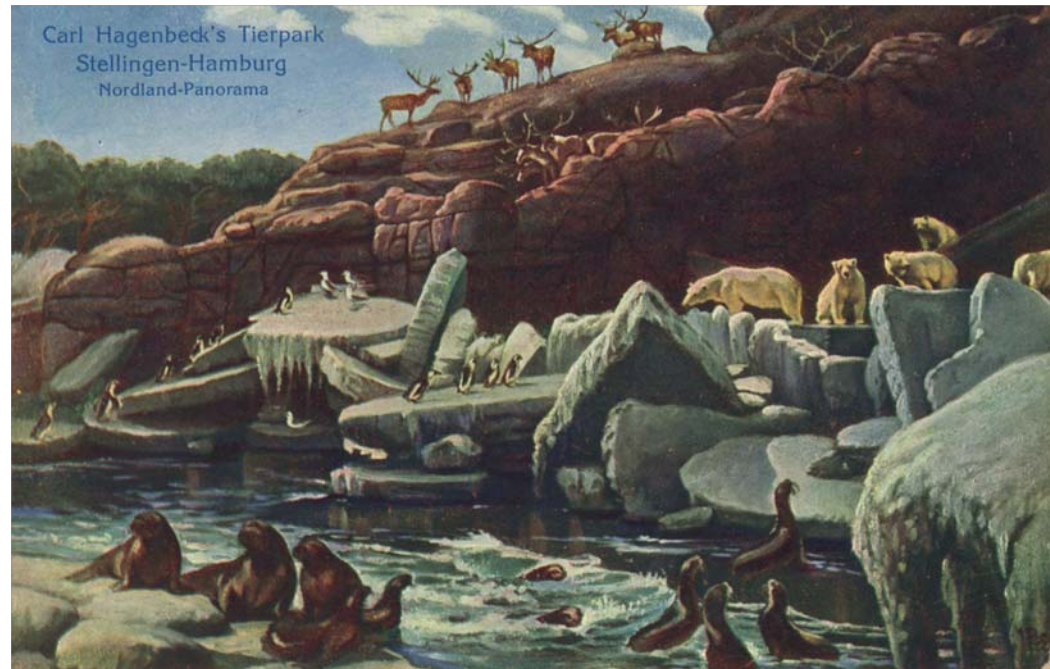
2014

“While some favoured the well-ordered symmetry of the Beaux Artes [sic] classic revival period, . . . others . . . favoured the informal, romantic park style initiated by Capability Brown and later popularised and modified for America by Frederic Law Olmsted” (Coe 1994:33).



Hagenbeck introduced the naturalistic exhibition in which artificial landscape elements were constructed as concealed barriers and simulations of natural landscapes. This principle was followed by mixed species exhibitions, predator-prey illusions and the zoogeographic order, opposed to the previous taxonomical order. Hagenbeck’s exhibitions were, however, focused on what the public wanted, based on the picturesque landscape, rather than actual natural habitats. Coe (1995:97) comments that “the ‘naturalistic’ exhibitions originated by the Hagenbecks usually placed the viewer on the outside of the romantic panorama. While the animals may be portrayed in the picturesque grottos as a make-believe stage set, the public looked over pruned hedges and flower borders of a traditional park. People were separate from and in control of nature (*ibid.*)”

Graetz (1995) explains that the role of zoos emerged from a “bourgeois intellectual toy to a social amenity for the masses for much the same reasons that gladiatorial battles between men and beasts were put on by the Romans (though with much less disastrous consequences for the animals).”



II_3. Hamburg Zoological Garden; Carl Hagenbeck Zoo; Nordland Panorama (Zeno 1911).



*II_4. Zoo as conservation centre
(National Geographic, 2000).*

2.1.1.3 *Candidates for conservation*

Post-modern: 1950 – modern times

The final realm in the development of the zoological garden reflects the new and contesting thoughts of the role of zoological gardens within the urban environment. The notion of zoological gardens acting as environmental resource centres became prominent and this realm is still enduring in present times.

The notion of conservation rose as society became increasingly concerned about the welfare of animals, particularly in zoos. Conservation became a social concern during the sixties, influenced by the earlier generation of thinkers and the above-mentioned wilderness ethic. The combinations of factors led to renovations and the implementation of new exhibitions all over the world.

During the seventies, zoos reacted to the concerns about the “squalid conditions of animals by creating ever-more sterile exhibitions” that permitted a “high degree of disease and vector control”, as described by Greatz (1995). Designers were “exploiting glass and ceramic technology for the first time, influenced by Modernist architecture” (*ibid.*).

A Seattle-based landscape and architectural firm, Jones & Jones, followed this notion by the design of the ‘Long-Range Plan’, representing the zoo as a single biome. Jones & Jones established a tendency for zoos to be “enlarged and redesigned to emphasise an ‘ecological’ approach to the display and management of animals” (Pregill & Volkman 1993:714).



*II_5. Orang-utangs
imitating children
(Gruetz, 1997).*

2.1.1.4 *Animal as client*

Present day

The co-evolution among zoos, nature sanctuaries and museums has been prevailing since the conservation realm. Game reserves started putting wildlife in separate camps for the public to see and zoological gardens developed more naturalistic animal enclosures influenced by the typical natural history museums diorama.

According to Benbow (2000:13) “the enclosures and exhibitions within zoos today are arranged according to a number of rationales, based upon zoological, environmental, regional, and climatological characteristics”. This rationale leads to an increased emphasis on environmental aspects within zoo design. Enclosures are therefore grouped according to aspects relating to conservation and habitat creation.

Benbow’s argument is supported by Hosey *et al.* (2009) in the book *Zoo Animals*, stating that “promoting animal welfare is one of the main goals contemporary zoological parks assume as a priority”. Broom & Johnson (1993) further claims that “this task goes beyond nutrition and veterinary care. It involves housing the species in suitable environments to satisfy their biological needs”. Enclosures are designed with the animals as the main concern at heart, the species’ original environments, its ecology and behaviour.

The intention is therefore to raise the public’s perception of the biodiversity preservation by replicating the habitat of the enclosed animals. According to Coe (2012), this practice has changed the viewer’s attitudes toward animals in captivity.



*II_6. Historical map of
NZG (NZG, 1920).*



Polakowski (1987:82) summarises, “the continuing debate over how accurately habitat needs to be portrayed, thus some designers believe that . . . in many instances a setting with simulated rock outcroppings is inappropriate to the animal’s native habitat . . . Many exhibitions representing this design approach are unsuccessful because the essence of the native habitat was never realised and/or the physical abstraction of the essence was poorly conceived and executed. The lack of sufficient space for animal exhibitions on the zoo grounds has helped perpetuate the need to abstract, in size and atmosphere, the natural habitat.”

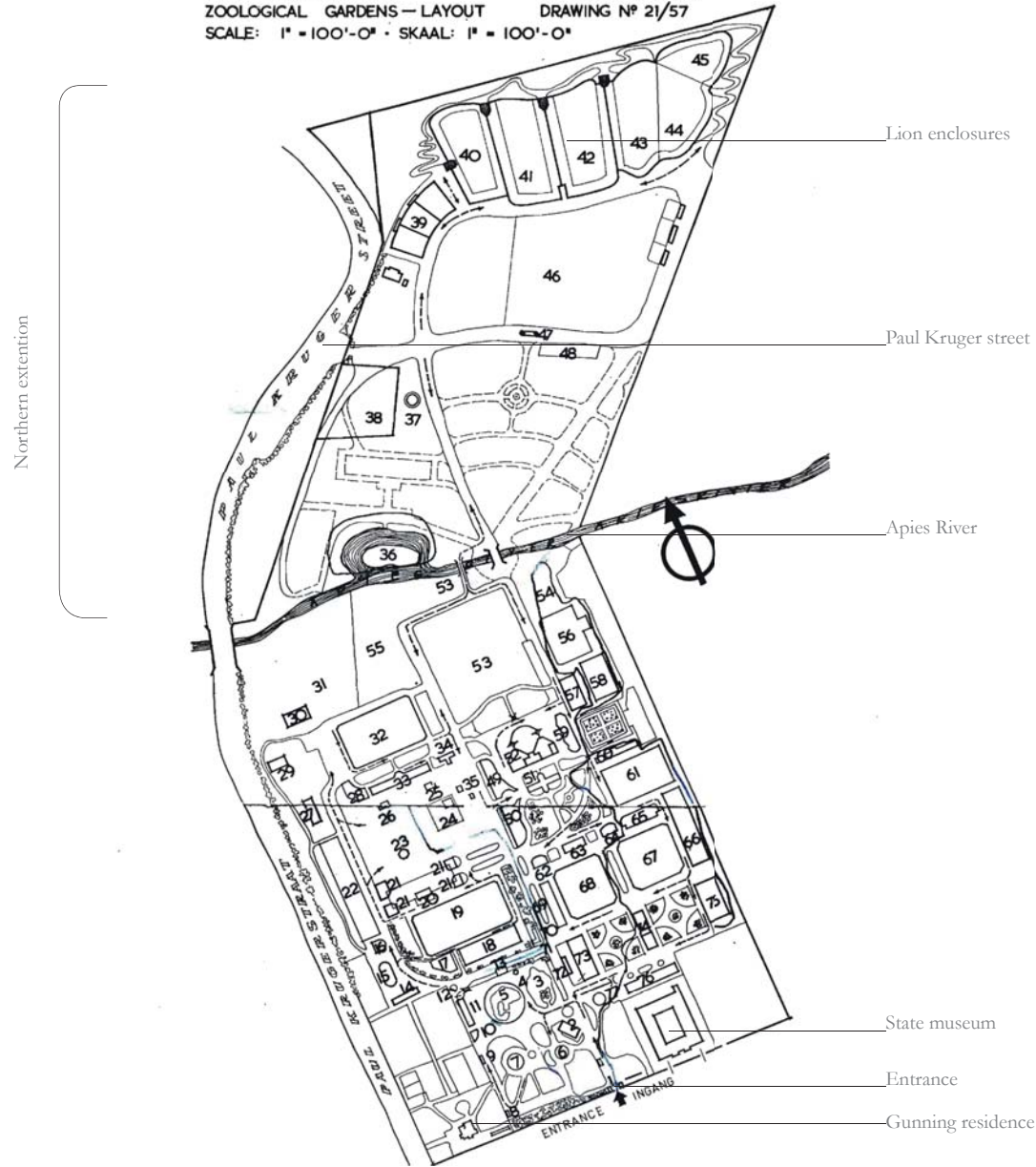
The future of zoo design appears to be seeking ways to convey a greater meaning and message in exhibitions, while sacrificing neither the accuracy of portrayal of habitat nor returning to the expression of man’s dominance over beasts. As Coe (1995:39) puts it, “the coming challenge is to use behavioural knowledge to entice animals into ideal viewing positions. The trick is to provide as many positive incentives as possible to keep the animal in view rather than providing negative stimuli if the animal chooses to be seen.”

Zoos are therefore called do stretch the boundaries beyond the mere display of animals. “Animals are the difference between zoos and museums and the experience of these must be maximised to make a deeper but correct impression on visitors (Graetz 1995).”

In summary, the historical and contemporary background of zoo design becomes the *Tamed Platform* from which various elements of zoo enclosures, the implications of the animal exhibition and the threshold it creates relative to man can be explored.

DIERETUINUITLEGPLAN
ZOOLOGICAL GARDENS — LAYOUT
SCALE: 1" = 100'-0" · SKAAL: 1" = 100'-0"

TEKENING N^o 21/57
DRAWING N^o 21/57

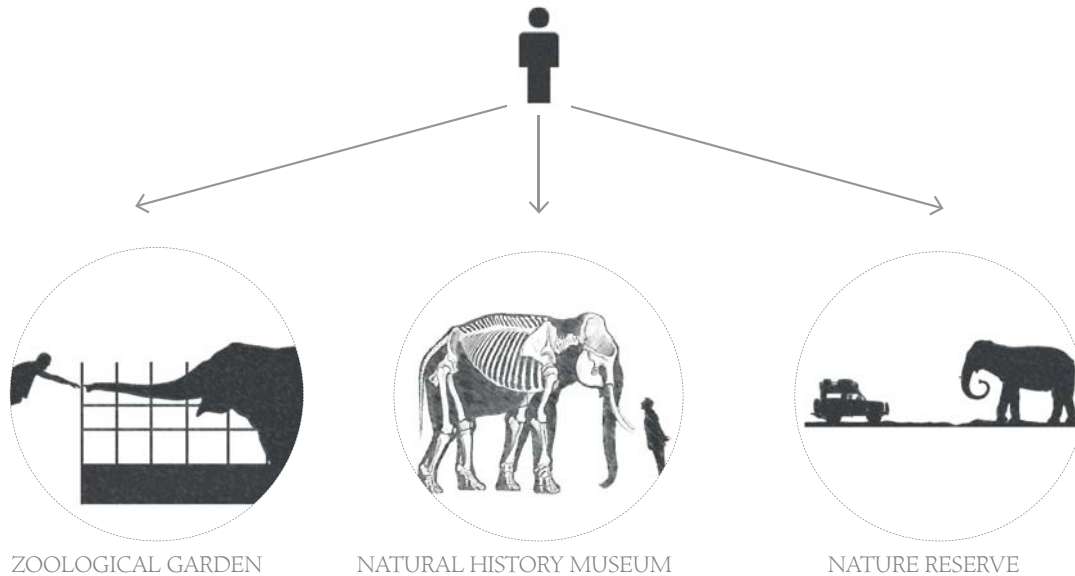


II_7. Map Plan of Developed Zoological Gardens, north and south of the Apies river (department of public works 1967)

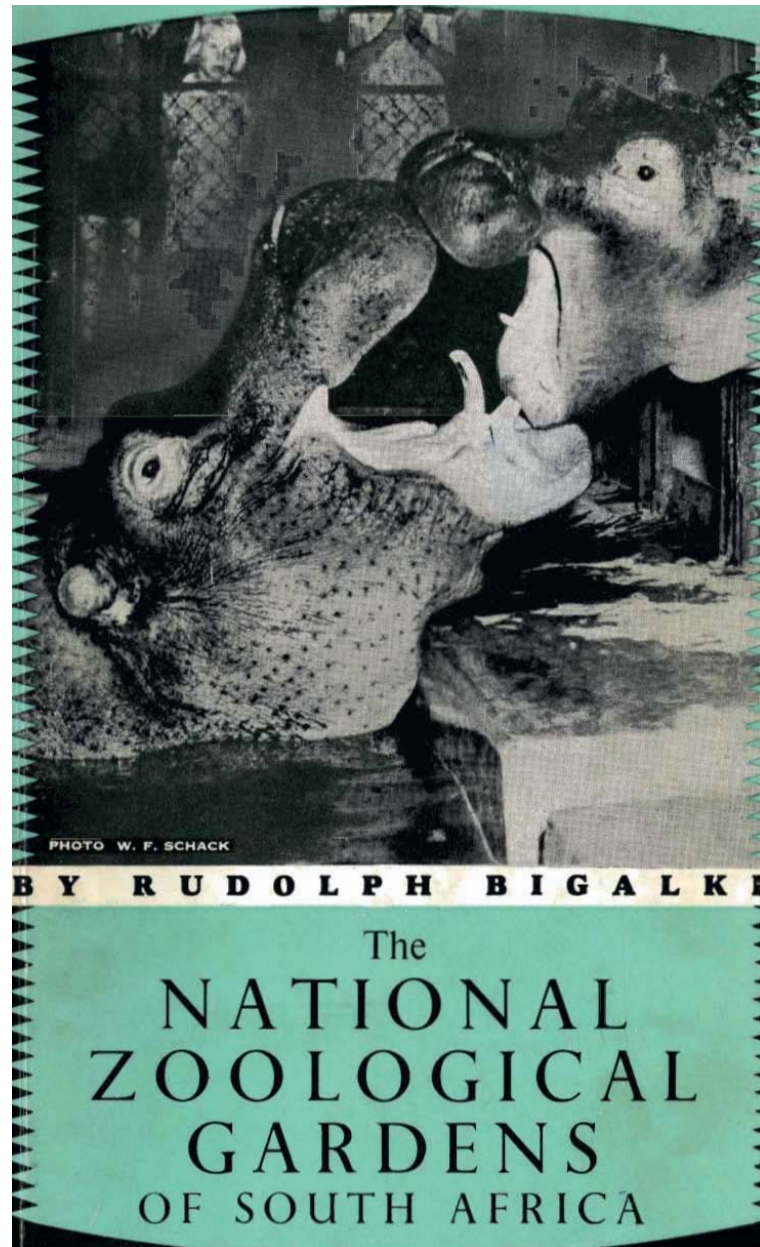
2.2 *The tamed platform*

The need for interaction with animals has spatially manifested itself in three ways within the urban context of South Africa as illustrated in figure II_8 on page 61. According to Joffe (1969), we either accord legal protection to certain species, confine the species and its environment in some sort of enclosure or, finally, we take the species out of its natural environment and continue breeding under controlled conditions. Contemporary zoos, natural history museums and nature reserves all over the world represent these three practical methods.

As noted throughout the development of zoos, the evolution and design of the zoological garden's intellectual and spatial constructs of wilderness and ecology can all be prescribed to one common factor, that of which man is always the central figure of the experience. This statement is evidently visible within the NZG.



II_8. Spatial manifestation of how we look at animals adapted from Joffe (1969) (Author 2014).



*II_9. Cover of NZG guide
book 1961 (NZG, 1961)*

The National Zoological gardens of South Africa – since 1902

The National Zoological Gardens of South Africa came into existence as a branch of the Staatsmuseum der Zuid-Afrikaansche Republiek and their establishment was due entirely to the late Dr J.W.B. Gunning.

Prior to the construction of the Old Museum in Boom Street, animals were housed in the Market Hall on the market square of Pretoria. Live animals were occasionally given to the Staatsmuseum and by the end of January 1898, about a dozen mammals of various sizes, as well as approximately fifty small birds, one owl and two reptiles, were on hand. Gunning was permitted to have a few simple birdcages made, so that the large numbers of small birds offered to the museum from time to time could be kept alive until their plumage had become suitable for mounting. These animals, together with others that were purchased or presented were kept in a small yard at the back of the museum on the market square. As the public came to know about the animals and desired access to them, it resulted in the public paying admission fees. The revenue from this source helped to pay for the maintenance of the animals. According to Van den Berg (2000:32), Gunning went to great extents to create a “recreational heaven for the city’s inhabitants”.

In 1899, Dr Gunning received permission to move his small collection from the market square to the farm Rus in Urbe, the present site of the National Zoological Gardens.

The NZG were beautifully landscaped and complemented with dramatic buildings, such as the Lion House built in 1902. The main entrance was erected in 1903. At this time, the Zoo consisted of a few farmhouses and enclosures housing small animals. Gunning enthusiastically continued to expand with the following: a camp for buffalo and zebras in 1907, elephant and rhino houses in 1910, a bear house in 1911, and the raptor cages in 1912 (Dry & Joubert Argitekte 1991:42). The NZG became a popular place to visit throughout the years, especially on Sunday afternoons when bands would play and entertain the visitors (Bigalke 1958:21).

Gunning was later introduced to Carl Hagenbeck and implemented his ideas and philosophies at the NZG. Gunning developed a principle to display the animals not as captives confined to narrow spaces to be observed between bars, but as free species to wander from place to place within larger boundaries. The bars were replaced by concealed manners of control. As a result, enclosures started to be seen less as cages and more as exhibitions (Dry & Joubert Argitekte 1991:42).



*II_10. Dr. Jan Willem
Boudewyn Gunning
(NZG, 1920)*



This approach recognised the importance of the position of the observer in relation to the observed. The dominance of the constructed cage was greatly reduced to a simple holding structure. This approach required much more space than previous enclosures to allow for adequate landscaping, hence the term “Zoological Park” or “Zoological Garden”.

In the year 1909, additional land was granted for the “Northern Extension” to be added to the Zoo on the northern side of the Apies River. Years later this vision led to the northern lion and tiger enclosures, which are still in use today. In 1935 the NZG extents were increased by the addition of the Prinshof Farm No. 628. See figure II_7 on page 60.

Due to its expansion, the government decided that the Transvaal Museum and Zoological Gardens were to be separated from one another in April 1913 and independent committees and directors were appointed.

In June 1913, Dr Gunning passed away after a long illness, and Dr A.K. Haagner, who served as director from 1914 until 1926, succeeded him. In 1916, the Zoo received national status. At this point of time, the Zoo had limited funds for acquiring additional animals, and served as a stopover for animals travelling from Africa to the rest of the world.

Dr Rudolph Bigalke became the third director of the National Zoological Gardens in 1927. Bigalke managed to acquire additional funding from the Department of Public Works to erect the enclosures on the hillside, as envisioned by Gunning. The tiger and lion enclosures opened in December 1938.

During the 1930s to 1940s, the Zoo had an amusement park atmosphere. Many of the animals were exhibited on poles and performed tricks to the delight of the public. In 1960, the NZG were modernised by the order of Dr Frank Brand, who became the fourth director of the Gardens. At this time the amusement previously provided was eliminated and the focus was shifted towards implementing night facilities into all the enclosures in such a manner that the public could only view the animals from a maximum of three sides, offering the animals a safe retreat. Most enclosures were also upgraded to suit the natural requirements of each animal.

Mr Willie Labuschagne has been director since 1985. Labuschagne has improved the connection between the NZG and the public. He believed that only through this connection could the Zoo reach its full potential as an educational and research entity. Great progress has been made in achieving this goal by the formation of organisations such as Friends of the Zoo and the Adoption Scheme (Dry & Joubert Argitekto 1991).

Max the gorilla 1970-2004



II_11. Max the gorilla sculpture, Johannesburg Zoo (Author 2014)

2.3 Conclusion

Today the Gardens are a major natural gem within the inner city and stands at the forefront of an increased effort towards the awareness of the value and frailty of the environment.

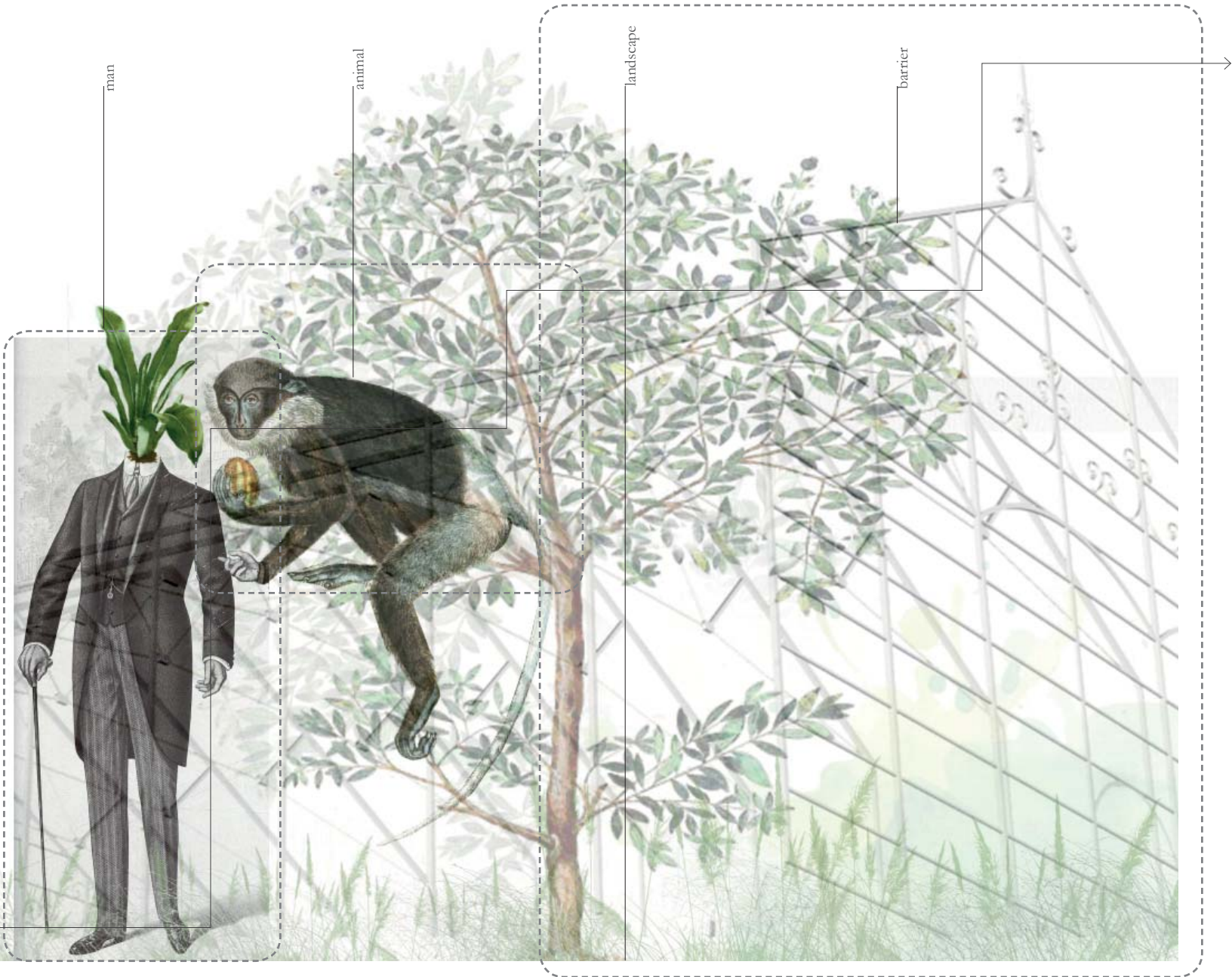
The NZG have evolved from a menagerie-style exhibition to being leaders in conservation and education. The NZG occupy 85 hectares and house over 8000 animals, including reptiles, fish and birds. It is also the largest zoo in the country and the only one with national status. More than 600 000 visitors pass through the Zoo's gates each year. Other facilities include a reptile park, South Africa's largest inland aquarium and an extensive exotic tree collection (www.gauteng.net 2014).

To really understand the lure of the zoo, one should not look at the animals, but at the people. People enter the gates and feelings of respect for animals, concern for and solidarity with animals arise. Contrary to that, people see in them the beast within and somehow believe that having tamed them we simultaneously succeed in taming our inner beasts.

According to Mullan and Marvin (1997) in the book *Zoo Culture*, zoo visitors tend to respond to animals not as creatures with a separate existence and identity from human beings, but as reflections of themselves. The activities of the animals stimulate a response to the user and a desire to understand the behaviour it presents. This behaviour is interpreted through humanlike emotions or needs.

Society uses these anthropomorphic devices to understand animals. For many, it might be the only way to understand, appreciate or emotionally respond to animals. We are colluded into this false world where animals, their environment and behaviour are not viewed zoologically, ecologically or ethologically, but rather with ignorant statements such as, "it is sitting in the corner because it is sad" or "it is splashing around in the water because it is lazy".

The author has conducted an exercise at the NZG and the Johannesburg Zoo to observe the zoo visitors as a cultural study. It was evident in the findings that zoos are about real people who experience in close constructs.



II_12. Collage of the threshold between man and animal influenced by the landscape (Author 2014).



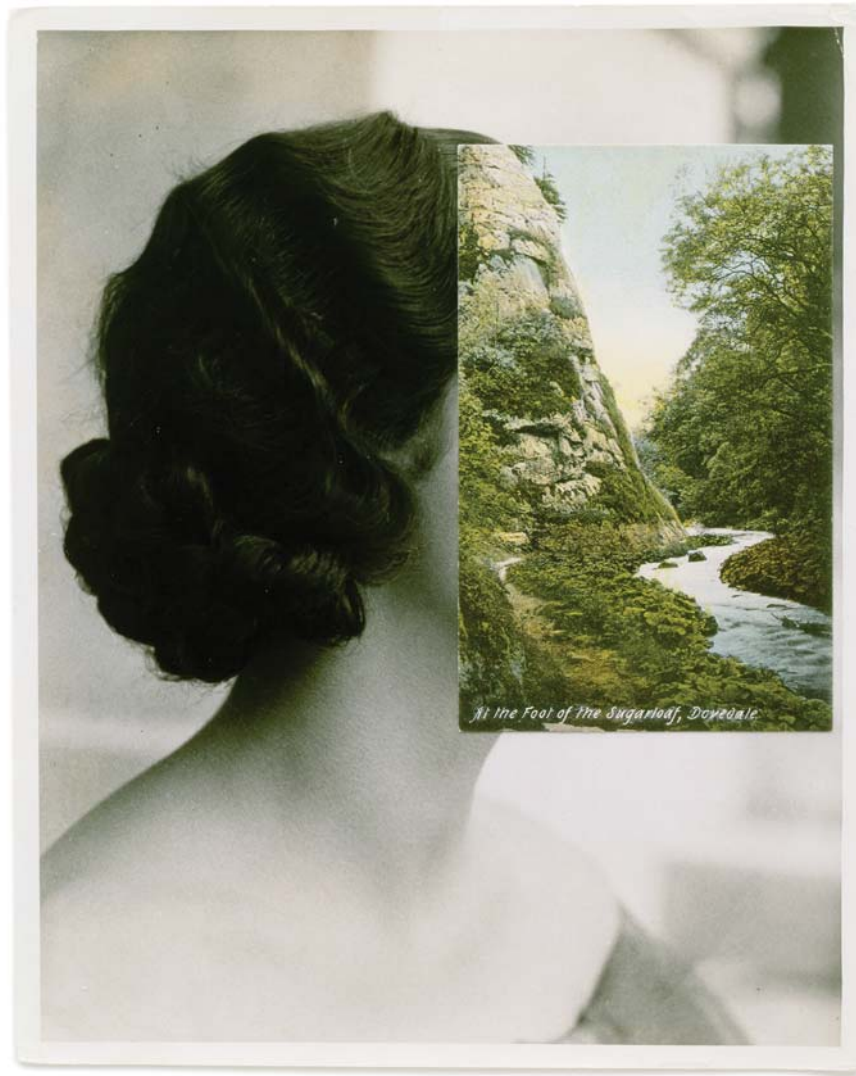
Cherfas (1984:239) argues that “zoos are a panoply of interaction between man and animal providing pleasure and joy. They might act as reservoirs for genetic diversity but so would a fridge full of embryos. They may be sources of information and knowledge, but so are books, films and photographs. Zoos offer something that nothing else can, the simple experience of contact and pleasure. For that alone, zoos are worth it.”

Cherfas support this argument with a story about a girl and an elephant:

One day, on a visit to a zoo, a little girl and her mother were watching the elephants. The mother was bored and tried to persuade the little girl to move on, but the girl held fast by her fascination with them. Eventually, and somewhat exasperatedly, the mother pleaded. “Do come on,” she said, “you’ve seen elephants lots of times on TV.” Her daughter thought for a while and without turning away from the animals, replied, “Yes, but these are so big” (ibid.).

Nevertheless, re-evaluation is called for zoos all over the world, even though they are promoted as wonderful institutions performing miracles. The visitor is limited from an optimal experience with the animal. Restrictions conformed as a barrier physically and psychologically distance our experience with the animal.

Implementing new design principles as introduced by Coe (2012) focuses on the “interconnectedness within natural systems and the interdependence between all living things”. These principles will lead to new design standards and an increased awareness of animals’ needs. By recognising the impossibility to replicate certain eco-systems and satisfy the needs of many traditional zoo species, an alternative option will give new attention to smaller species that do well in captivity, without neglecting the qualities of the social and cultural aspects of the site. This option will surface opportunities to redefine the threshold between man and nature and the experience of the zoo enclosure as a whole.



III_13.

*Composite Landscapes:
Photomontage by John
Stezaker (land8 2013)*

CHAPTER III

THEORETICAL ENCOUNTER

Instruments to renegotiate and reconcile the threshold: theoretical discourse



Theoretical encounter

THE THEORETICAL ENCOUNTER ARGUES HOW LANDSCAPE ARCHITECTURE CAN BE INTRODUCED AS AN INSTRUMENT TO RENEGOTIATE AND RECONCILE THE THRESHOLD BETWEEN MAN AND NATURE.

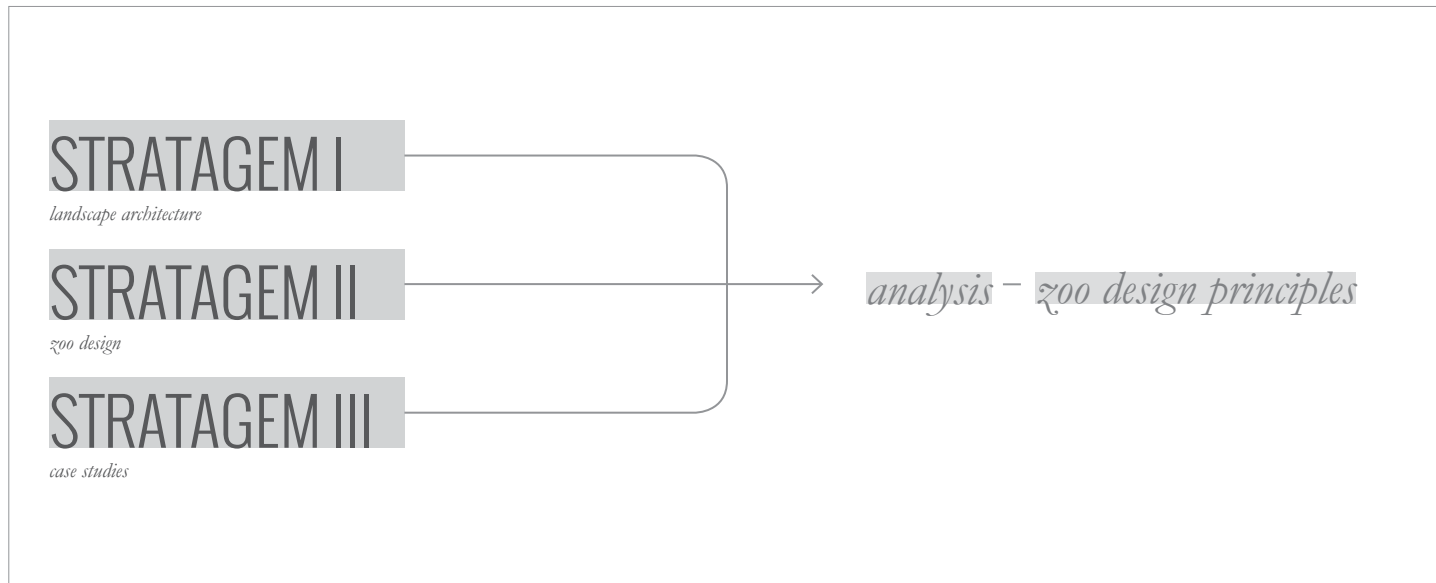


3.1 *Introduction*

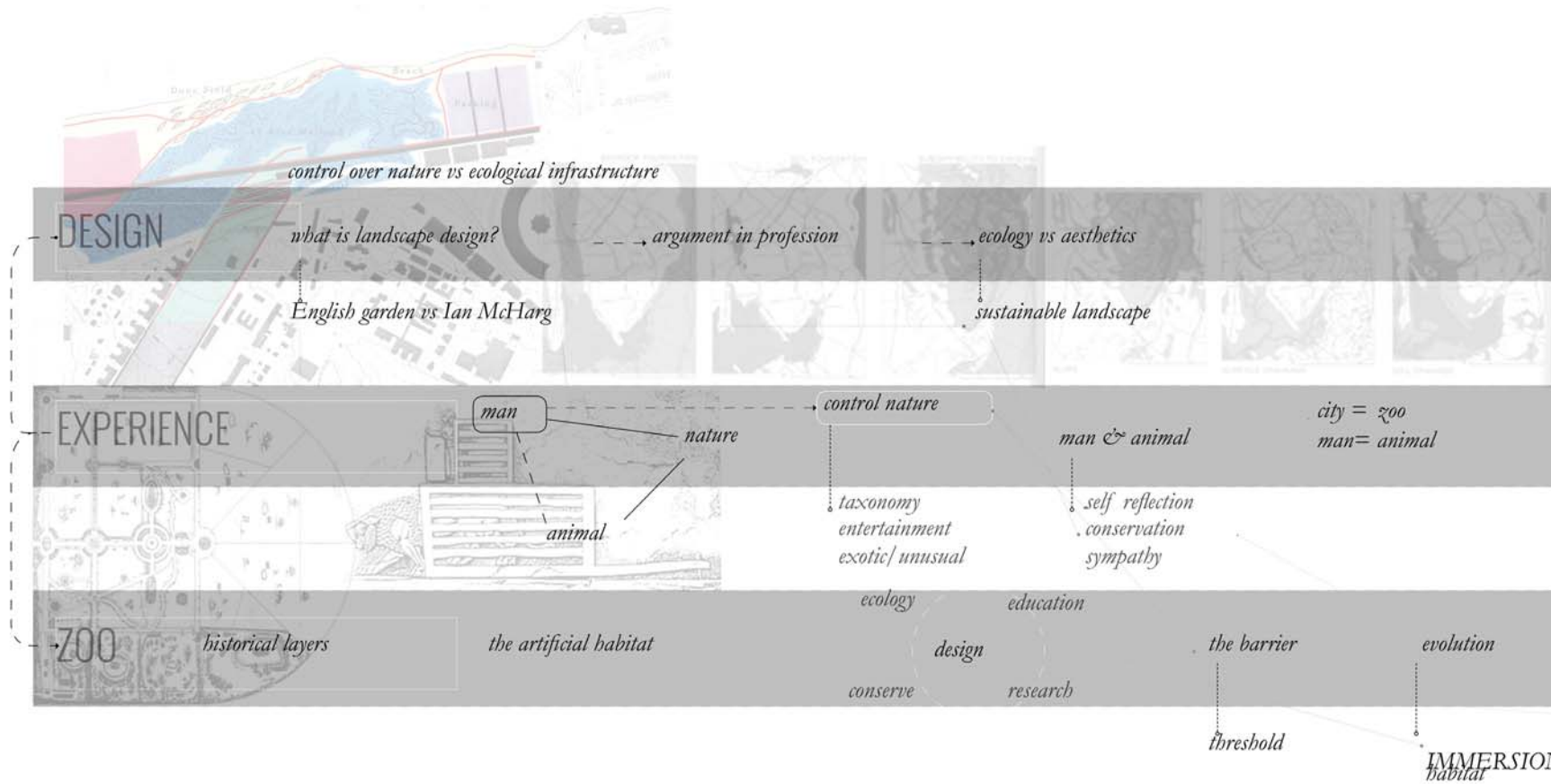
Chapter III analyses the current site conditions and determines possible opportunities for landscape design to be used as an intervention. Chapter III is divided into three strategies for design response: theoretical issues general to the discipline of landscape architecture; theoretical issues specific to zoological garden design; and relevant case studies relating to zoo enclosures. Through the analyses of these three strategies, a new programmatic response and zoo design principles can be determined.

“A park is a work of art, designed to produce certain effects upon the mind of men.”

-Frederick L. Olmstead



III_14. Stratagem
methodology
(Author 2014)



III_15. Theoretical development: 'Zoo' versus 'Experience' versus 'Design' (Author 2014).





*III_16. Nelson Byrd Woltz's
Biohabitats: weir system*

*III_17. Nelson Byrd Woltz's
Biohabitat: water channel*

*III_18. Nelson Byrd
Woltz's Biohabitats: water
inlet (Woltz, 2009)*

3.2 *Stratagem I: Theory in landscape architecture*

The author will discuss points of debate of *Sustainable beauty* – an approach in opposition with the *Design with nature* approach.

3.2.1 *Beauty and aesthetics in sustainable design*



Within the landscape architecture discipline, designers and theorists often focus on the ecological aspects of sustainability and design. Ian McHarg's *Design with Nature* (1969) cited the natural world as the only viable model for landscape design. McHarg's theory provided landscape architecture with instructions to avoid decisions of form and design. The *McHargian method* argues that if the design process is correct, the consequent form would be correct and automatically give rise to an appropriate aesthetic. McHarg and his predecessors perceived the discussion of beauty and aesthetics as a trivialisation of landscape architectural ornamentation.

During the nineteenth century, due to their availability, Frederick Law Olmstead designed urban parks to become spaces of social and environmental reform. Olmstead designed parks to be environmental “cleaning machines, open spaces with well-drained soils, shady groves of trees to reduce temperature, absorbing carbon dioxide and releasing oxygen.” More importantly, he believed that this urban environmental function was equalled by the “performance of the designed landscape’s appearance” (Meyer 2008:6). Olmstead was mainly concerned about the landscape’s appearance and its performance.

Olmstead believed that “the experience of that appearance – the combination of physical characteristics and sensory qualities – altered one’s mental and psychological state” (*ibid.*). The particular form of appearance is described by Meyer as the ‘beauty’ performed (*ibid.*).

The landscape served as an experience and an environment that sustained the cultural as much as the required environmental aspects Meyer states that “eco-technologies, such as rain gardens or green roofs, are being described as quantifiable ecological and hydrological processes showing no regard for the performance of appearance” (*ibid.*:7).

Meyer further claims that designers should readmit the aesthetic factor into the sustainability equation of ecology, society and economics. Landscape design should therefore rescue the visual beyond the stylistic or ornamental.

“It will take more than ecological regenerative designs for culture to be sustainable . . . what is needed are designed landscapes that provoke those who experience them to become more aware of how their actions affect the environment, and to care enough to make changes (*ibid.*:6).”

The aesthetic experience of the environment therefore becomes fundamental in “re-centring human consciousness from an egocentric to a bio-centric perspective (*ibid.*).”

This philosophy can be seen in the design of Nelson Byrd Woltz's *Biohabitats*. The waterway intervention may not be a replication of nature, but the hydrological processes of the disturbed urban stream are restored through human intervention. “The design and construction of *natural processes* advances over *natural forms* (*ibid.*).” (see Figures III_16 on page 78)



III_19. Patio de los Naranjos in Seville: irrigation as art (Treib 1999)



III_20. Patio de los Naranjos in Seville: top view of courtyard and cathedral (Treib 1991)



Patio de los Naranjos in Seville (Figure III_19 on page 80) is another example of a design that, as described by Marc Treib, “testifies to the limits imposed by its environment, but does not try to replicate the proximate natural landscape” (Treib 1999:31). The patio “elevates the pragmatic requirements for irrigation to the level of art” (*ibid.*).

Treib (*ibid.*) supports this description mentioned above with the argument that the McHargian thinking leads landscape architects to an ecological trend, and results in analysts rather than creators. Treib (*ibid.*) continues to say that such design eliminates form-making, which is central in landscape design. Treib states that “one cannot design *without* nature, but should also be able to design viably *around* it (*ibid.*).”

Meyer concludes the argument by stating that “landscape architecture is more than designed ecosystems, more than strategies and open-ended processes. Landscapes are cultural products with distinct forms and experiences that evoke attitudes and feelings through space, sequence and form” (Meyer 2008:10).

Meyer explains how design can provide an aesthetic, but immersive experience that can lead to the recognitions, “empathy, respect and care for the environment” (*ibid.*). By listing eleven principles in Meyer’s manifesto, the author aims to incorporate it as objectives for programmatic response and intervention.

The author has identified five of these principles that will serve as design strategies for the zoo design intervention of the study area.

The principles include: beyond ecological performance, natural process versus natural form, the hyper-nature, the performance of beauty and dynamic beauty.

3.2.1.1 *Beyond ecological performance*

Meyer (2008) argues that “sustainable landscape design must be more than a functional and ecological” performance system, but it must also “perform socially and culturally.”

Meyer’s term “Sustainable landscape design” must use natural cycles identified within the given landscape, such as cleaning and filtering of water or replenishing soils and intersect these elements with recreational activities and spatial practices. This will link the dynamic and biophysical aspects of the landscape with the activities of users. Nature is not seen as a separate entity, but interwoven with the human condition.



III_21. Human condition intertwined with the natural landscape. Adapted from Hargreaves landscapes' Crissy field park (Author 2014).

3.2.1.2 *Natural process vs natural form*

This principle states that the replication of natural processes becomes more important than the replication of the natural form. Meyer (*ibid.*:16) believes that “natural-looking landscapes are not the only genre to perform ecologically.” Within a constructed urban condition, there is not sufficient space to support a natural-looking landscape. Natural processes must therefore be designed and constructed in alternative ways and in explored in different configurations. (See Fig. III_22 below)



III_22. Natural process in form of art. Interpretation of Hargreaves landscape (Author 2014).

3.2.1.3 *Hyper-nature: the recognition of art*

According to Meyer (*ibid.*:11), “sustainable landscape must be form-full, evident and palpable, so it draws attention of an urban audience distracted by daily concerns of work or the over-stimulation of the digital world”.

The designer must therefore understand the landscape as medium. Implementing design tactics, such as “exaggeration, amplification, distillation, condensation, juxtaposition or palimpsest” in the landscape as explained by Meyer (*ibid.*:11).



III_23. Hyper-nature, recognising art in the landscape. Aerial view of crop circles (Author 2014).

3.2.1.4 *The performance of beauty*

Meyer believes that a beautiful landscape influences our psyche. Through a design experience we can de-centre, restore, renew and reconnect to the biophysical world. “The haptic, somatic experience of beauty can inculcate environmental values” (*ibid.*:17).

Art critic and philosopher Arthur Danto argues that beauty is not found or discovered immediately, “it is discovered through a process of mediation between the mind and body, between seeing and touching, smelling and hearing, between reason and the senses, between what is known through past experiences and what is expected in the here and now” (Danto 1999:192-93).

In conclusion, the aesthetic experience of constructed hyper-nature is transformative, not simply in terms of the practices known to Olmstead, but rather as an experience that can result in the appreciation of new forms of beauty that are discovered because of what they reveal as previously unrealised. The relationship between human and biophysical life processes therefore becomes an important aspect.

3.2.1.5 *Dynamic beauty*

The final response in Meyer’s manifesto argues the landscape medium as temporal. The user does not only move through the landscape, the landscape also moves, changes, grows and declines. Sustainable beauty design therefore arrests, delays but also intensifies time; “it opens up daily experiences to what Michael van Valkenburgh calls “psychological intimate immensity”, the wonder of urban, social and natural ecologies made palpable through the landscape medium” (Amidon 2005:11-27).

III_24. Constructing landscapes that refine landscape and engage culture adapted from PWP Landscape architecture (Author 2014).



culture
refine
landscape



III_25. Creative ecology: James Corner, Taking measures across the American landscape collage: Hoover dam and the colorad (Corner 2008)

James Corner contributes to the manifesto above by saying that the “similarities between ecology and creative transmutation are indicative of an alternative kind of landscape architecture, one in which calcified conventions of how people live and relate to land, nature, and place are challenged and the multivariate wonders of life at once” (Corner 1997:100).

Corner urges that landscape architecture and ecology should develop a creative relationship in order to exploit a “potential that might inform more meaningful and imaginative cultural practices than the merely ameliorative, compensatory, aesthetic or commodity-oriented” (*ibid.*:82). Corner further points out that creativity in landscape architecture has “all too frequently been reduced to dimensions of environmental problem-solving and aesthetic appearance” (*ibid.*).

Weller (2006:75) points out that in the book *Taking Measures across the American Landscapes*, Corner and MacLean (2000) critically engage aerial imagery and frame the magnitude of what a relevant practice of landscape architecture should be. Weller continues to argue that unlike McHarg’s plans and panoramas that, as Charles Waldheim identifies, were predicated on a nature-culture polarity, Corner’s montages anticipate and marvel over a synthetic future of constructed ecology (Waldheim 2002). Weller, however, further states that “unlike McHarg’s *Design with Nature*, *Taking Measures across the American Landscapes* is not a book with a plan” (Weller 2007:75). According to Weller, Corner does not design the ground he sees; neither does he propose a method for others to do so. McHarg’s didactic instruction of how to redesign the world below had an answer for everything (except why the plan can never be achieved). Corner’s collages of maps, photos, and site data seem to remain merely representational; they are “graphic recordings of particular intersections of *topos* and technology, a brand of hermeneutic site analysis” (Weller 2006:76). Weller (*ibid.*) suggests that “if we can see the impossibility of McHarg’s ecological and methodological fundamentalism, we must also be critical of an overly aesthetic, self-conscious post-modernism in Corner’s images”. Weller therefore argues a conjunction of McHarg and Corner and a motivation of both. Johan Dixon Hunt concludes this notion by instructing designers towards such a conjunction. According to Hunt, the rarefied practice of gardens and parks can provide models for making whole places (Hunt 2000).



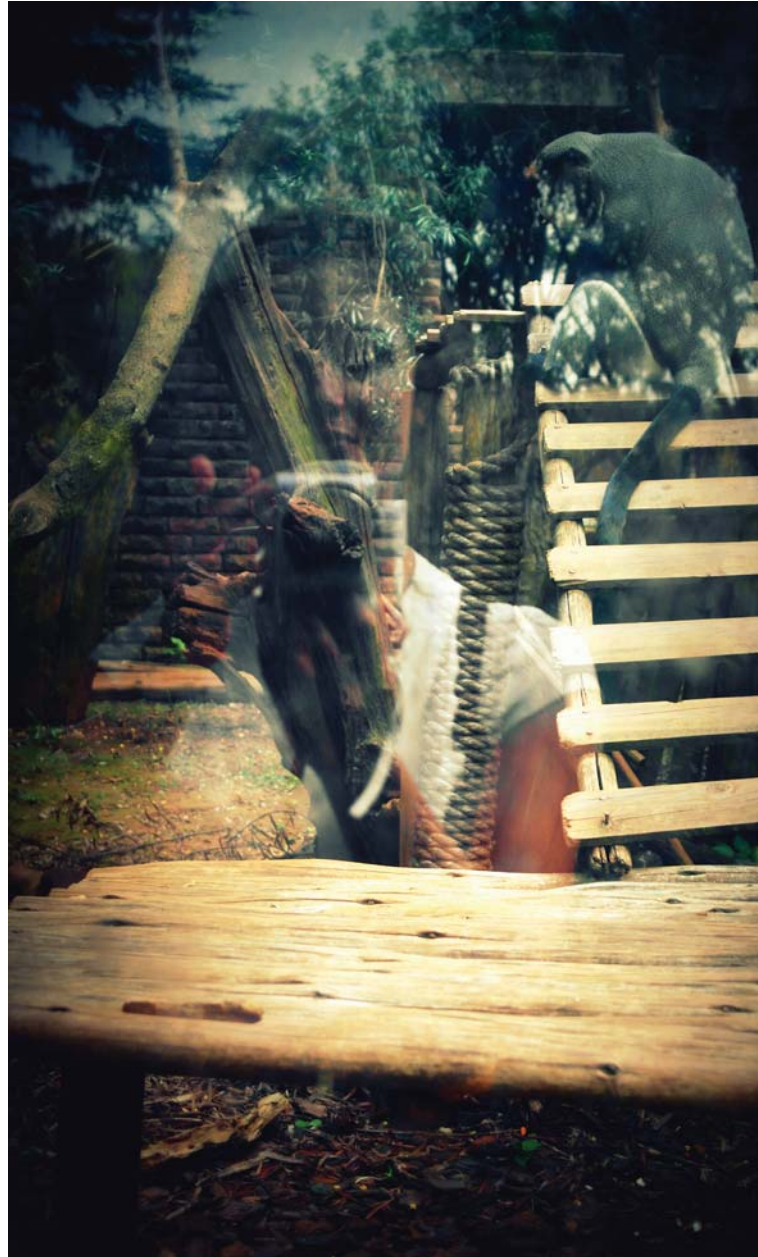
III_26. Crissy Field Park by Hargreaves associates integrates a diversity of recreational uses with a vigorous and dynamic environment. (Hargreaves 2001)

3.4 *Conclusion*

The spatial manifestation of creative ecology and grounding the theoretical discourse within the context leads to the exploration of the mimicry of natural process vs natural form, the hyper-nature, ecology and human life intertwined, and the experience of beauty as design generators within the context of a zoological garden. This concept is applied in Crissy Field Park by Hargreaves associates where a diversity of recreational uses is with a vigorous and dynamic environment. See figure III_26 on page 88.



III_27. Stratagem I
synopsis (Author 2014)



*III_28. Photograph
showing reflection of
Author and primate
cage (Author 2014).*

3.5 *Stratagem II: Theory in zoological garden design*

The author will discuss points of debate and theory in zoological garden design regarding The Animal-As-Client and The Unzoo movement to illustrate global trends as opportunities for landscape design response.

3.5.1 *The Animal-As-Client theory*

Traditional zoo exhibitions placed focus on the needs of the visitor above the needs of enclosed animals. The needs of the enclosed animals in zoos have more recently become a focus in contemporary zoo design. According to Nuttall (2004) there is no substantial theory to describe how a designer should consider animal needs during the design process. The “Animal-As-Client (AAC) theory” has therefore been developed by Nuttall (*ibid.*) to be introduced in zoo exhibition design. The AAC theory instructs that animal culture should be the focus in the design process and emphasise the need for the animal to participate and collaborate as a user. Nuttall (*ibid.*) introduces the “manipulation of space, time and environmental quality as critical explorations”. This dissertation aims to use this theory, among other zoo theories, as the second stratagem for the design response.

“A poor display can destroy the wonder of the rarest, most marvellous creature” (Conway 1973:226).

According to Nuttall (2004), the introduction of the AAC theory in zoo exhibition design can begin to communicate the challenges faced with the design of animal exhibitions to the designers. The AAC theory can provide opportunities to evaluate the success of such an exhibition design regarding animal welfare. The AAC theory can be applied to the design of zoo exhibitions by means of ten steps. Each of the steps will be discussed separately as proposed by Nuttall.

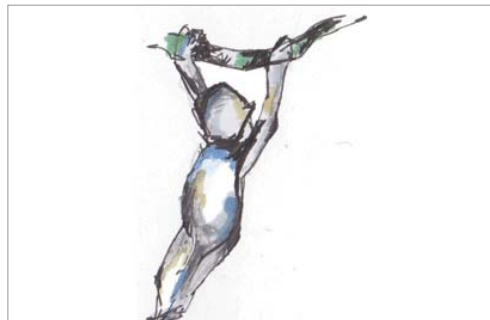
3.5.1.1 “Understanding the ‘in situ life history’ of the animal”

In order to provide for and understand the animal as a client, the designer must begin to identify the differences but also similarities between humans and animals; we do so through our own species-specific lenses. According to Sheets-Johnstone (1996:57), “humans are believed to possess a unique consciousness, which is distinct from other animal life forms, a distinct culture, and unique minds capable of thinking and reasoning”. What we perceive about human-beings are therefore “inherently different from that of animals and objects” (*ibid.*).

The traditional view of animals has often categorised animals as “neutral objects waiting to be ordered” (Ellen 1996:105). Ellen decries that “one cannot directly ask animals about their culture but must instead rely upon facsimile information generated by field workers in ecology, animal behaviour, primatology and anthropology, who have spent years studying the *in situ* lives of animals (*ibid.*)”.

According to Nuttall (2004) non-human animal culture is becoming more evident. Goodhall (1965) provides evidence of these behaviours with regards to the chimpanzee species pretending to ‘fish’ for termites with plant material. De Waal (1982) also provides research on the “complex emotional responses” that primates and elephants present.

Nuttall (2004:78) claims, “there is a wealth of *in situ* and *ex situ* information regarding the life histories of animals” and this information can lead to the “first step in design process of including animal presence”. See figure III_29 on page 92.



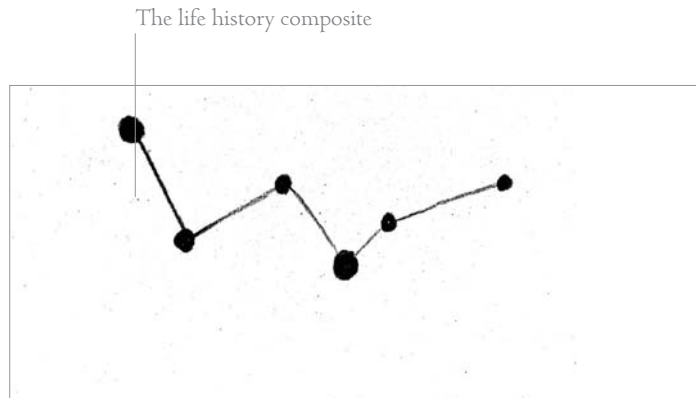
III_29. The “in situ life history” of the animal (Author 2014)

3.5.1.2 “Constructing the ‘life history composite’ of the animal”

In order to design for a client, one must understand the client’s needs.

The life history pattern, according to Nuttall, can be identified by stages of “major milestones such as birth, achievement of independence, sexual maturity, emigration from the natal social group, establishment of a territory, mating, raising of offspring and death” (Nuttall 2004:79). Designers must in turn design for these patterns in order to conserve animal culture. Nuttall (*ibid.*) claims that the “consideration of the life history pattern suggests that the entire lifespan of the animal is a focus of design”. See figure III_30 on page 93 illustrating the conceptualisation of the “life history composite” of the animal (Nuttall 2004:79).

“*In situ* stimuli” and the resources required to elicit behavioural patterns should be investigated by designers, such as grazing methods of antelope and giraffe etc (Nuttall 2004:79). Behaviour in a zoo can preserve the animal culture and enhance the education of the zoo visitor.



III_30. Conceptualisation of “life history composite” of the animal. (Author 2014)

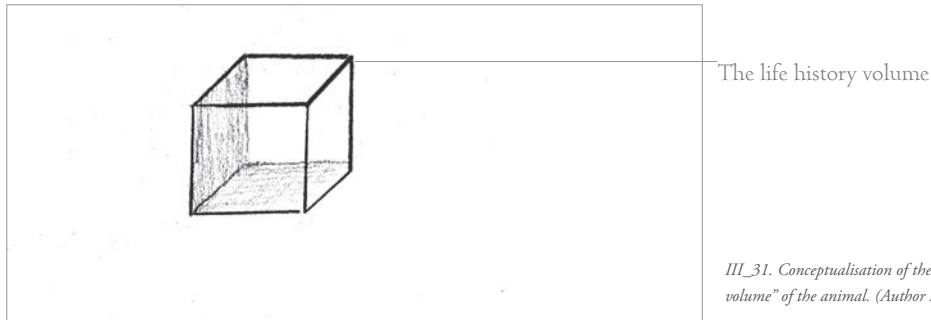
3.5.1.3 “Constructing the life history volume”

“Animals have inevitably been defined, categorised, interpreted, praised, criticised, hated and loved in a diversity of ways, which have commonly had spatial implications for them” (Philo 1995:677).

Zoos are often being criticised due to insufficient space provided for the animals. According to Wielebnowski (1998), “smaller environments tend to increase aggression and abnormal behaviour... while larger environments tend to promote reproduction”. In response to this, the spatial dimension is therefore very important when examining zoo exhibition design theory.

Nuttall therefore instructs the designer to design an enclosure with three-dimensional quality “*life history volume*” (Nuttall 2004:81). “The ‘*life history volume*’ can be defined as “one facet of an animal’s life history that designers are trying to replicate in zoo exhibition design” (*ibid.*). The “*life history volume*” can be defined as “the average total volume occupied by an animal throughout its lifespan” (*ibid.*:94). Figure III_31 on page 94 illustrates the conceptualised *life history volume*.

Nuttall explains that “mathematically, the ‘*life history volume*’ is the irregularly shaped two-dimensional home range area of a species multiplied by the average vertical displacement of the animal (*ibid.*:94).” For example, within the “*life history volume*” of an elephant, “the maximum vertical dimension is six metres, the height up to which foraging can occur” in the wild (Estes 1991:260). “By multiplying the vertical dimension by the two-dimensional extent of the elephant’s home range, one can determine that the ‘*life history volume*’ occupies between 0.084 and 18 km³”. The vertical dimension will dictate the total size and shape of the volume that will allow the required scale, aid in visualising the “space occupied by an animal and in turn describe an animal’s experience of space” (Nuttall 2004:82).



III_31. Conceptualisation of the “*life history volume*” of the animal. (Author 2014)

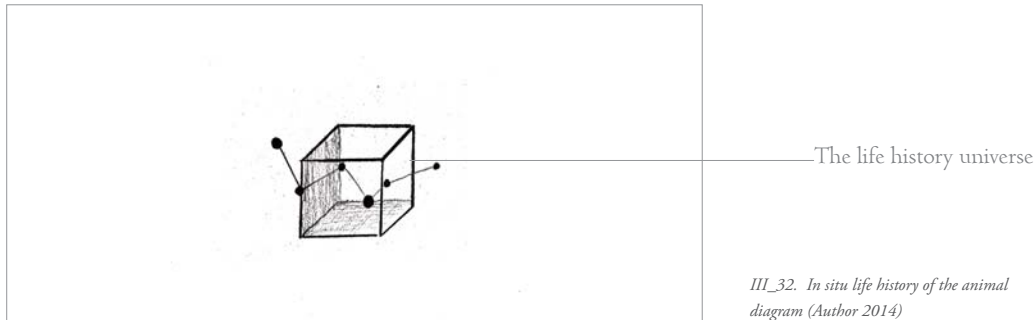
3.5.1.4 “Constructing the life history universe”

Nuttall (*ibid.*) continues by instructing designers to “integrate the life history composite with the life history volume”. This will allow designers to conceptualise an ideal animal life in a four-dimensional continuum.

Nuttall (*ibid.*) suggests that designers must “consider the in situ animal and its link to both space and time”. This will provide the designer with raw material for design.

“The purpose of zoological gardens [is to] present [animals] ... in territories as close to their natural environment as possible. These sections of nature should ... provide the animal with all of its requirements for life development” (Gribl 1975:48).

According to Nuttall (*ibid.*), the designer must maintain “species which are more suitable for some forms of research”, “increase the survival rates if animals are released into the wild” and provide more “enriching recreational and educational experience for zoo visitors”.

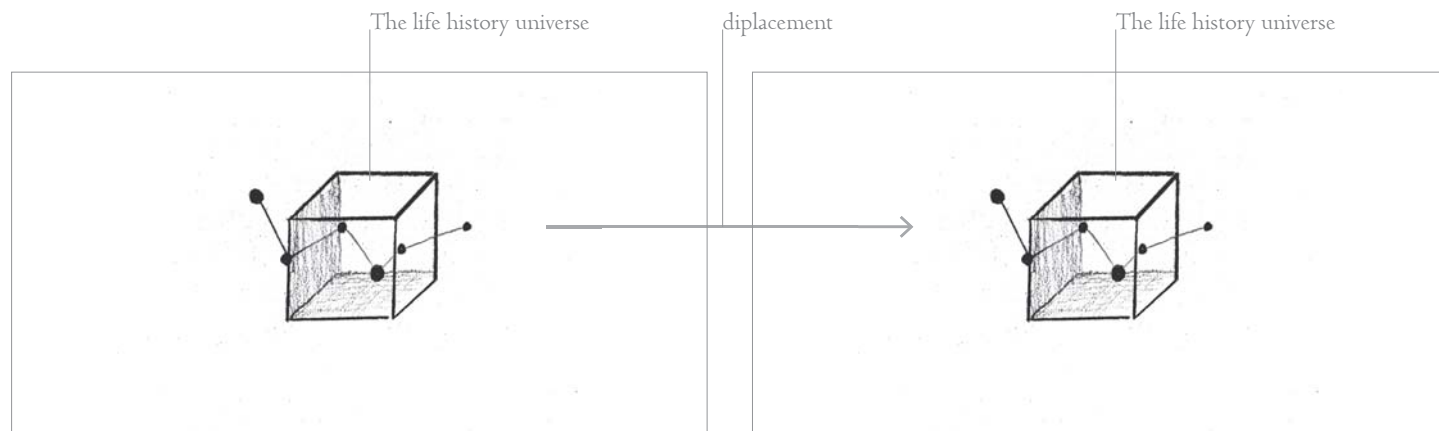


III_32. In situ life history of the animal diagram (Author 2014)

3.5.1.5 “Displacement and replication of the life history universe”

During this step of the design process, the designer must understand the “*in situ* life history events of an animal”, conceptualise it in the form of the “*life history universe*” and then subsequently displace the replicated volume. Nuttal (2004:82) explains that the “displaced and replicated volume, with its attendant stimuli, resources and animal responses”, will result in the designed zoo exhibition (see Figure III_33 on page 96). The purpose of the displacement is, however, still entangled with the entertainment factor in zoos, but the sole opportunity of the displacement is to conserve the species.

“The beauty and genius of a work of art may be preconceived, though its first material expression be destroyed; a vanished harmony may yet again inspire the composer; but when the last individual of a race of living things breathes no more, another heaven and another earth must pass before such a one can be again” (Beebe 1906:18).



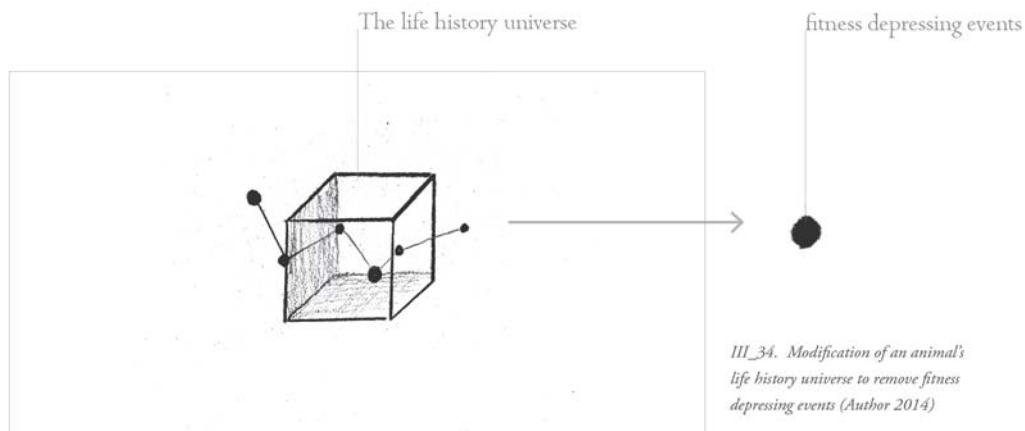
III_33. Displacement of the life history volume (Author 2014)

3.5.1.6 “Modification of the life history universe to enhance animal fitness”

The immense space required by animals cannot be replicated and displaced in most zoo situations.

Nuttall therefore explains the terms “fitness”, ecological term coined by Curtis (1983), referring to the “genetic contribution of an individual to succeeding generations relative to the contributions of other individuals in the population” as a solution. Nuttall states that the “higher the fitness the greater the reproductive contribution”. Fitness depressing events, such as disease, starvation, predation and poaching are removed from the zoo exhibition environment equation. Similarly, fitness enhancing events occur in the zoo exhibition environment, such as the supply of food and water and the provision of a mating partner are guaranteed.

Regarding primates, for example, the provision of stimuli for high levels of productivity will result in animals to be able survive in smaller areas. ‘Fitness’ therefore allows designers to “compress the spatial requirements for animals” (Nuttall 2004:86). Nuttall (*ibid.*), however, states, “as in the wild, the defence of a territory and movement within a home range are directly related to obtaining and guaranteeing access to resources. The question becomes: how much spatial compression is appropriate?”. Figure III_34 on page 97 illustrates the removal of fitness depressing events from the *life history universe*.

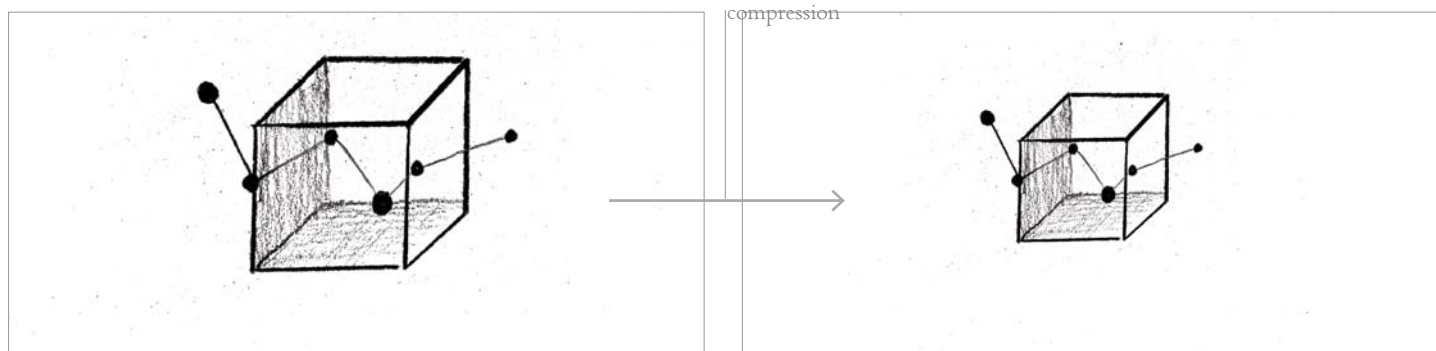


3.5.1.7 “Spatial compression of the life history universe”

“No zoo in the world has ever attempted to exhibition a blue whale, due to their enormous spatial requirements and complex life history patterns (*ibid.*:87)”. Nuttall (*ibid.*) explains that “at the other extreme, an exhibition for the earthworm will be much more manageable. The *in situ* life history volume is easy to displace and replicate with minimal to no spatial compression”. According to Edwards & Bohlen (1996) the “vertical distribution of earthworms ranges from approximately 0 to 1 m below the surface”. Ecologist Zicsi (1983) explains, “the mean population density of earthworms in natural forest associations varies between 3 and 8.1 individuals per square metre”. According to the AAC Theory, a zoo exhibition volume of 1m^3 should therefore be adequate (Nuttall 2004:87).

Nuttall, however, argues that the “shrinking of natural habitats will, ultimately, place constraints on animals (*ibid.*)” (see Figure III_35 on page 98). A succesful zoo exhibition design is therefore directly related to Natall’s opposition to spatial compression.

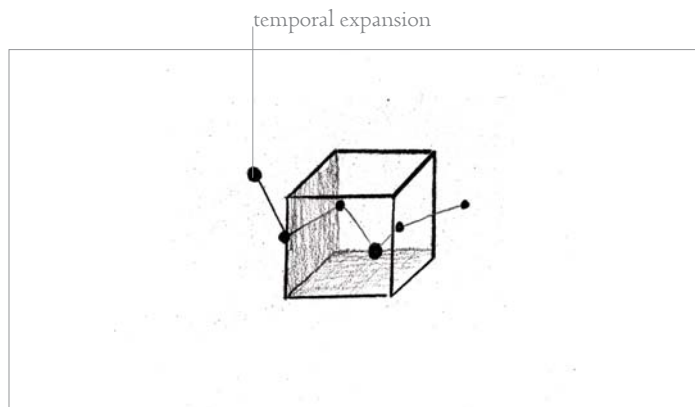
Designers have to consider the quality of the space and resources available to the animal of the resulting compressed exhibition. The provi-sion of adequate fitness enhancing resources can however allow designers to shrink the volume occupied by the animal. Nuttall claims that “this suggests that the zoo environment has the potential to become synonymous with a highly productive *in situ* environment, biologically speaking” (*ibid.*). He continues by instructing designers to begin to “imagine variables of area, height, volume, shape, proportion, quality of resources, timing of resources, age, sex and number of animals or access to mates that could be manipulated, which would affect the overall quality of the environment”. Nuttall (*ibid.*:89) concludes that “an optimal environment for a displaced animal species is one that conserves animal culture in the fullest sense possible by providing sufficient space and resource levels to achieve positive evidence of a full complement of *in situ* behaviour patterns, as well as a complete absence of pathology in behaviour.”



III_35. “Spatial compression”
(Author 2014)

3.5.1.8 “Temporal expansion of the life history universe”

Nuttall’s theory further suggests that spatial compression should coincide with temporal expansion (See Figure III_36 on page 99). For instance, the time increase in prey handling in feeding by means of activity will consequently expand the temporal component. Food locations, food types and foraging will “expand the temporal component” and “eliminate boredom for zoo animals” (*ibid.*:91). Nuttall (*ibid.*) notes that the foraging component occupies a major component of any animal’s daily routine and should therefore be an important consideration during the design process and the resulting exhibition.



III_36. Temporal expansion of a zoo exhibition (Author 2014).

3.5.1.9 “Assessing animal welfare in relation to design”

The information obtained to understand the animals as clients served as the foundation or starting point for the AAC design approach (*ibid.*). Nuttall also argues that the AAC approach becomes a tool to assess success of a zoo exhibition. According to Nuttall, “the role of the zoo exhibition designer is to create a spatially compressed and temporally expanded space that provides similar if not identical forms of stimulation that result in the display of behaviour patterns observed *in situ*” (*ibid.*).

Given that the designer understands the “*in situ* behaviour, an *a priori* (pre-design) performance standard is established” (*ibid.*). For example, according to zoologist, Estes (1991:229), “digging for water is a *type* of behaviour that black rhinoceros exhibition”. The designer can use this *in situ* observation as an experiment to assess the success of the exhibition. Nuttall advises that the physical design of the mentioned exhibition can be altered by means of more “perching locations, the addition of water as a resource for play behaviour or increasing handling time of food items, separating sexes for certain periods of time” (Nuttall 2004:91).

3.5.1.10 *Adaptive design management*

In the final step, Nuttall (2004:92) instructs designers to assess how form and function of the design can be manipulated in order to achieve a successful exhibition. This will make the zoo exhibition environment, according to Nuttall, “responsive and changeable, rather than static and presumptuous” (*ibid.*:92). Animals can therefore collaborate with designers by communicating to us via their response to exhibitions. The design process should therefore incorporate the needs of animals and the proposed form and function are the result of this assessment.

3.5.2 *Conclusion*

We live a world with an ever-shrinking natural habitat. An increased responsibility for animal welfare is therefore warranted. As Nuttall instructs, “seeing zoo exhibition design as an ongoing and adaptive commitment to supporting intertwined and evolving cultures is imperative in an AAC design process (*ibid.*:92)”. Zoo designers must therefore re-assess their role in establishing design strategies that will support the welfare of animals as their personal clients.

ZOO

With “cages”

Physical barriers for animals

Display based upon coercion or limitation

Managed captive animals

Animals forced to human schedule

Large animal shows

Capital intensive

unZOO

Without “cages”

Physical barriers for people

Display based upon attraction, motivation

Managed free-ranging rehabilitated and wild animals

People adapt to animal’s schedule

Small naturalistic shows and demonstrations

Staff intensive

III_37. Unzoo versus
Zoo , adapted from Jon
Coe (Author 2014)

3.6 *The Unzoo alternative*

“Stop showing the world’s inhabitants behind bars and wire. I don’t care how good the cage is, it is still a cage. We are the masters; they who live out their lives behind bars, the possessed. Create a place where the residents share the land. Create a place where the viewer is not the owner but a humble guest. Remind people that we are all connected and that wild places have spiritual and emotional wealth beyond dollar value. Make that your mission!” (Mendez 1999)

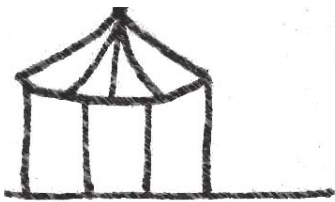
The *Unzoo* concept has been introduced into the zoo design field by Jon Coe, a leading international zoo designer from Australia. The *Unzoo* is defined as “a place where the public learns about wild animals, plants and ecosystems through interaction with and immersion in original or recreated natural habitats” (Coe 2005:1).

According to Coe, “the philosophy and technology of zoo design are evolving into the *Unzoo* paradigm (*ibid.*)”. Old cages are being replaced with open “barrier-less” grottoes, which in turn are being replaced by “immersion” exhibitions with hidden barriers. Isolated enclosures are being connected to enhance “animal rotation” and mixed specie enclosures are being implemented. Animal shows are moved to natural settings, evolving into “habitat theatre” (*ibid.*:2). Coe identifies the statement of Besten below as a vision for the Unzoo alternative:

“We need another and a wiser and perhaps a more mystical concept of animals. Remote from universal nature, and living by complicated artifice, man in civilisation surveys the creature through the glass of his knowledge and sees thereby a feather magnified and the whole image in distortion. ... They are not brethren, they are not underlings; they are other nations, caught with ourselves in the net of life and time, fellow prisoners of the splendour and travail of earth” (Beston 1928).

Coe emphasises that an alternative is sought for current zoos. Coe claims that designers have dreamed of the ‘cage-less-zoo’, however, the possibility to keep animals “safe, secure and visible without close confinement” remains contradictory (Coe 2005:3).

Coe suggests that the *Unzoo* trends should be integrated through design to establish a secure future for zoo design and animal welfare. Coe claims that it will advance the evolution of zoos to *Unzoos*, as illustrated in figure III_38 on page 105, and ultimately eliminate the need of barriers (*ibid.*). The *Unzoo* is supported by *Zoogeography* and *Landscape immersion* as discussed in the next paragraphs.



cage

*human dominate
animals-objects*



naturalistic barriers

"naturalistic"



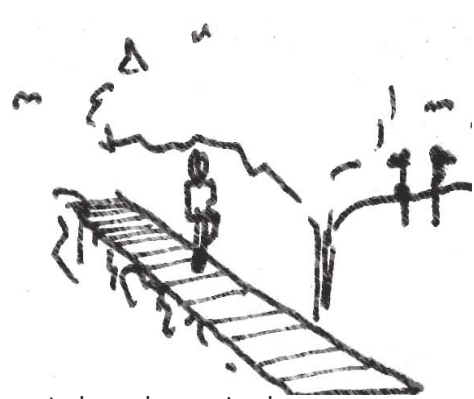
immersion exhibition

*bidden barriers
animals dominate*



"unzoo"

nature and animals dominate



control people vs animals

boardwalks

skywalks



*III_38. Coercion to cooperation:
The evolution in zoo design towards
the Unzoo (Author 2014).*

1000 ANIMAUX

ANIMALS - ANIMALES

GUYANE

12530 m² - Guyana

Forêt équatoriale, crique...
67 espèces / 67 species / 67 species

• Forêt équatoriale, crique.

• Selva ecuatorial, ensenada.

- Singes Loutoux / Woolly Monkey / Mono Loutoux
- Jaguar
- Caimans / Caimans / Caimanes
- Lézards / Lizards / Lagartos
- Tapires / Lowland tapir / Danta Araracú

EUROPE

10800 m² - Europa

Forêt de conifères, marais, garrigue, montagne froide...
28 espèces / 28 species / 28 species

• Conifer forest, swamp, garrigue, cold mountain.

• Bosque de coníferas, marisma, garriga, montaña fría.

- Vautours / Vulture / Buitre
- Loups / Wolves / Lobos
- Chouettes / Woodpecker / Chotinos
- Lynx / Lynx
- Vivarium / Vivarium / Vivarium
- Loutres / Otter / Nutria

SAHEL-SOUDAN

45215 m² - Sahel-Sudan - Sahel-Sudán

Savane, delta...
44 espèces / 44 species / 44 species

• Savane, delta.

• Savana, delta.

- Zèbres / Zebras / Cebras
- Rhinocéros / Rhinoceros / Rinocerontes
- Lions / Lions
- Autruches / Ostriches / Avestruces
- Oryx / Oryx
- Koudous / Kudu / Kudus
- Girafes / Giraffes / Jirafas
- Babouins / Baboons / Papio
- Maison des girafes / Giraffe house / Casa de las jirafas
- Grande volière / Large aviary / Grande pajarera

MADAGASCAR

9 655 m²

Forêt tropicale humide...
30 espèces / 30 species / 30 species

• Tropical rainforest.

• Bosque húmedo tropical.

- Deux lémuriens / Lemur Island / Isla de los lemurios
- Tortues / Turtles / Tortugas
- Oiseaux en vol libre / Free flying birds / Pájaros en vuelo libre

PATAGONIE

16570 m² - Patagony - Patagonia

Pampa, côtes rocheuses, forêt andine...
7 espèces / 7 species / 7 species

• Pampa, rocky shores, andean forest.

• Pampa, costas rocosas, bosque andino.

- Otarie / Sea Lion / Leones marinos
- Manchote / Penguin / Pingüinos
- Guanacos
- Pumas / Cougar / Puma
- Fuhas / Puma / Puma
- Mandoules / Greater Rhea / Nandúes



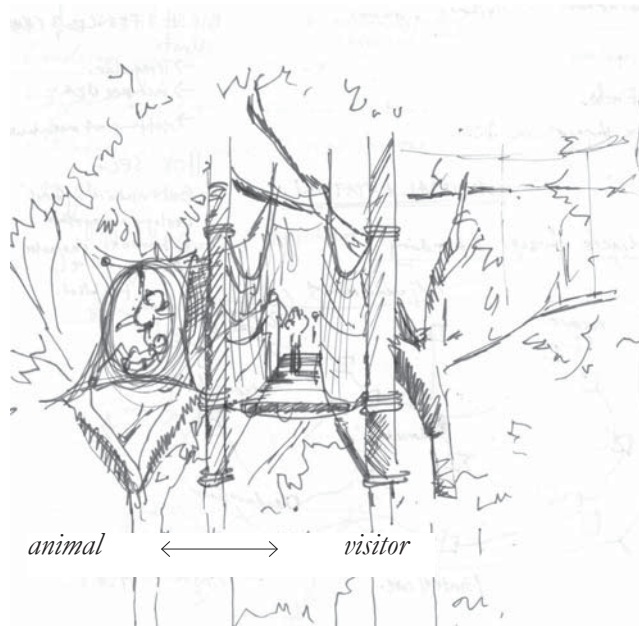
- Toilettes / Restrooms / Aseo
- Restaurants / Restaurants / Restaurantes
- Point d'information / Information point / Punto de información
- Aires de pique-nique / Picnic areas / Zona de picnic
- Points gourmands / (Wine & export) / Bodega / Bares (Wine pass bar)
- Fontaines d'eau potable / Water fountains / Fuentes de agua potable
- Librairie - Boutique / Bookshop / Librería-bodega
- Point de vue / View point / Mirador
- Clinique vétérinaire / Veterinary clinic / Clínica veterinaria
- Bureau d'exploration / Exploration pavilion / Oficina de exploración

III_39. Zoogeography in Parc Zoologique, Paris (parczooologiqueparis.fr 2014).

3.6.1 *Zoogeography*

City inhabitants do not typically have the opportunity to travel and admire wild animals in their natural habitat. A visit to the zoo can replace a family vacation. The zoo lures the public by providing a vicarious experience into a distant and exotic location. Unlike televised presentations, the zoo's "presentation of nature promises an authentic experience of real nature". "The heightened geographical focus of the zoo is mostly manifested in what is called *Zoogeography*" (Graetz 1995).

Zoogeography can be defined as "distinct areas devoted to representative fauna and flora of zoological regions of the world" (Graetz 1995). A site-specific replication of nature is established that results in pockets of nature that are being categorised by their geography, rather than through their habitat, such as a tropical rainforest or a desert biome. Figure III_39 on page 106 illustrates this principle in the zoological guide map of Parc Zoologique in Paris.



III_40. Illustration of Landscape immersion aims to bring animals and guests within their natural environment habitat or landscape. Animals are separated by sunken fences and people move through sky walks thus allowing as much space as possible for animals and the best views for people.

immersion

post-immersion

Landscape immersion

In addition to zoogeography, the illusion of nature in the midst of the modern zoo's urban space is also created through landscape immersion. Jon Coe explains this term as the “soliciting of experiences that make people feel part of, rather than external observers of, this nature” (Coe 1996). Much like a theatre, the zoo-goers become the spectators who participate in the theatrical act of the animals (Coe 2012).

Landscape immersion is phrased by Jon Coe as a term coined to describe exhibitions in which visitors share the same landscape with the animals. “Instead of standing in a familiar city park, known as a zoological garden, and viewing the zebra in an African setting, both zoo visitor and zebra are in a landscape carefully designed to ‘feel’ like the African savannah. Barriers separating the people from the animals are invisible and no matter where the viewer turns, the entire perceptual context appears consistently and specifically ‘African’” (Coe 1985:206).

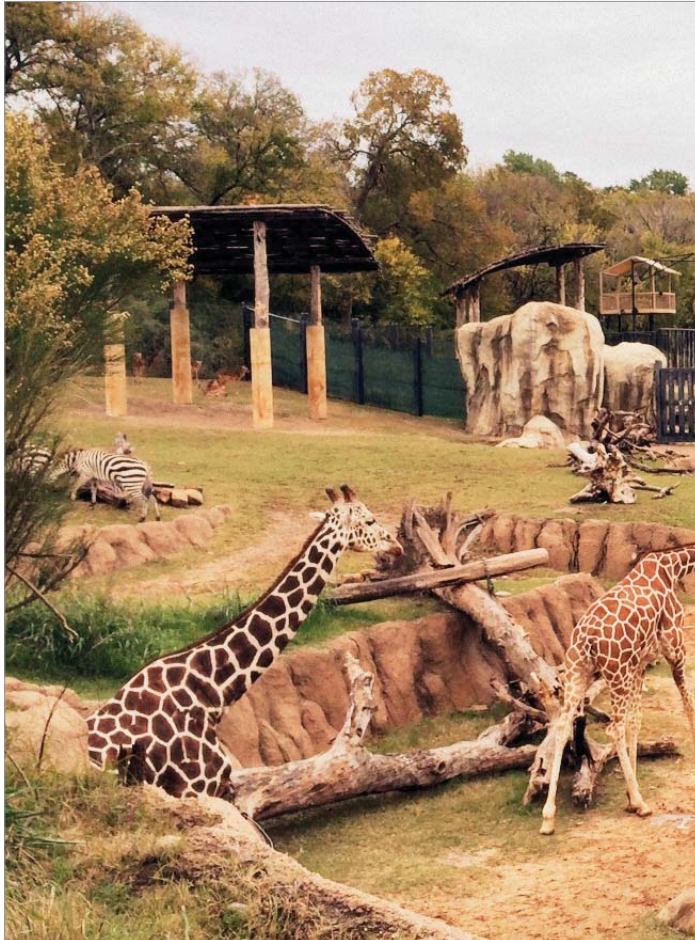
Nature in the zoo is explicitly not a precise simulacrum of wild nature. On the contrary, the zoo differentiates itself from the wild. For example, zoo design must include elements that promote a safe and sanitised environment for both zoo-goers and zoo animals, such as moats, glass windows, air pipes and exit signs. These design constraints merely reinforce the idea that such a wild exists somewhere.

In contrast to the old-style cage exhibits where animals were fully and constantly exposed to the gaze of the public, a convincing nature display inevitably renders the designers of zoo space less control of the animal spectacle.

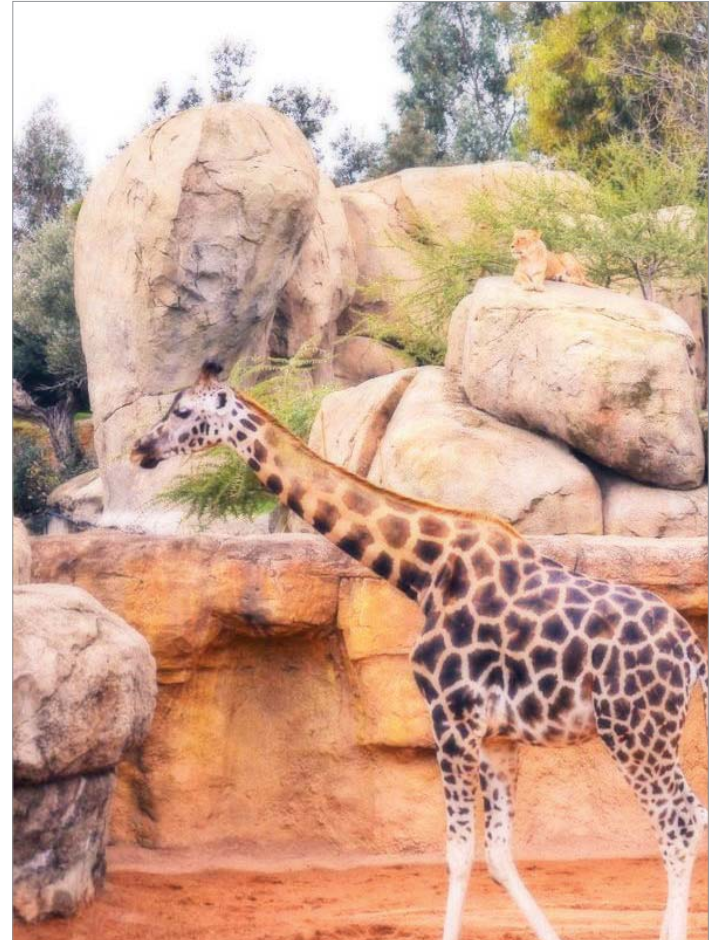
“The animals are going to do whatever the animals want to do. You cannot control them, nor should you. These are wild animals; they do what they want” (Coe 2012:5).

Architects Jones & Jones, a firm based in Seattle that specialises in zoo design, propose a number of general ‘viewing guidelines’, which include the following:

1. Ensure that the animals are seen as only a part of the surrounding landscape that they co-occupy with the viewer.
2. Provide selected views only into the exhibit.
3. Augment the sense of anticipation by sequential staging of approach views before the animals are actually seen.
4. Screen out the cross-viewing of other people and exhibits.
8. Eliminate views of animals from outside the zoo and from parking and entry areas (Mullan & Marvin 1999:65).



III_41. Critique of artificial landscape: savannah enclosure (Graetz 1997).



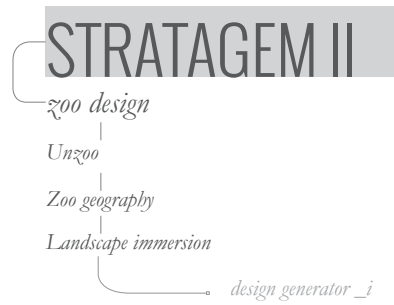
Critique

Mitman (2009:199), however, argues that the current trend in zoo exhibition, “although intended to make one feel” part of nature will essentially erode the “boundaries between nature and artefact”. Although this type of design is supposed to blind these tricks, one need not conduct interviews with zoo-goers to know that most are well aware that they are not in the African Savannah but in the CBD.

Hancocks criticises the African Savannah exhibition designed by Jones & Jones in Woodland Park Zoo of being “a small mammal exhibition at its centre, cramped and crude, a deformity of lumped rockwork, which the zoo proudly boasts as its own work” (Hancocks 2001:141). Hancocks continues to argue that the critical importance of landscape immersion as a technique for zoo design is that it acknowledges the importance and the value of natural systems.

In this regard, critics have pointed out that “enclosures designed in the interest of perceived naturalism may offer as little habitat as the barren cages of traditional zoos” (Shepherdson 1998:1-14).

Fàbregas *et al.* (2012) conducted a study to prove that “naturalistic designs provide suitable environments for the animals”. In Spanish zoological parks, 1381 naturalistic and artificial enclosures were analysed for that purpose. As it is noted by Hutchins (2006), “zoo exhibition design and animal care have advanced considerably over the past few decades and contemporary animal exhibitions tend to be comparatively larger and more complex and studies shows that there are still zoo enclosures in need of improvement”. Different levels of interaction can act as a starting point provided on different strata as a platform for enhanced experience.



III_42. Stratagem II
synopsis (Author 2014)

3.6.4

Conclusion:

The quality of an exhibition is of paramount importance due to its impact on visitors' attitudes toward wildlife. Hancocks (*ibid.*:144) explains that “the validity of the experience hinges on the functional and visual integrity of the zoo exhibitions”. The plea for better design must, however, not be reduced to the aesthetic value of visual balance, harmony and the integrity of materials. Zoo environment must ultimately engender a respect for nature. The study therefore argues that nature must be the constant norm and inherent design philosophy in animal enclosures.

A wild animal seen in the context of its natural habitat carries a natural dignity. The more degrees of distortion in the representation of that habitat, the more unnatural the animal will behave and appear. The study therefore aims to find a manner to replicate a natural habitat that will not require unnatural distortion but still provide experience to the user, without compromising the animal exhibited and the natural dignity of the habitat.



III_43. Disney's Animal Kingdom african safari (Land, 2012).



III_44. Disney Animal Kingdom african safari and artificial Boabab tree (Land, 2012).

3.7 *Stratagem III: Case studies*

The third stratagem will discuss and analyse case studies regarding zoo design to illustrate global trends, theories and design approaches.

The case studies will be critiqued in terms of dealing with zoo design, and their relevance will also be established to serve as the final design instrument for intervention. The case studies include *Disney's animal Kingdom*, *Parc Zoologique* and *Zootopia*.

3.7.1 *Disney's animal kingdom*

Orlando Florida

-Joe Rohde and Michael Eisner, 1998.

A 48-hectare astoundingly realistic African Savannah exists within Disney's Animal Kingdom. Visitors can tour this large enclosure via an open-air camouflaged vehicle on a carefully crafted soil-coloured concrete road to simulate a real dirt road experience. Traversing a series of orchestrated landscape experiences, the journey encompasses many different types of savannah habitat. A guide points out and explains the features along the way and provides conservational information, such as the exaggerated fact that “we have been losing elephants at the rate of 150 a day” (Hancocks 2001:225).

Hancocks argues that visitors are facing a dilemma when being absorbed by these Disney stories, as it implies that “nature is not quite worthy of sustaining its own stories without embellishment (*ibid.*)” At Disney's Animal Kingdom, staff have been trained to stage this *feeling* to perfection. The savannah enclosure contains hundreds of species of plants, some of which have never grown in North America. Horticulturalists enter the savannah during the early hours of the morning to re-plant new trees, grasses and shrubs for animals to feed on each day. Water drippers for birds are hidden inside artificial termite mounds and feeding troughs are disguised inside artificial tree stumps (*ibid.*). Malmberg (1998) describes this as “an authentic-looking tale of the circle of life, without putting any of the park's animals in harm's way”.

3.7.1.1 *Critique*

One might arguably see more animals with this experience than during a real trip to Africa, but Hancocks (2001) argues that it is just too easy. Hancocks (*ibid.*) questions whether the Disney experience will imbue the visitor with a greater appreciation of the natural world. Hancocks (*ibid.*) criticises this experience as a reduction of the natural world and a set of staged experiences.

Essentially, the NZG could never sustain such a performance. It is undeniable that the quality of Disney's savannah has set a very high benchmark, but only provides a basis for the argument that design of the enclosure simulating species' original environments, its ecology and behaviour, can essentially never be replicated with full integrity.

3.7.1.2 *Relevance*

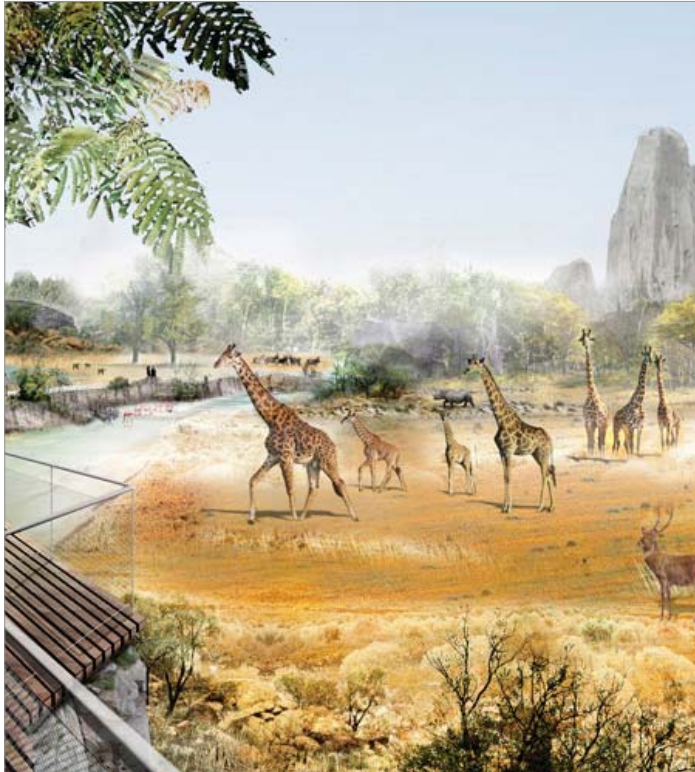
Greatz (2014) argues that if the design only uses other zoos for references, it would do worse than copy Disney's Animal Kingdom, as it is a high-quality zoo in most respects. The Animal Kingdom, however, has its own objectives in meeting a standard for entertainment, style of presentation and storytelling. It is therefore important to recognise where the design's objectives diverge and a better point of reference is the wild habitat of the species the enclosures will display. From high-quality zoos one can learn about integrating the story of the exhibition with design, however, the natural world should be the standard to aspire to

3.8 *Eco-zoology: Contemporary case studies*

Kallipoliti (2011) defines *Ecozoology* classification as to distinguish the contemporary paradigm of zoological developments from earlier typologies. *Ecozoology* classifies the projects that mix performative elements with visual interest to create a hybridised, experiential interaction with nature and animals (Kallipoliti 2011).

According to Kallipoliti (2011), the contemporary zoo emphasises the coexistence of wildlife and human activity without relying so heavily on the necessity of programming to engage visitors. Contemporary zoos thus aim to encourage interactivity between people and nature; insofar that observation does not disturb activities in nature. In the following case studies, there remains an emphasis on educating visitors through engaging them within the context of an undisturbed, native setting.

Kallipoliti further argues that the user's interest in preserving local biodiversity within both urban and rural contexts is informing the sustainably driven design proposals for future zoological park rehabilitation projects. Kallipoliti notes that there is a recent appreciation for observing natural processes and patterns, such as bees producing honey or birds migrating (*ibid.*). The following projects fall under the *Ecozoology* classification and will serve as more contemporary or un-built case studies. The *Ecozoology* projects will establish the direction that zoo design is developing towards.



III_45. Zoo de Vincennes proposal for Savannah exhibition (Kebence, 2012).



III_46. Paris zoological garden implemented savannah exhibition (Archdaily 2014).

3.8.1

Parc Zoologique de Paris, France

Architects: Bernard Tschumi Urbanists & Veronique Descharrieres

Landscape Architects: Atelier Jacqueline Osty, 2008-2014

The Paris Zoological Gardens have undergone a total remake of the landscaped spaces rather than adapting the existing.

The Atelier team worked in close collaboration with the NMNH to foster the well-being of each species by respecting their style of life while offering the public as much a change of scenery as possible.

The Paris Zoological Gardens are now composed of six biozones that completely immerse the visiting public. The animals are closely connected with their natural habitats and are shown as an integral part of the whole. Visitors are called upon to discover an enhanced landscape in which the visual, sound and olfactory surroundings increase the sense of a total change of scenery.

The six biozones include Patagonia, the Sudanese Sahel, Europe, Guyana and Madagascar and Equatorial Africa. The biozones resulted from diverse references, such as travel descriptions, animals, materials, plants and colour. The Atelier selected plants similar to those endemic to the animals' regions. The Atelier, however, did not directly replicate one landscape based on another but implemented an in-between situation specific to the Parisian Zoo.

Beckmann (2014) notes that the 'new shapes mix within the landscape to break down the park's formal barriers between visitors and exhibits.'

3.8.1.1

Critique

The Paris Zoo serves as an unsuccessful precedent due to the artificiality of the materiality. The honesty of materials is not evident and it has missed an opportunity to be more authentic. The intervention might be technologically ground-breaking, but up close an artificial rock still looks and feels like an artificial rock. These artificial experiences are degrading our view of nature. The designers also implemented a completely new design without considering adaptive re-use or improving existing feature. This seems to be an uneconomical approach and not a possibility for a developing country like South Africa.

The Zoo renovation also released fantastic renderings in 2009 (see figures III_45 on page 118), but the photographic record of the final intervention, however, did not achieve the image intended

3.8.1.2

Relevance

The organisational qualities of the biozones can be implemented as a design principle. However, this should be done in response to the site conditions in terms of topography, microclimate, hydrology and geology.



III_47. Zootopia elephant exhibition showing mirror-balls and visitors (CDN, 2014).



III_48. Zootopia zoo, large central square (CDN, 2014).

3.8.2 *Zootopia, Denmark*

-Bjarke Ingles Group, 2014: Unbuilt

Danish architects Bjarke Ingles Group (BIG) have released this ambitious design, a cage-free zoo that reverses the roles of animals and people in Givskud, Denmark. It is a project that provides an intriguing opportunity for, as BIG explain, the creation of a space with ‘the best possible and freest possible environment for the animals’ lives and relationships with each other and visitors’ (Archdaily 2014). According to Givskud Zoo’s director, Richard Østerballe, the park’s transformation will benefit greatly from this fresh approach to design, one that has been characterised by the integration of nature and natural elements into cutting-edge, innovative architecture.

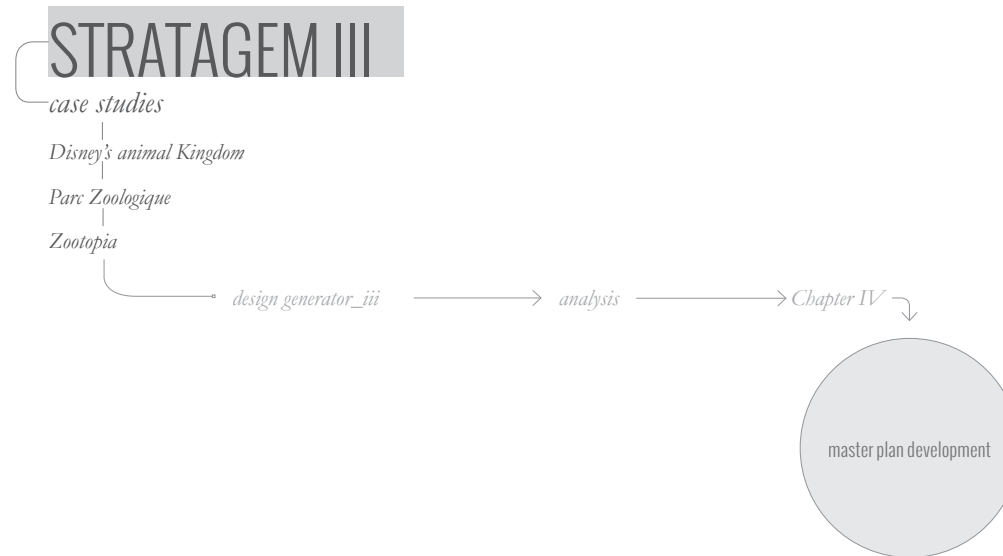
The project will attempt to ‘integrate and hide buildings’ within the landscape. Upon entering the zoo, visitors can either enter a large central square or climb the ‘building-landscape’, allowing them to get a general overview of the layout of the park. From this central element, visitors can access different areas of the zoo. A four kilometre hiking trail connects the different areas (which represent the continents of Africa, America and Asia). Visitors will observe the hidden animals from a view, buried beneath the ground or obscured inside piles of logs.

3.8.2.1 *Critique*

This project will be underwhelming unless there is a chance to interact with the animals. Zoos must provide novel entertainment, and simply hiding the people would lead to a dull experience, as the animals are not viewed in their actual natural habitat. The only difference is that the visitors will be isolated from them in sterile cubicles or in what looks like a vast and barren concrete pit. The beguiling picture of elephants knee-deep in lush grasses and with pretty trees is a misrepresentation and will inevitably end up in a space devoid of living vegetation, like any other zoo elephant yard. Zoos are maintained and cleaned by humans, rather than robots. The animals will sense human presence either way.

3.8.2.2 *Relevance*

The concept of the reversal of the spatial occupancy of the animals and visitors is a concept that will be taken further in developing a new set of zoo design principles and an exploration of the threshold this will create.



3.9 Conclusion

The *Tarzanesque* vernacular, as described by Hancocks, can be attributed to zoo designers proclaiming themselves as more enlightened than their predecessors. Designers have pointed out inadequacies and artificiality of other zoos, arguing instead for the more ‘natural’ principles of their plans. Hyson argues that “there are serious problems within the environmentalist rhetoric that dominate contemporary zoo design and, indeed, much of contemporary landscape architecture in general” (Hyson, 2000:25). A mimetic relationship between landscape architecture and nature appears throughout the profession and in the theory presented. As explored in the *design with nature* controversial theory, landscape architects may risk losing their critical consciousness in design, which is essential to their art. Hyson explains that the works of landscape architecture, including zoo designs, is cultural constructions. The rhetoric of environmentalism may, however, encourage the dangerous view that immersion exhibitions actually *are* nature.

The case studies of zoo exhibits presented therefore suggest reconsiderations of the prevailing environmentalist discourse. Hyson explains that “while the best work of today’s zoo designers is impressive, exciting, and invaluable to our appreciation of wildlife, their confident environmentalism is challenged when viewed in the historical context of the planning and the perception of zoos’ ‘natural’ landscapes” (Hyson, 2000:24). Such a challenge may, in turn, prompt a more reflective and historically informed practice of landscape architecture.

The vision of ‘zoo-as-paradise’, filled with contented creatures enjoying lives of apparent freedom, effectively obscures the very identity of the zoological garden. In the words of journalist and landscape designer Alexander Wilson; “Do the new designs somehow disguise the confinement that is the primary fact of a zoo? . . . Can we really see ourselves looking?” (Wilson, 1992:254). Charles Siebert took this provocative point even further; “Somehow, by the end of a day of peering into deep, landscaped ‘natural habitats’, looking for the animals we’ve brought from so far away only to place too far away to really see, I’d decided that it was far less depressing to proceed, as one did in an old zoo, from the assumption of the animals’ sadness in captivity than to have to constantly infer the happiness we’ve supposedly afforded them in our new pretend” (Siebert, 1991).

What Siebert objects to here is the lack of critical consciousness of landscape architects. When zoo designers try too hard to tell the proper environmentalist stories, they risk losing the essence of what a zoo is. Hyson concludes this notion; “By claiming that environmentalist designs truly are an *Edenic* nature, we risk forgetting how landscape architecture really works” (Hyson, 2000:43).

In conclusion, this dissertation therefore argues the replication of natural habitat that will not require unnatural distortion. The study will prove that an enclosure can still provide experience and beauty to the user, without compromising the animal exhibited, the natural dignity of the habitat, or finally, the character of a zoological garden.

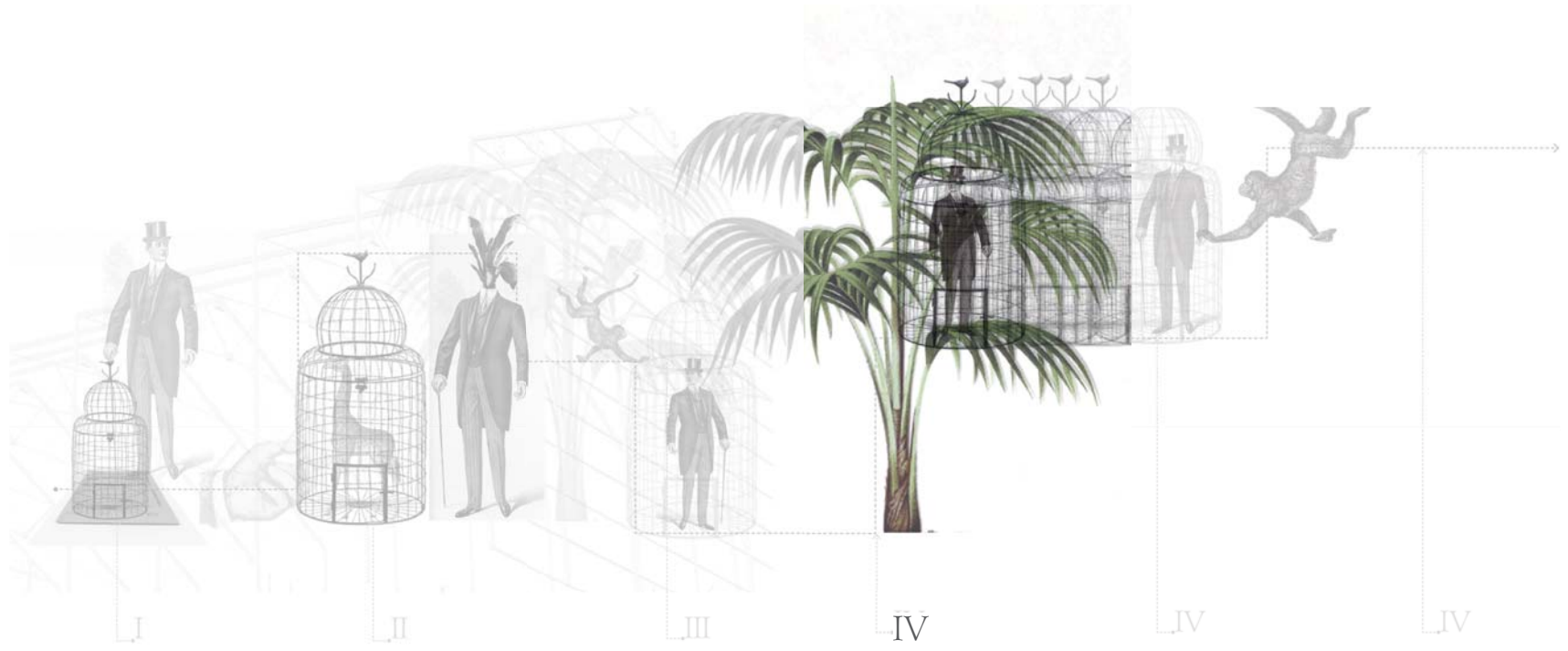


IV_1. "The zoo is the best way to learn the behavior of animals-Myth"
(Norris-Webb 2005)

CHAPTER IV

CONFINED EXPERIENCE

design generators and synthesis: master plan development



Confined experience

CONFINED EXPERIENCE HIGHLIGHTS THE DESIGN GENERATORS AND SUBSTANTIATES THE DECISION-MAKING WITHIN THE THEORETICAL PREMISE AND CONTEXT OF THE DISSERTATION. THE MASTER PLAN WILL RESULT IN THE SPATIAL IMPLICATION OF THE STRATAGEM APPLICATIONS AND PROVIDE A PLATFORM FOR SITE SELECTION OF AN INDIVIDUAL ENCLOSURE FOR SPECIE SELECTED.



4.1 *Introduction*

Wearied animals walking in circles, plastic wrappers flying over paved sidewalks, 'Slush Puppy' stands blocking natural views, plastic snakes, lion soft-toys, chain-link fences and trees made from epoxy resin. Dusty enclosures with steel feeding dishes, rubber tyres hanging from rope and endless lumps of artificial rock walls, followed by plants delegated to the side. Typical municipality-styled landscaping.

The zoo can be identified as a place where a child develops a love for animals and cares for their status in the world. One can almost envision the image of a child filled with fear and excitement upon his first confrontation with the majestic roar of a lion. This image is often clouded by the plastic snakes and dusty enclosures described above.

The author has observed many of these plastic snakes and dusty enclosures in the NZG. Ignorant zoo visitors throw objects at animals to trigger a reaction, and during the last hours of the day before cleaning and particularly on weekends, the site sometimes appears neglected. Some of the enclosures are impoverished and filled with a jumble of artificial objects for animal activity. This defeats the justifications for the enclosure's existence and reverts to the menagerie's base purpose of showing people the shape, size and colour of wild animals. This provokes a negative reaction in animal activists and visitors.

It is, however, perceived that zoos are reliant on these visitors as one of the contributing factors for economic development. An economy that is directly proportional to the required resources and quality of life of the wild animals.

Within the NZG, people circulate the grounds, looking at animals, birds and insects surrounded by a natural backdrop to the north, the urban backdrop to the south, a view to the industrial west and the boundary of Paul Kruger Street to the east.

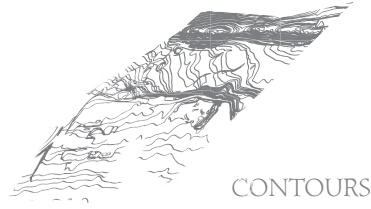
The Apies River runs through the centre of the grounds. This water is, however, very contaminated and does not feed into the enclosures. It is the only part of the Apies River that has not been canalised. This invites opportunity for lucrative habitat for indigenous trees, attracting indigenous birds and insects.



IV_2. Diagrammatic representation of base condition: NZG (Author 2014).

base condition

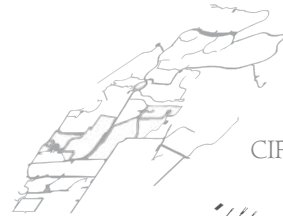
National Zoological Gardens, Pretoria



CONTOURS



APIES RIVER



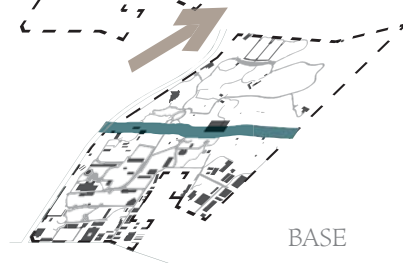
CIRCULATION



ACCOMMODATION



BOUNDARY

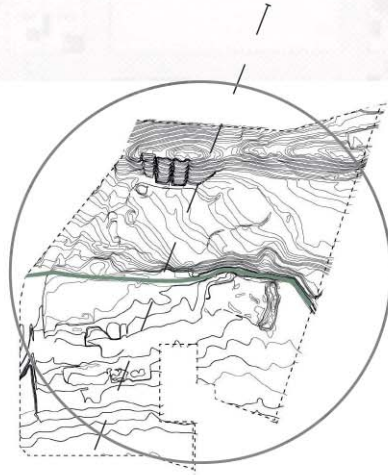


BASE

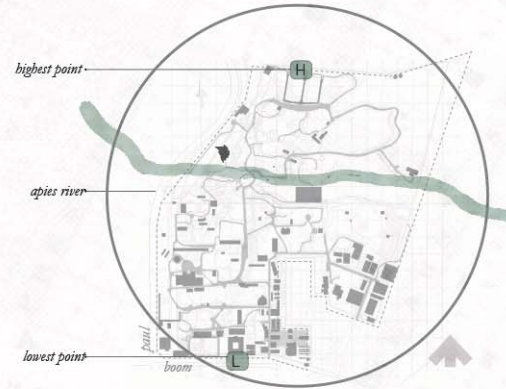
site features

landscape as medium

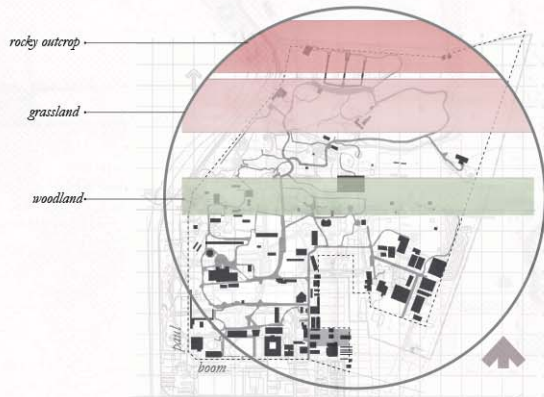
*IV_3. Existing site component
analysis: NZG (Author 2014)*



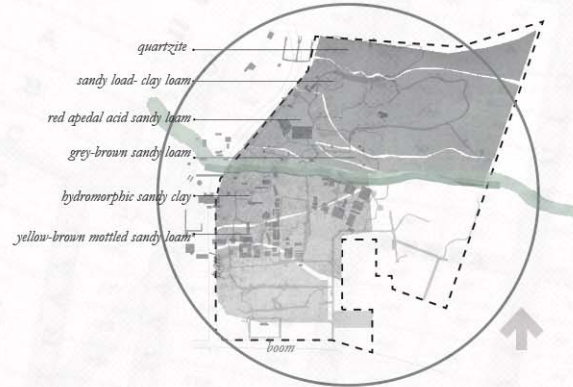
TOPOGRAPHY



HYDROLOGY



CLIMATE



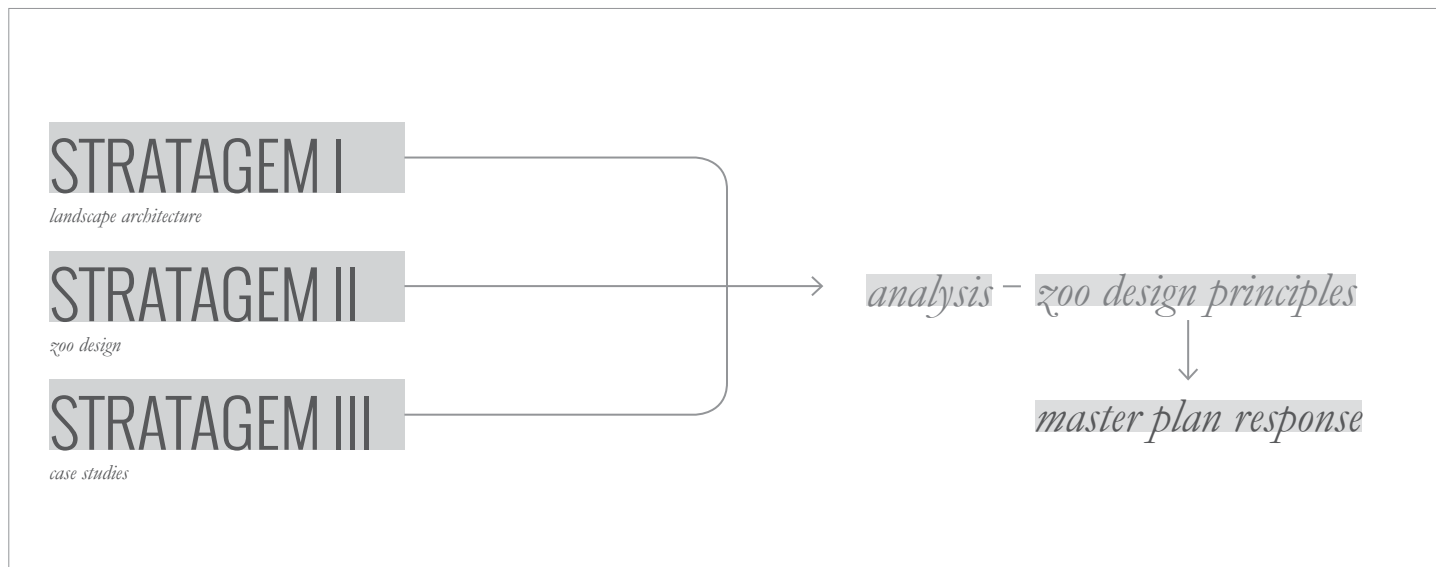
GEOLOGY

IV_4. Site analysis
of topography,
hydrology and climate
(Author 2014).

The NZG are arranged on an eighteenth century model of *Rus in Urbe*: translated as an illusion of countryside created by a building or garden within a city. The NZG make use of focal points in the form of landmarks, such as the Sammy Marks fountain, the historical lion enclosures, the cable car and the other animals. Many enclosures are still built on the old zoo model, while most of the *Unzoo* and other contemporary zoo design principles have not been applied. It therefore has room for improvement in terms of the quality of life of the animals, as well as the experiential quality for the visitors. The question to readdress for the twenty-first century zoo typology is a universal question; a rethinking of this zoological garden could be the starting point.

A design approach was established to inform decisions for master plan development. These guidelines are based on the three stratagem from Chapter II. Theoretical issues general to the discipline of landscape architecture, theoretical issues specific to zoological garden design and relevant case studies relating to zoo enclosures were addressed. Through the analyses of these three strategies, a conceptual master plan response and zoo design principles can be determined.

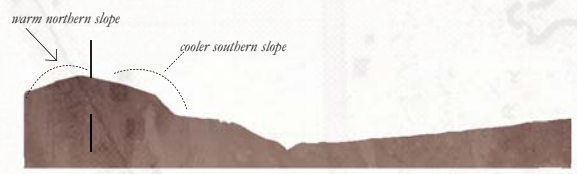
The principles will aim to inform the process of dealing with the current zoo typologies and organisation of enclosures within the NZG. Moreover, the threshold condition between man and animal within the context of the zoo can be readdressed. The new design principles will focus on the interconnectedness within natural systems and the interdependence of the exhibited animal's habitat. The design principles will lead to new standards of awareness of animals' needs, the recognition of the impossibility to replicate certain eco-systems and satisfy the needs of many traditional zoo species.



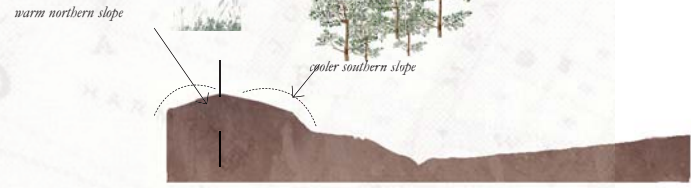
IV.5. Stratagem application for master plan response (Author 2014).



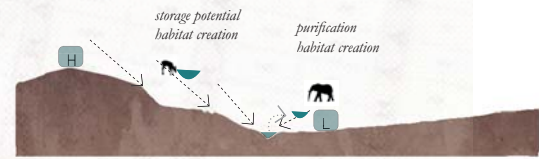
TOPOGRAPHY



CLIMATE



HYDROLOGY



IV_6. Site analysis and implications of topography, hydrology and climate (Author 2014).

4.2 *Zoo design principles*

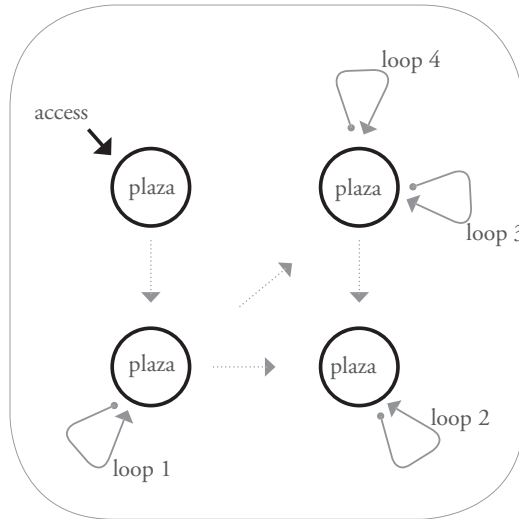
4.2.1 *Stratagem I: Sustaining beauty*

As described in Chapter III, landscape architecture is more than designed ecosystems, strategies and open-ended processes, as McHarg (1995) instructed. Landscapes provide experience that can lead to a new awareness of the rhythms and cycles generated by nature. Landscapes provide new forms, spaces and sequences, whilst preserving the memory of previous experiences and conceptions of the created space. Through the experience and the processing of the landscape, a new awareness and empathy for species and habitats around us will develop.

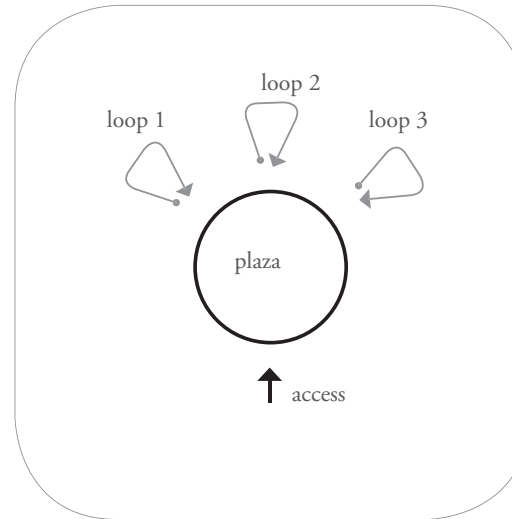
The five steps selected from Meyer's (2008) manifesto can be implemented to form part of the new design principles model within the context of the NZG in the following manner:

4.3.0.1 *Beyond ecological performance*

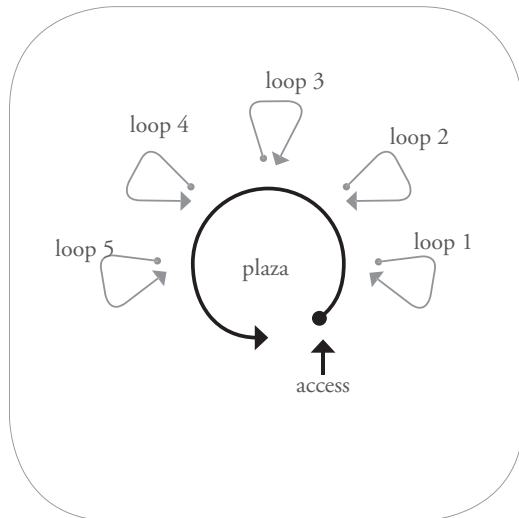
The design must acknowledge the qualities of the social and cultural aspects of the site. The proposed enclosure must perform well ecologically. However, if this is the only objective, the design will lack the human dimension that lies at the core of designing a zoo in the first place, and will obscure the essence and character of the zoological gardens. The design process must therefore incorporate a broader range of factors beyond the ecology as design generators. To achieve this, the design process must intersect the natural cycles, such as cleaning and filtering of water, with the recreational elements and spatial practices of the visitor. The natural landscape must imbue the visitors in the landscape as they encounter the animals on display. The result will be an update of the landscape immersion concept described in zoo theory. The updated immersion exhibit will serve the purpose to attract attention, increase curiosity, and thereby encourage intellectual involvement, eventually creating a memorable image in the mind of the observer.



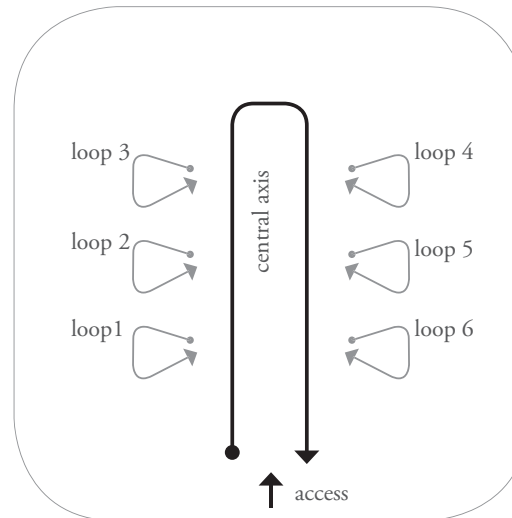
IV.7. Circulation strategies: Without Hierarchy - not efficient and quite often is an unpleasant experience. It is easy to be disoriented, one can become lost, and one can, as a result, miss many worthwhile animal exhibits (Author 2014, adapted from Harrison 2007).



IV.8. Circulation strategies: With Hierarchy, multiple loops- he visitors can select the zones they wish to visit and the sequence of visitation depending on the time and energy (Author 2014, adapted from Harrison 2007).



IV.9. Circulation strategies: With Hierarchy, central main loop- this is typical for zoos that have an icon in the middle, such as a lake or a heritage structure, or a space that provides a traditional activity (Author 2014, adapted from Harrison 2007).



IV.10. Circulation strategies: With Hierarchy, central axis- allows for greater dispersion of visitors into the various exhibit zones (Author 2014, adapted from Harrison 2007).

4.2.1.0.1 *Visitor experience*

Enclosures must do more than just display animals. They should aim to satisfy the aesthetic, educational, experiential, intellectual and emotional needs of zoo visitors. Zoo visitors have a tendency to spend a short time at exhibits, anticipating a greater experience from one enclosure to the next. By considering the approach to the exhibit, and the sequence of preceding experiences, the design is able to build a high level of anticipation.

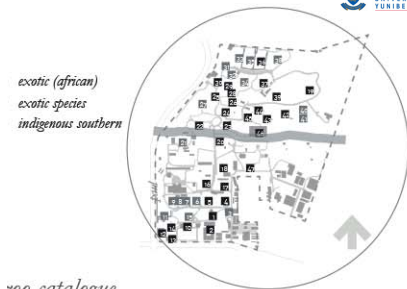
4.2.1.0.2 *Circulation*

Circulation is a key element in visitor experience. It must therefore be planned to maximise the zoo experience and provide structure for the coherent story. The central axis system as illustrated in Figure IV_10 on page 138, will help with orientation and relaxation to work against fatigue due to lengthy zoo loops (Harrison 2007).

4.3.0.2 *Natural process vs natural form*

Meyer (2008) instructs the designer to replicate the natural process rather than the natural form. This principle can be applied in the enclosure design, considering the objective to replicate a certain habitat for certain species. A habitat is made up of certain natural elements, such as a stream or rocky outcrop of grassland.

When implementing these principles, the process of generating and replicating these elements must take priority over the actual form and appearance of these elements. The designer must consider the space available in the zoo grounds. To simulate actual grassland habitat based on form and appearance will be impossible. But the natural processes necessary to generate and sustain life within a grassland habitat may provide an alternative solution. In order to design and reflect the animals' natural habitat as closely as possible to the quality of the original, the natural processes must form the foundation of the design, before the insinuated image.



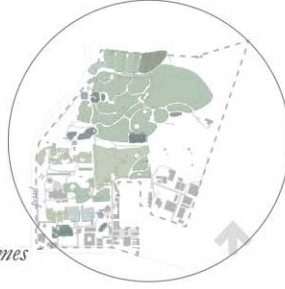
zoo catalogue

- aintenance ●
- aintenance ●
- aintenance ●
- aintenance ●

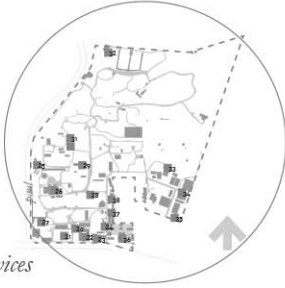


vs natural landscape

- woodland ●
- semi-desert ●
- outcrops ●
- marshland ●
- aquatic ●



enclosure biomes



functions and services

1. cape vulture, white backed vulture
2. demoiselle crane, red crowned crane, blue crane, wattled crane, egyptian goose
3. chimpanzee
4. cape fur seal
5. greater flamingo
6. caribbean flamingo, chilean flamingo
7. axis deer
8. mhorr gazelle
9. scimitar-horned oryx
10. southern ground hornbill, green-winged hornbill, blyth's hornbill
11. orange-winged amazon, brown necked parrot, african grey parrot, red-sided eclectus parrot
12. leopard, lion tailed macaque, patas monkey, baboon, hamadryas baboon
13. reptile park
14. penguin
15. lemur
16. african elephant
17. giraffe
18. black rhino
19. cheetah
20. african buffalo
21. farmyard
22. hippopotamus
23. wild dog
24. blue duiker
25. owl
26. hog deer
27. kangaroo, emu, koala bear
28. gorilla
29. okapi
30. seal
31. kodiak bear
32. nubian ibex
33. siberian tiger
34. okapi
35. siberian tiger
36. african lion
37. blesbok
38. mountain goat
39. white rhino
40. red river hog
41. bongo
42. dazie
43. zebra
44. ostrich
45. kudu
46. hyena
47. waldraap ibis, sacred ibis, yellow headed conjure, sun conjure, little corella, goliath heron, great white pelican

- 1 zoo entrance
- 2 parking
- 3 old museum
- 4 offices
- 5 conservation centre
- 6 aquarium and reptile park
- 7 restaurant
- 8 armifora house exhibition
- 9 entertainment hall
- 10 braai shelter
- 11 farm shop
- 12 cable car ground station
- 13 cable car upper station
- 14 restaurant 2
- 15 animal hospital
- 16 animal feed
- 17 storage
- 18 nursery
- 19 waste disposal

IV_11. Analysis of existing enclosures on site: catalogue, biomes and functions (Author 2014).

4.3.0.5 *The performance of beauty*

Beauty, as defined by Meyer (2008), in the landscape can influence our psyche. This principle must focus on a design experience with sensory and haptic quality that can reconnect the zoo visitor with the animal and its habitat. It has the potential to restore and refocus our views of wild animals and the wild. The beauty will be unveiled in the design through a process of discovery, as described by Danto (1999:192-193): “. . . seeing and touching, smelling and hearing, between reason and the senses, between what is known through past experiences and what is expected in the here and now”. Materiality is therefore an important consideration in order to build landscape experience in subtle and unique ways.

The visitors rely on all their senses for the opportunity to identify with the animal. Hence the need for active comparative identification can be exploited in conveying conservation and cultural messages. The design approach therefore requires innovative ways for the visitor to interact with the animal and its environment. Eye-level sight develops a sense of respect, and different strata of interaction, such as _____ in turn enhance the experience of the user, as well as the animal. It develops an understanding of the animal and its habitat.

According to Dry and Joubert (1991), the viewers must be encouraged to experience the zoo beyond the mere level of reacting to physical sensations. They must be enticed to interact at a perceptual level, where storing mental images are formed through the processing and organisation of all the sensations that they experience. The goal is thus to produce an intellectual reaction that can reinforce and contribute to the visitors' total learning experience.

4.3.0.6 *Dynamic beauty*

The dynamic beauty design principle focuses on observation and manipulation of the landscape as a temporal medium. Landscape architecture's medium is material and tactile; it is spatial. The user will circulate through the enclosure, while the landscape moves, changes, grows and declines as a designed ecosystem. These changes are multiple and overlapping, operating at different scales and rhythms. The temporal landscape is based on moments of spontaneous successional vegetation growth, the tidal rhythms of water ebbing and flowing next to smooth, constant, gently sloped grass mounds, or the seasonal changes of temperature and plant growth. The designed animal enclosure must reveal, enable and regenerate ecological processes in order to become temporal and dynamic.



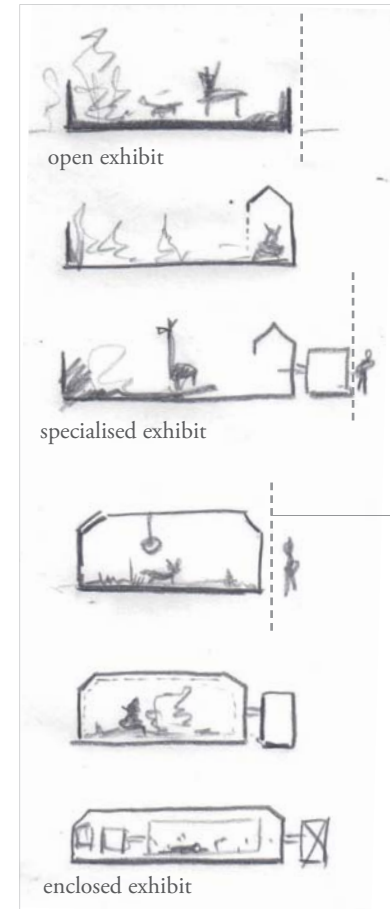
*IV_12. Barrier
analysis in the
NZG (Author
2014)*

4.1.1 *Stratagem II & III*

This study further identified one component from the zoological theory strategy and another from the case study analysis to form part of the new design principle model. The elements include: *The Unzoo revisited* and the *Biozone Proposal*.

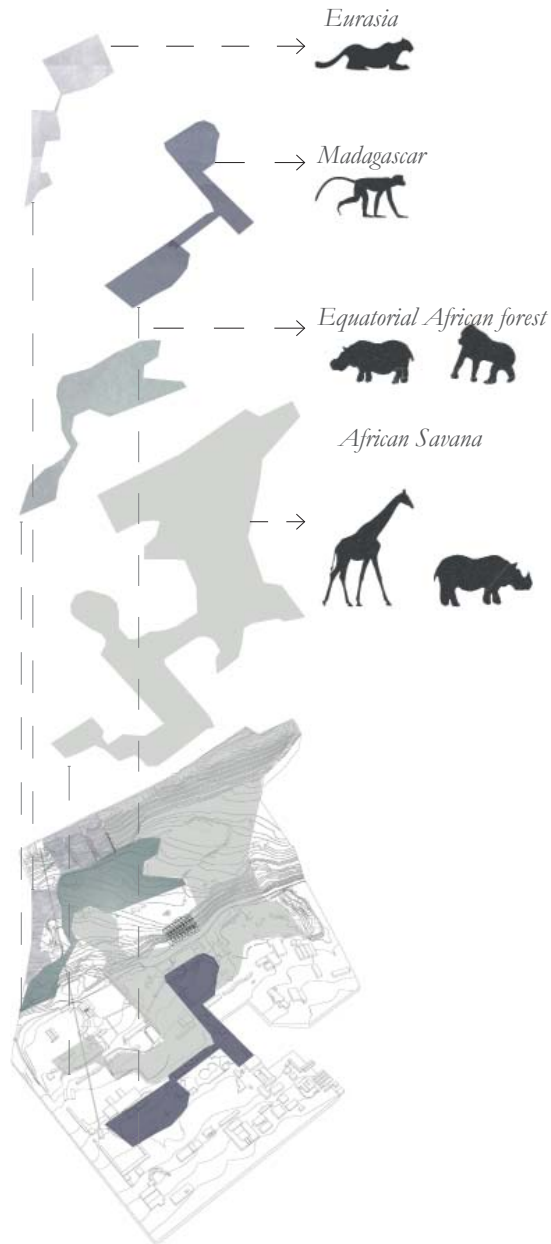
4.3.0.7 *Unzoo revisited*

The *Unzoo* model would be the most applicable for animal species well-adapted to local climate and vegetation. New attention must be afforded to smaller species that do well in captivity. Free access shelters could extend the possibility of displaying a wide range of animals with minimum containment, maximum choice and self-determination without coercion. The zoo should therefore focus on display and conservation of animals from native biomes. The principle will place emphasis on providing memorable encounters with native species, making them as entertaining as the better-known exotic animals. As the *Unzoo philosophy* emphasises, the principle will further aim to implement a sense of no barriers between visitors, the animals and the landscape. The barriers must therefore be eliminated in-between the enclosures where animals have been grouped together and visitors are in turn immersed in the landscape through means of skywalks and boardwalks. Natural scenes can also be employed as barriers, such as fallen trees, earth slippages, streams, mud-banks and wetlands.



confined experience

IV_13. Barrier analysis in the NZG of the confined experience (Author 2014)





IV_15. Proposed savannab biozone vision (Author 2014)



IV_16. Photographic presentation of existing primate cages at the NZG (Author 2014)

4.3.0.8 *Mixed species exhibition*

Mixed species exhibits form part of the *Unzoo philosophy*. Mixed species exhibits can be developed by the addition of new species to pre-existing enclosures and by incorporating smaller enclosures into larger areas.

Mixed species exhibits offer educational, entertainment and experiential value over comparable mono-specific mammalian exhibits (Veasey & Hammer, 2010). Zoo studies have shown considerable interspecific play between primates, carnivores and ungulates in mixed species enclosures (Freeman & Alcock, 1973). Chosen species can exploit different resources within the enclosure; thus, there is the potential to increase the stocking density without compromising animal welfare or resource usage. According to Veasey and Hammer (2010), combining arboreal and terrestrial species reduces the likelihood of negative interspecific interaction, ensuring that visitors can always observe an occupied enclosure, and offers considerable interpretive possibilities and experience.

4.3.0.9 *Biozone Proposal:*

Each biozone is characterised by its topography, fauna and flora, as well as the specific features of the different ecosystems it comprises. A mosaic of landscapes will therefore recreate natural environments through the elimination/concealing of barriers and the immersion of visitors through the enclosures.

The landscape will shape as a result of process design implementation, as mentioned in principle 2, and not through the mere replication of natural shape or artificial landscape elements. The landscape must shape as a result of sophisticated, meticulous design in which every shape and colour has been considered. Vegetation, soil types, positioning of rocks, hydrology, waterfalls, shelters and troughs will be designed accordingly to create the illusion of intended biome, while offering optimal views of the animals.



*IV_17. Zoo 360 at
philadelphia Zoo. big
cat crossing and primate
crossing (philadelphiapzoo.
org 2014)*

4.3.0.10 *Connecting the zoo*

The *Biozone Proposal* will, however, in essence still create barriers between the enclosures itself. The threshold between the *biozones* can be bridged with the *Zoo360* concept. The *Zoo360* concept has been implemented in the Philadelphia Zoo and currently consists of three trails: Treetop Trail, Great Ape Trail and the Big Cat Crossing. The trails link existing animal habitats so that animals with similar habitat requirements can use one another's spaces in a time-sharing system and take advantage of more room to roam. The trails are constructed of flexible stainless steel mesh elevated as a passageway through the treetops and over the visitor ways. The implementation of a treetop trail will provide monkeys and lemurs the opportunity to travel long distances and move high in the trees, exposing them to a wide variety of new and changing visual stimuli. Different species from the different biomes can 'timeshare' the system at different times of the day (www.philadelphiazoo.org, 2014).



IV_18. Johannesburg zoo Gibbon enclosure (Author 2014).



IV_19. Johannesburg zoo Madagascar primate enclosures (Author 2014).

4.1.2 *Local case study:*

Johannesburg Zoo

The Johannesburg Zoo forms part of the local case studies conducted. The zoo is situated in the northern suburbs of Johannesburg, Gauteng. The Johannesburg Zoo houses over 320 species of animals, totalling approximately 2000 animals. It is much smaller than the NZG, occupying only 55 hectares of land. The author's main objective with this case study visit was to compare the monkey cages and the visitors' experience of these specific cages.

As part of its efforts to build specific geographic zones for its inhabitants, the Johannesburg Zoo implemented new Madagascar enclosures filled with its natural foliage and housing animals that are endemic to the island.

The newly renovated enclosures were initially designed for and inhabited by brown bears and Asiatic black bears. According to Van der Spuy (2013), the bears had been relocated as part of the new geographic zoning of the entire zoo.

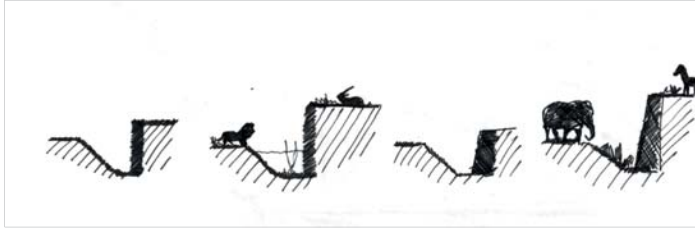
The Madagascan enclosures are encircled by plants, mostly palms, ornamental grasses and philodendrons, as well as shrubs from the Madagascan tropical rainforests. These plant species are used to accommodate the animals in the enclosure because of their tropical forest natural habitat (www.joburg.org.za, 2014).

The gibbons and lemur species in the NZG are held in significantly smaller enclosures with hardly any natural vegetation. Gibbons live in the upper story of forests and hardly descend to the ground. Their long limbs are adapted for a particular suspensory form of locomotion known as "brachiation, in which they swing from branch to branch" (Petter & Desbordes, 2013).

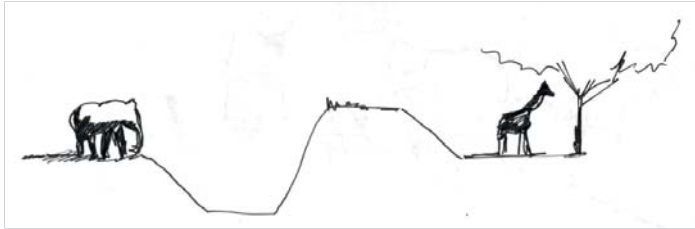
It is evident that the NZG did not apply the AAC theory with the gibbon enclosure (see Figure IV_29 on page 158). The Johannesburg Zoo precedent, however, succeeded in supplying these species with a sufficient life history volume for 'brachiation' to occur.



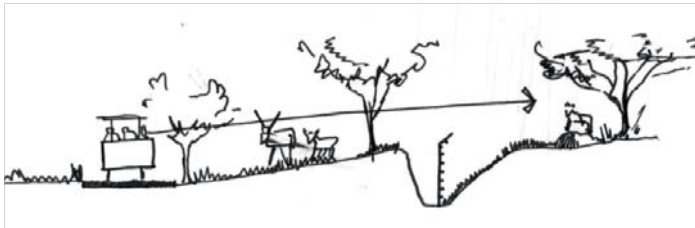
IV_20. Ecosystem creation: Animals attracted vs confined (Author 2014)



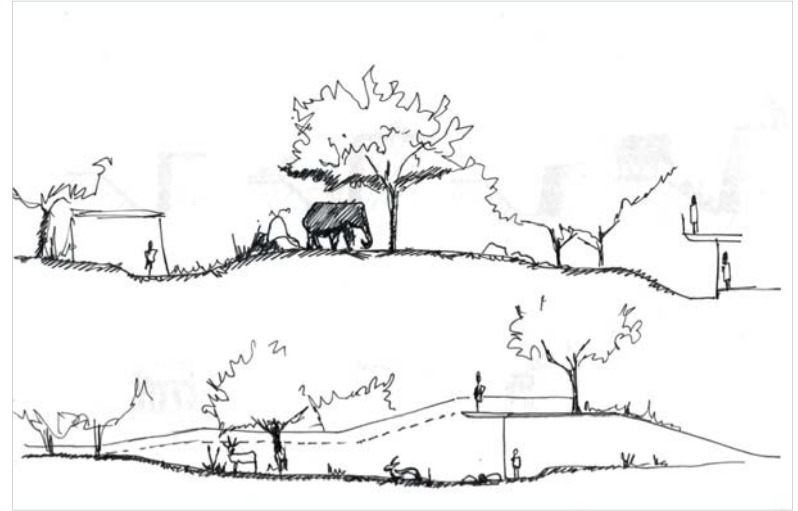
IV_23. Deep fence exploration (Author 2014).



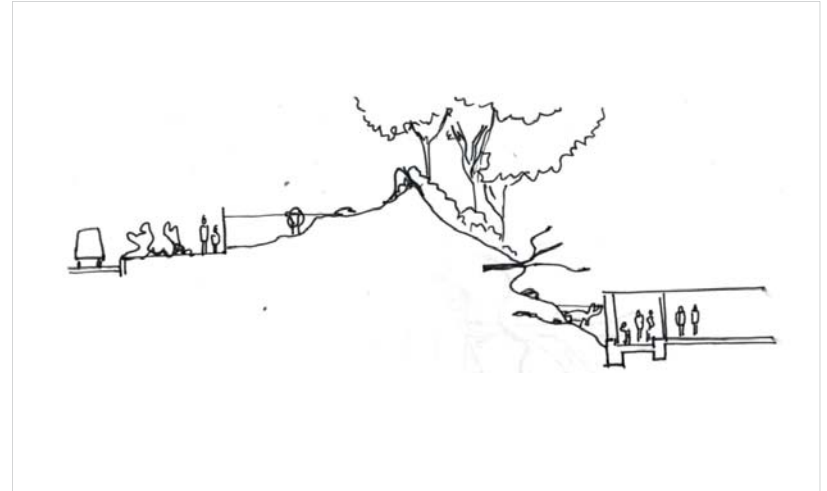
IV_24. Mixed specie exhibition (Author 2014).



IV_25. Safari rides (Author 2014).



IV_21. Hidden barriers, landscape immersion (Author 2014).



IV_22. Use existing topography as design driver (Author 2014).

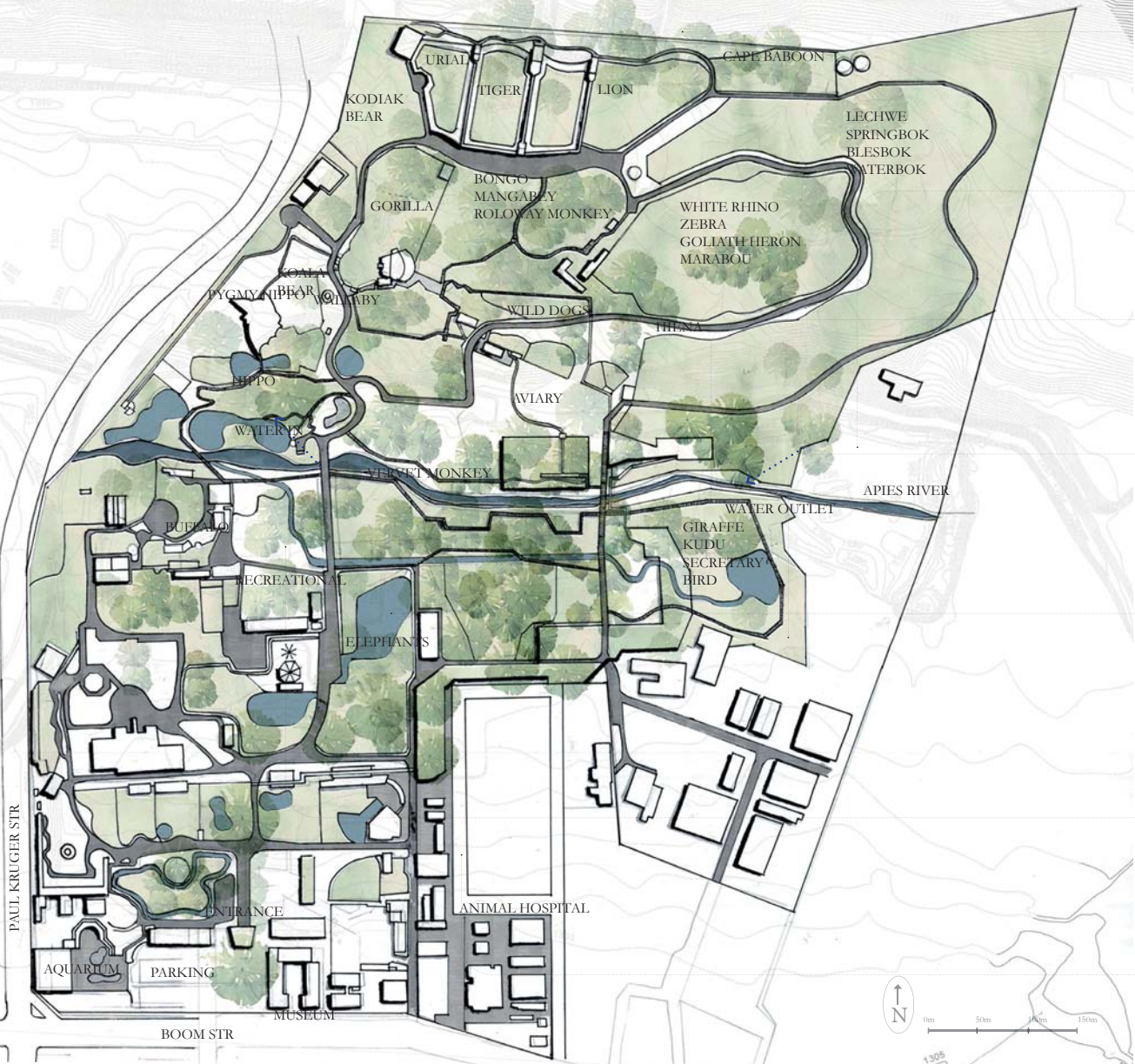
4.1 *Master plan*

The design principles established from the three stratagems contributed to the conceptual intentions for the master plan development. The implemented principles predominantly comprise the *Unzoo revisited* and the *Biozone Proposal*. The *sustaining beauty principles* must be used as a guide but will have more relevance dealing with design decisions at sketch plan level.

4.1.1 *Biozone*

The *Biozone Proposal* led to the development of four *biozones* within the NZG: Madagascar, Eurasia, Savannah and Equatorial Africa. The Savannah and Equatorial Africa biomes will occupy most of the master plan to support an increase of local and African species, more suited for the climate of Pretoria.

Animals were grouped together according to their *biozone* requirements. The current animal catalogue (see figure IV_7 on page 140) and site analysis of topography, hydrology and climate (see figure IV_3 on page 131 and IV_6 on page 134) served as a guide to re-connect animals that are indigenous to the proposed biome. As a result, enclosures of these animals were enlarged and connected, following the *Unzoo* principle of mixed species exhibition, enlargement of enclosures and animal habitat creation supported by the site topography, hydrology and climate of the site. See figures IV_20 on page 150.



IV_26. Proposed conceptual master plan of NZG and its components (Author 2014).

vegetation



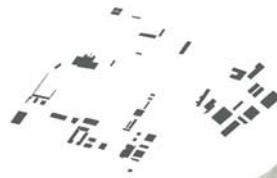
apies river



additional water bodies



buildings



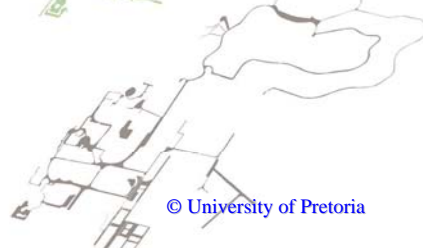
animal exhibition space



public soft space



hard space

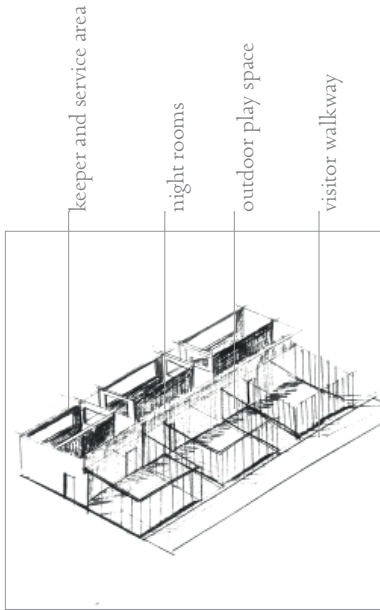




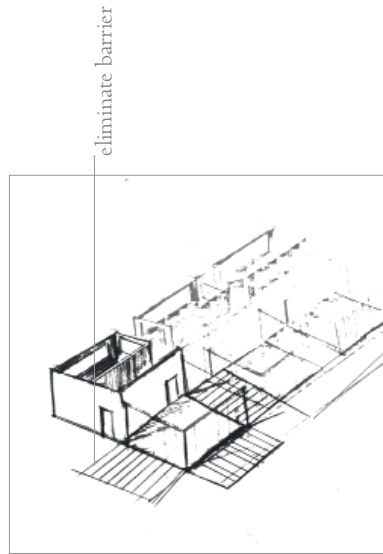
IV_27. Biozone proposal, primate 'elevation' and vervet monkey enclosure (Author 2014).



proposed site location: Vervet Monkeys



existing primate cage condition



unzoo approach



replicate natural habitat



immerse in original habitat

4.3.0.11 *Unzoo revisited*

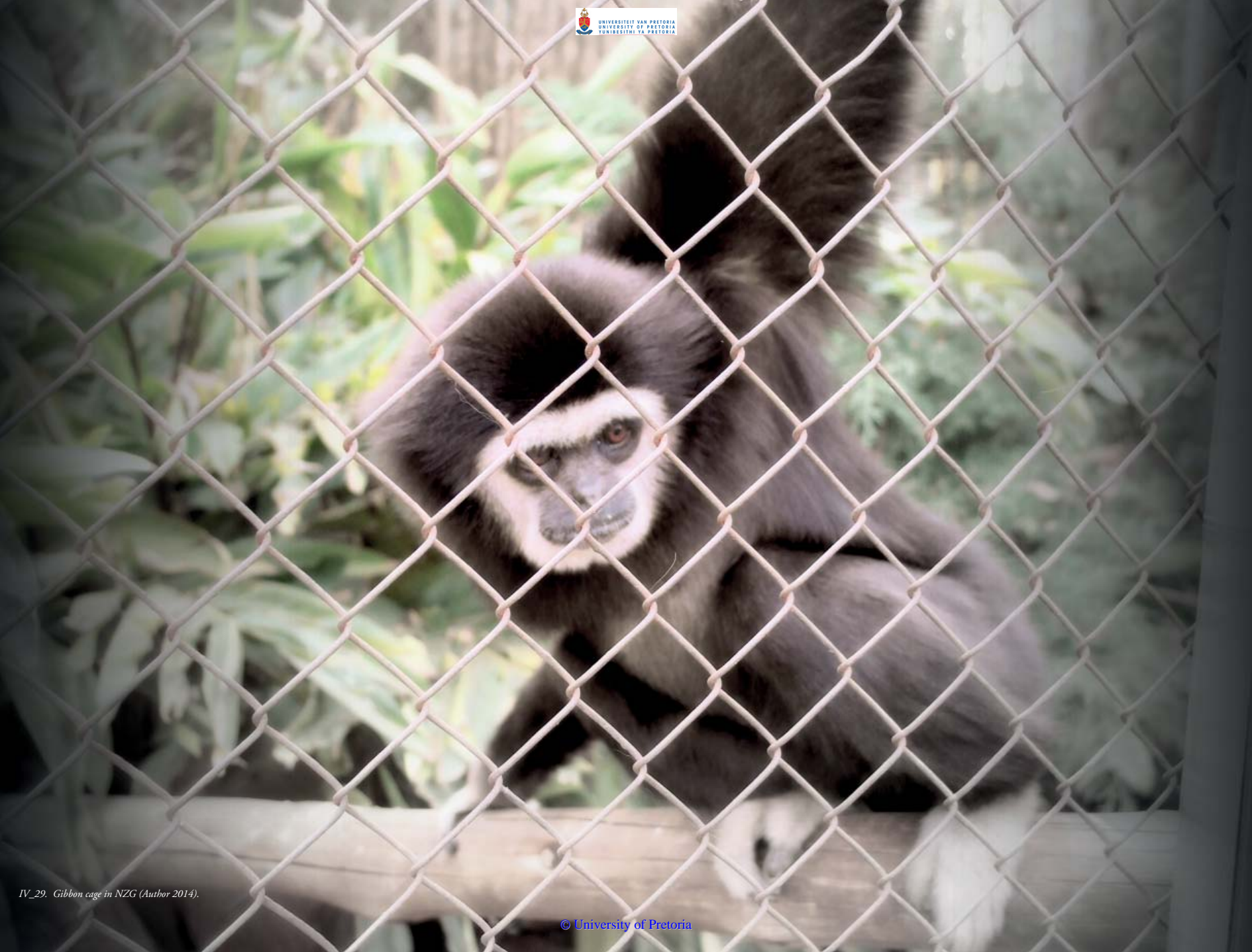
Enclosures of the animals relocated to the *biozones* were as a result enlarged and connected, following the *Unzoo* principle of mixed species exhibition and enlargement of the enclosures and landscape immersion of the visitor .

4.3.0.12 *The primate 'elevation'*

As a reaction to the small monkey enclosures, the master plan proposes to enlarge the primate enclosures according to the AAC theory (See figure IV_27 on page 154). The primates will be categorised according to the proposed biomes and dispersed throughout the zoo grounds. The master plan will aim to display and implement conservation of animals from native biomes where possible, but will not disregard the species from the other proposed *biozones*. This principle places emphasis on providing memorable encounters with native species, making them as entertaining as the better known exotic animals. According to Allenby (2011), historically the animal collection was managed on an *ad hoc* basis, but the unsuitable growth is bound to change under a new animal collection plan. The new plan will dictate an increase of local and African species to 70% and a decrease of exotic species to 30%. The primate elevation strategy will therefore propose the introduction of native primates, specifically the vervet monkey, which is not presently exhibited in the NZG. Figure IV_28 on page 156 illustrates the conceptual enclosure development.

4.3.0.13 *Zoo 360*

The master plan will finally propose to bridge the thresholds between the *biozones* with the *Zoo360* concept. The trails will link the proposed primate enclosures so that animals with similar habitat requirements can use different enclosures on a time-sharing system.

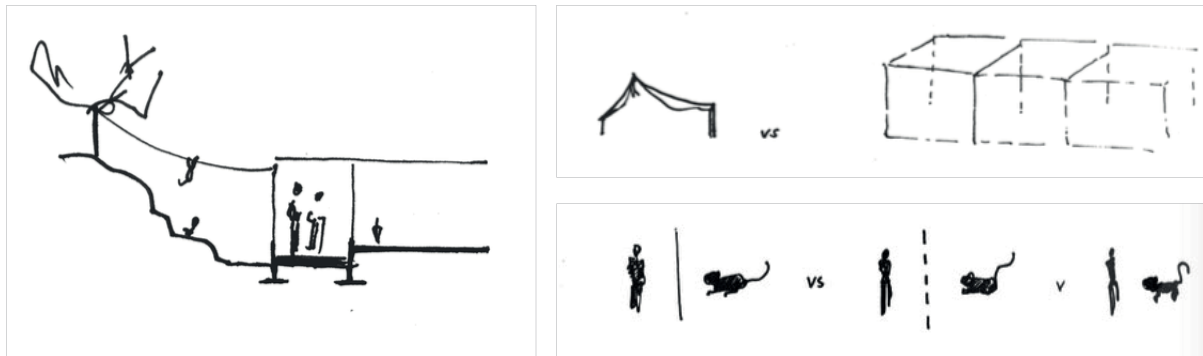


4.2 Conclusion

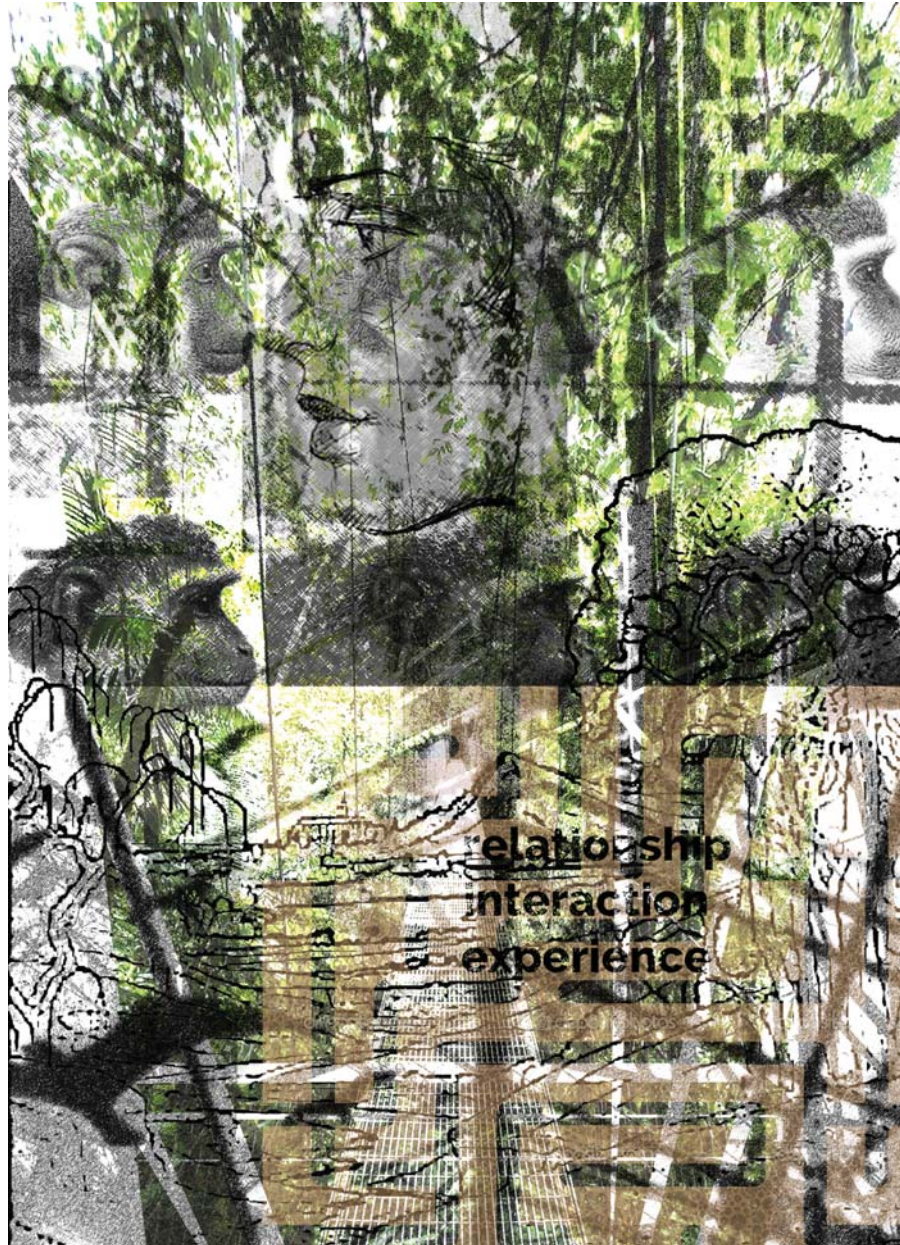
The final master plan proposal will provide the visitors with an improved, meaningful and educational experience. The *Biozone Proposal* will showcase the diversity of the animal kingdom by evoking the natural habitats in which the animals thrive and reside in enlarged enclosures.

The mixed species exhibition will offer interpretive possibilities and experiences for both the animal and the zoo visitors. Landscape immersion will redefine the current circulation of the visitors and elevate them into the enclosures, where possible, through means of skywalks and boardwalks. Primate elevation and the Zoo360 concept will bridge the thresholds between the *biozones* and in turn provide an amplified experience to the zoo visitor.

These conceptual master plan strategies will serve as an experiment for the proposed principles and provide a base for sketch plan development. The master plan site analysis and design principle synthesis will guide the dissertation to a final response of the proposed detail design.



IV_30. Primate cage threshold exploration (Author 2014).



V_1.
Conceptual collage
of man and
animal threshold
(Author 2014).

CHAPTER V

EXTRUDED EXPERIENCE

design development: enclosure intervention



Extruded experience

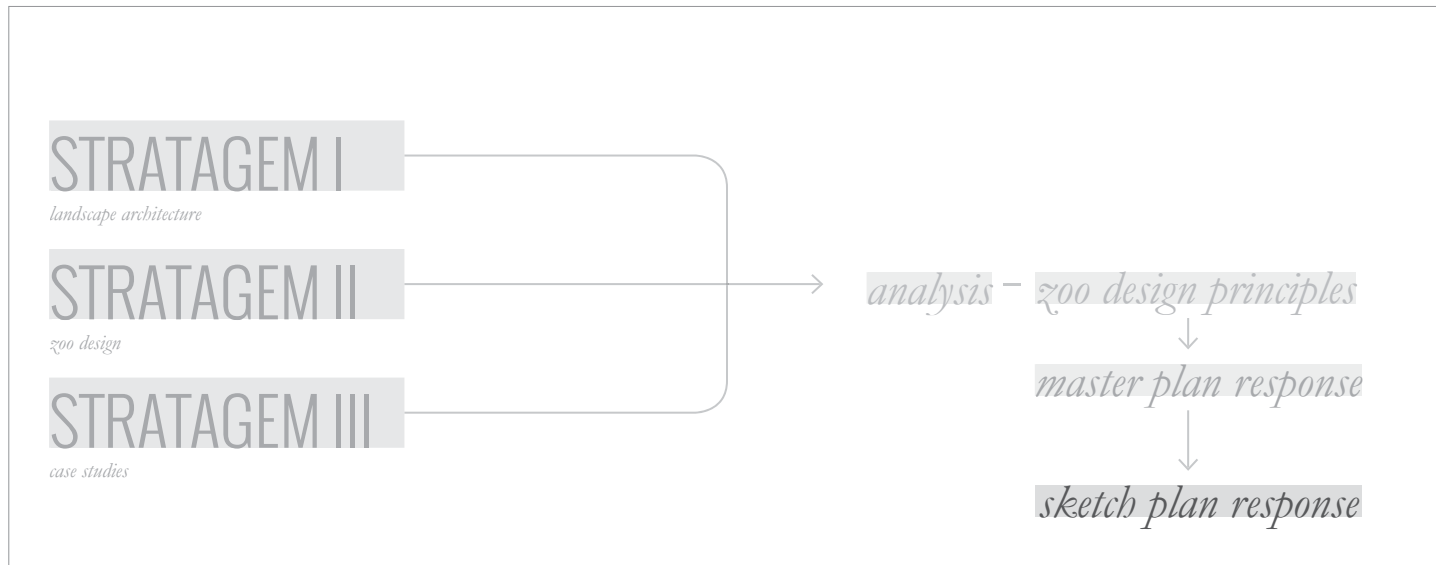
THE EXTRUDED EXPERIENCE WILL FOCUS ON THE SPATIAL IMPLICATION OF THE THRESHOLD BETWEEN MAN AND ANIMAL WITHIN A ZOOLOGICAL ENCLOSURE. CHAPTER V ADDRESSES THE ENCLOSURE DESIGN OF A SELECTED SPECIES ON A DETAIL DESIGN LEVEL AND AIMS TO PROVIDE AN EXTRUDED EXPERIENCE FOR BOTH MAN AND ANIMAL. CHAPTER V AIMS TO PROVE THE DESIGN HYPOTHESIS AND ADDRESS THE RESEARCH QUESTIONS OF THIS DISSERTATION.



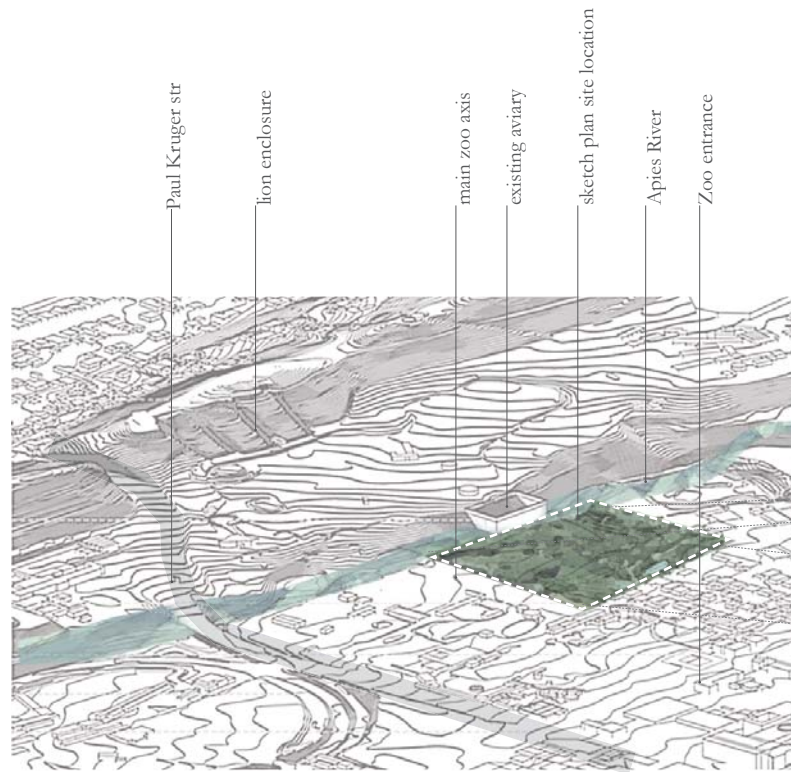
5.1 *Introduction*

The proposed conceptual master plan served as a collaborated experiment of different applied design principles to provide a specified platform for sketch plan development. Detail design principles will be implemented to the identified site and aim to influence the typical enclosure designs. The initial outcome of the master plan experiment gave rise to critical issues that are addressed in this chapter. Alternative options will be explored to support the final conceptual design intent. The analysis of current enclosures, topography, hydrology and historical value of the site will serve as design determinants for the identified site. This review will refer directly to the unique relationship between man and animal. The proposed enclosure design will aim to reconfigure current zoo typologies to spatially inform the new set of design principles.

Landscape design becomes a fundamental instrument that will aim to combine ecology and aesthetics to create a hybridised interactive experience with nature, animals and humans. The design will acknowledge the historical and cultural significance of the NZG and use the landscape as a medium to communicate this significance.



V_2. Stratagem
application for
sketch plan response
(Author 2014).





lion enclosure

existing aviary

existing rhino enclosure

lion enclosure

bridge

sketch plan site location

main zoo axis

existing giraffe enclosure

Zoo entrance

V_3. 3d and plan view of sketch plan site location (Author 2014).



*V_4. Carrying
capacity feasibility
representation
(Author 2014)*

5.2 *Master plan analysis*

The master plan analysis will serve as the first set of guidelines for sketch plan development. The identified issues of the master plan will aim to redefine the proposed zoo design principles. A single biozone will be selected and analysed to determine the outcome critique. The critique will include pragmatic aspects, such as the carrying capacity of enclosures, but also spatial and experiential implications of the proposed master plan.

5.2.1 *Carrying capacity*

In the master plan analysis, it has been noted in the savannah biozone that the intended biome cannot be replicated in the NZG to the full extent due to the amount of space available. The degree to which one can successfully maintain a high quality immersion exhibit is directly proportional to and dependent on the size of the exhibit and the type and number of animals contained within it.

In every case, the carrying capacities, or density of animals within the zoo exhibit, are numerous times of those found in natural ecosystems. Generally, the larger the space and the smaller the number and size of animals in it, the easier it will be to maintain the original landscape concept. Figure 4 on page 168 illustrates the carrying capacity feasibility conceptually.

Conversely, exhibits housing too many large, heavy herbivores in a minimal area have little chance of success. Where possible, the duplication of exhibit spaces to allow the rotation of animals from one space to another will allow for sound pasture management practices and will significantly improve the exhibit experience. While the emphasis is on the authenticity and natural appearance of every biozone, the reality is that satisfactory results depend on intensive management practices to overcome wear and tear generated by animals within any simulated or replicated habitat. Ultimately, the closer an exhibit habitat parallels the true ecosystem, the greater the opportunity for meaningful interpretation and education.

The purpose of an immersion exhibit is to attract attention, increase curiosity, and thereby encourage intellectual involvement, eventually creating a memorable image in the mind of the observer.

In conclusion, the carrying capacity should therefore not be applied to wild animals, as it will not be to the advantage of the animals and their habitat. Nature and the ecosystem should be the norm and the objective towards environmental integrity in terms of education and interpretation of zoo visitors.



V_5. View of site location showing existing Apies River, wooded area and existing primate cages (Author 2014)

5.2.2

The Unzoo response

The master plan implemented a number of Unzoo principles to support the final master plan intent. One of the principles was that animals should have superior domination and humans serve as the inferior background. Initially, the aim should reflect coercion versus cooperation. The author, however, argues that when the enclosure design replicates the Unzoo principles regarding novel and natural habitat too literally, the design will risk to lose the essence of what a zoo is really all about. The visitor can only experience a mono subjective response to an extent that will restrict the user to contribute or experience to the full potential of the enclosure and the animal.

The sketch plan design will therefore aim to use nature and the ecosystem as the norm, but acknowledge the zoo as a place-making platform for humans. The humans will not serve as observers in the background but become part of the design which aim to enhance the experiential quality of the visitor to further interaction and relationship between man and animal. This notion will be explored through the reconfiguration of the current enclosures and compare animal as the spectacle versus visitor as the spectacle.

5.2.3

Tarzaneque

The enclosure design will aim to prevent the ‘Tarzaneque’ vernacular and the re-construction of unrealistic habitat replication. The proposed detail enclosure design will aim to establish a sustainable enclosure that will not result in dusty un-experiential scenes of landscapes overgrown with Kikuyu. This can be achieved by identifying a larger site for the enclosure and choosing smaller numbers and sizes of animals in it. This will result in the original landscape concept.



V_6. Approach to site location next to existing Apies River (Author 2014).



V_7. View towards existing aviary existing Apies River (Author 2014).



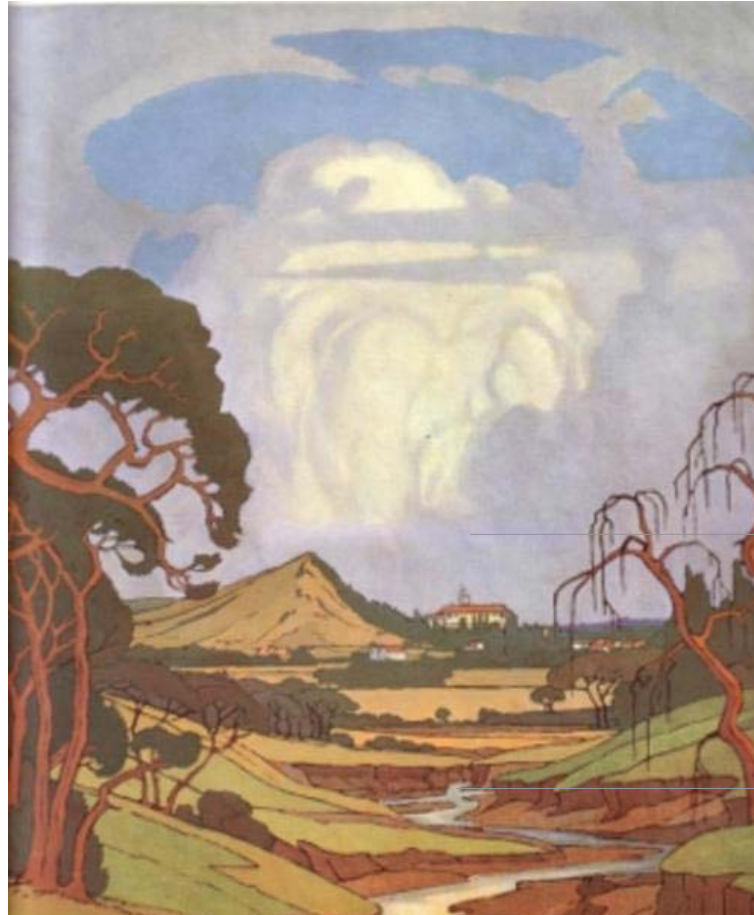
V_8. Approach to primate cages on site (Author 2014).



V_9. Existing primate cages on site (Author 2014).



V_10. 'Brachiation' of Gibbons in confined enclosure (Author 2014).



union buildings location

predicted historical location of NZG today

The Apies River with Meintjieskop

Jacobus Hendrik Pierneef

V_11. Apies
river, Transvaal
by J.H Pierneef
(Bolsmann 2001).

5.3 *Concept development*

Stratagem I, the sustainable beauty application, proposed that the enclosure design must acknowledge the qualities of the social and cultural aspects of the site. The proposed enclosure will therefore incorporate a broader range of factors beyond the proposed ecology as design generators. The historical image of the Apies River will serve as a design driver for sketch plan development.

As established in the master plan analysis, smaller and local species must be chosen in order for the design to establish full ecological integrity and meaningful interpretation of the ecosystem. Because of the historical image of the Apies River and the vervet monkeys, this species has been identified as one of the prominent species in the historical landscape, which will initiate a platform for habitat replication. The original Apies River landscape will therefore be replicated and regenerated within the new enclosure. This design principle will respond to the site-specific conditions in terms of ecology, history and culture. The chosen site will therefore be adjacent to the Apies River to further strengthen this metaphor.

Eugene Marais describes the historical Apies River significance in one of his short stories, *Van oudae en oumense in Pretoria*: "Daar was niks waarvoor Pretoria in die ou dae beroemder was as sy water nie. Die Apiesrivier was 'n dolomietstroom, 'n sterk riviertjie met water so helder soos kristal. In die diepste kuile was die kleinste klippie op die bodem sigbaar. As mens vandag die vuil, klein straaltjie water aanskou, kan jy nooit 'n denkbeeld vorm van die *marchenbafte* stroom van ouds nie, die walle bedek met varings en kapokvelde; varklblomme het elke vleitjie versier" (Marais 2006: 758). The Marais (2006) image will be the proposed aim for the replicated Apies River within the enclosure. The design will aim to implement an artificial stream with crystal clear water and banks filled with ferns and arum lilies (*Zantedescia spp.*).

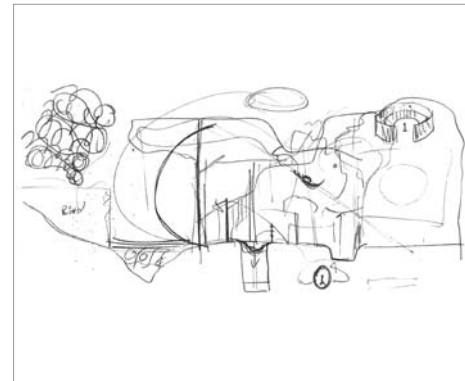
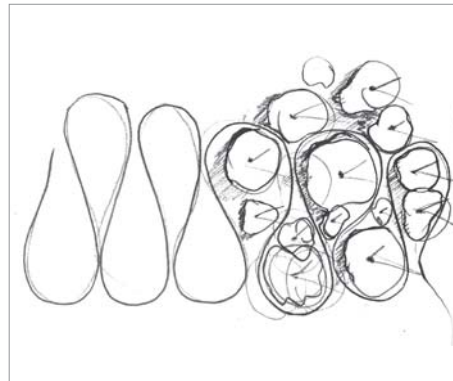
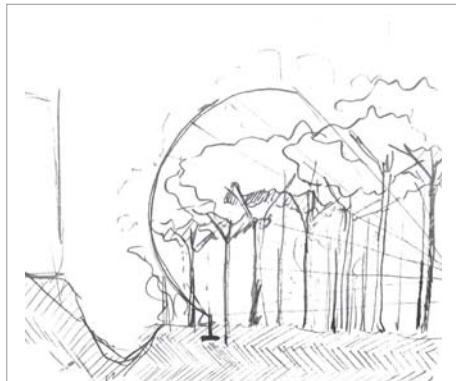
“Daar was niks waarvoor Pretoria in die ou dae beroemder was as sy water nie. Die Apiesrivier was ‘n dolomietstroom, ‘n sterk riviertjie met water so helder soos kristal. In die diepste kuile was die kleinste klippie op die bodem sigbaar. As mens vandag die vuil, klein straaltjie water aanskou, kan jy nooit ‘n denkkeeld vorm van die magiese stroom van ouds nie, die walle bedek met varings en kapokvelde; varkelblomme het elke vleitjie versier.”

-Eugene Marais

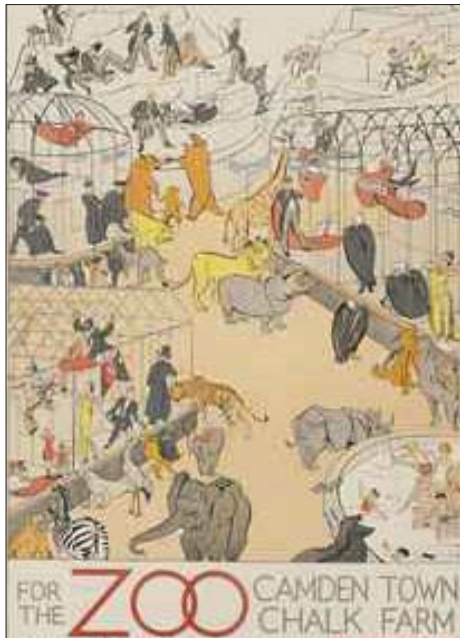


According to Bolsman (2001:170), the name of the Apies River was adapted from the prolific vervet monkeys that inhabited the white stinkwood (*Celtis africana*) forest along the banks of the river when the first settlers arrived in the Fountains Valley. One of the earliest settlers wrote: "Trees along the Apies River made a beautiful pleasance, remarkable for its scenery, and the place was blessed with a fine climate and an abundance of the purest water". The historical imagery of this specific area paints a different picture from what the Apies River currently provides within the context of Pretoria and in the NZG. The historical context dispenses a character in terms of the appropriate planting that historically occurred and hints at the state of the river that is lost. The design will therefore acknowledge the qualities of the social and cultural aspects of the site. The exposure of the ecological, historical and cultural memory of the site can be celebrated through the introduction of an abstracted memory by means of determining where the course of the river used to run from historical maps.

Introducing endemic vegetation types that diminished over time (as noted in the description from historical records and books) will reinstate the habitat where the vervet monkeys used to reside. Water will also form a critical building block for the proposed constructed systems and support the ecology and pragmatic requirements of the proposed enclosure design. The design will therefore aim to replicate natural process through the abstraction of the natural form. These natural processes will generate and replicate the above-mentioned elements and will take precedence over the actual form appearance of these elements in nature.



V_12. Conceptual development and barrier exploration (Author 2014).



*V_13. Zoo poster by
Arnid Banniza for
Regent's Park Zoo
1920 (Christies).*

The Inverted Zoo

Arnid Banniza

5.4 *Stratagem application*

5.4.1 *Stratagem I: Sustaining beauty*

As described in Chapter IV, the spatial manifestation of creative ecology, grounding the theoretical discourse within the context, will lead to the implementation of design practices from Stratagem I. These practices include the mimicry of natural process vs natural form. The hyper-nature, ecology and human life intertwined and the experience of the aesthetics will become the design generators within designed enclosure.

5.3.0.14 *Beyond ecological performance.*

The proposed enclosure will perform as an ecological system by means of the implementation of the regenerated vervet monkey habitat. In order to design beyond ecological performance, the natural systems, such as the stream and the wetland moat, will intersect with the spatial experience of the visitor. The visitor will therefore not observe the design intent from the perimeter, but will be immersed within the enclosure through proposed design elements. The elements include an underground entrance, a circulation tunnel, historical enclosures, a skywalk and a tower. The experience of spatial platforms and the ecological performance of the enclosure will celebrate the vervet monkey and manifest a diverse interactive experience between man and animal.

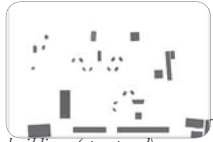
The enclosures will therefore perform beyond the display of animals. The enclosure will aim to satisfy the aesthetical, educational, intellectual, ecological, social and emotional needs of zoo visitors through a sequence of preceding experiences at different strata. Refer to figure V_49 on page 196.

5.3.0.15 *Natural process vs. natural form*

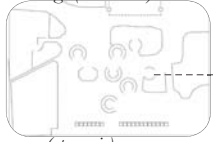
In order for the design to replicate a specific habitat, the enclosure will have to contain specific natural elements, such as the meandering stream, the wetland and the woodland habitat.

In order for the enclosure to obtain natural processes over natural form, the processes ought to generate and replicate elements that will take precedence over the actual form appearance of the identified elements. Proposing a design that will replicate the animals' natural habitat to a qualitative standard similar to a 'first nature', the natural processes will have to dominate form and initiate a foundation of the design enclosure.

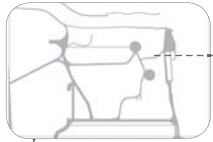
1. existing site conditions



buildings (structural)



cages (open air)



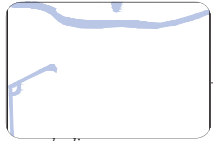
pathways



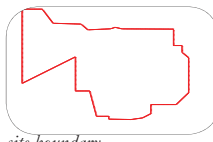
vegetation (lawn)



vegetation (trees)

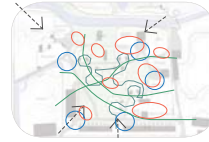


water bodies

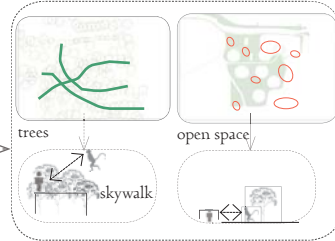
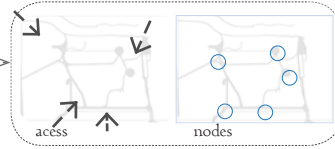
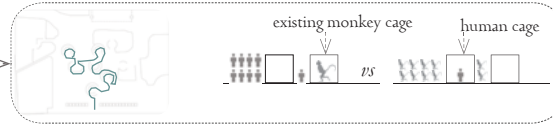


site boundary

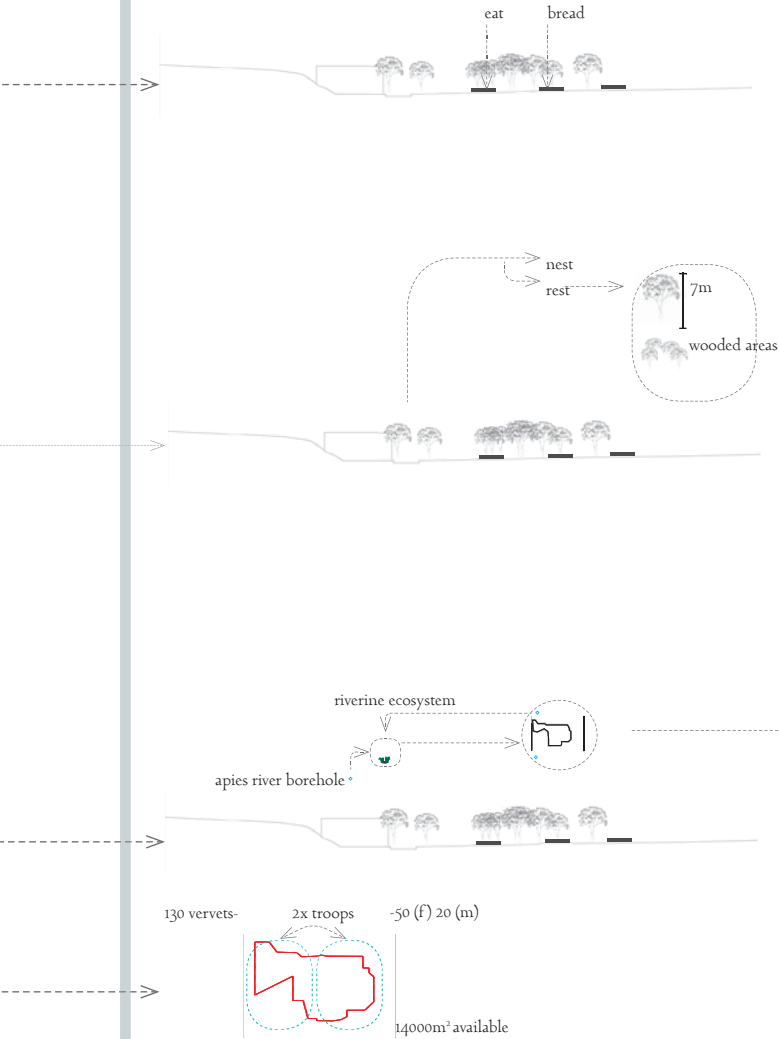
2. users



- access
- top circulation
- nodes
- bottom circulation
- open space

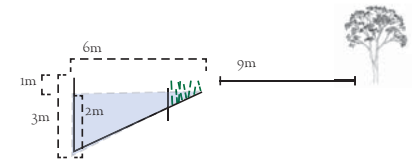
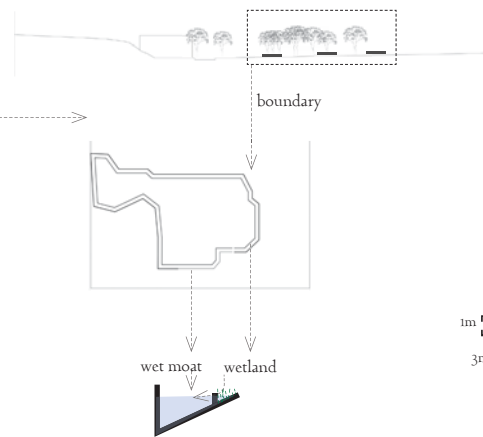


3. vervet monkey

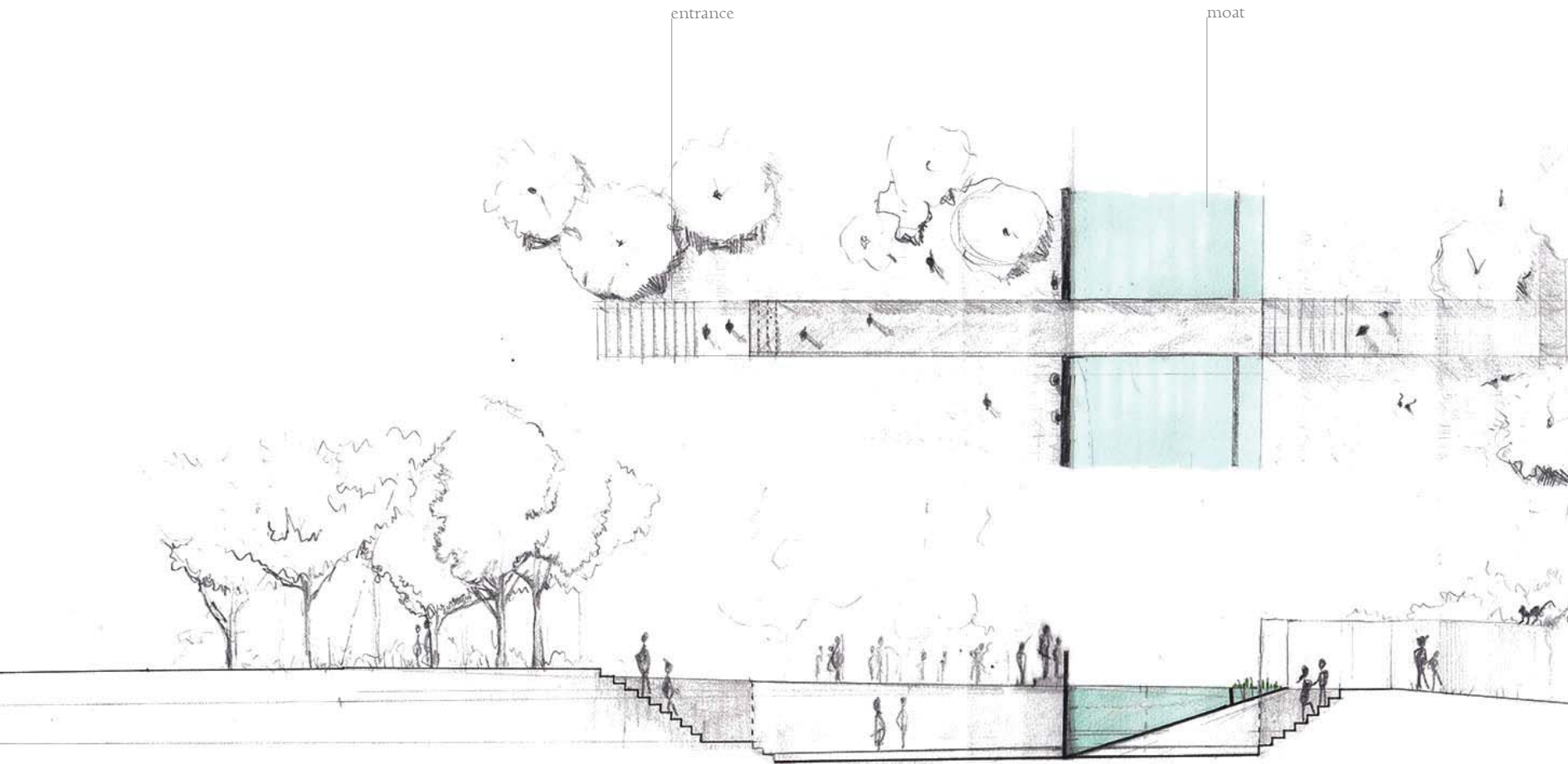


UNIVERSITEIT VAN PRETORIA
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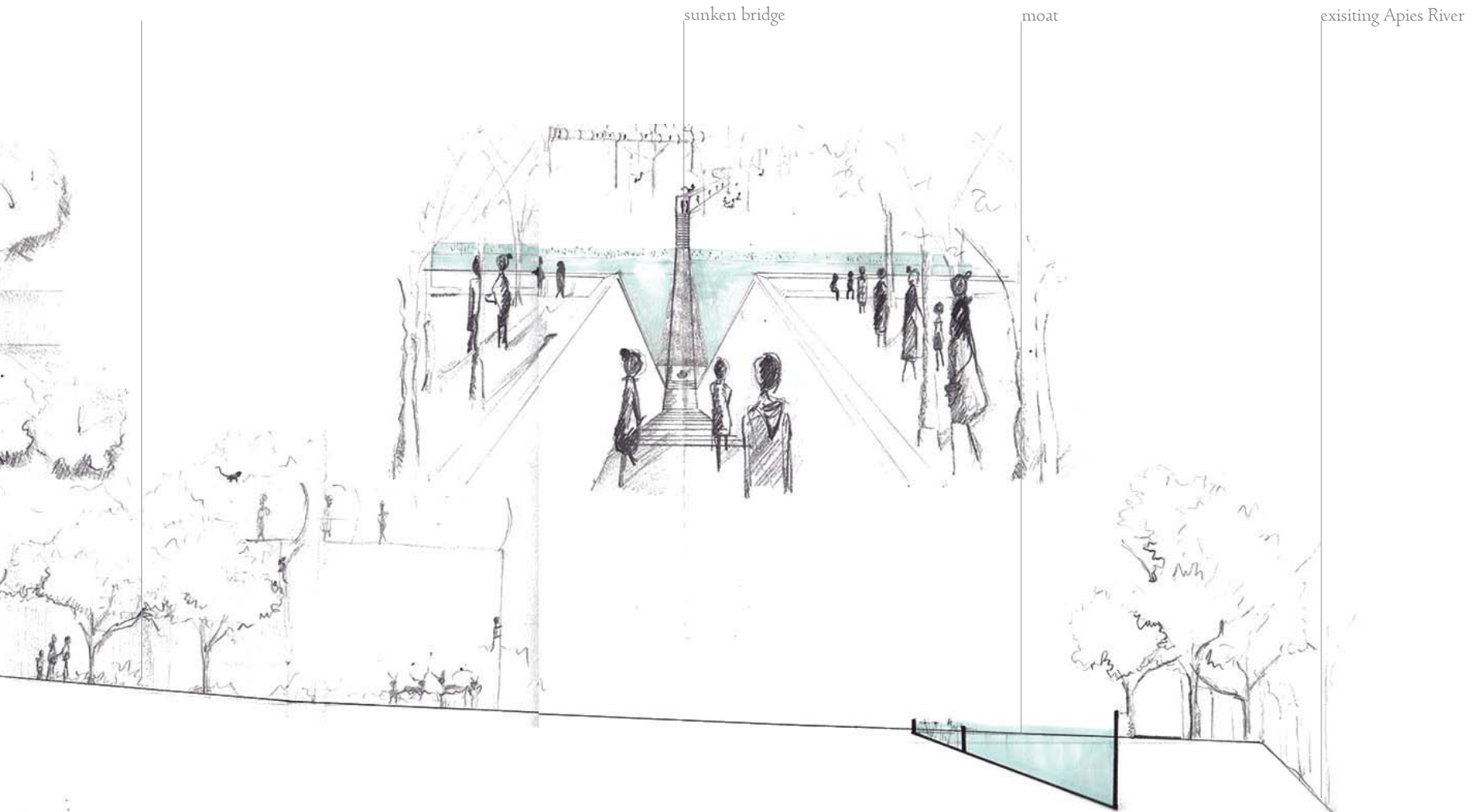
4. functional



V_14.
Pragmatic analysis
of chosen site for
enclosure: user vs.
monkey vs functional
(Author 2014).



V_15. Conceptual development of entrance and moat design. Critique: sunken bridge becomes obstacle for monkeys to escape (Author 2014).

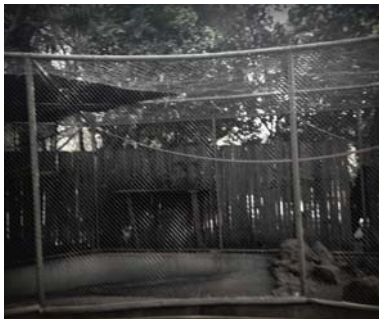


5.1.1.1.1 *Hyper-nature: the recognition of art*

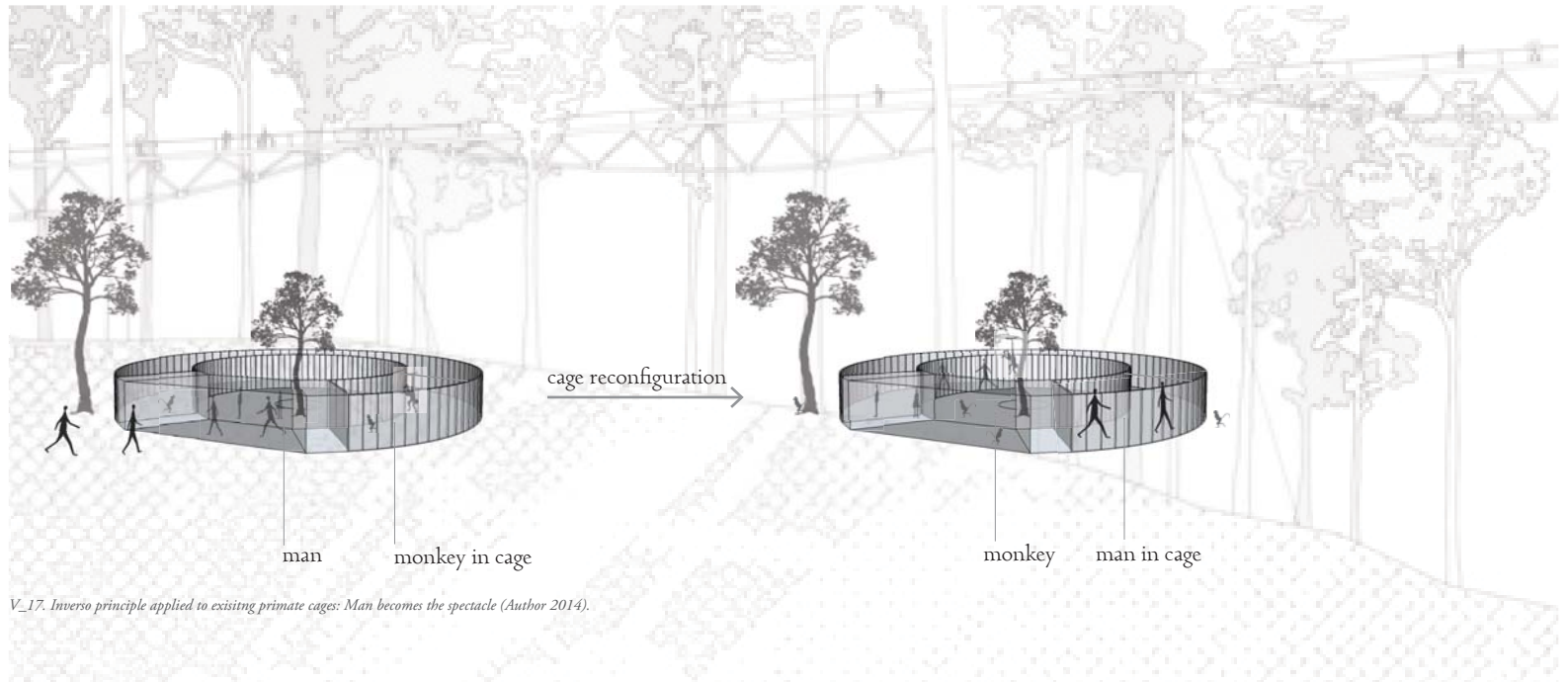
The design will further aim to analyse and understand the landscape enclosure as a design medium – a medium that will provide opportunity for the manipulation and sculpture of spaces. The manipulation and sculpting application will be achieved through exaggeration, amplification, purification, abstraction, juxtaposition and palimpsest. The sculptured landscape will, in turn, create a more experiential environment for the visitors and the animal. This landscape will amplify a translucent threshold between man and animal.

5.1.1.1.2 *The performance of beauty*

Beauty in the landscape, as defined by Meyer (2008), can influence the psyche of the zoo visitor. The design experience intent will therefore aim to stimulate a sensory and haptic quality to enable a reconnection of the zoo visitor with the animal and its habitat. The beauty will be discovered in the design enclosure through a process of stimulating different senses. Materiality will therefore serve as an important factor to physically construct the landscape experience in subtle and diverse stratum. This experience will be enhanced through spatial manipulation of the constructed elements.



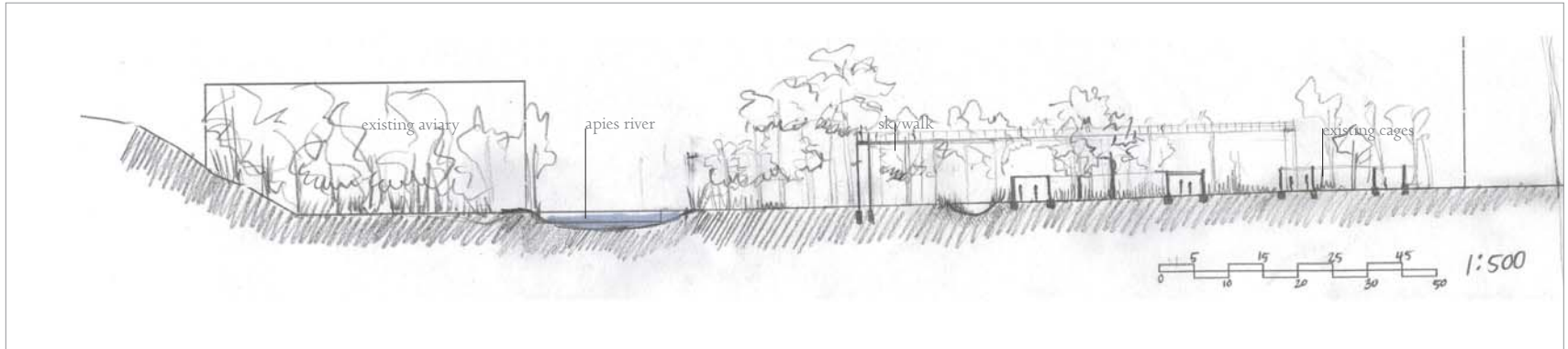
V_16. Photographic study of existing primate cages on selected site (Author 2014).



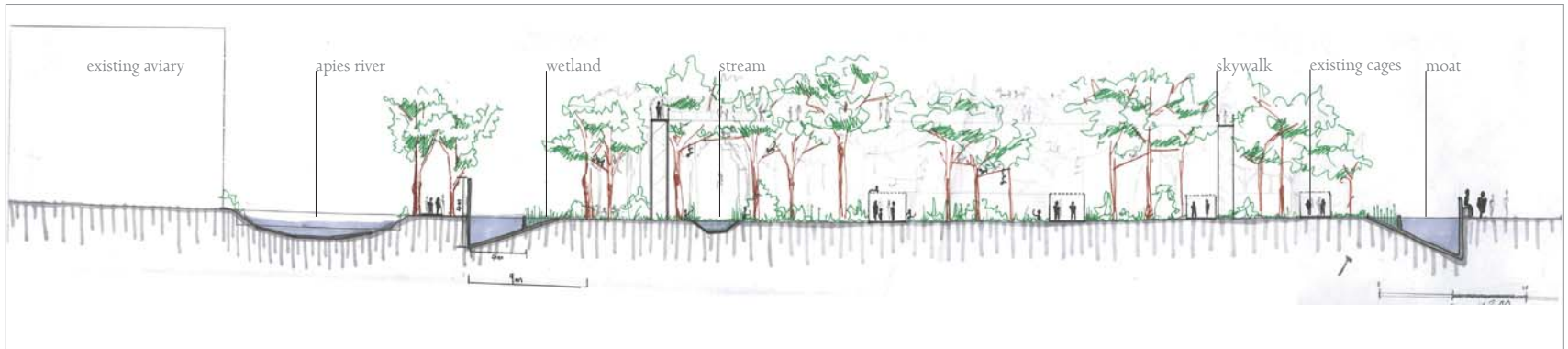
V_17. Inverso principle applied to existing primate cages: Man becomes the spectacle (Author 2014).



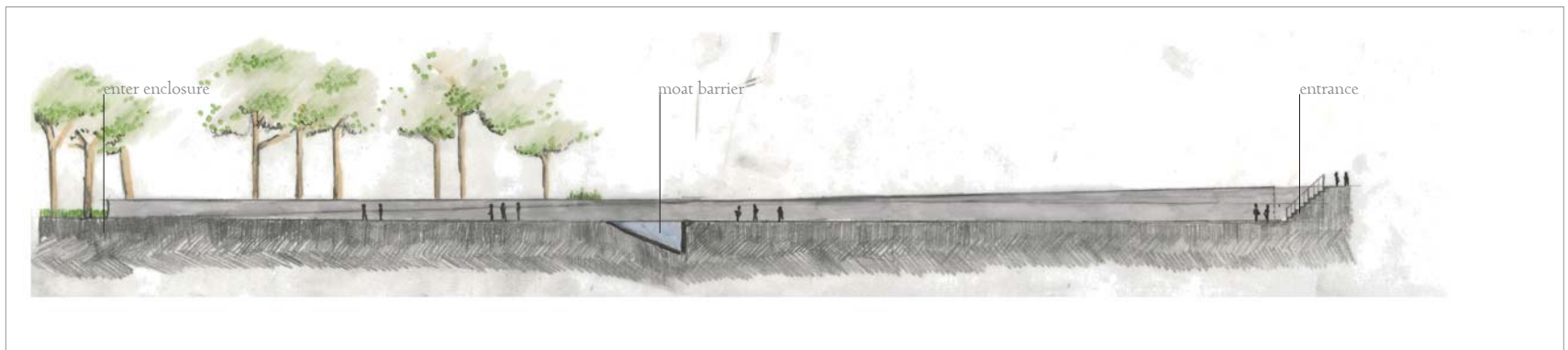
V_18. Photographic study of existing primate cages on selected site (Author 2014).



V_19. Design exploration: apies river, skywalk and existing cages (Author 2014).

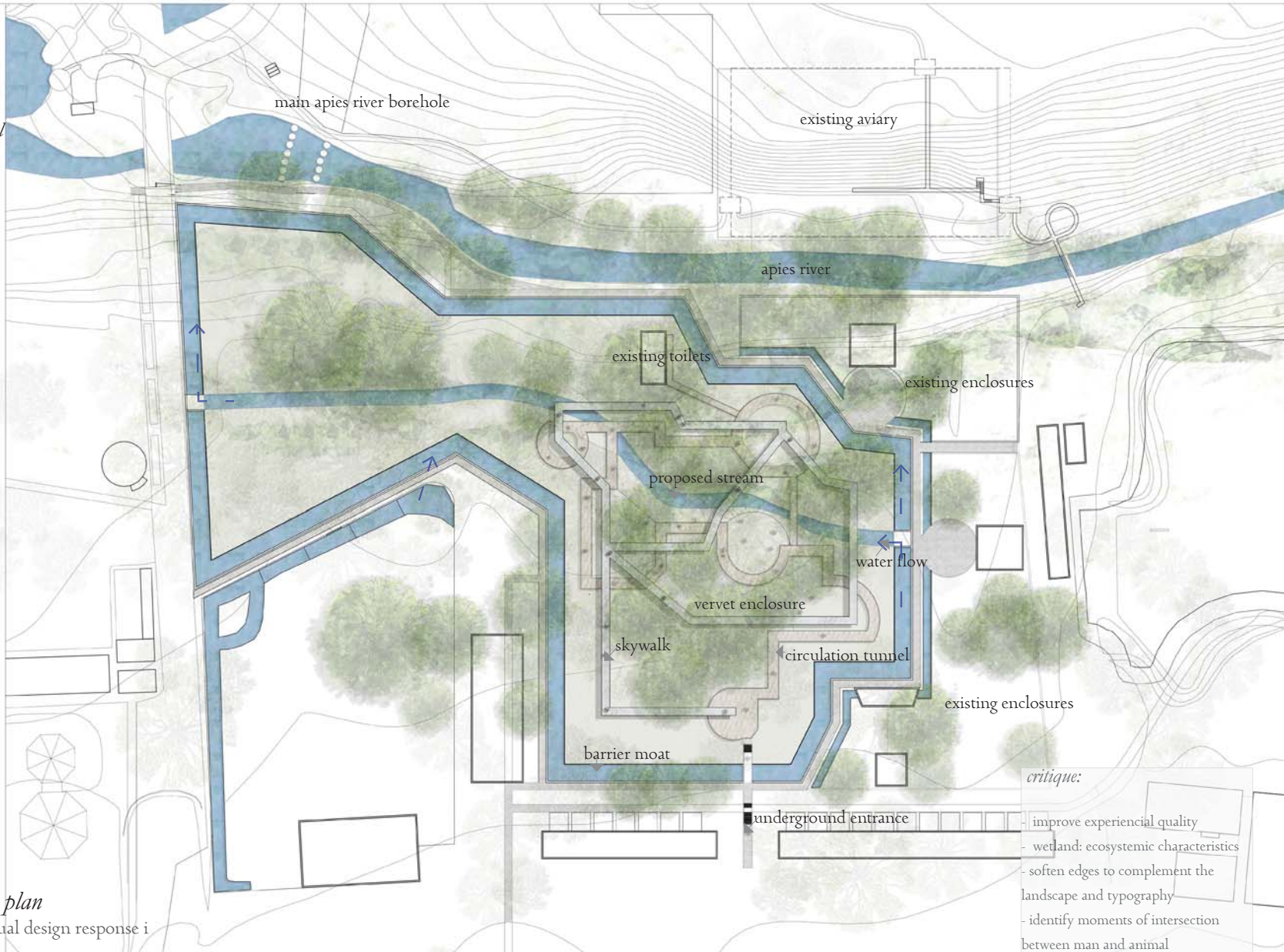


V_20. Design exploration: moat, skywalk and stream introduction (Author 2014).



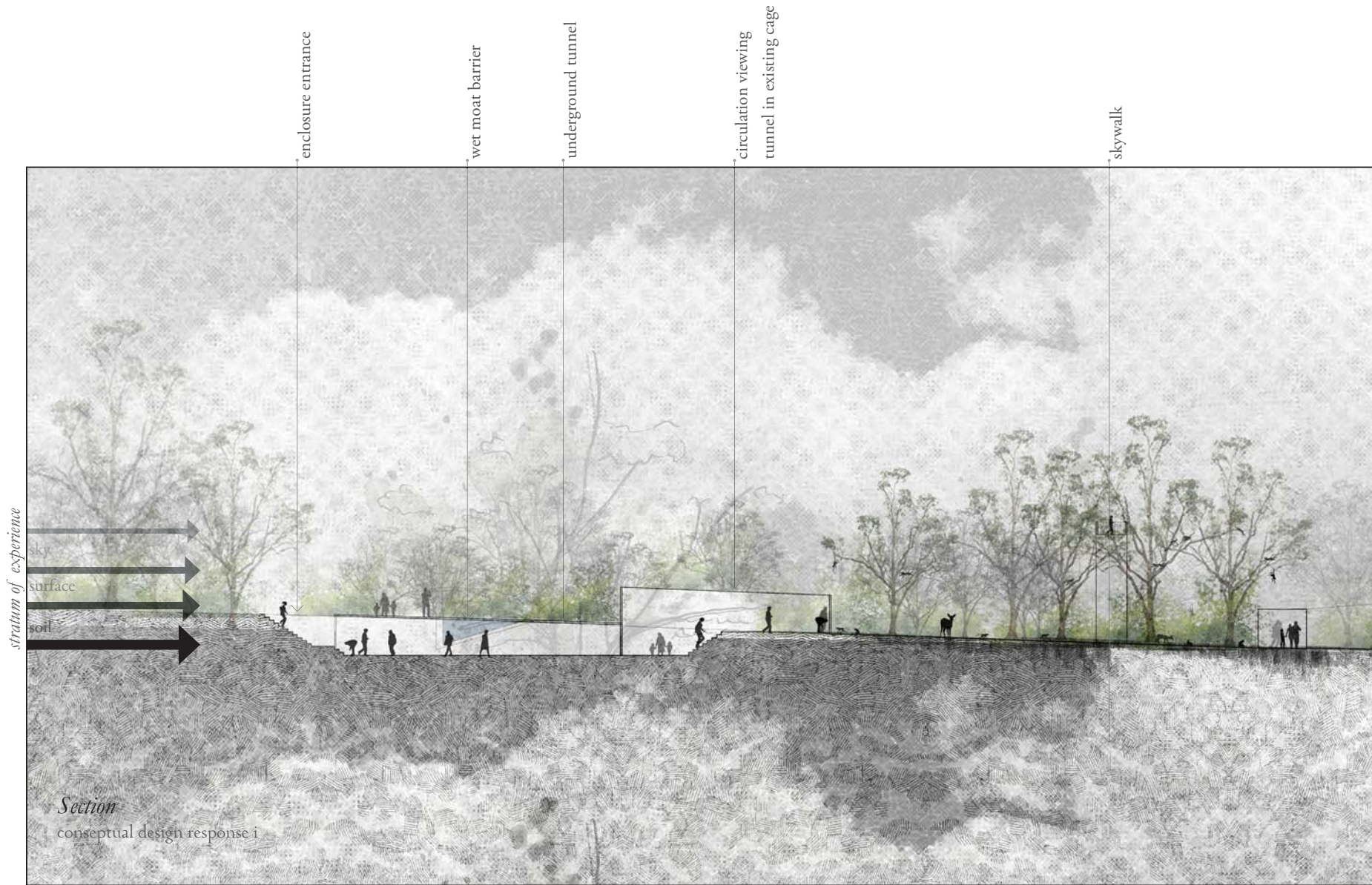
V_21. Design exploration: moat, entrance (Author 2014).

- water bodies
- vegetation
- skywalk
- circulation tunnel



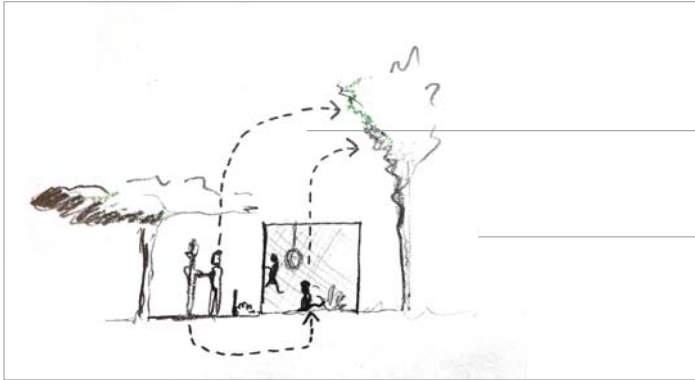
Sketch plan
conceptual design response i

- critique:*
- improve experiential quality
 - wetland: ecosystemic characteristics
 - soften edges to complement the landscape and typography
 - identify moments of intersection between man and animal
 - manipulate threshold further
 - monotonous and rigid



V_23. Section: First draft design response of primate enclosure (Author 2014).

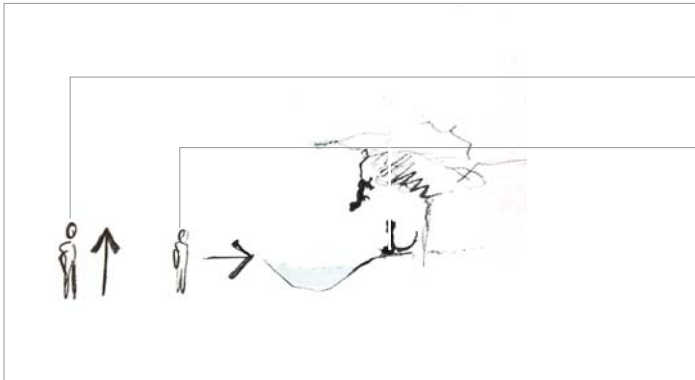




elevate user and primate

existing primate cage

V_24. Exploration of 'extruded' experience in enclosure (Author 2014).



elevate visitor

immerse user and primate in natural habitat

V_25. Illustration of principle application: visitor and primate elevation and immersion (Author 2014).



primate interaction with landscape element

skywalk

circulation tunnel

habitat replication

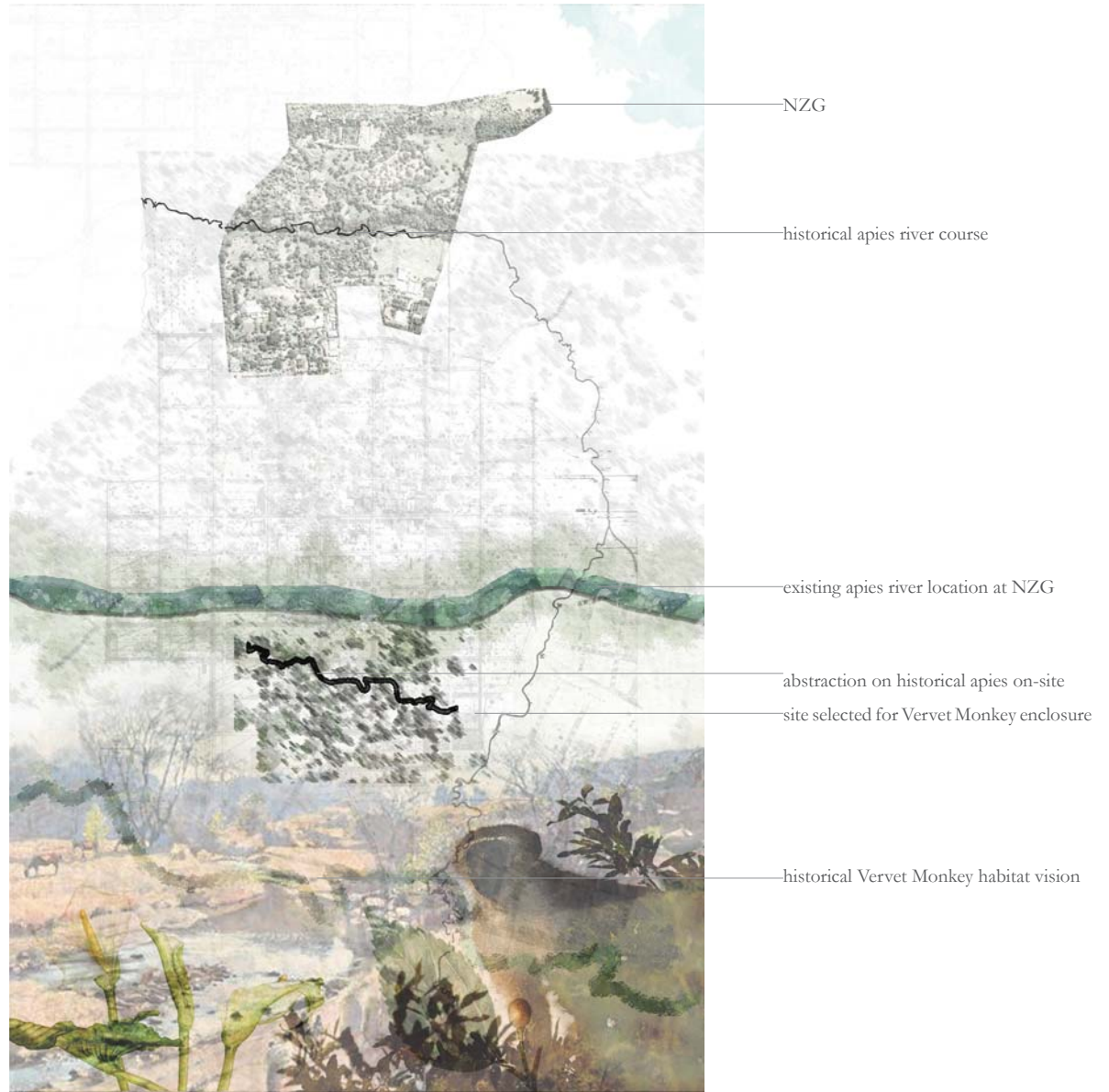
V_26. Illustration of principle application: animal interaction with landscape elements implemented (Author 2014).

5.3.0.17 *Dynamic beauty*

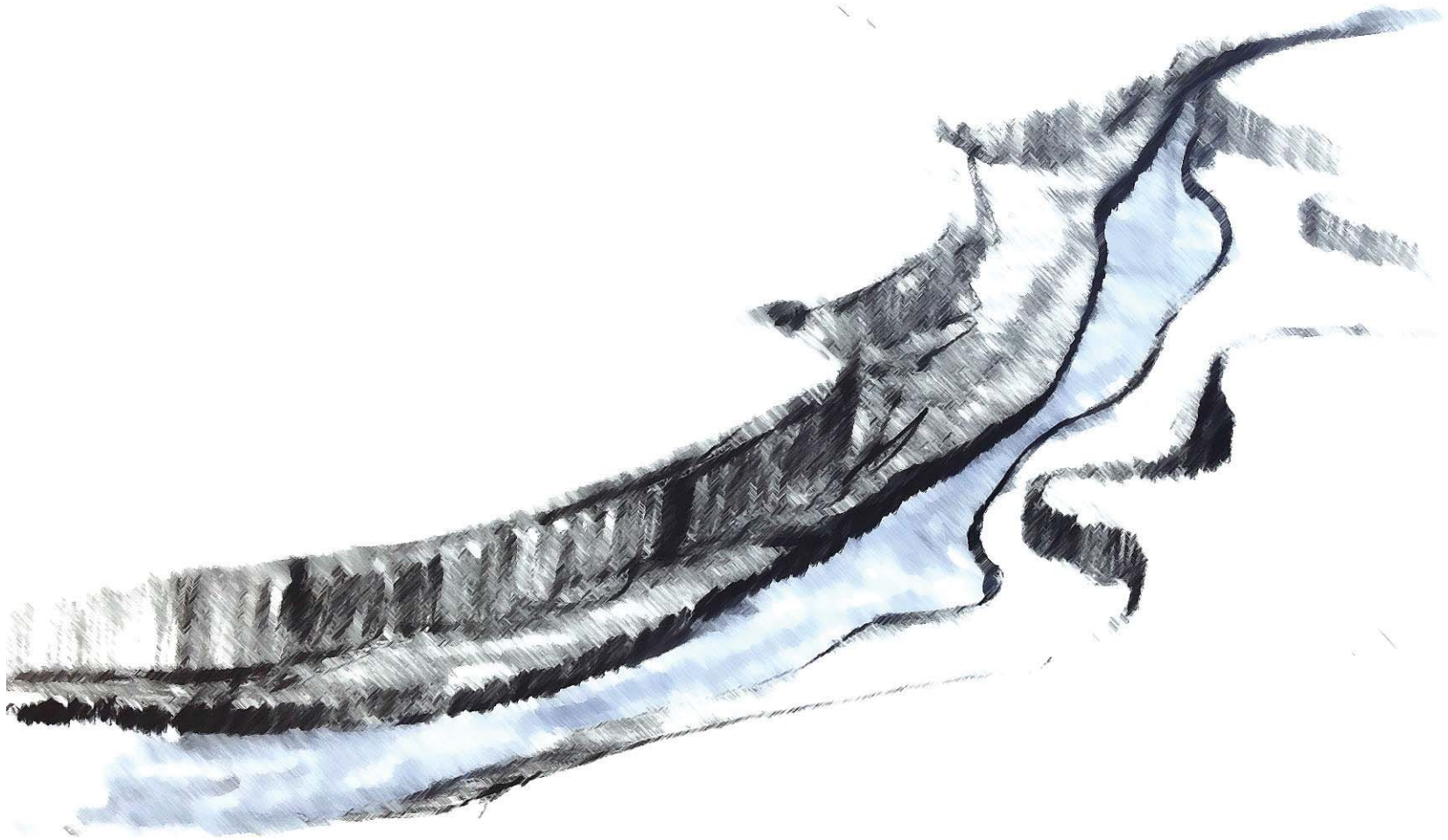
The aim of the dynamic beauty is to provide a diverse experience as far as possible. Users will circulate through the enclosure, while the landscape that surrounds them transcends, morphs, ascends, descends and transforms as a regenerative ecosystem. The enclosure experience will multiply, overlap and operate on different strata, scales and rhythms. The landscape enclosure is based on incremental moments where human activity overlaps with the animals' activity. The visitor will operate on different strata within the enclosure – namely, soil, surface and sky. This concept integrates with the pragmatic requirements of the vervet monkey relative to the demanding patterns of eating, sleeping, resting and nesting. The monkey's patterns will complement the design experiences through the selected planting pallet, spatial organisation and proposed natural systems of the enclosure. The designed animal enclosure will reveal, enable and regenerate ecological processes in order to become temporal and dynamic. The dynamic landscape will be due to the changes that occur naturally in the landscape and spatial practice of the *life history universe* of the vervet monkey.

In summary, the enclosure will revive the historical image of the site-specific vervet monkey habitat, as described above. The monkeys will roam free within the enclosure and the visitors will be immersed in the landscape. This 'inverse' concept will place the visitors in the role of spectacles for the animals by means of positioning the visitors in the historic cages on-site and allowing the monkeys to observe them. The enclosure will be surrounded by a wetland moat, established as an integral part of the ecology and ecosystem regeneration (Refer to figure V_57 on page 204 for design response) . The historical cages will be connected with circulation tunnels to create an experience through the landscape. The incremental moments, strata and interactions of the design intent, combined with the *life history universe* of the vervet monkey will manifest as a route within the enclosure. See Figure (x).

The route will intentionally become a horizontal and vertical exploration of the proposed habitat. The route will simultaneously be a habitable and interactive structure for the animals. The established route will offer interaction between the user and animals to enhance the experience for both. The landscape design response will redefine the typical threshold of a fence as boundary condition through the reconfiguration and spatial manipulation of the existing cages. The sketch plan will focus on creating different experiences and moments in the design enclosure of the vervet monkey habitat.



*V_27. Palimpsest
collage of vision
for enclosure
(Author 2014).*



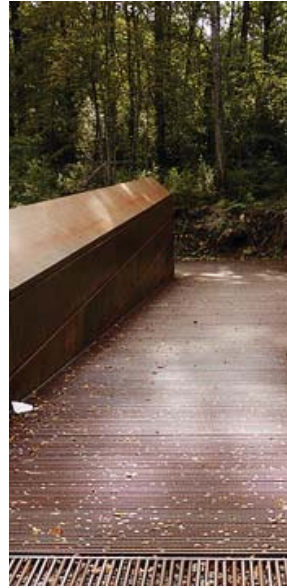
*V_28. Abstraction
of old Apies River,
adapted from Pierneef
(Author 2014).*



V_29. Footbridge Crossing L'Areuse (Architizer 2014).



V_30. Pedestrian bridge, Mirp Rivero Architects (Archdaily 2012).



V_31. Re-bar footpath, RCR Architects (Landezine 2014).



V_32. Puffadder walkway, Babylonstoren, Patrice Taravella (Dezeen 2014).



V_33. Re-bar walkway, Tussols basil sport-park, RCR Architects (Landezine 2014).



V_34. Bell-lloc winery, RCR Arquitectes (Archdaily 2014)



V_35. Bell-lloc winery, RCR Arquitectes (Archdaily 2014)



V_36. Bell-lloc winery, RCR Arquitectes (Archdaily 2014)



V_37. Yad Vashem holocaust museum Safdie Architects (Archdaily 2011)



V_38. Eggum Lofoten, Snohetta Architects (Archdaily 2007)



V_39. Eggum Lofoten, Snobetta Architects (Archdaily 2007)



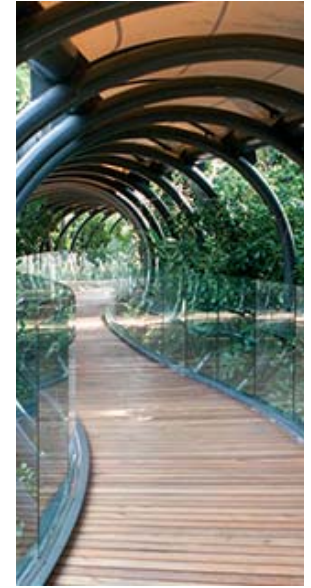
V_40. Kirstenbosch "boomslang" canopy walkway Mark Thomas Architects (Archdaily 2007)



V_41. Kirstenbosch "boomslang" canopy walkway Mark Thomas Architects (Archdaily 2007)



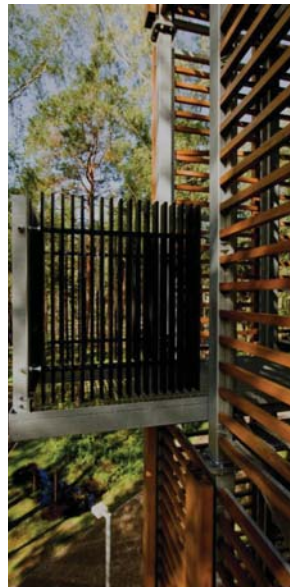
V_42. Xtrata Treetop Walkway(Archdaily 2007)



V_43. The Saxon Boutique Hotel walkway (Classicafrica 2010)



V_44. Observation Tower / ARHIS (Archdaily 2010)



V_45. Observation Tower / ARHIS (Archdaily 2010)



V_46. Viewingtower at Vecht Riverbank / Ateliereen Architecten (Archdaily 2012)



V_47. Viewingtower at Vecht Riverbank / Ateliereen Architecten (Archdaily 2012)

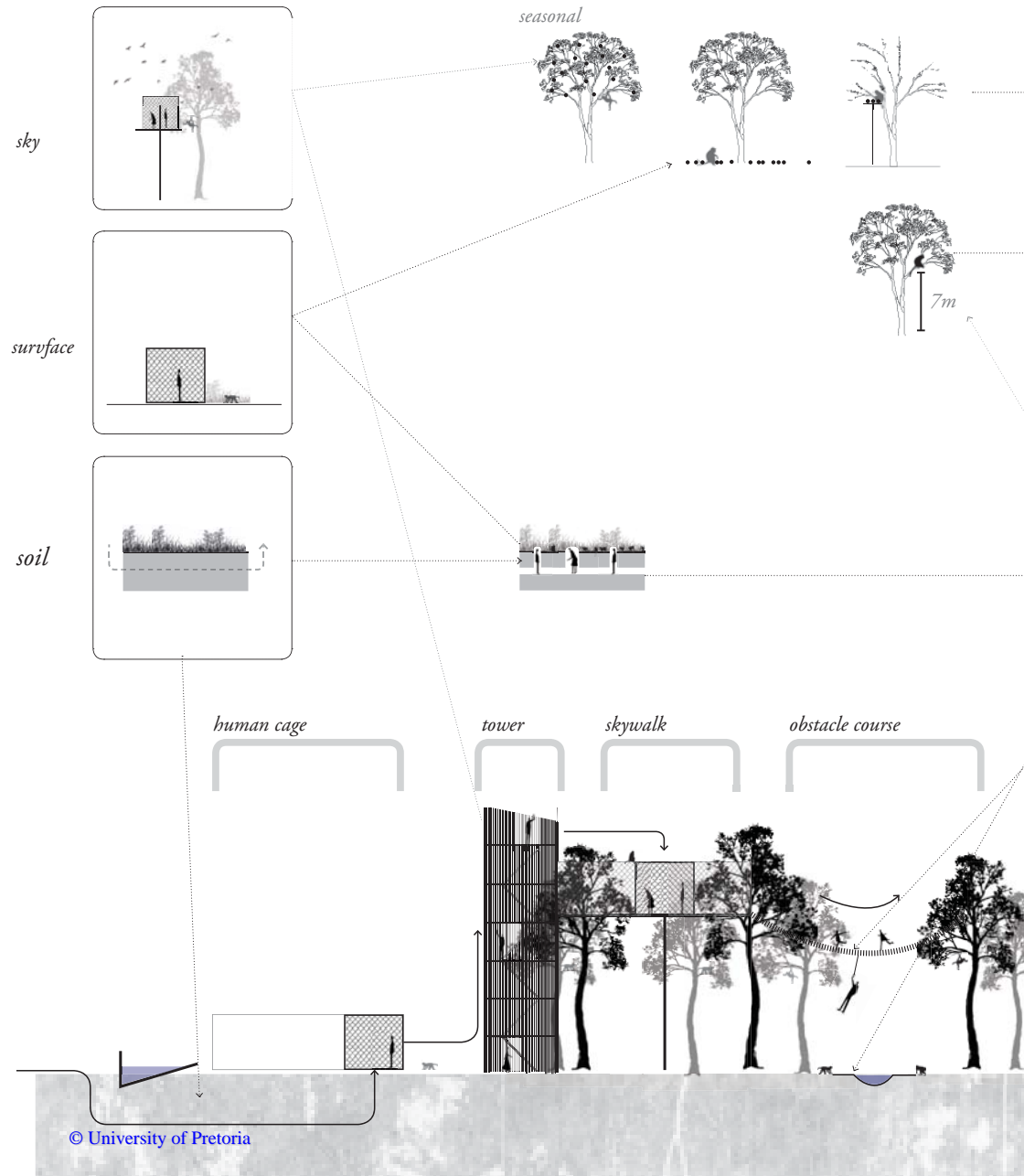


V_48. Hedge Building Germany : Rostock Architecture (e-architect 2003)

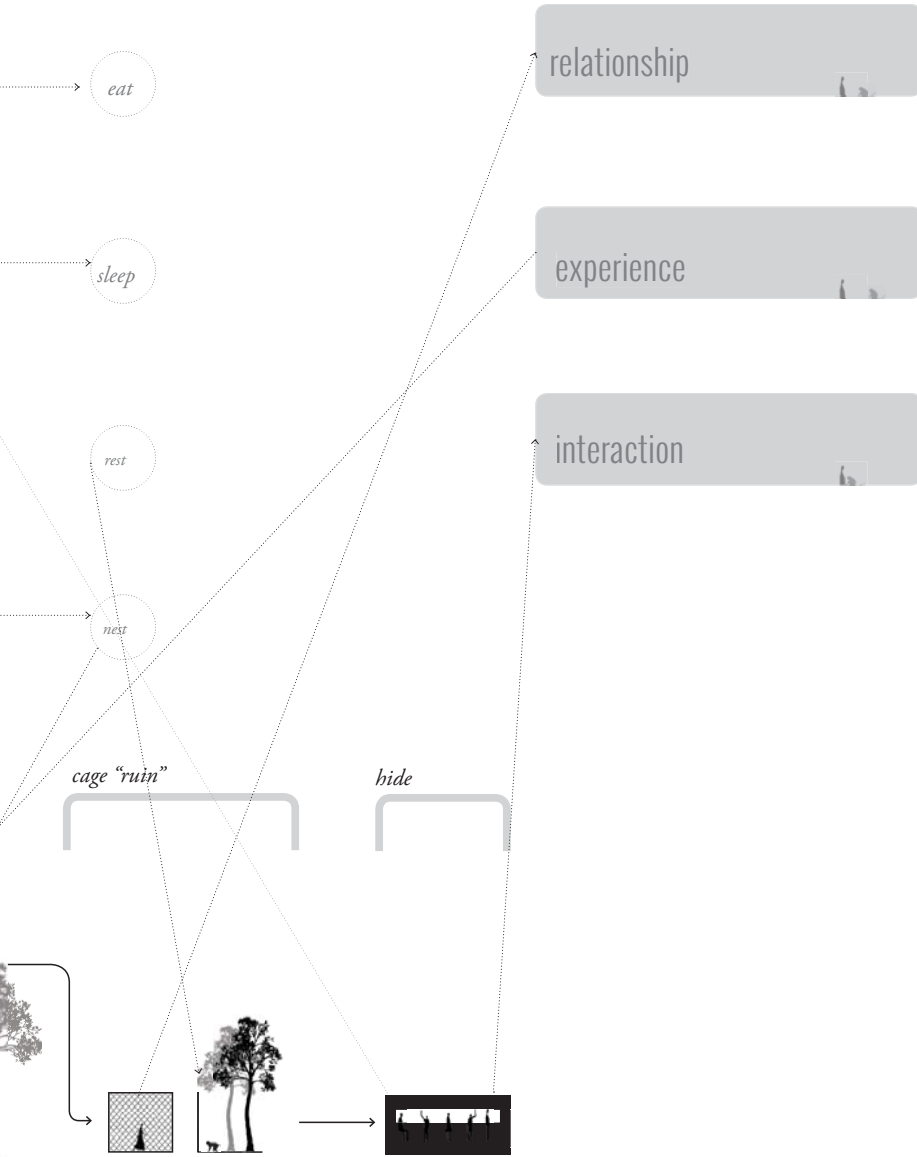
user



stratum of interaction

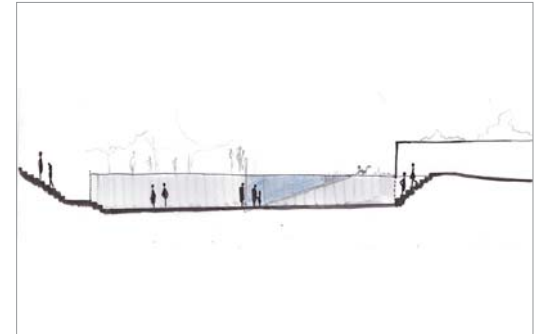


V_49. Stratum of interaction infographic (Author 2014).

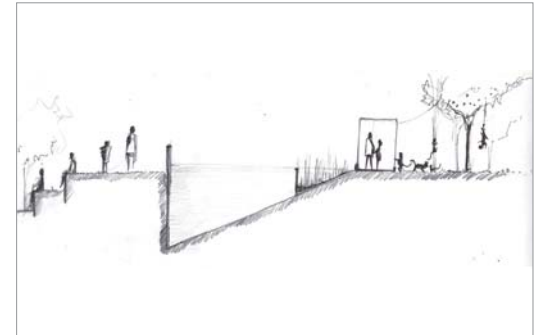




V_50. Conceptual collage of skywalk (Author 2014).



V_51. Conceptual development of moat (Author 2014).



V_52. Conceptual development of moat (Author 2014).



KEY: existing cages on site

Sketch plan
conceptual design response ii

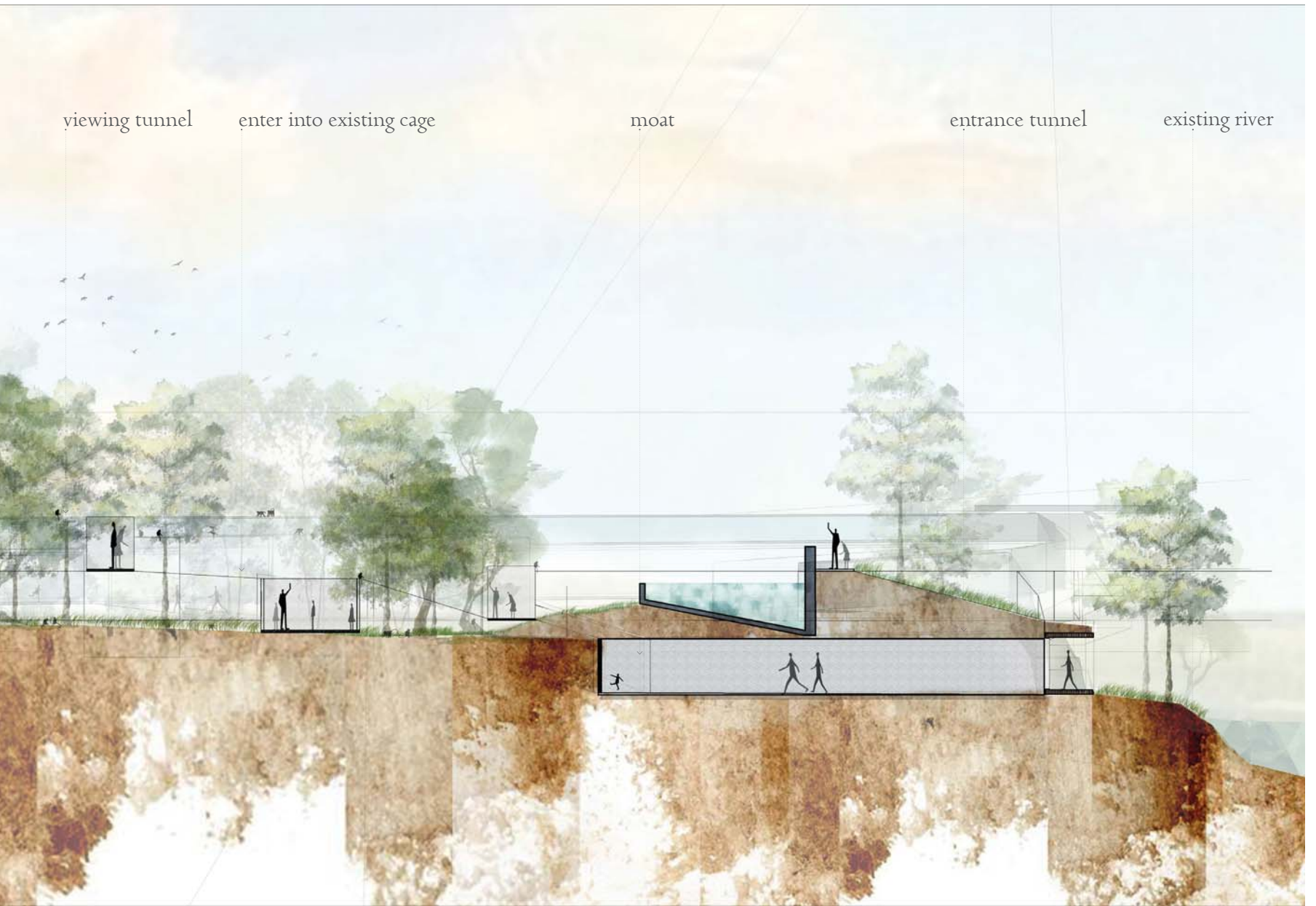
critique:

- accentuate moments established
- strengthen apies river metaphor
- moat: opportunity to feed into adjacent cages, soften edges
- make barrier invisible
- weir system create obstacle for primate to escape
- investigate stratum further
- focus on detail design of primate vs human spaces



Section a-a
conceptual design response ii and stratum application

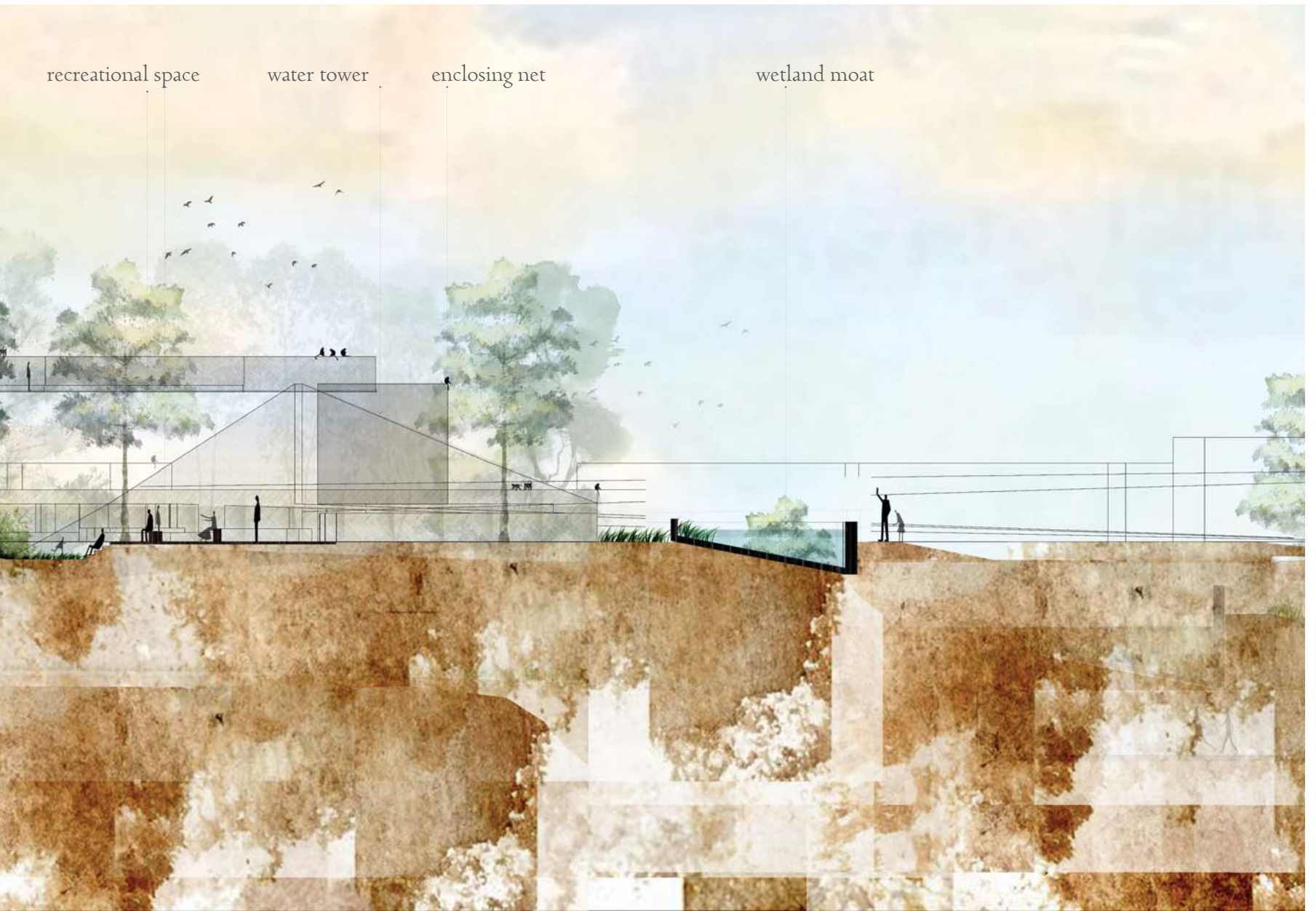
V_54. Sectional elevation a-a: Draft design response to stratum concept application showing moat barrier, tower and underground tunnel (Author 2014).



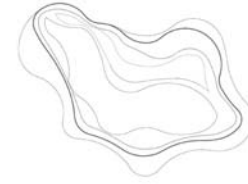
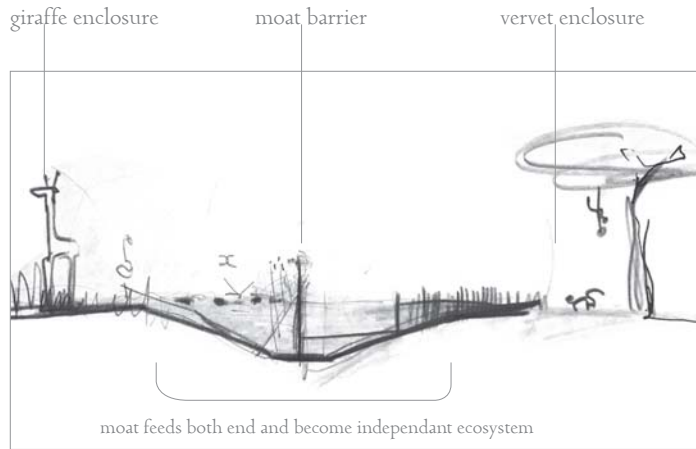


Section b-b
conceptual design response ii and stratum application

V_55. Sectional elevation b-b: Draft design response to stratum concept application showing moat barrier, and skywalk (Author 2014).



V_57. Response to moat critique: rethink moat ecology and influence on other enclosures (Author 2014).



moat



skywalk



old cage ruins



connection tunnel



entrance

V_56. Sketch plan: components (Author 2014).



critique:

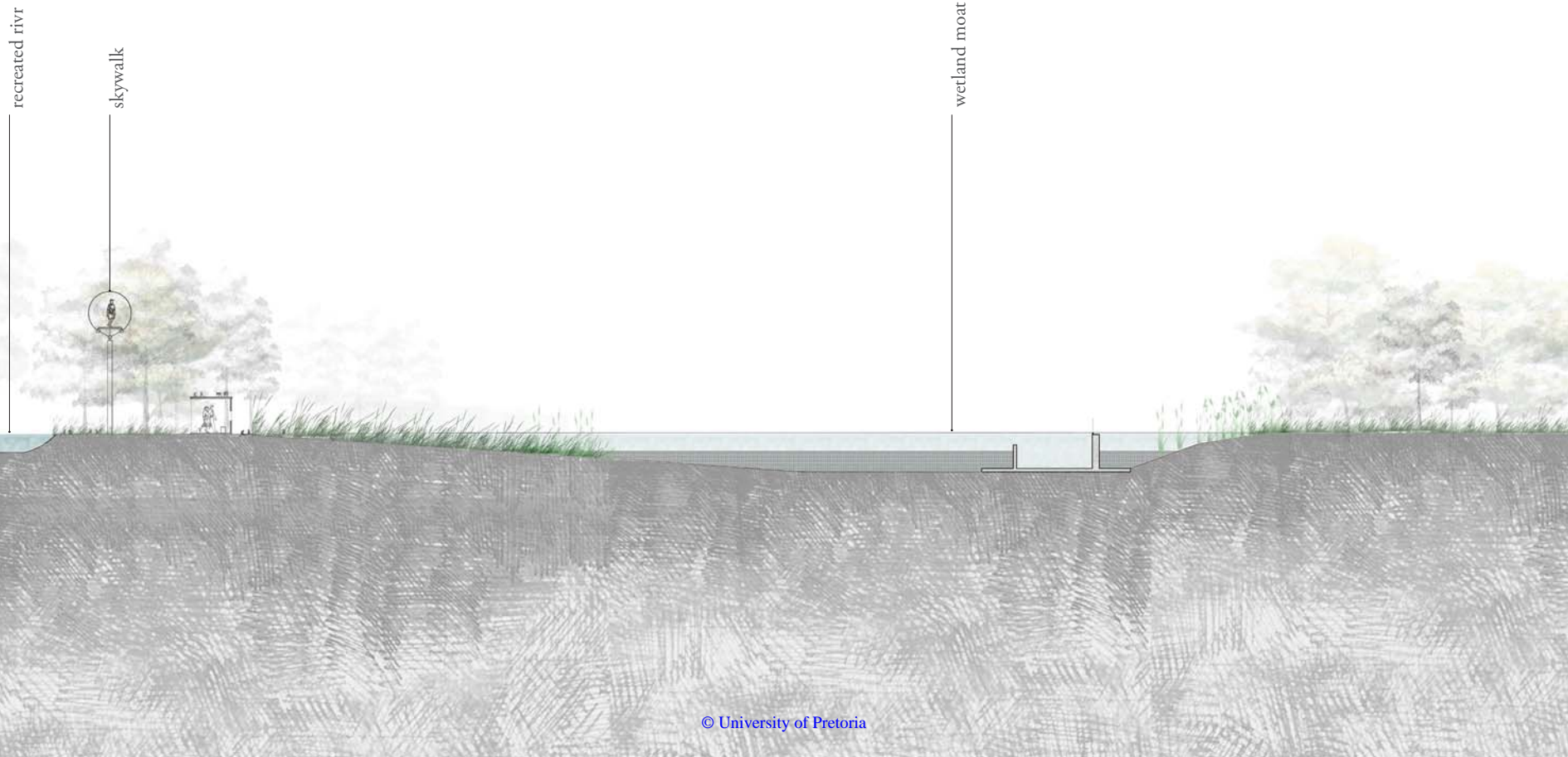
- accentuate moments established
- implement abstracted form of old apies
- investigate stratum and narrative of elements
- focus on detail design of primate vs human spaces
- dual spaces

Sketch plan
conceptual design response iii



Section a-a
conceptual design response iii and stratum application

V_59. Sectional elevation b-b: Draft design response iii to stratum concept application showing moat barrier, and skywalk (Author 2014).

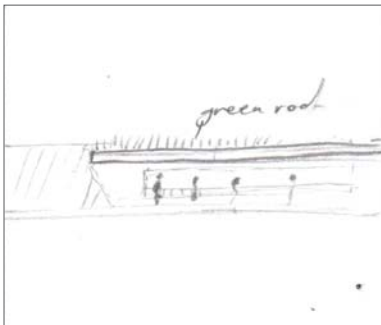




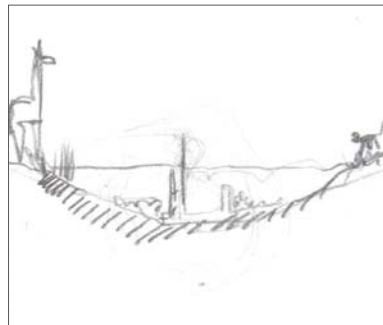
V_60. Conceptual intention: skywalk (Author 2014).



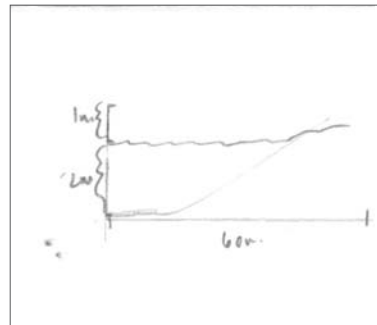
V_61. Conceptual intention: skywalk (Author 2014).



V_62. Conceptual intention: entrance (Author 2014).



V_63. Conceptual intention: moat (Author 2014).



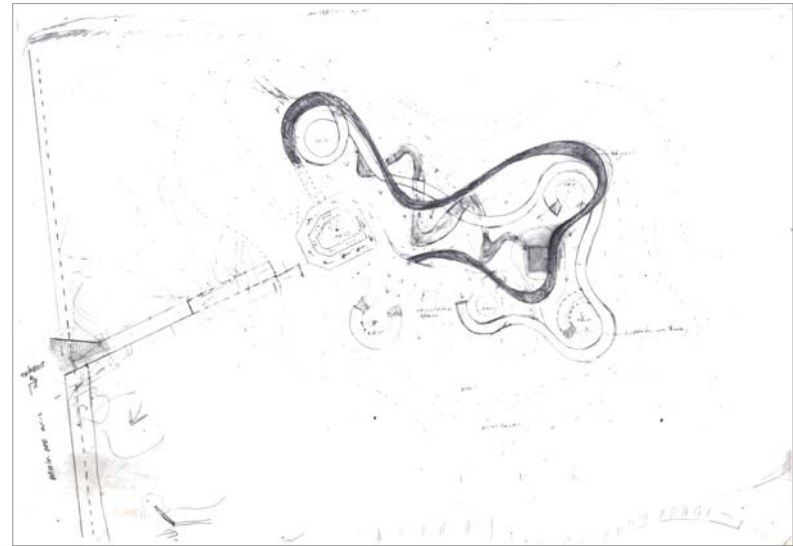
V_64. Conceptual intention: moat (Author 2014).



V_65. Seamless water body: moat (Author 2014).

5.1 *Conclusion*

The landscape design intervention will act as a mediator of different experiences for the visitor within the proposed enclosure. The new set of principles will aim to enhance the experience and simultaneously become the threshold between man and his perceptive attitude towards nature. The established threshold will provide experience for both the user and the animal. Finally, the new set of principles will culturally, ecologically and experientially inform the enclosure design and establish a plausible model for the rest of the zoo enclosures. The detail design and technicality of the proposed elements will be investigated in Chapter VI to indicate the characteristics and concepts of the threshold, which promotes experience as an important detail design principle.



V_70. Conceptual sketch plan development (Author 2014).



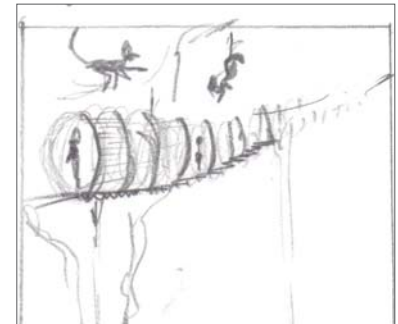
V_66. Pierneef abstraction: stream (Author 2014).



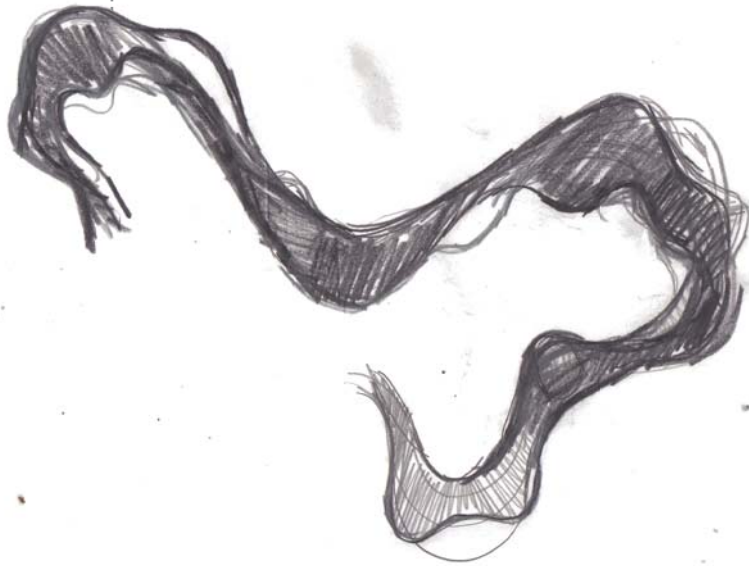
V_67. Reconfiguration of old cages (Author 2014).



V_68. Conceptual intention: Skywalk (Author 2014).



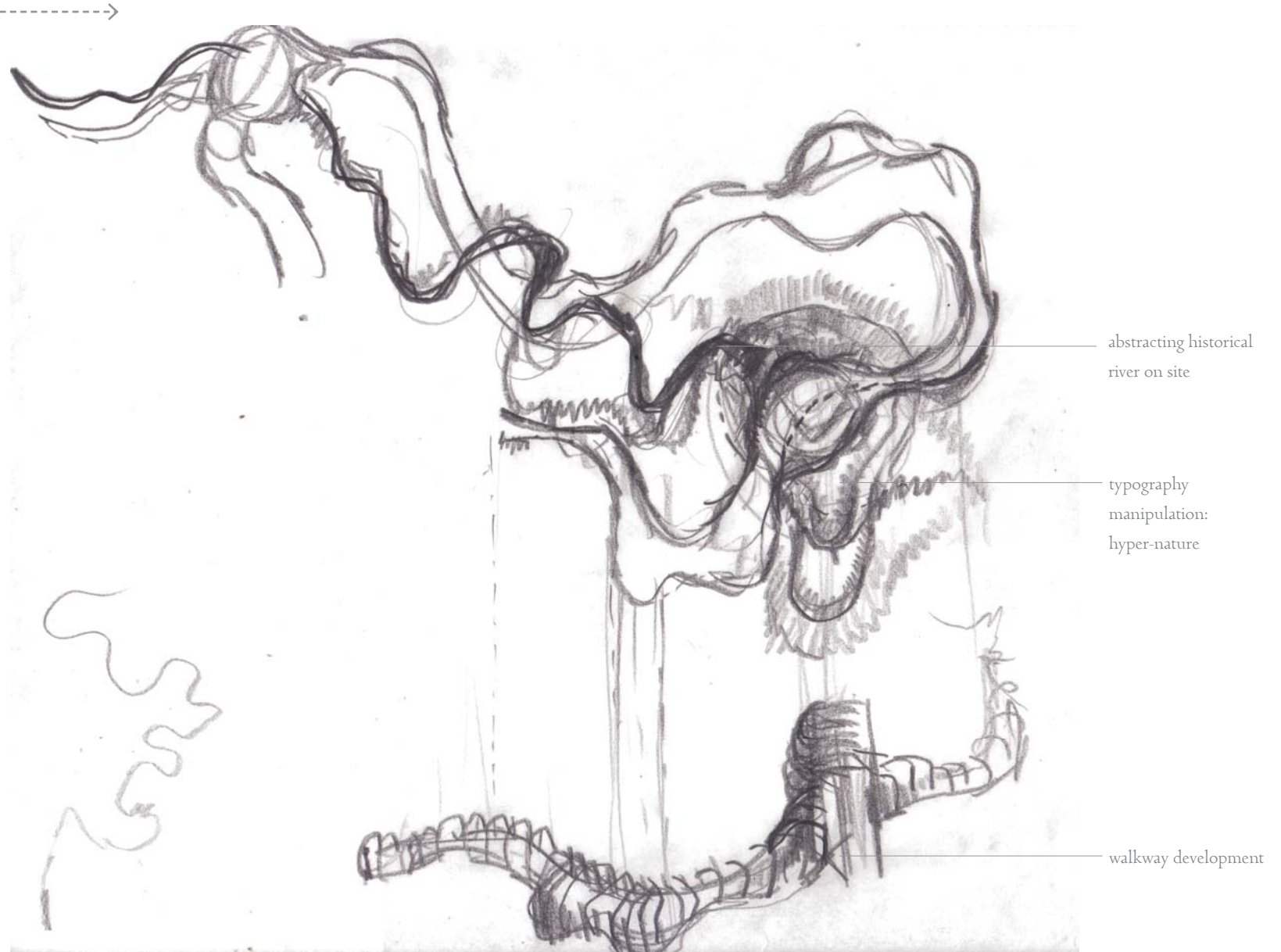
V_69. Conceptual intention: Skywalk (Author 2014).



V_71. *Conceptual development: moat edge (Author 2014).*



V_72. *Conceptual development: connection (Author 2014).*



V_73. Conceptual development: Apies river palimpsest (Author 2014).



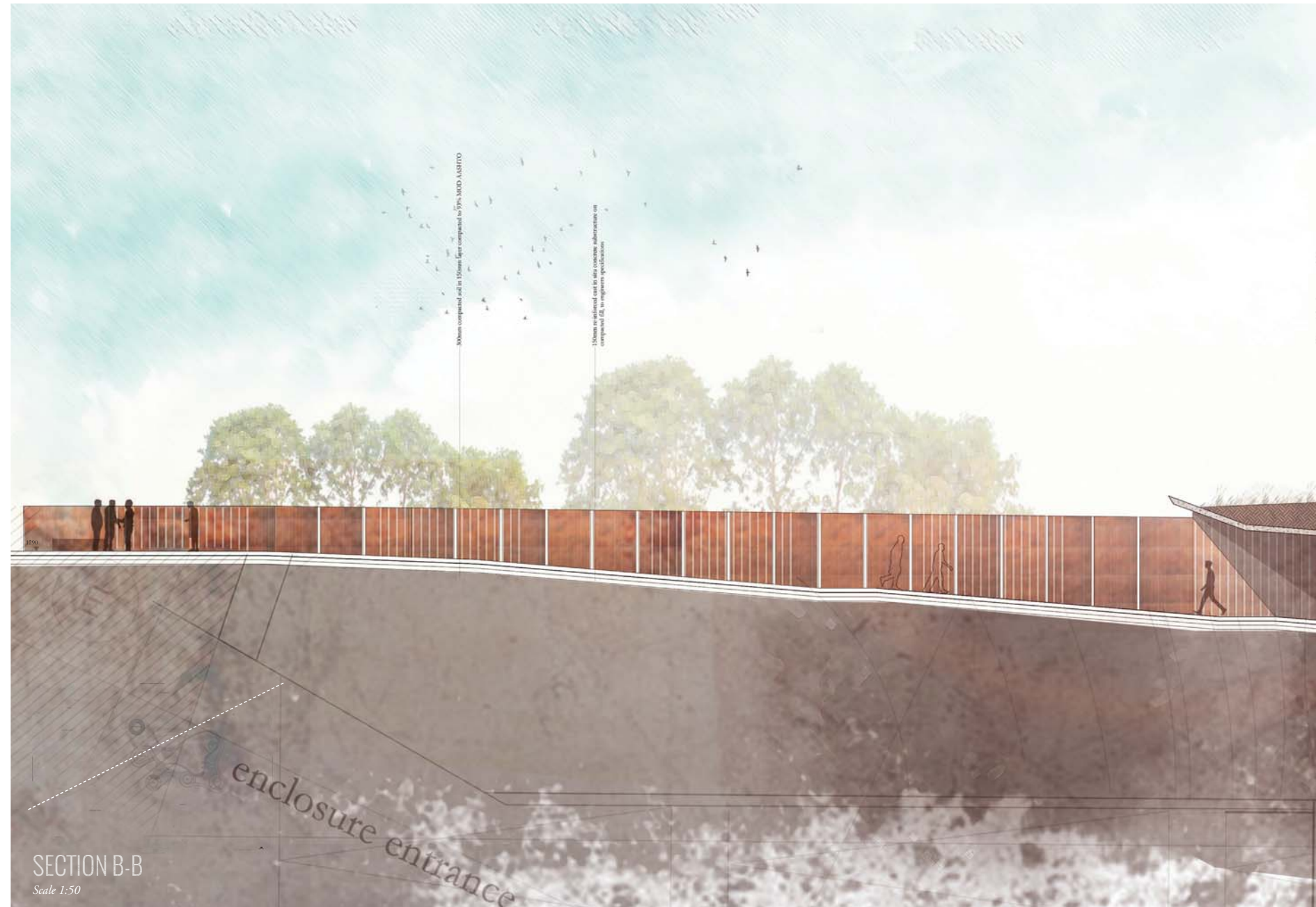
Sketch plan

Main Zone with proposed design response (not to scale)

V_74. Sketch plan: Technical drawing of design response of primate enclosure (Author 2014).



Sketch plan
Main Zoo area
proposed design response (not to scale)



V_76. Section bb: final proposed design response of primate enclosure (Author 2014).

200mm reinforced concrete deck slab



20mm waterproofing layer trenched on bituminous layer

170mm x 900mm x 2000mm Reno Matrooms with 100 dia. cracker stone area 200 and washed area cracker to assist plant growth. 150mm concrete Kerbside Block® kerbside, prevents underlying waterproofing layer from puncturing by Reno matrooms. 40mm dia. x 100mm high geopolymeric chip basecoat on 150mm prepared soil. 150mm topsoil to assist plant growth.

55 dia. gravel to max 1500mm depth

160 dia. Drainage® HDPE flexible slotted drainage pipe 400mm x 2250 in situ cast reinforced concrete retaining wall 20mm impregated fibre-free glass fibered fibro to concrete wall.

20mm waterproofing layer paste on bituminous layer

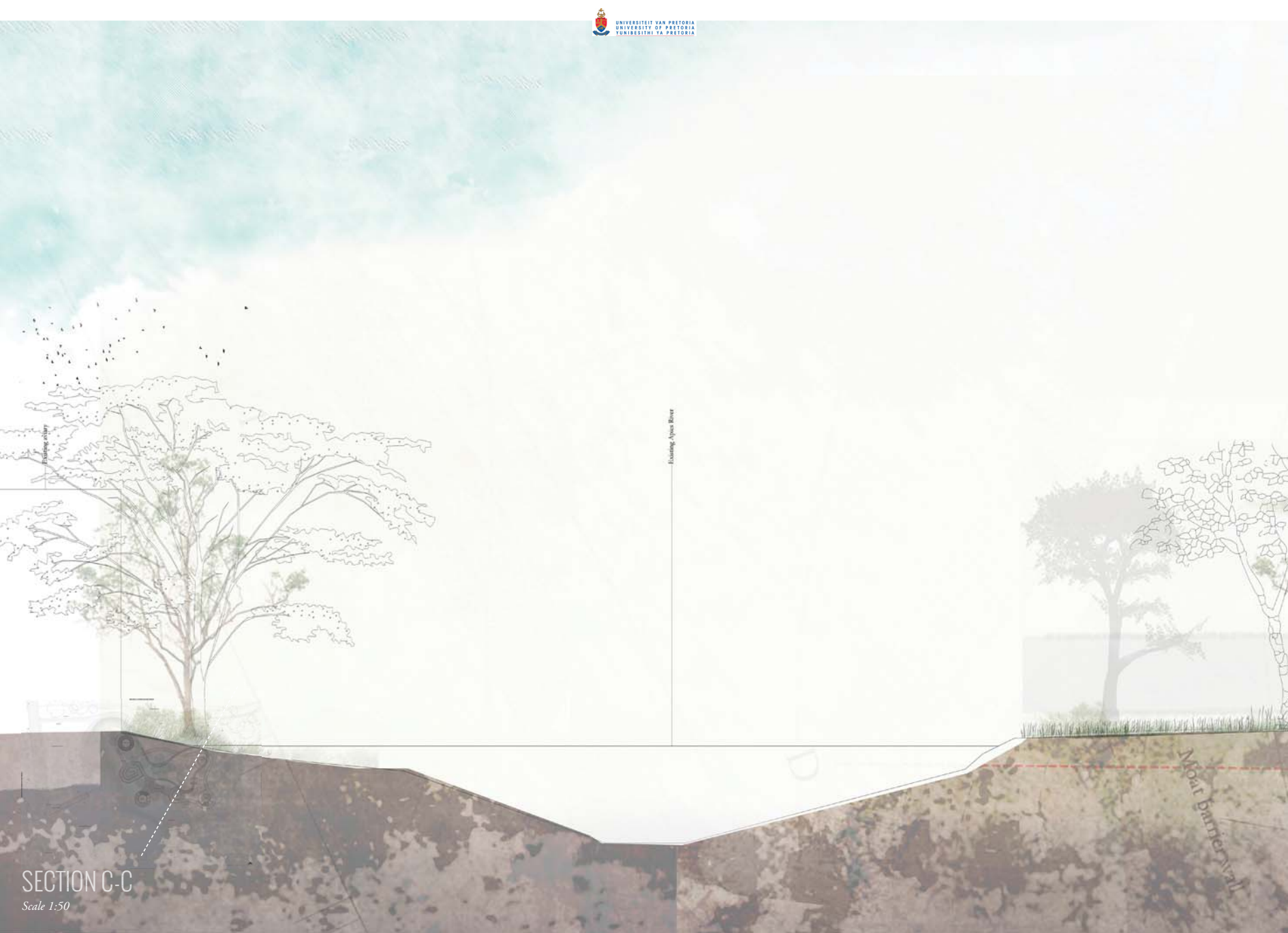
Minority ramp rain

1:15 concrete ramp. Refer to detail (b)

Seed and nutrient. Refer to detail (b)

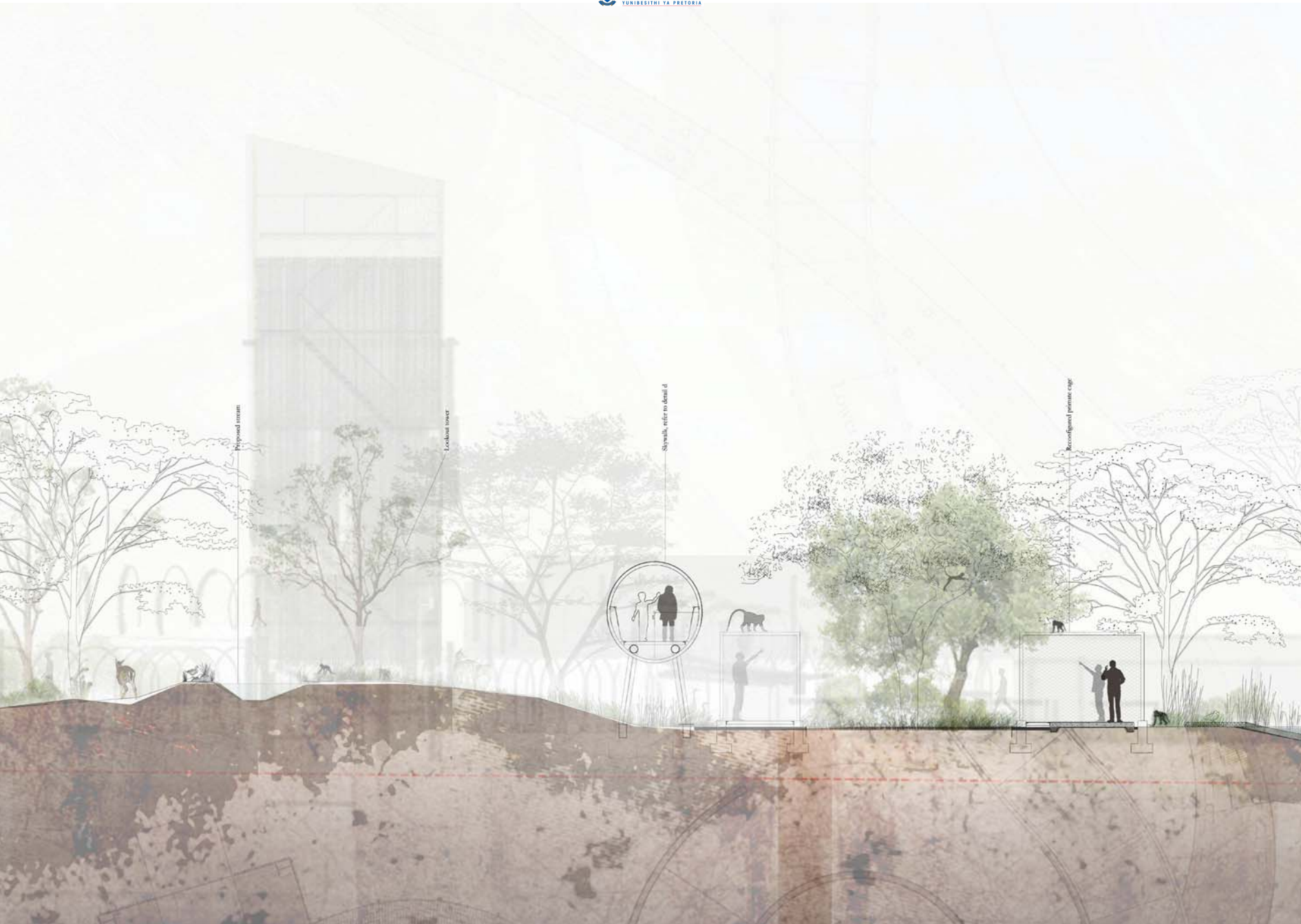






SECTION C-C
Scale 1:50





Proposed terrace

Lookout tower

Sitwalk, refer to detail d

Reconfigurable terraced cage



steel plate screen

view into rhino enclosure

green roof

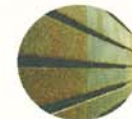
concrete retaining wall



ENTRANCE



1. 2500mm x 1500mm x 10mm mild steel plate @ 1500mm interval untreated
2. Reinforced concrete green roof, butimin torch on waterproof
3. 150mm re-inforced cast in situ concrete substructure on compacted fill, to engineers specifications
4. Reinforced concrete retaining wall



ramp towards orientation space

excavated monkey space

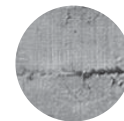
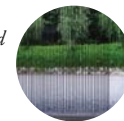
steel rod barrier



SPIRAL RAMP



1. Mild steel Y10 pre-fabricated reinforcement bar surface fixed to angle frame structure
2. 10 dia. steel rod @ 50mm intervals threaded at ends and connected and fixed with coupling nuts to angle ,untreated
3. 100mm x 55mm IPE100 I section untreated



skywalk

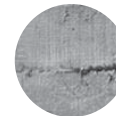
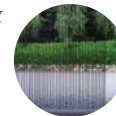
reinforcement bar barrier

proposed stream



LOWER WALKWAY

1. Mild steel flat bar curved to 1400 radius @ 2000mm intervals welded to plasma cut section fixed to concrete footing
2. Y15 mild steel reinforcement bar with 50mm spacing @ 2000mm intervals welded to mild steel flat bar, untreated
3. 150mm re-inforced cast in situ concrete substructure on compacted fill, to engineers specifications
4. 30mm dia gravel fill



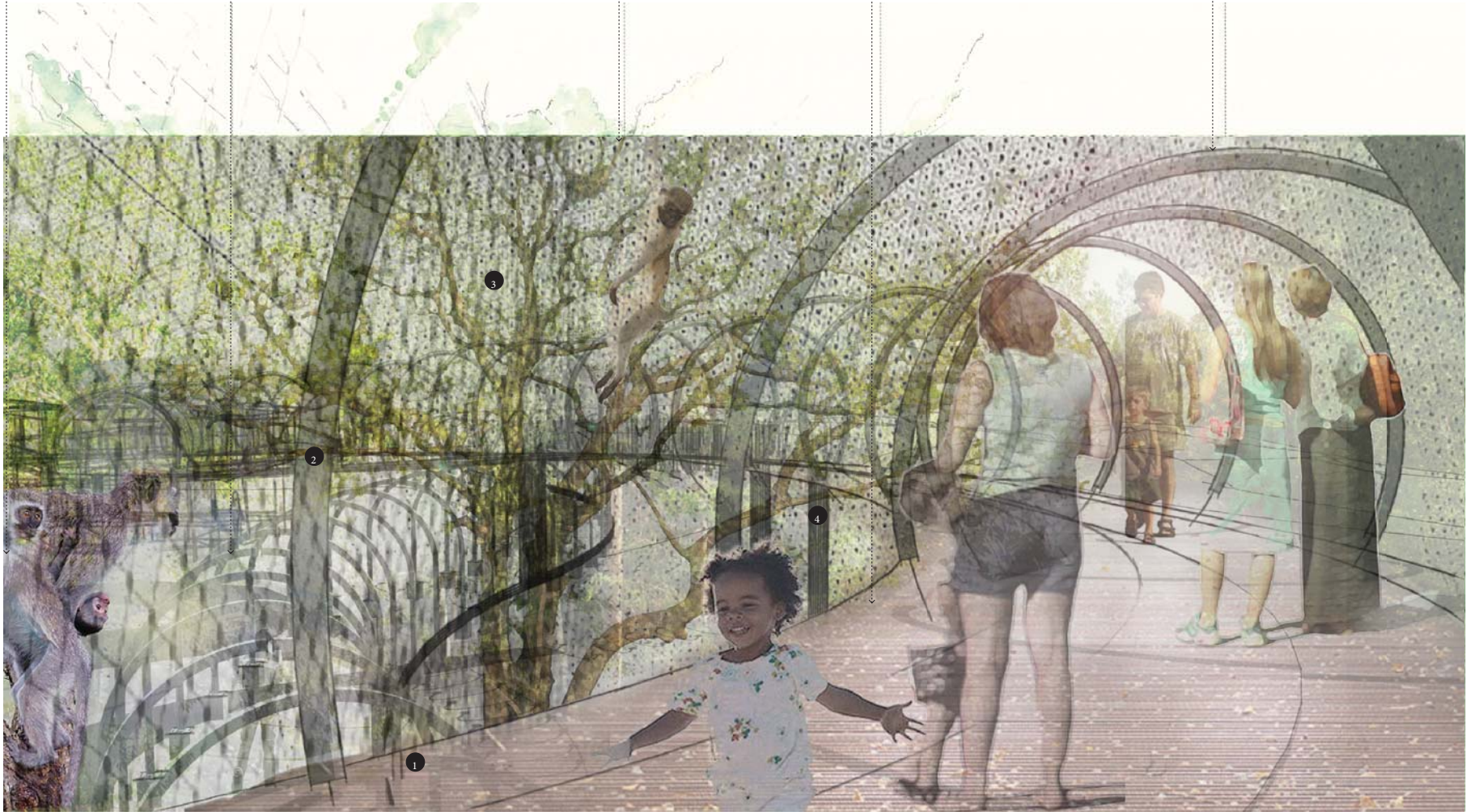
Vervet monkey

lower walkway

webmesh barrier

reinforcement bar walkway

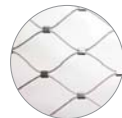
steel tube skywalk structure



SKYWALK



1. Mild steel Y10 pre-fabricated reinforcement bar surface fixed to angle frame structure
2. 101 Ø mild steel circular hollow section frame @ 2000mm intervals
3. 20mm x 38mm Aperture x 1mm Ø cable stainless steel (Jakob® INOX LINE Webnet) fixed to circular tube
4. 273mm x 12mm mild steel circular hollow section column
5. 60 Ø Rhino Modified Wood handrail with oil based finish radii of skywalk curvature



skywalk entrance

lookout tower

existing reconfigured cage

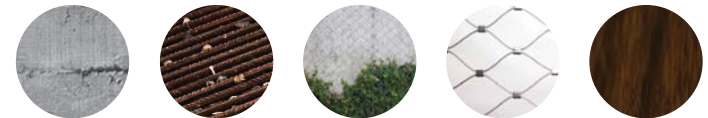
lower walkway entrance

webnet "human enclosure"



ORIENTATION SPACE

1. Mild steel Y10 pre-fabricated reinforcement bar surface fixed to angle frame structure
2. 101 Ø mild steel circular hollow section frame @ 2000mm intervals
3. 20mm x 38mm Aperture x 1mm Ø cable stainless steel (Jakob® INOX LINE Webnet)
4. Existing cage with chain-linked fence
5. 38mm x 38mm Rhino Modified Wood cladding fix to steel square tube with oil based finish





VI_1.
*Conceptual technical
approach collage of
materiality disintegration
(Author 2014)*

CHAPTER VI

TECHNICAL SPECTACLE

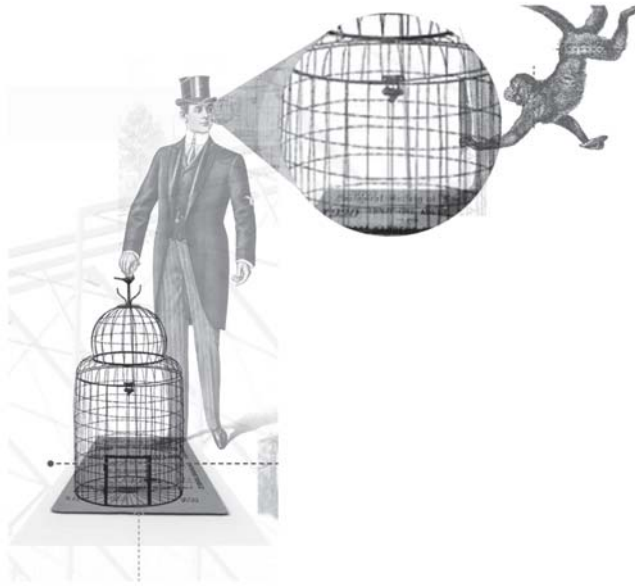
technical resolution

THE TECHNICAL SPECTACLE PRESENTED IN CHAPTER VI WILL SERVE AS THE INVESTIGATION OF THE TECHNICAL AND PROGRAMMATIC REQUIREMENTS OF THE ENCLOSURE DESIGN INTERVENTION.



6.1 *Introduction*

Technical strategies were developed to give expression to the palimpsest concept on-site. Special attention ought to be given to specific detailing elements when considering the overall concept of this dissertation. Materials were carefully selected throughout the enclosure to interpret the palimpsest and the character of the zoo.



*VI_2. Conceptual
representation of the
technical spectacle
(Author 2014).*

6.2 *Vervet monkey*

The vervet monkey was chosen as the primary client for the proposed enclosure. The pragmatic requirements and zoo husbandry is therefore an important consideration for the design enclosure intervention. The study has simplified the life history universe as described in Chapter III to fit the daily activities of the monkey in terms of their eating, sleeping, resting and nesting habits (refer to figure VI_2 on page 232). The selected species will therefore inform decisions, such as the planting pallet, moat wetland design, general material selection and the ecological approach of the enclosure design.

1.

Vervet monkey

Chlorocebus pygerythrus



Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Primates
Family: Cercopithecidae
Genus: Chlorocebus
Species: *C. pygerythrus*

FEEDING



1. *Acacia erioloba* – seeds and pods
2. *Aloe spp* – nectar (flowers)
3. *Celtis africana* – fruit
4. *Colophospermum mopane* – seeds
5. *Deinbollia oblongifolia* – fruit
6. *Euphorbia ingens* – fruit
7. *Euphorbia tirucalli* – fruit
8. *Ficus abutilifolia* – figs
9. *Ficus sur* – figs
10. *Ficus sycamorus* – fruit
11. *Grewia caffra* – fruit
12. *Harpephyllum caffrum* – fruit
13. *Hyphaene coriacea* – fruit
14. *Protobius longifolia* – fruit
15. *Searsia chirindensis* – fruit
16. *Sclerocarya birrea* – fruit
17. *Strelitzia nicolai* – soft parts of the flowers

weight
(m) 4.5kg
(f) 3.3kg

height
height: 46-66cm

habitat
Savannah and woodland edge, near water.

status
ST least concerned

RESTING



NESTING



TRAVELLING, FEEDING

FEEDING, RESTING, GROOMING

monkeyland

*The world's first free-roaming multi-species primate sanctuary,
Plettenberg Bay, Western Cape*

12 hectare forest

550 primates total

6m high fence + 1m of live wires



VI_3. Suspension bridge at Monkeyland, Plettenberg Bay (www.monkeyland.co.za 2011).



VI_4. Monkey at Monkeyland, Plettenberg Bay (www.monkeyland.co.za 2011).

primate kingdom

Singapore Zoo

Primate Kingdom is made of six large and two small man-made islands planted with tall trees, wild grasses, palms and bamboos. It boasts several collection of attractive primate species such as the lion-tailed macaques, patas monkeys, playful bunch of brown capuchins, docile-looking Celebes crested macaques, douc langurs, black spider monkeys and golden-lion tamarins.

Its landscape was carefully designed to ensure there are ample spaces for each animal, not to mention the need for the primates to feed themselves from the trees.



VI_5. Gorilla enclosure at the Primate Kingdom, Singapore (Graetz 2000).



VI_6. Gorilla enclosure at the Primate Kingdom, Singapore (Graetz 2000).

6.3 *Water strategy*

Water will form a critical part of the proposed enclosure. The use of water will influence the ecology and pragmatic requirements of the enclosure design. Water will form the barrier of the enclosure and become an essential component of habitat creation. The water body will consist of smaller components and will be discussed in the following paragraphs.

6.1.1 *Stream*

A proposed stream will serve as an important ecological component of the design. In order to apply the vision encapsulated in Marais's quote, the purification of the water therefore becomes an important aspect. The topography will also be manipulated by means of gravity in order for the stream to flow. Figure VI_11 on page 239 illustrates the process of purification and of the moat.

6.1.2 *Moat*

The proposed moat is not only to serve as a functional barrier but bleeds as an ecological filter into both the proposed and adjacent enclosures. The moat itself will induce habitat creation and will be inhabited by birds, antelope, insect and other aquatic life. Fig. x illustrates the water purification process of the moat and the pragmatic requirements of the moat as barrier.

6.4 Ecology

The proposed ecosystem will be supported by habitat functions. The enclosure will provide a refuge and habitat to plants and animals, thereby contributing to the conservation of biological and genetic diversity and evolutionary processes. The enclosure will replicate the vervet monkey's habitat, specifically in context of Pretoria vegetation typologies and the site selection adjacent to the Apies River. The existing *Celtis* trees on-site form the basis of a historical *Celtis* forest replication and connect to the habitat functions of the vervet monkeys as well as other species that will not be a threat to the monkeys. The habitat will contribute to the conservation of biological, genetic diversity and evolutionary processes. A selective choice of species was made to share the enclosure with the vervet monkeys. The species include the bat-eared fox, steenbok, klipspringer, brown rabbit, leopard tortoise, the South African hedgehog, grey reedbuck, the secretary bird, the blue crane and other bird and aquatic species. Figures VI_7 on page 237 shows similar species from the NZG Guide from 1960.



VI_7. Female Oribi (Chris Pisart in NZG Guide 1960).



VI_8. Crowned crane (Chris Pisart in NZG Guide 1960).

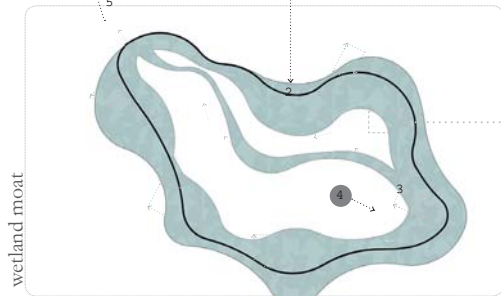


VI_9. Bushbuck (Chris Pisart in NZG Guide 1960).

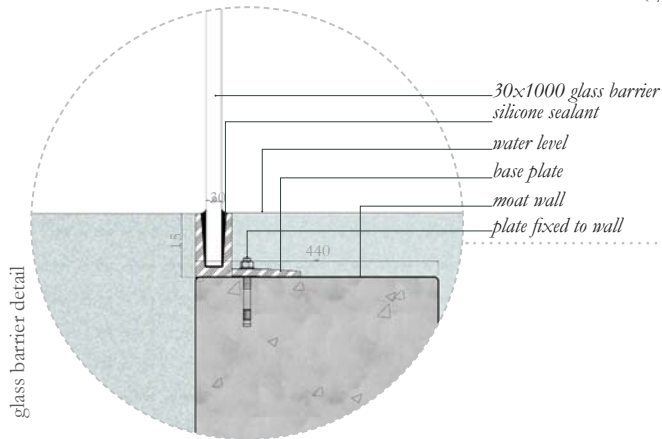
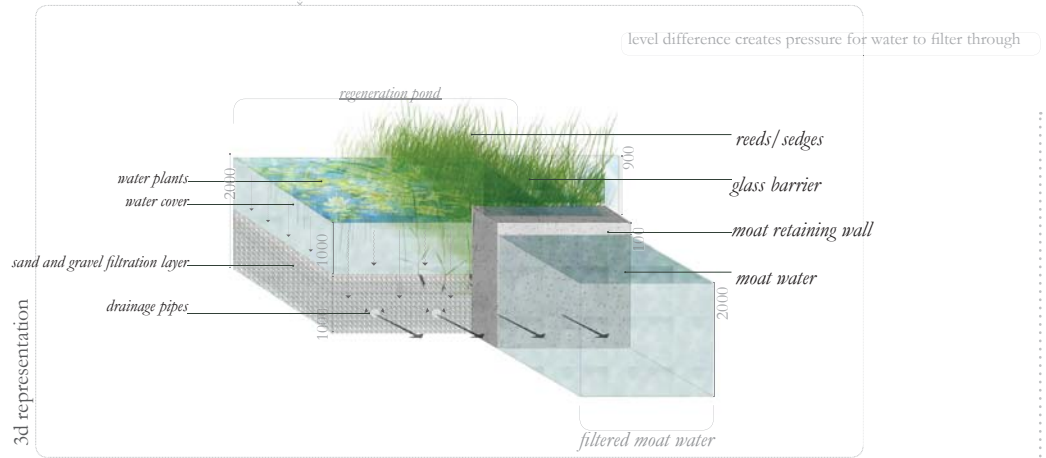
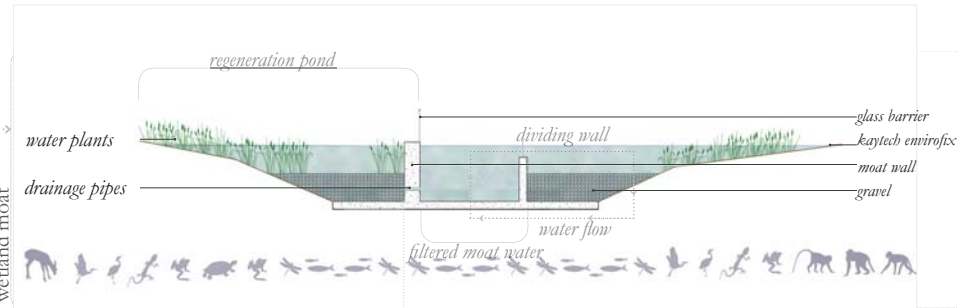


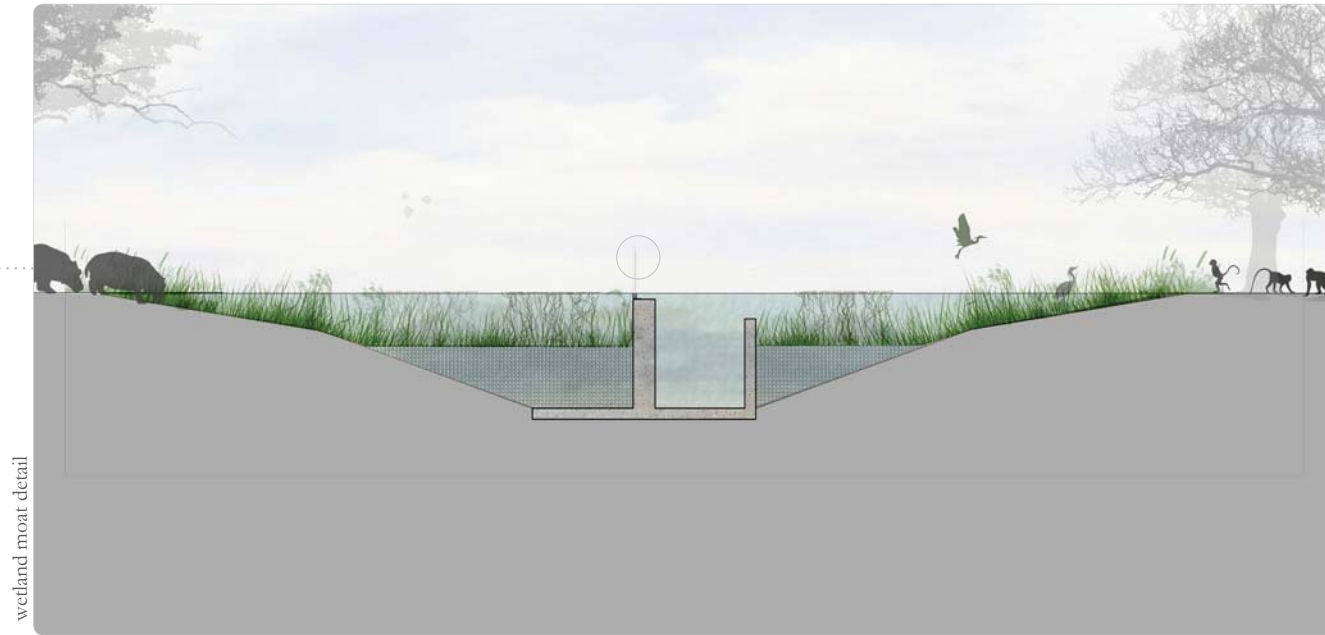
VI_10. Steenbuk ewe (Chris Pisart in NZG Guide 1960).

2 Wetland moat

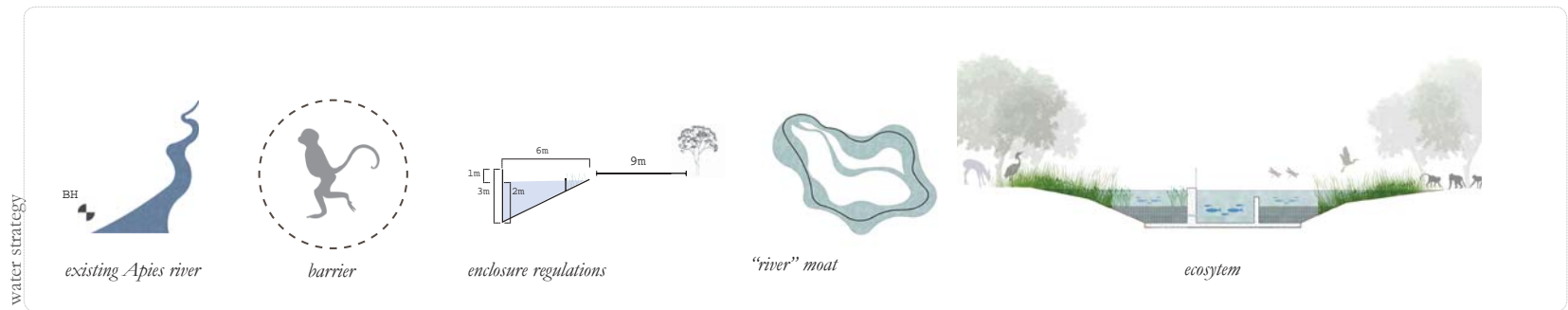


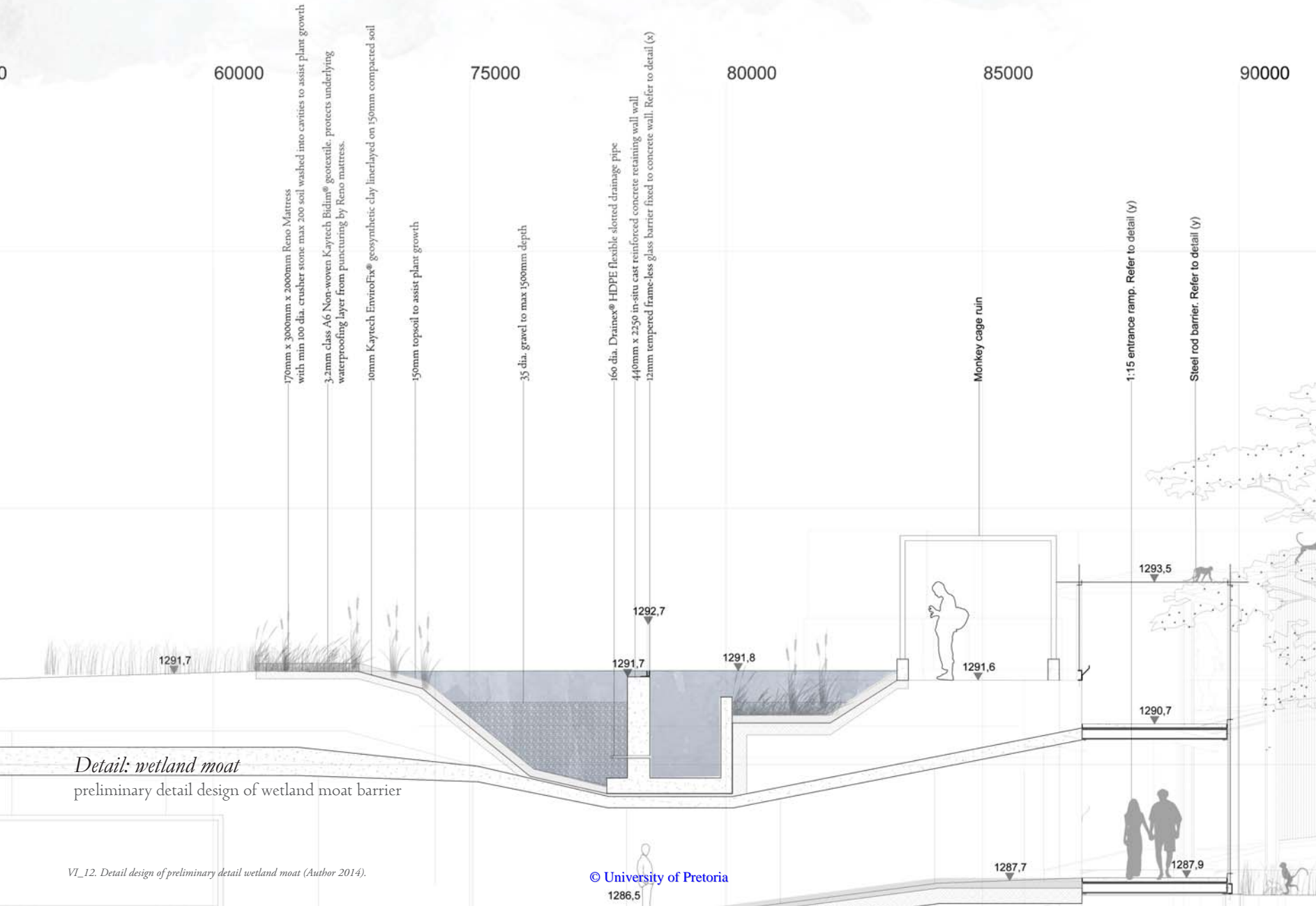
1. water supply from Apies river borehole
2. moat fills to indicated water level
3. water circulated/aerated with nozzles
4. emergency supply reservoir to provide for evaporation loss
5. overflow into river during flood event





VI_11. Water strategy: wetland moat (Author 2014).





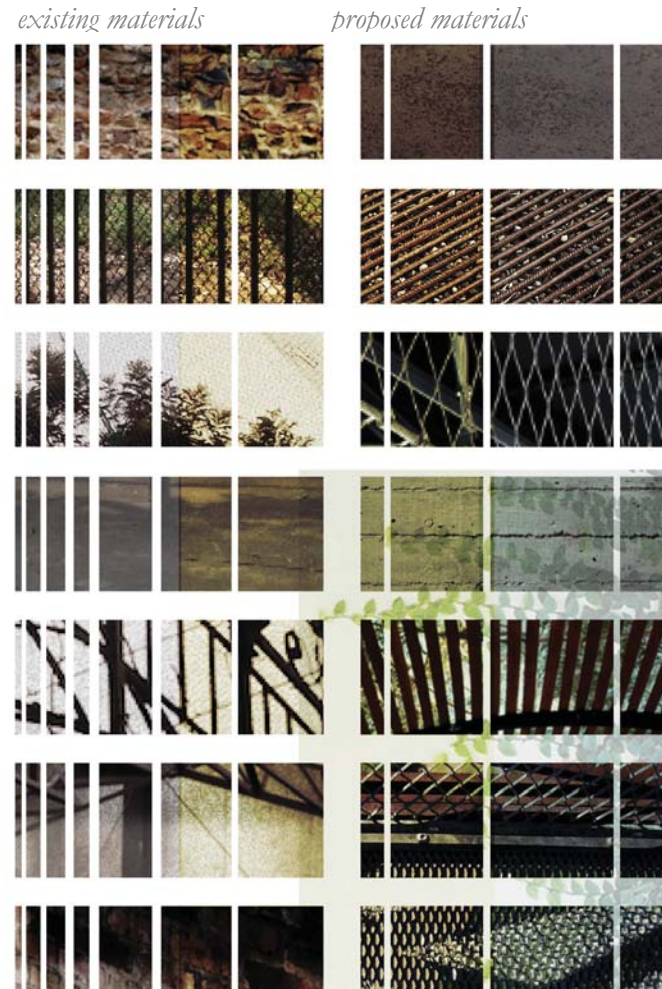
Detail: wetland moat
preliminary detail design of wetland moat barrier

6.5 *Materials*

The design experience aims to provide sensory and haptic qualities that will reconnect the zoo visitor with the animal and its habitat. The beauty, as described by Meyer, will be unveiled throughout the design to stimulate the user's senses. Materiality is therefore an important design consideration when building landscape experiences in subtle and unique ways.

The visitors rely on all their senses to identify opportunity for interaction with the animal. Hence the need exists for active comparative identification so that one can exploit conservation and cultural messages throughout the landscape design.

The material palette is carefully selected to celebrate the existing character of the historical cages by means of material choices on-site. The technical approach will induce an analogy with the proposed elements in relation to the old materials. The material choices will contribute to the narrative of the enclosure route and extend to properties, such as weathering and seasonality. The narrative will commence at a confined cage-like character, dissolving towards lighter materials and finally release into natural spaces. Mild steel plates, steel rods, reinforcement bars, concrete and timber will be typical materials used in different ways to strengthen the transition and haptic quality of the enclosure experience. The contemporary zoo materials will also be implemented where specific views must be acknowledged. A skywalk circulation tunnel and tower will attempt to serve as an extruded experience for both man and animal.



VI_13. Material selection: existing versus new.

6.1.3 *Mild steel plates*

The *dynamic beauty principle* requires a material that changes over time, just as the planting palette will differ with season changes. The proposed mild steel plates will be allowed to weather over time and adapt to the appearance of dynamic changes through time. The staining caused by corrosion will be channelled in such a way that it selectively allows for stains to occur on the concrete at certain points and complement the dynamic beauty intention.

6.1.4 *Steel rods and reinforcement bars*

Steel rods and reinforcement bars will be used as aesthetical and functional elements within the enclosure. The rods and reinforcement bars will strengthen the cage-like narrative within the enclosure and provide opportunity for a haptic and transitional experience.

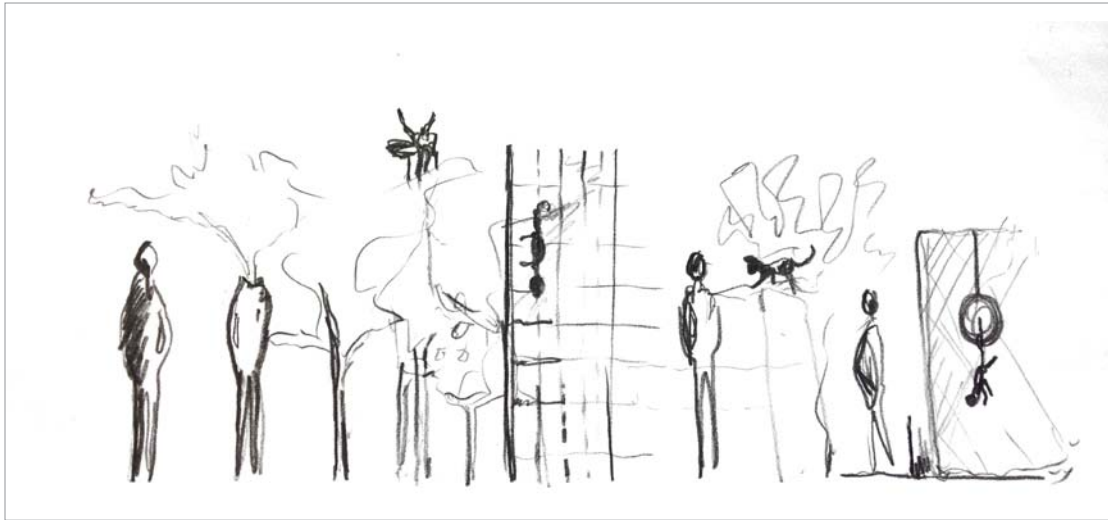
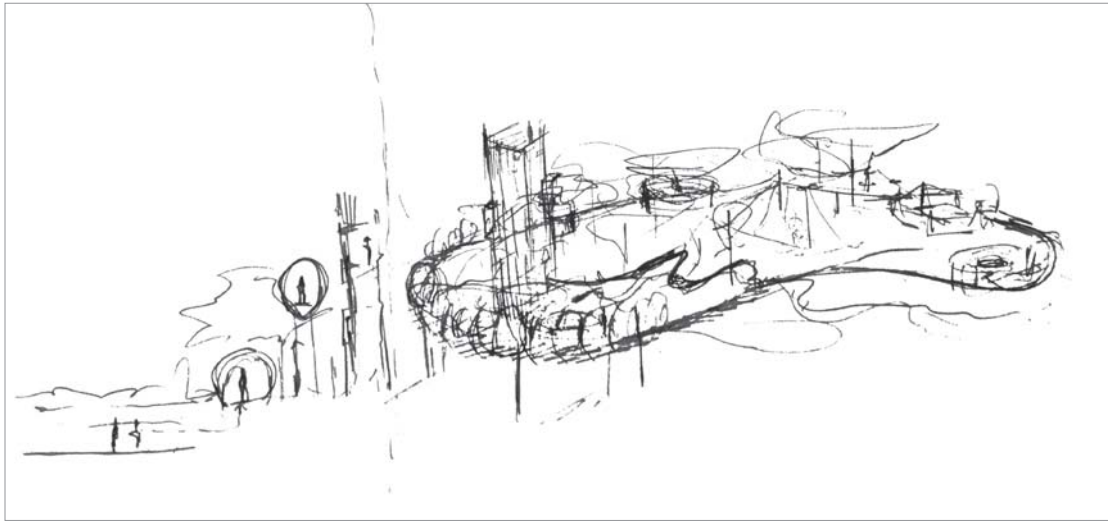
6.1.5 *Mesh*

The proposed enclosure canopy will consist of a transparent grid structure made of stainless steel rope from Jakob® INOX LINE series. The Jakob® INOX LINE webnet has a skin-like appearance of a diaphragm. The mesh will form a simplistic surface but can also be tensioned into three-dimensional forms featuring funnel-type, cylindrical or spherical shapes. It is therefore an ideal material to use within the enclosure. The mesh has a translucent appearance and is weather-resistant and non-corrodible.

The mesh is 1mm thick and strung in a 30mm diamond pattern, the webnet mesh breaks down the visual barriers between inside and outside. Due to its transparency and flexibility, the mesh can cover large areas of the design. The mesh will be implemented over all walkways and the arrival space, and act as a barrier for the general communal areas.

6.1.6 *Surface finishes*

The surface finishes of the walkways on ground level will be constructed with steel reinforcement bar. The intention will be to expose the 'natural' surface underneath the walkways and contribute to the interface between the visitor and the landscape.



VI_14. Conceptual movement and strata intent of elements (Author 2014).

6.6 *Movement*

The experience through the enclosure is dependent on the intended stratification of the design. The general movement of the design therefore circulates the visitor from as many levels as possible. The visitor will experience the enclosure from below the ground right through to the tree canopy level.

The design aims to provide inclusive access across the entire site. The SANS 10400-S:2014 guidelines will therefore influence the walkway and ramp decisions. The design will therefore adapt a 1:15 gradient on all ramped areas with a minimum of 1200mm landing space.

6.1.7 *Planting strategy*

According to the Sustainable Sites Initiative (SSI) ecosystem processes involving the interaction of living elements, such as vegetation and soil organisms, and non-living elements, such as bedrock, water and air, have many direct and indirect benefits to humans (www.sustainablesites.org 2014).

The SSI suggests that a design should implement ecosystem processes in order for a sustainable site to thrive, protect or regenerate sustainable land development and management practices.

In order to sustain such practice, a site-specific planting palette was investigated to reinstate an appropriate endemic community. The planting palette includes the establishment of a woodland habitat relating to the local climate and site conditions. The chosen plant species will provide feeding opportunities and attract the maximum number of species.

Sufficient light, a suitable growing medium, nutrients, irrigation, survival ability, grazing, browsing and other animal impacts are some of the basics requirements for vegetation choices within the enclosure. Plants are selected to accentuate their natural appearance and be planted in mixed communities.

Nevertheless, this proposed strategy will require management practices to overcome the wear and tear generated by the animals within the habitat. An adequate period of time will be allowed (minimum 4 to 6 months) for plant species to ensure sufficient plant growth and establishment.

6.1.8 *Community*

The plant strategy for the proposed and existing vegetation is to duplicate the inventory of the communities; Marikana thornveld and the species of the Moot plains as they previously existed in this region.

These species shape the environment by virtue of sheer size and numbers. The design will therefore aim to recreate the plant community that was once established at the identified site by implementing most plant species from the chosen community structures.

6.1.9 *Habitat*

The community is divided into the three habitats that correlate with the habitat of the vervet monkey species and the existing Apies River habitat. The habitats include wetland, riparian and woodland ecologies. The plant strategy choices are therefore further categorised according to these three introduced habitats. These specified species occur mostly in the form of vegetated strips throughout the site and create spaces and places for ecological emergence. Biological processes, social interactions and recreational activities of both man and animal will still remain as important factors of the design.

The introduction of the stream, wetland and woodland typologies into the enclosure aims to improve the biodiversity. Wildflowers, grass, birds and insect species will inhabit the enclosure and form part of the ecological processes.

6.1.10 *Current conditions:*

Woodland Community

This Woodland Community habitat established by Grobler *et al.* (2002) generally occurs on gradual to moderate steep slopes and consists of aspects of hills, ridges and granite boulders. The Woodland Community is common to occur along rivers in lower lying areas in the Pretoria vicinity. The vegetation typology presented within the Woodland Community will be introduced to the enclosure to support the woodland ecology of the vervet monkey habitat.

6.1.11 *Vervet monkey feeding*

The vervet monkey is an omnivorous animal. Their diet consists of both plant matter and other smaller animal species in order to get the nutrition they need to survive. Leaves and young shoots make up the bulk of the vervet monkey's diet, along with tree bark, flowers and fruits that can be found in the trees surrounding them. The monkeys forage for food on the ground, such as roots, bulbs, seeds, grasses and small arthropods. The final addition to the plant strategy will provide a habitat for the dietary needs of the vervet monkey. The vegetation introduced to the enclosure will aim to sustain the vervet monkeys during most of the year, especially during the summer months.

3. Planting strategy



trees

tall trees:

- Celtis africana*
- Ficus sur (a) (r)*
- Harpephyllum caffrum (a)*
- Searsia chirindensis (a) (r)*
- Sclerocarya birrea*

shrubs:

- Asparagus cooperi (c)*
- Grewia occidentalis (a)*
- Buddleja saligna (c)*
- Searsia pyroides var. pyroides*

other:

- Strelitzia nicotai*
- Hyphaene coriacea*

riparian

mix 1:

- Asparagus laricinus*
- Scadoxus puniceus*
- Setaria megaphylla*
- Panicum maximum*

mix 2:

- Hibiscus calyphyllus*
- Hypoestes aristata*
- setaria megaphylla*
- Jasminum multipartitum*

trees

tall trees:

- Searsia lancea (c)*
- Acacia caffra (c)*
- Combretum molle (c)*
- Combretum erythrophyllum (w) (e)*
- Searsia leptodictya (w)*
- Zanthoxylum capense (w)*
- Ilex mitis (c)*
- Colobospermum mopane*

shrubs:

- Euclea crispa subsp. crispa (c)*
- Pavetta gardeniifolia*
- Olea europaea subsp. africana (c)*
- Rhamnus prinoides (a) (w)*
- Buddleja saligna (c)*

other:

- Melinis nerviglumis (g)*
- enneapogon scoparius (g)*
- themeda triandra (g)*
- Euphorbia ingens (a)*
- Euphorbia tirucalli (r) (a)*

riverine/woodland

mix 1

- Vernonia oligocephala*
- Clematis brachiata*
- Phyllanthus reticulatum*
- Zantedeschia aethiopica*
- Blechnum tabulare*

wetland

mix 1:

- Setaria megaphylla (s)*
- Juncus kraussii (s)*
- Cyperus prolifer (s)*
- Sium repandum (w)*
- Eragrostis plana (s)*

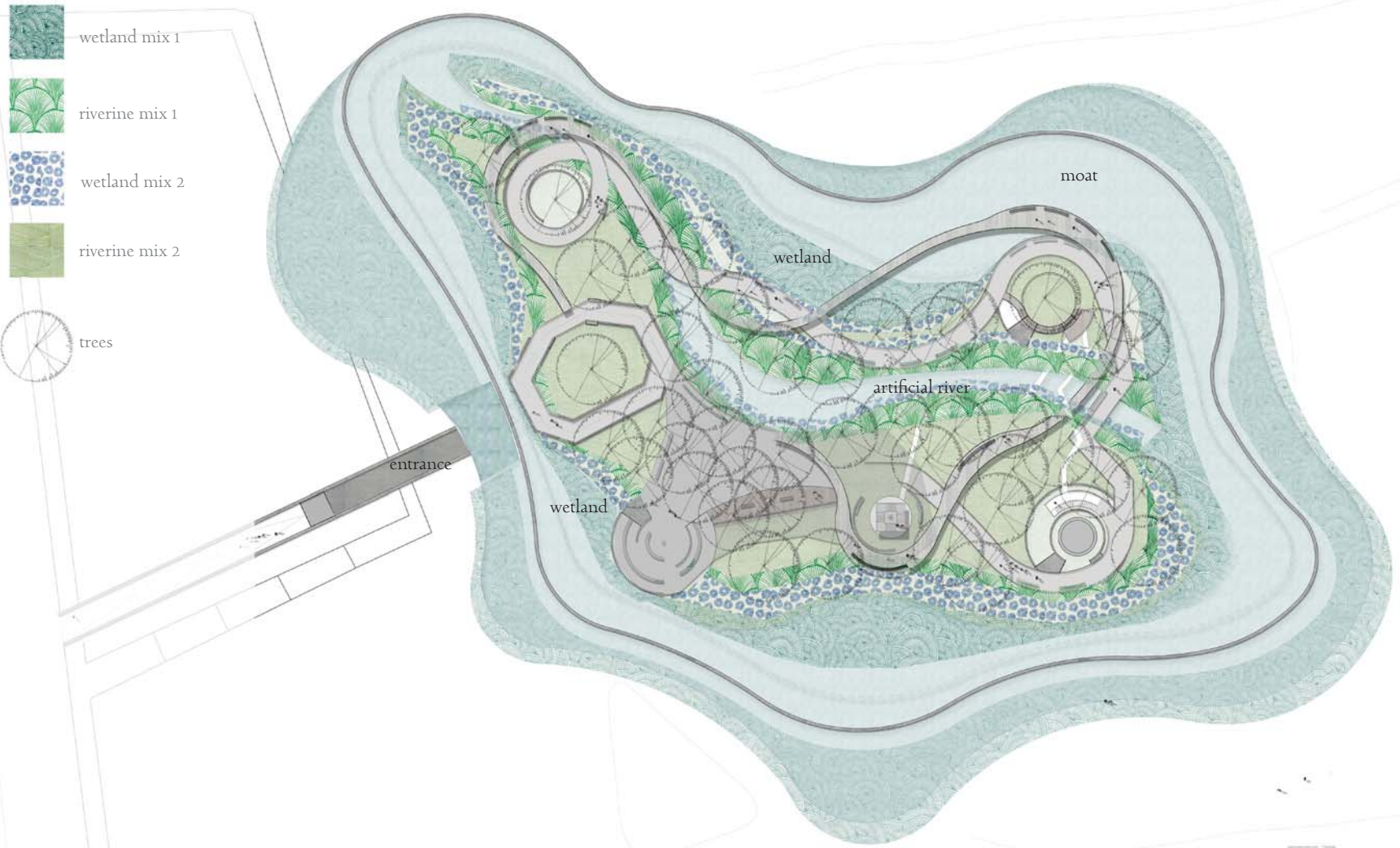
mix 2:

- Nymphoides thunbergiana (w)*
- Nymphaea nouchali (w)*
- Mentha aquatica (w)*



VL_15.

Planting strategy habitat (Author 2014).



VI_16. Conceptual preliminary planting plan (Author 2014).

Resultant specie list:

Trees

- Celtis africana* (c)
Searsia lancea (c)
Acacia caffra (c)
Combretum molle (c)
Combretum erythrophyllum (w) (e)
Searsia leptodictya (w)
Zanthoxylum capense (w)
Ilex mitis (e)
Calophospermum mopane (a)
Ficus sur (a) (r)
Harpephyllum caffrum (a)
Searsia chirindensis (a) (r)
Sclerocarya birrea (a)



Shrubs

- Euclea crispa* subsp. *crispa* (c)
Pavetta gardeniifolia var. *gardeniifolia* (c)
Buddleja saligna (c)
Olea europaea subsp. *africana* (c)
Rhamnus prinoides (a) (w)
Buddleja salviifolia (e)
Searsia pyroides var. *pyroides* (c)
Asparagus cooperi (c)
Grewia occidentalis (a)



Herb

- Hypoestes aristata*
Hibiscus calyphyllus (w)
Phyllanthus reticulatu (a) (r)
Vernonia oligocephala (g)
Clematis brachiata (g)



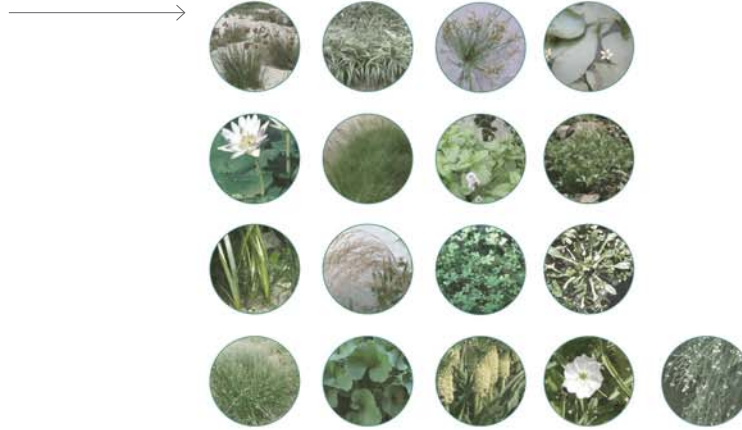
Graminoids

- Melinis nerviglumis* (g)
enneapogon scoparius (g)
themedra triandra (g)



Wetland

- Setaria megaphylla* (s)
Juncus kraussii (s)
Cyperus prolifer (s)
Nymphoides thunbergiana (wl)
Nymphaea nouchali (wl)
Eragrostis plana (s)
Mentha aquatica (wl)
Sium repandum (wl)
Vallisneria aethiopica (wl)
Phragmites australis (wl)
Gunnera perpensa (s)
Marsilea schelpiana (wl)
Limosella major (r)
Isolepis prolifer (s)
Eucomis autumnalis (wl)
Falkia oblongata (r)
Gomphostigma virgatum (s)



Succulents

- Euphorbia ingens* (a)
Euphorbia tirucalli (r) (a)



Other

- Hyphaene coriacea* (a)
Strelitzia nicolai (a)
Zantedeschia aethiopica (h)
Blechnum tabulare (h)



Key: (c)- community; (w)- woodland; (e)- existing; (r)- riverine; (a)- monkey feeding plant; (wl)- wetland ; (g)- grass; (s)-sedge; (h)- historical

4. Enclosure entrance



VI_19. Bell-lac winery. RCR Architects (Archdaily 2014)



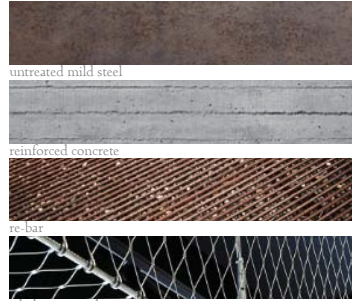
VI_20. Bell-lac winery. RCR Architects (Archdaily 2014)



VI_21. Bell-lac winery. RCR Architects (Archdaily 2014)



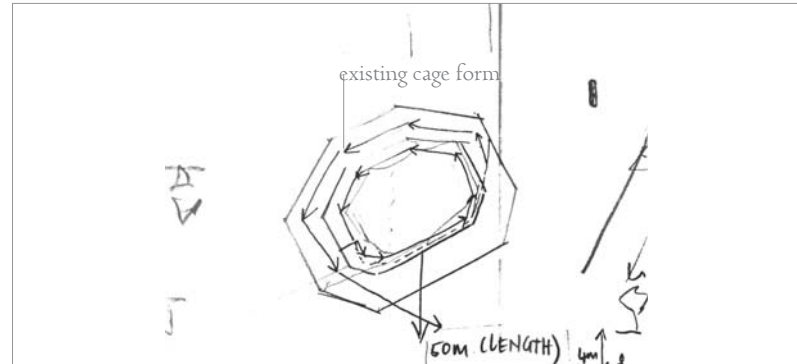
VI_22. Jakob's winery. Jakob's winery (Archdaily 2012)



VI_25. Material palette of Entrance and ramp (Author 2014).



VI_23. Design development: entrance ramp and monkey space excavation (Author 2014).

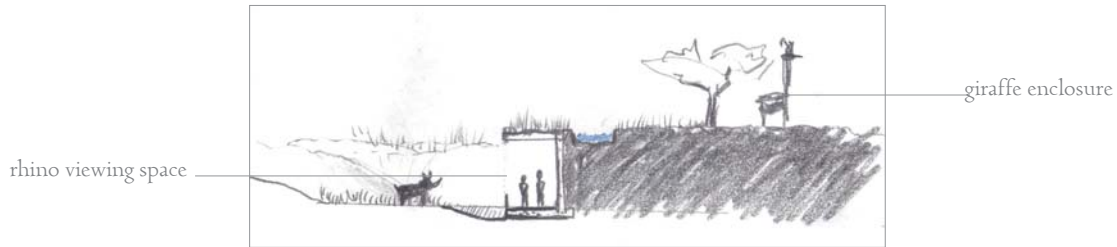
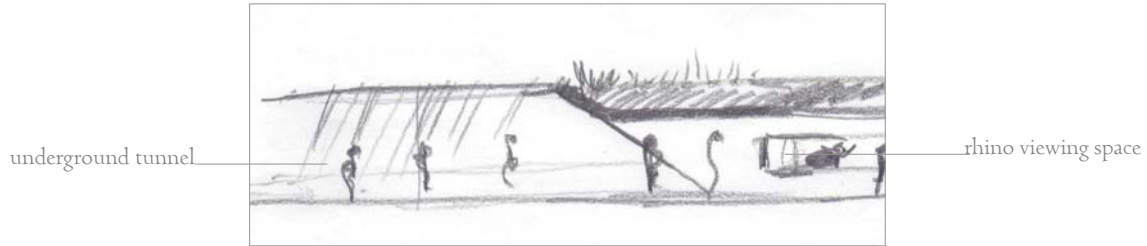


VI_24. Design development: entrance ramp circulation in old cage (Author 2014).

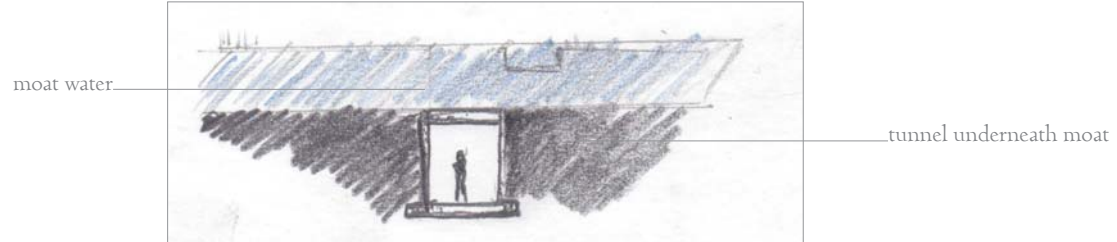




VI_26. Technical development: entrance (Author 2014).



VI_27. Technical development: view to rhino enclosure (Author 2014).

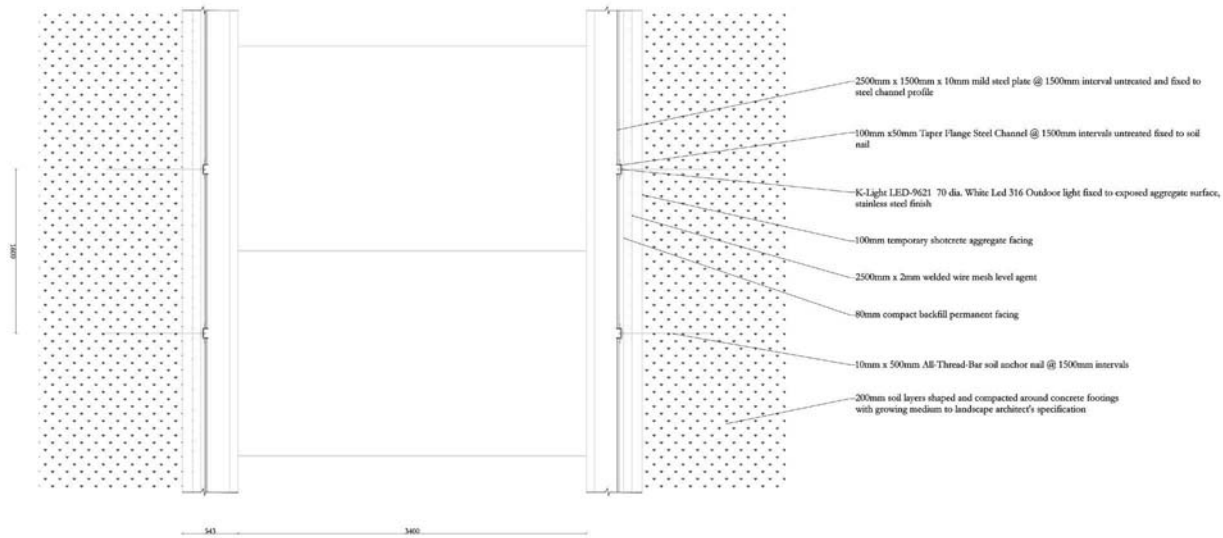


VI_28. Technical development: underground tunnel (Author 2014).



Detail: entrance tunnel

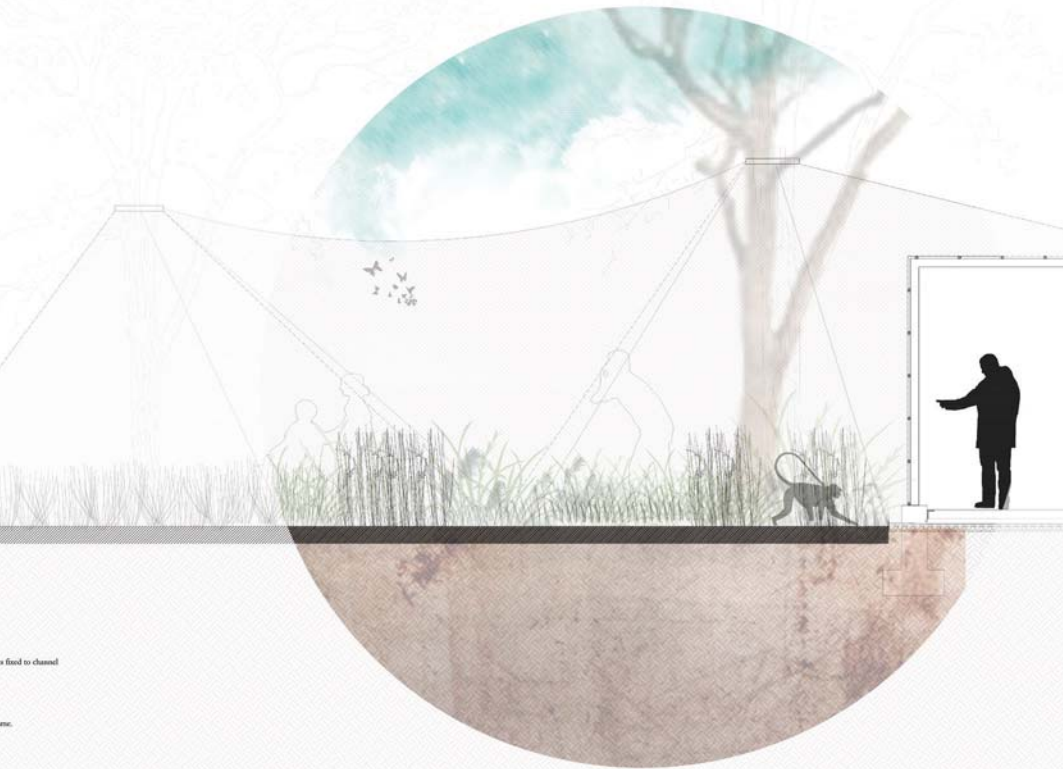
detail design of entrance tunnel into enclosure (not to scale)





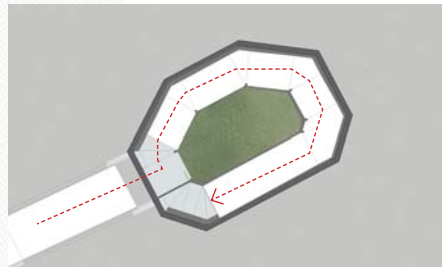
Detail: entrance ramp

detail design of entrance ramp into existing cage (not to scale)

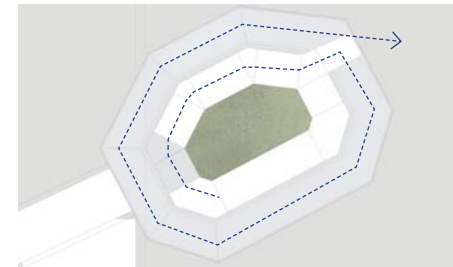


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loading of off-shutter finish to ENGINEERS' specification.

return to



VI_30. Entrance ramp circulation (Author 2014).



VI_31. Entrance ramp circulation: existing cage (Author 2014).

5. Ground level walkway



VI_32. Puffadder walkway, Babylonstoren, Patrice Taravella (Dezeen 2014).



VI_34. Puffadder walkway, Babylonstoren, Patrice Taravella (Dezeen 2014).



VI_33. Eggum Lofoten, Snobetta Architects (Archdaily 2007)



VI_36. Les fleurs maudites, Charlotte Trillaud (Domusweb 2014)



chain linked fence



reinforced concrete



re-bar



rhodesian teak timber

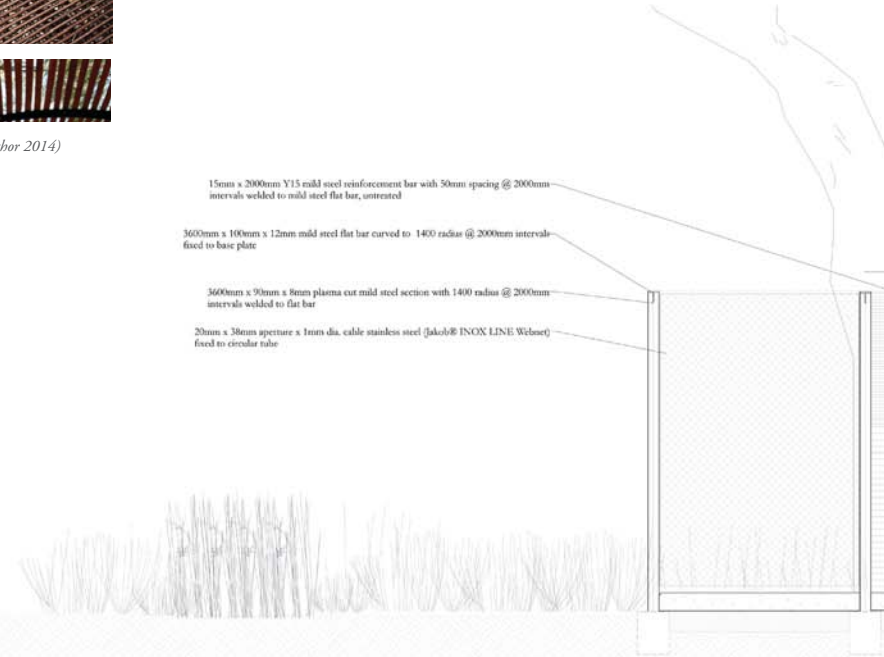
VI_35. Material pallet of walkway (Author 2014)

15mm x 2000mm Y15 mild steel reinforcement bar with 50mm spacing @ 2000mm intervals welded to mild steel flat bar, untreated

3600mm x 106mm x 12mm mild steel flat bar curved to 1400 radius @ 2000mm intervals fixed to base plate

3600mm x 90mm x 8mm plasma cut mild steel section with 1400 radius @ 2000mm intervals welded to flat bar

20mm x 38mm aperture x 1mm dia. cable stainless steel (Jako® INOX LINE Websort) fixed to circular tube





Detail: ground level walkway
detail design of ground level walkway (not to scale)

6. Skywalk



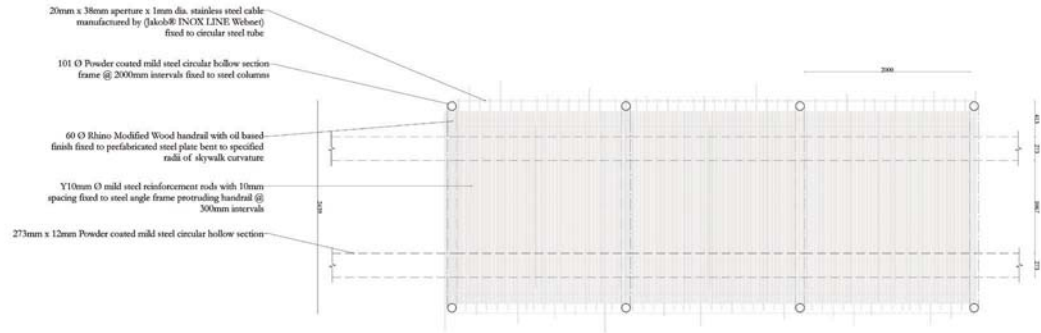
VI_37. Eggum Lofoten,
Snobetta Architects
(Archdaily 2007)



VI_38. Kirstenbosch
"boomslang" canopy
walkway Mark
Thomas Architects
(Archdaily 2007)



VI_39. The
Saxon Boutique
Hotel walkway
(Classicafrica 2010)

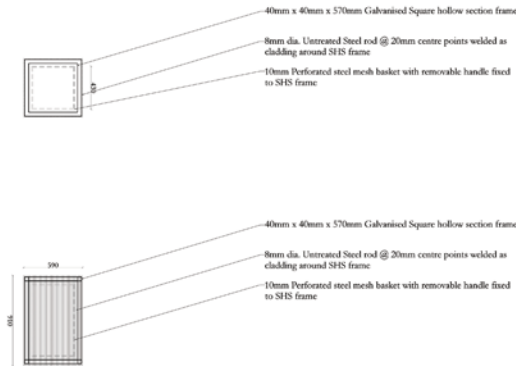
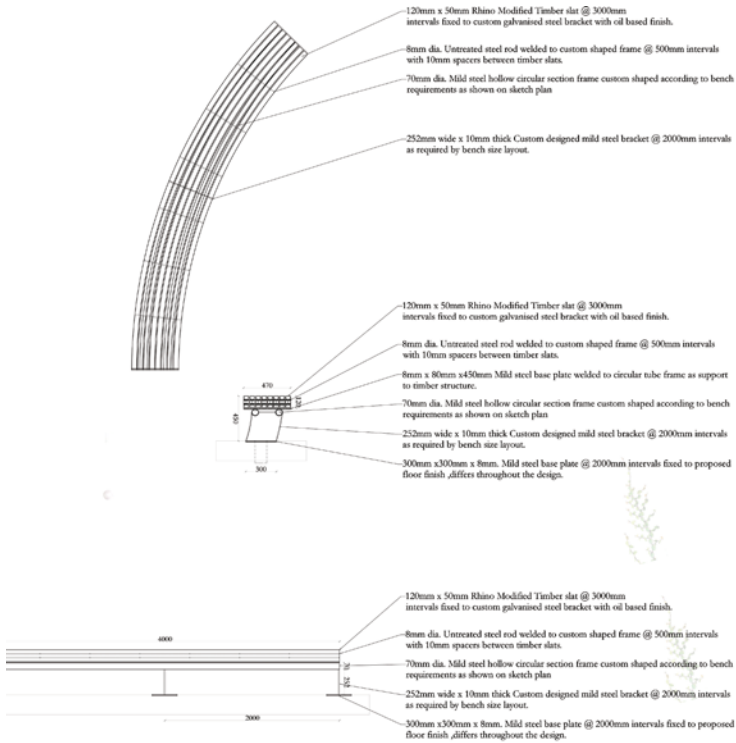




Detail: skywalk
detail design of skywalk (not to scale)

6. Furniture





Detail: bench and dustbin
detail design of bench and dustbin (not to scale)

6.1.12 *Zoo landscape sustainability*

According to Thayer (1994: 317), ‘the goal of sustainable landscapes is the transformation of culture – the taming of technology, the emergence of a new environmental ethics, a new measure of life quality and a substantially broadened sense of community, including not only humans but all life’.

With hundreds of people visiting the NZG, the NZG can influence visitors by example. The enclosure will therefore aim to design a landscape that encourages natural plant succession, the demonstration of wildlife conservation, and regional resource collaboration. The enclosure will produce oxygen, collect storm water and recycle waste, while creating a habitat for humans and animals. The enclosure will interpret sustainable design principles by responding to the local climate, culture, planting and animal requirements. This will result in a rich diversity of new design principles for the design enclosure.

The sustainable use of water is a global issue that zoos need to address. A well-designed exhibit can set an example for the public and designers of the zoological milieu. The plant selection and horticultural practices can reduce the requirements for ongoing irrigation. The design will therefore aim to include endemic vegetation and proper soil preparation. Composting programmes, such as collecting animal manure produced on a daily basis, must also be implemented.

In conclusion, the sustainable principles implemented within the enclosure will aim to reduce the water demand, act as a filter, reduce storm-water runoff, provide wildlife habitat, reduce energy consumption, improve air quality, improve human health and increase outdoor recreational opportunities (www.sustainablesites.org 2014).

6.1.13

Sustainability rating

The Sustainable Sites Initiative (SSI) tool was used to generate a sustainability rating for the proposed vervet monkey enclosure. The prerequisites and credits are organised into nine sections that are based on the process of site development. The vervet monkey enclosure achieved the following ratings:

Site context: 10/13

Pre-design assessment and planning: 3/3

Site design – water: 22/23

Site design – soil and vegetation: 40/40

Site design – Material selection: 33/42

Site design – human health and well-being: 28/30

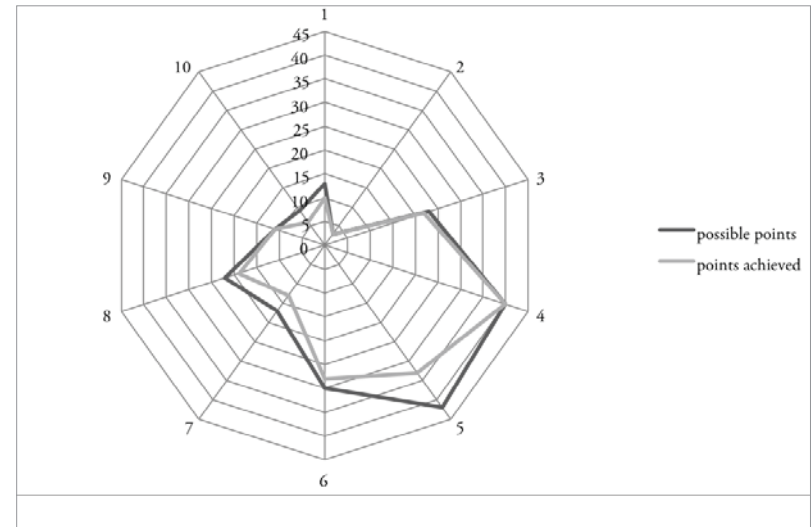
Construction: 13/17

Operations and maintenance: 19/22

Education and performance monitoring: 11/11

Innovation or exemplary performance: 6/9

The design achieved an overall rating of 185/200, which classifies it as a platinum-rated project.



VI_41. Graphic representation of SSI sustainability rating: possible points vs points scored (Author 2014).



VI_42.
Conceptual "Apies" habitat
vision (Author 2014)

CHAPTER VII

APPENDIX

The concluded enclosure

The concluded enclosure has multiplied, overlapped and implemented the difference design experience strata on various scales through different rhythms. The incremental moments of monkey and human interaction has revealed, enabled and regenerated a temporal and dynamic ecology. The enclosure revived the romantic Apies River described by Eugene Marais, while simultaneously creating habitat and evoking visitor emotion. The final design response redefined the threshold between man and animal through reconfiguration and spatial manipulation. The study proved that a zoological enclosure can provide experience and beauty to the user without compromising the animal exhibited, the natural dignity of the habitat, or finally, the character of the zoological garden.

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