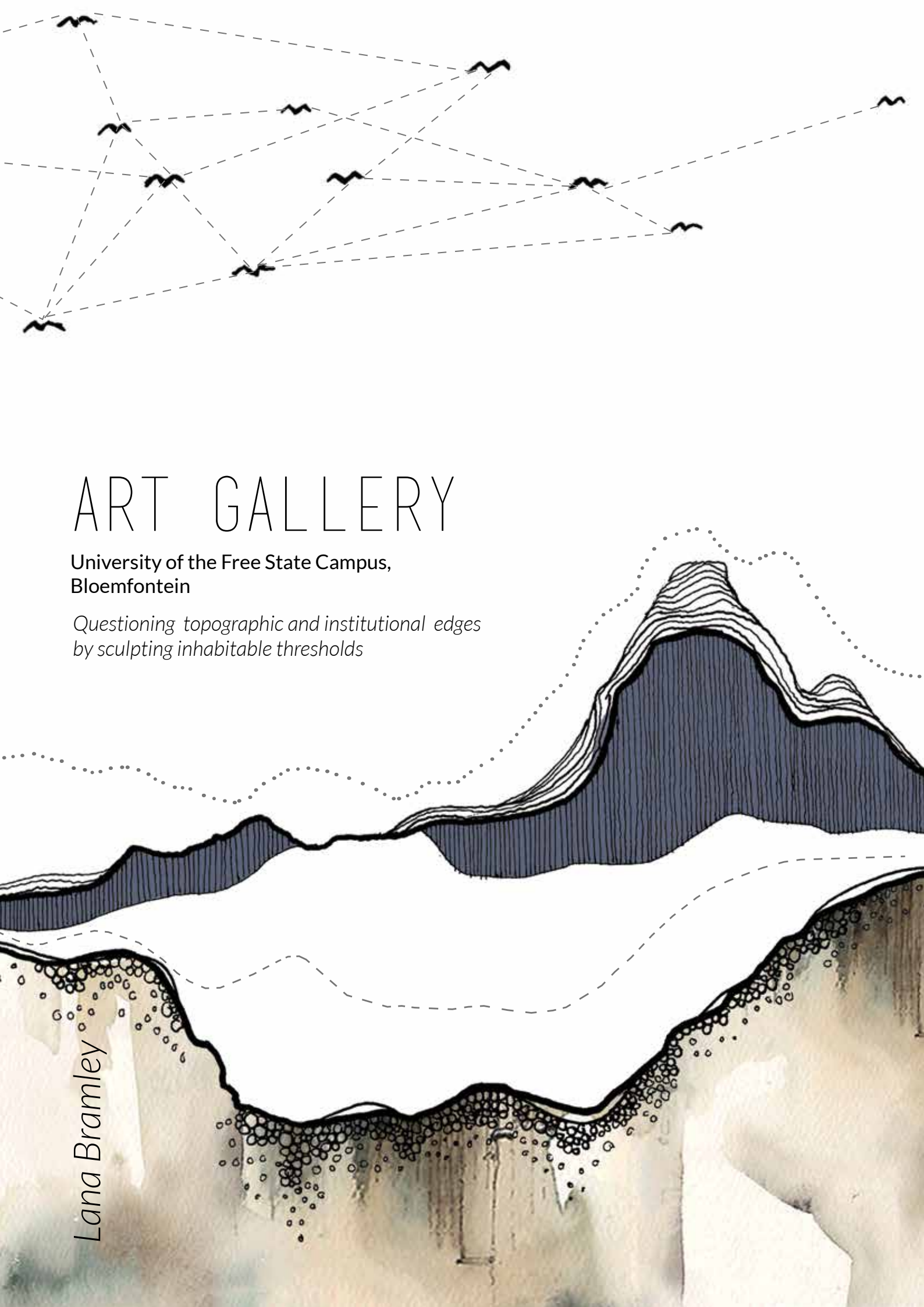
ART GALLERY

University of the Free State Campus, Bloemfontein

Questioning topographic and institutional edges by sculpting inhabitable thresholds



Lana Bramley

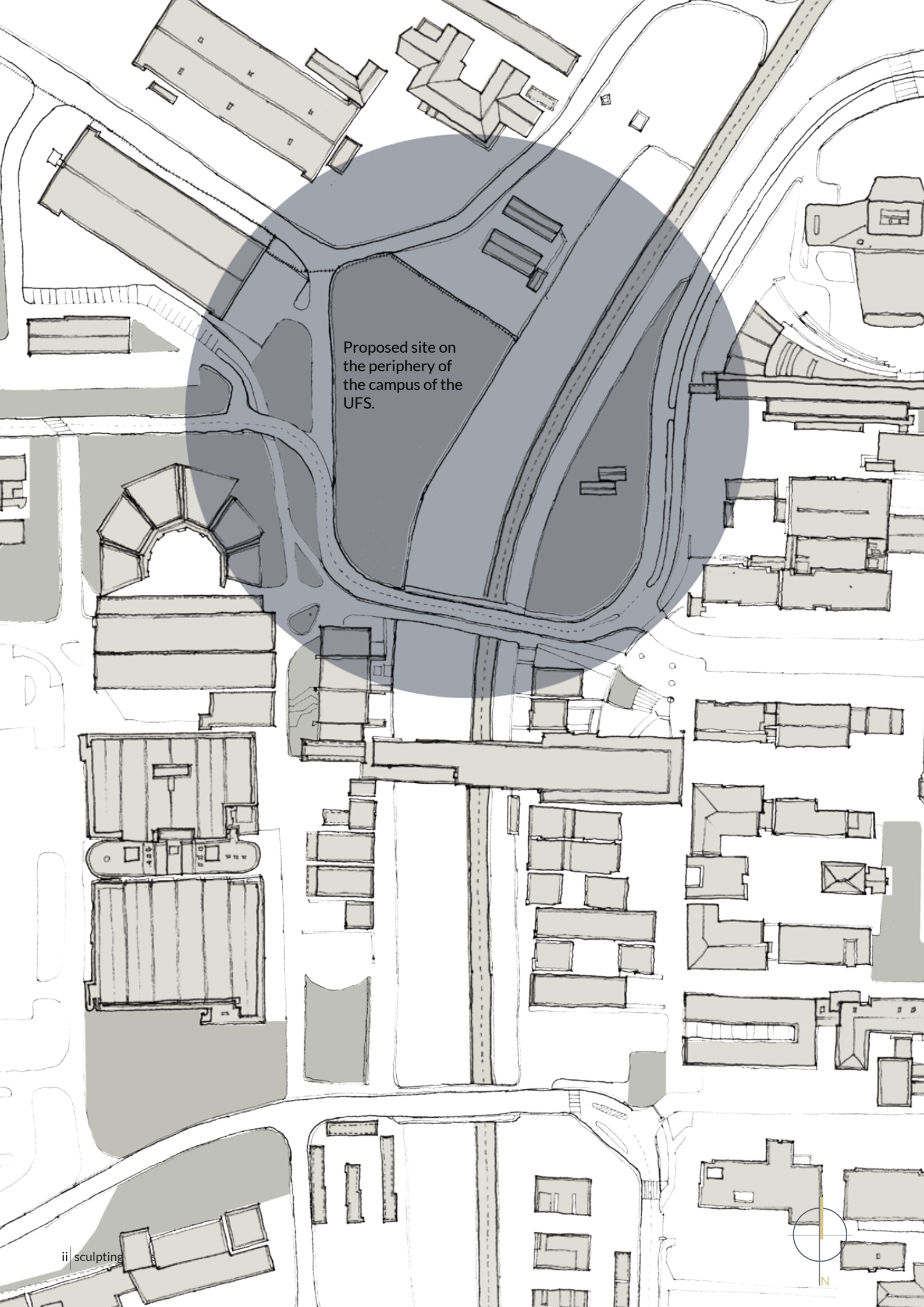
Lana Bramley 2011017882

Department of Architecture, Faculty of Natural and Agricultural Sciences, University of the Free State.
October 2016

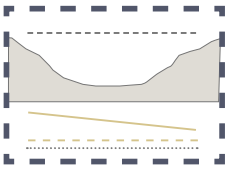
Supervisors:
Prof. J. D. Smit, H.B. Pretorius; J. I. Olivier; H. Raubenheimer.

Plagiarism is creating the impression that someone else's work is my own. Every contribution and quote, photo and drawing, from other sources in this essay has been acknowledged and there is a reference and a source. If not referenced, figure is by author. This essay is my own work. I have not copied it, nor will I allow that anybody copy it.

Signature:


Proposed site on the periphery of the campus of the UFS.
N

PREAMBLE



This research document sets out to investigate architecture as a threshold to overcome rigid boundaries placed to separate social groups. The project questions whether art through architecture is able to transcend beyond thresholds in order to redress non-place.

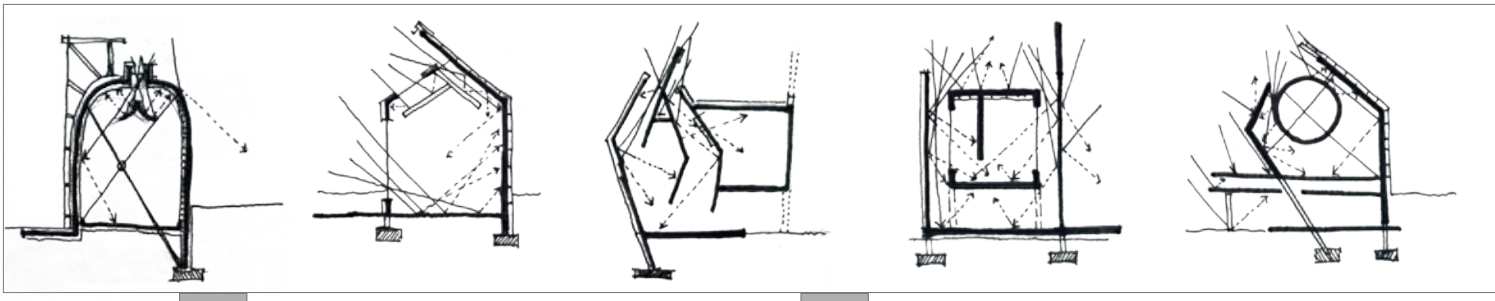
An Art Gallery is proposed for the University of the Free State on the periphery of the campus to provide an entrance for the public into student art and the international art collection of the university. At present, the Johannes Stegmann Art Gallery is used for exhibitions but is too constraint for permanent exhibitions and also hidden within the Sasol Library.

The client for the project is the University of the Free State, with Angela de Jesus, the curator and also the spokesperson. The client requested a gallery space that becomes an interactive gathering area rather than a destination building. The site for the gallery is situated on the edge of DF Malherbe Road, which divides the campus into two parts and contributes to the reconciliation of the east and west campus and also between the public and students.

The gallery is placed on the threshold of the eastern boundary of the site. Therefore, the threshold is forced open and as a result, the gallery starts sculpting the threshold. The gallery embodies the threshold to encourage dwelling in a previous non-place space. The original boundary is dissolved and the edges of the gallery forms the edges of the created threshold.

The campus context becomes a platform for students to express artistic ideas towards the public and also to engage the public in artistic workshops and social events. The rigid boundary of the university becomes a porous edge as art envelopes around the displaced fence. Through methods of deconstruction, the threshold will dissolve in the creation and sculpting of proposed space.

As the art gallery oversteps the boundaries of its frame, it involves both the pedestrian student and the public passing by in the process of sculpting space. Architecture acts as a mediator between the public and the students through accommodating both and encouraging interaction. The secured state of the university is obtrusive to public visitors and the process to keep students secure is rejecting influence from the rest of the city.
The proposed project aims to create a framework for artistic expression which becomes a visual narrative of architecture to facilitate dialogue between the campus as an enclosed space and the city of Bloemfontein as its host.



PART 1

PART 2

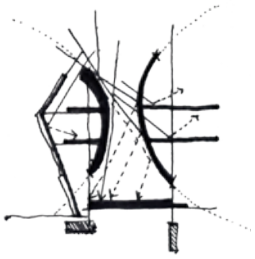


TABLE OF CONTENTS

PART 3

PART 4

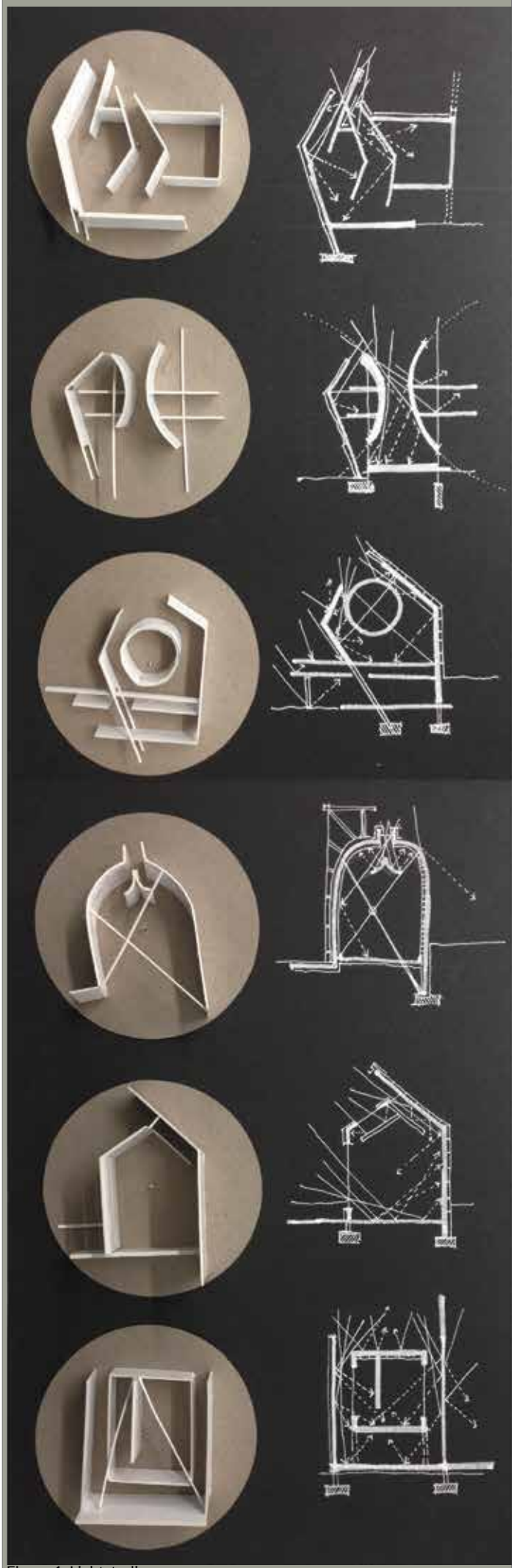
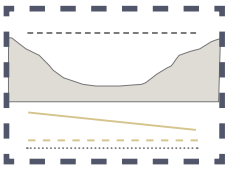


Figure 1: Lightstudies

INTRODUCTION AND ORIENTATION



The University of the Free State boasts with a collection of 1500 artworks which are rotated between the Main Building, the Eeufees Building and storage space. In a personal interview with Mrs De Jesus, the curator at the Johannes Stegmann Art Gallery on campus, it became evident that the University is in need of an art gallery which should entice a dialogue between the art and the visitor. She stated that the gallery should not be a destination building but rather an interactive proposal.

The concept of an art gallery as a transient space comes from investigating the campus as a large site. The campus used to be an open part of town where the exact boundary between the campus and the city was unclear. Families could enjoy the gardens on weekends and pedestrians were able to take a shortcut through campus and interact with students in the passing. Due to security reasons, the campus was closed off and boundaries reinforced. This enforced a threshold between students and the public. The proposed project aims to embody the boundary of campus in order to develop the harsh edge into a perforated entrance through the art gallery.

The design of an art gallery intrigued me, as the main denominator of its morphology is light.

"Architecture which enters into a symbiosis with light does not merely create form in light, by day and at night, but allow light to become form." (Meier, 2016)

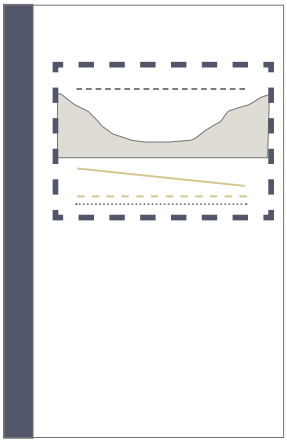
I have always been fascinated by the way architectural elements can be manipulated in order to create a shadow line or light shaft which allows for the replacement of a typical window punched into a wall. Light is the main denominator of form in this project through the way the archetypes are sculpting away the sky and embedding itself into the earth.

This investigation focuses on the way that an art gallery, as a transient space rather than a destination building, can allow the public a glimpse into the world of art. This is done by intriguing people during their ordinary path.

The need for the project was raised by the curator of the University of the Free State because of a lack of exhibition and storage space on campus. Therefore, the project will focus on the design of a gallery space and archive on the campus of the UFS.

Figure 2: Diagram from typology to topology to morphology to techtonics

DOCUMENT FRAMEWORK



Document Framework

The investigation of this dissertation focuses on the requirements of an art gallery which consists of public space, workshops and storage. The research of this document was aimed at the gallery white box theory and the deconstruction thereof. In a similar sense, the deconstruction of the threshold is investigated.

Part one and two of the document is structured around the four academic terms namely; typology, topology, morphology and tectonics.

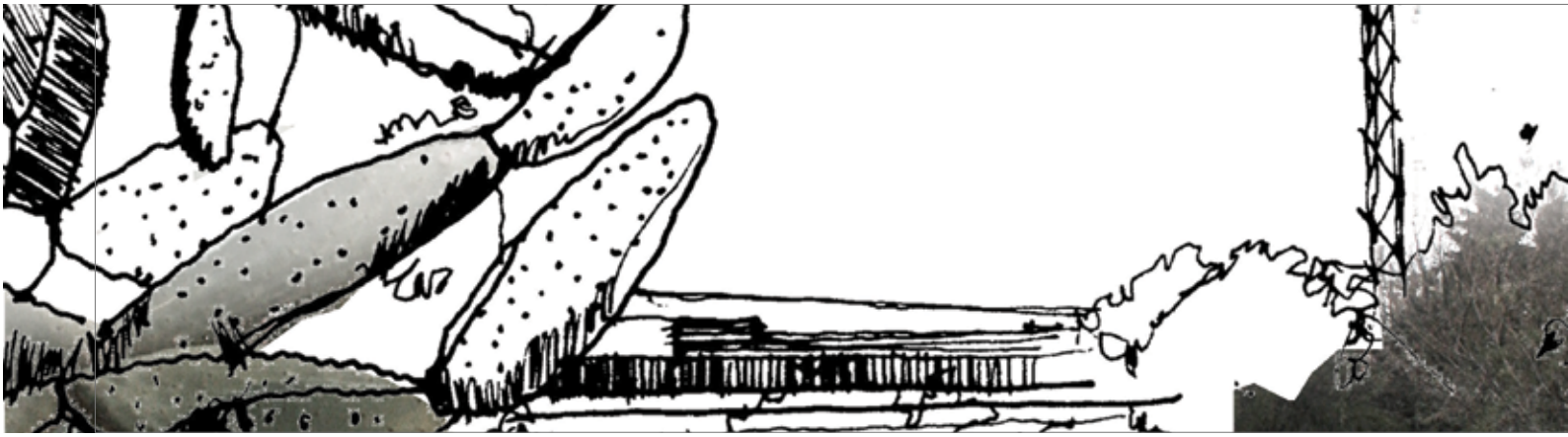
Topology: The topographic location is an informal parking space within the boundaries of the University of the Free State as well as the unused area next to DF Malherbe Road. The study of topology includes the site analysis of cognitive and qualitative information used to derive design possibilities. The understanding of place influences the architectural language of the project.

Typology: The type is classified as a public art gallery, archive and workshop. The study of similar building types will be investigated through precedent studies and case studies.

Morphology: The conceptual framework along with information of typology and topology is used to generate the morphology or form of the building. The making of a place is achieved through two main denominators: the position of the threshold on site and the influence of light.

Tectonics: The tectonics of a project refers to the 'art of construction'. The technical concept of the project is to punch light structured shafts into a stereotomic concrete shell. The structural concept is achieved through construction design.

PART 1



Research methodology

The research methodology is based on the primary problem statement of the project: What to design, for whom, in what location and how it should look. The client and brief will generate the location while the morphology is derived from research investigation.

The methods of research used in the design of the project can be categorized in categories of typology, topology, morphology and tectonics. Each research element will be explained through these distinctive categories.

The touchstone is that by which to test the design. The intuitive essence of the project portrayed in an abstract form.'

The touchstone captured the emotional goal of the project which is to intrigue and involve people other than artists into the functions of an art gallery.

The concept is the main idea which forms the spine of the development of all design decisions.'

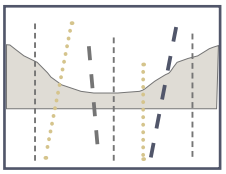
This project contains three separate design concepts which can be integrated into one main theme: resculpting non-place through framed movement.

The conceptual framework is the initial ideas formed through investigating precedent and case studies.'

The precedent studies for the project include the following buildings:
UJ Art Gallery
Red Location Art Gallery
Route 67
Circa Art Gallery

Case studies:
Gallery on Leviseur
KZN Society of Arts

1.1 RESEARCH METHODS



Literature review - 'Writings and critique.'

The literature review includes, but is not limited, to the ideas of the following people:

Michael Benedikt: Difference and the concept of 'ma', and hierarchy reversal.
Edward Casey: Physical edges, Mental edges and the in-between. Boundaries of the painting.
David Carrier: Poussin's paintings and the pictorial field.
Adrian Stokes, Stephen Kite: Process of carving.
Muzzonigro: Dwelling the threshold.
Martin Heidegger: The concept of dwelling.
Christian Norberg-Schulz: The classical landscape

Analysis - 'Critical analysis, cognitive analysis, interpretive analysis and creative reflection.'

The analysis of the project makes use of cognitive and qualitative information. This information is used for decision making.

Interview - 'Personal conversations with professionals, etc '

Angela de Jesus, curator at the Johannes Stegmann Art Gallery on the UFS campus.
Willem Boshof, world renowned artist and the UFS artist in residence, also a lecturer at the UFS Art Department.
Celeste van der Merwe, artist and art teacher.
Cari Niehaus, second-year art student at the UFS.
Martie Bitzer, artist, architect and lecturer at UFS Architecture Department.

Site investigation - 'Site analysis, including quantitative, qualitative and cognitive information.'

Quantitative information include real measurements of site, boundaries, maps, etc.
Qualitative information include measurements on site, such as noise patterns and pedestrian movement.
Cognitive information include the phenomenological experience of the site.

The process of defining the problem statements and aims for the project was initiated by an investigation into the typology and functioning of an art gallery. The primary challenges of the project were discovered during the interview with the client, who stated the problems with the current gallery (Johannes Stegman Art Gallery), and the lack of awareness of art on the campus of the UFS.

The investigation into the typology of the project created challenges with the function and in-between spaces of the project. The study of typology also revealed that the users of the project create a challenge as they are from different groups divided by a threshold on site.

The selection of the site was defined by the boundaries of the UFS and also the location of the art department on campus. The site had to interact with a public face, as well as with the students. In order to create an interactive space, as specified by the client, the chosen site is located next to the main pedestrian walkway on campus. The site presented physical parameters which can be overcome through the theoretical approach of dissolving the rigid boundaries.

The investigation into the morphology of the project was done through light studies, as light is one of the main form-denominators in a gallery space. The morphology of the project was therefore derived from a combination of the conceptual approach and the light studies.

The tectonic approach to the project was initiated by creating large uninterrupted spaces for art viewing. The challenges concerning the tectonics were derived from the morphology of the project.

The integration of the four aspects, typology, topology, morphology and tectonics, created the greatest challenge to the project as these aspects had to be combined into a single conceptual approach.

TYPOLOGY

The typology of the project is an art gallery which includes storage archives, studios and service space. The location of the building determined the client body and client representative for the project.

CLIENT

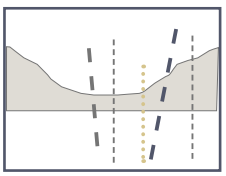
The University of the Free State requires an art gallery for permanent and temporary exhibitions. Angela de Jesus, the curator at the Johannes Stegmann Art Gallery on campus, is the spokesperson. The university as an educational facility requires that the project has an educational addition for students in the art department doing their PhD's in visual arts.

USERS

The proposed project will aim to provide a platform for users to interact with the collection of art that the university has to offer. The user group can be divided into two respective groups, namely the student body attending class at the UFS and the public passing through DF Malherbe Avenue and visiting the gallery from outside the campus. The intent is that the building can be utilised in a way to integrate these two different user groups.

The user group according to SANS is categorised as C1 and C2:
C1 – Exhibition Hall Occupancy where goods are displayed to be viewed primarily by the public.
C2 – Museum Occupancy comprising a museum, art gallery or library.

1.2 PROBLEM STATEMENTS AND AIMS



INITIAL BRIEF

The requirements from the client are the development of an adaptable art centre to integrate the arts on campus with students from other disciplines. The centre should encourage dialogue with its visitor and also allow meeting spaces for people to come together. Keywords regarding the requirements of the client:

The design of an art centre can be adapted to display a large range of different size artworks. A display space for installation art and a sculpture garden will be included. It requires workshop space for the development of the community. The design of an architectural intervention for the integration between the student body and the public is required.

PROBLEM STATEMENT: TYPOLOGY

The typological challenge is the hierarchy view of art museums where the viewer is removed from the art because the building, as well as the art, is placed on a pedestal.

The preservation and protection of art are of great importance in an art gallery and therefore constant temperatures and indirect lighting is part of the design of the gallery. Facilities required by an art gallery include collection facilities with sufficient storage space. The storage should include separated allocated areas for sculptures, paintings, etc, with protection against water leakage, fire, etc.

Circulation is another challenge in the typology of the project. The exhibition space should be designed to allow the flow of circulation between people entering and exiting. The exhibition space should be wide enough to allow visitors to view the art from a decent distance without people moving between the visitor and the artwork.

Lastly, the gallery should be approached as an interactive space rather than a destination building.

AIMS

The primary aim is to present a functional and interactive design to suit the needs of the client while dissolving the rigid boundary of the UFS without compromising the safety of students.

The aims of the typology include the integration of interior and exterior space without compromising the indirect lighting needed for the gallery.

PROBLEM STATEMENT: TOPOLOGY

The topography of the site was created by excavating large masses in order to build a road through the site. The excavations created boundaries on the site. The part of the site that was carved away too far can be seen as a non-place, as is it neither utilised by the campus, nor the road. The non-place is a challenge for this project.

The thresholds on the site present more challenges for the project. The topography on the southern part of the site include rock formation that can be incorporated for its sculptural quality. The road, which lead across DF Malherbe Road with a bridge, poses the boundary on the southern elevation of the site.

The northern edge of the site was closed off because the ground belongs to Tempe for their army support base. This is another physical boundary that cannot be crossed.

The eastern side of the site ends where DF Malherbe Road begins - the area between the road and the university's fenced boundary can be seen as a non-place, as it is neither utilised by the campus, nor the road.

The boundary of the western elevation is the same road that concludes the southern side of the site.

As the site was closed off for security reasons, popular pedestrian routes vanished and had to be re-routed, as seen in Figure 3 and 4.

The site contains a 4m slope from north to south and a 3m step from east to west.

AIMS

The primary aim is to ensure a responsible approach to the context and surrounding buildings. The building will be integrating with the site through gently sculpting the ground.

The architectural language of the project aims to be in unison with the existing language on the campus, while creating an element of excitement in order to invite visitors to the gallery.

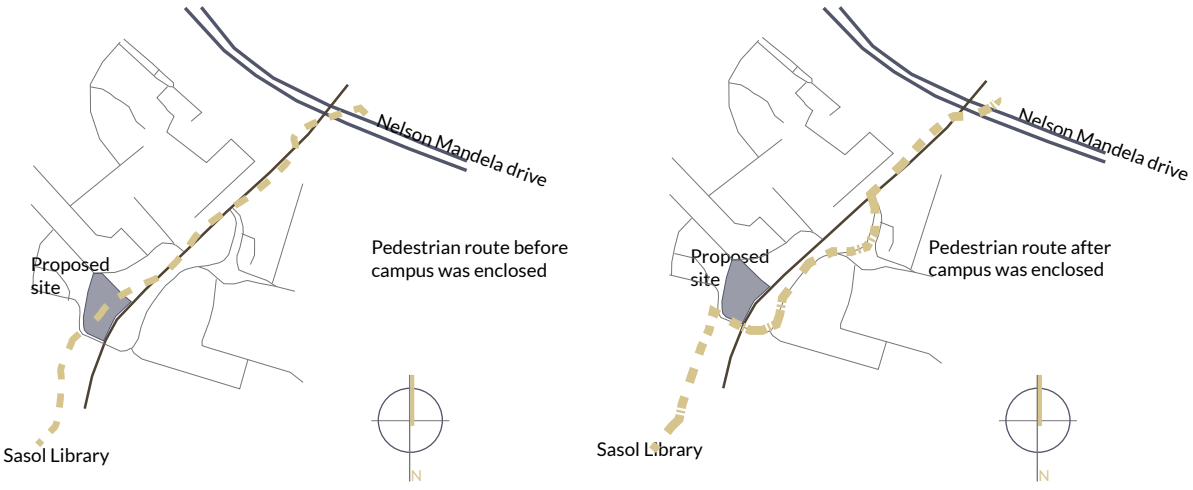
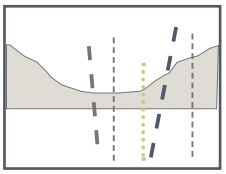


Figure 3 and 4: Change of pedestrian routes

1.3 PROBLEM STATEMENT AND AIMS



MORPHOLOGY
PROBLEM STATEMENT

The use of natural indirect light is one of the challenges of the form-giving of the project. Windows cannot be placed anywhere as it will allow direct sunlight which may damage the artworks.

The structural system used to create large uninterrupted spaces will contribute to the morphology of the project.

The placement of the building on the periphery of the site allows morphological challenges as the boundary stretches from east to west creating the longitudinal elevation facing west.

Another challenge with the morphology of the building is the deconstruction of hierarchy. Although high volume exhibition space is needed, it should allow the viewer to relate to the scale of the building in a humane manner.

AIMS

The morphological aim is to create a form which allows indirect light without being interrupted with columns. A second morphology aim of the project is to create a building that corresponds to the existing architectural language of the context.

The aim of the placement of the building on the site is to create a longitudinal building with a main circulation spine that stretches to the ends of the building on either sides. All functions are then accessed from the main circulation path.

TECTONICS

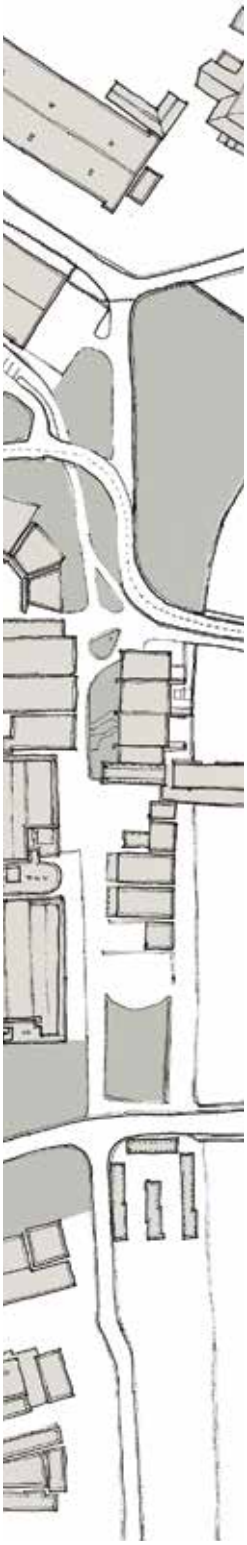
PROBLEM STATEMENT

The tectonic approach to the building is linked to the morphological approach which is to create a longitudinal exhibition space without interruption and enlightenment by natural indirect light. This requires a structure with long spans.

AIMS

The aim of the tectonic approach to the project is to design a structural system and detail that corresponds to the overall design concept of the project. The tectonic systems must be functional for a gallery space with all the services needed. The project aims to achieve the necessary standards for the preservation and viewing of art while challenging the concept of an art gallery as a white box.

The detailing and articulation of the tectonic elements are to synthesize with the conceptual framework of sculpting space.



PART 2

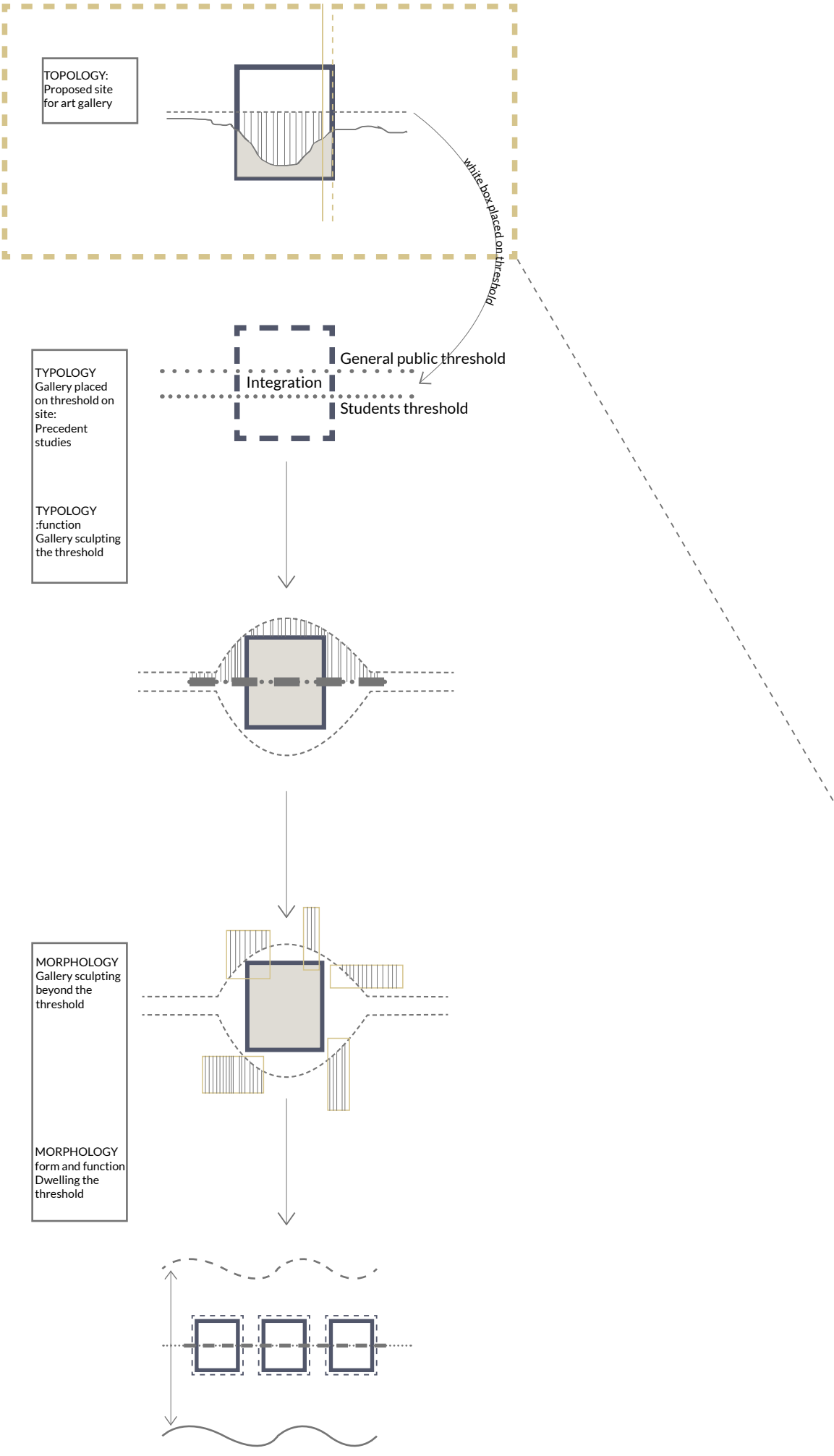
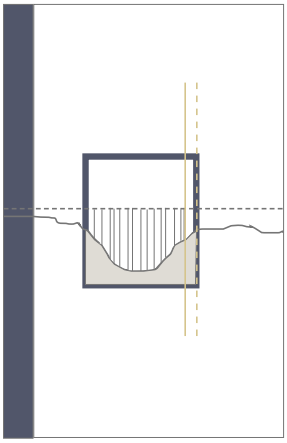


Figure 1: Explanation of document structure

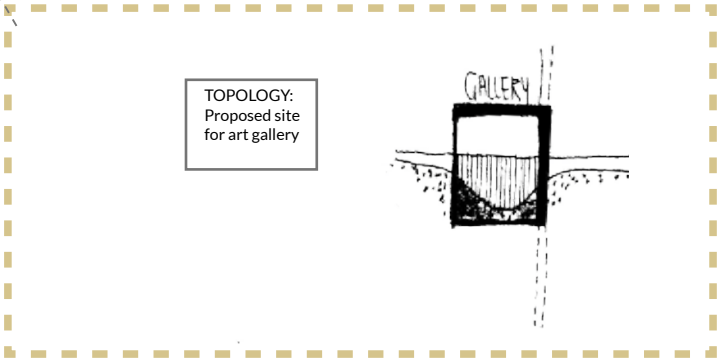
2.1.1 TOPOLOGY



Topology: Deconstructing the edge

The site analysis investigates the University of the Free State as a large site within the context of the city. The campus is closed off from the city and therefore sets certain boundaries. The site analysis of the project investigates the quantitative boundaries of the site as well as the mental thresholds it sets. The boundary of the university can be seen as the frame of the campus. The pictorial field within the frame extends beyond the boundary, as it is porous to students. The mental threshold to the campus is caused by the process that a visitor needs to go through in order to enter the campus.

The site for the proposed project is situated on the periphery of the campus, allowing the proposed gallery to be a part of the frame. In this way, the gallery will form part of the campus as well as the city.



TOPOLOGY:
Proposed site
for art gallery

The first stage of the argument is initiated by the investigation of the site through a quantitative and qualitative site analysis

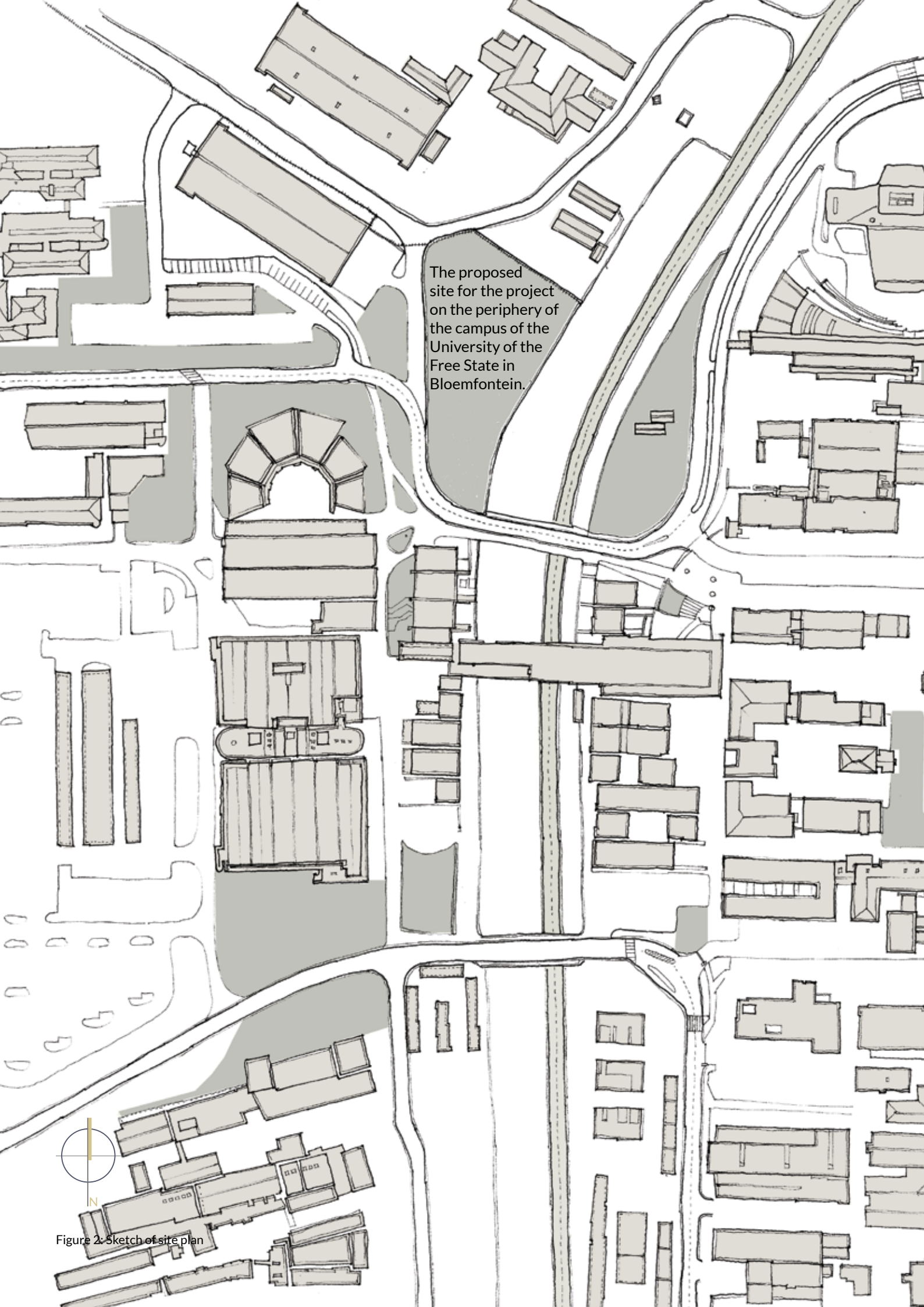


Figure 2: Sketch of site plan

2.1.2 TOPOLOGY

SITE ANALYSIS

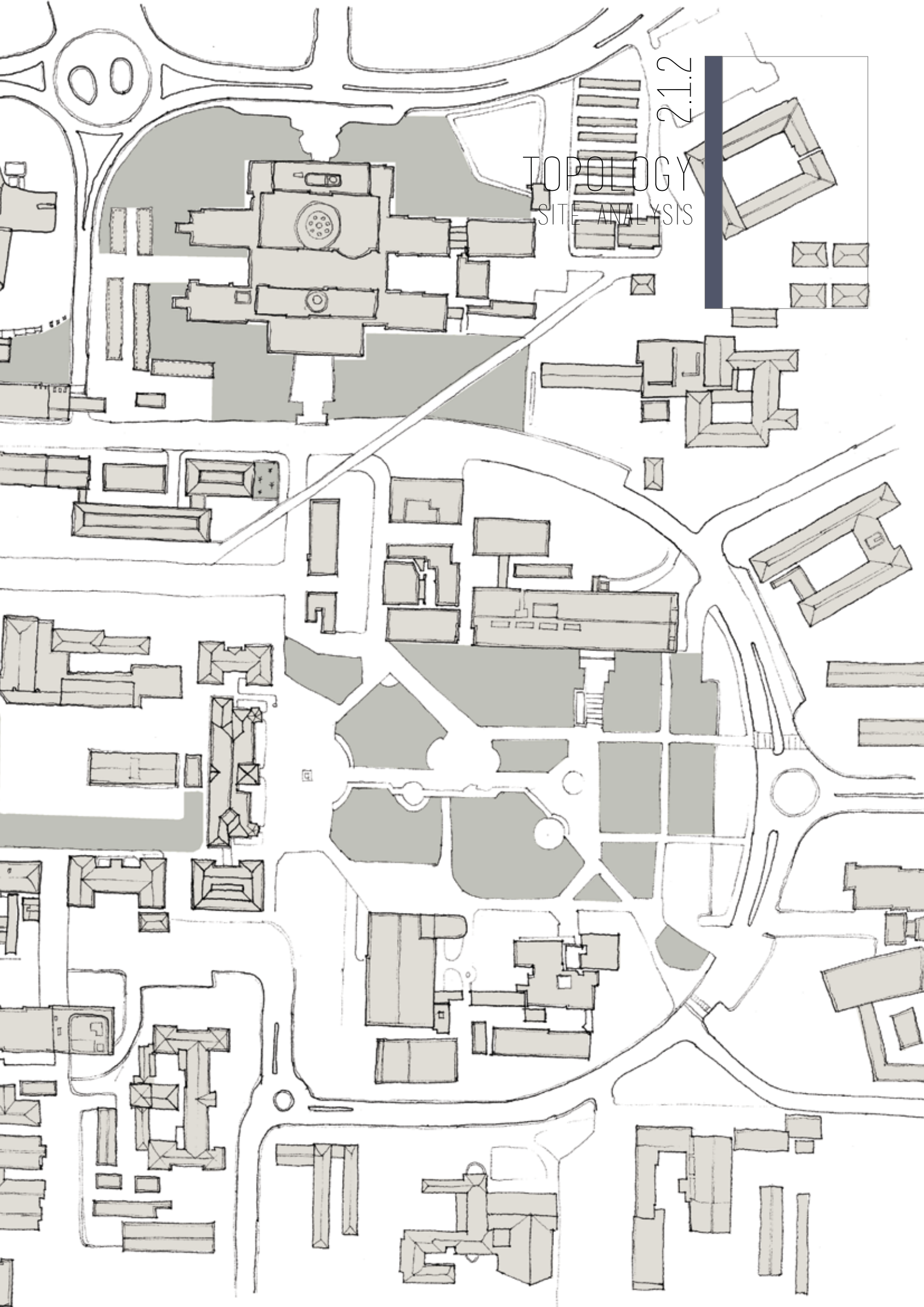


Figure 3: Map of Bloemfontein with site shown in circle

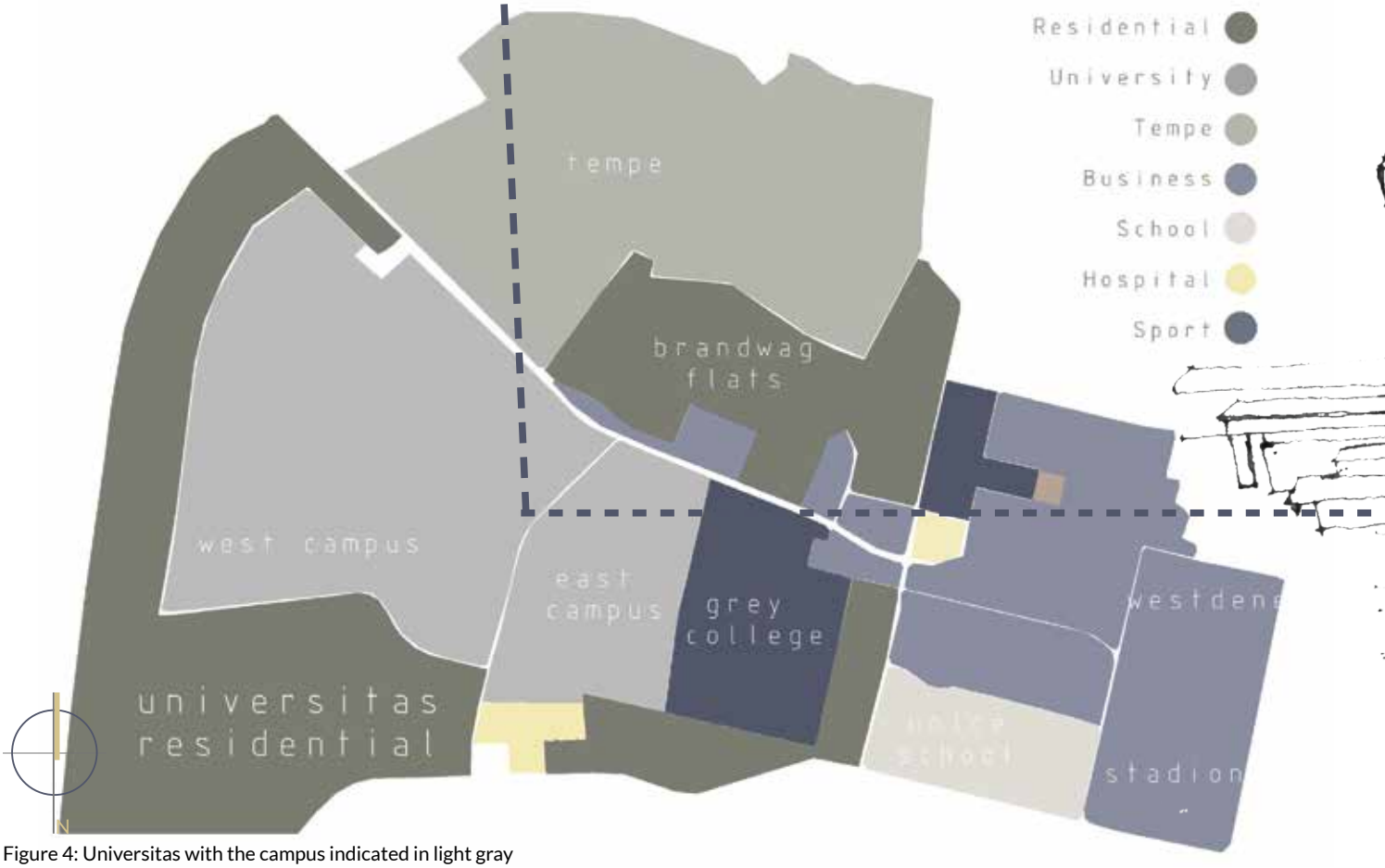


Figure 4: Universitas with the campus indicated in light gray

2.1.2 SITE ANALYSIS
Macro-context

The site for the chosen project is situated on the campus of the University of the Free State in Bloemfontein.

The image on the left shows the context surrounding the campus of the University of the Free State. The University is surrounded by residential and commercial areas which make DF Malherbe Road the road crossing through the campus, which is an ideal way from residential areas to commercial areas.

The bottom image shows a bird's eye view of the site. The site is surrounded by buildings from different eras, creating an interesting dialogue of architectural language.

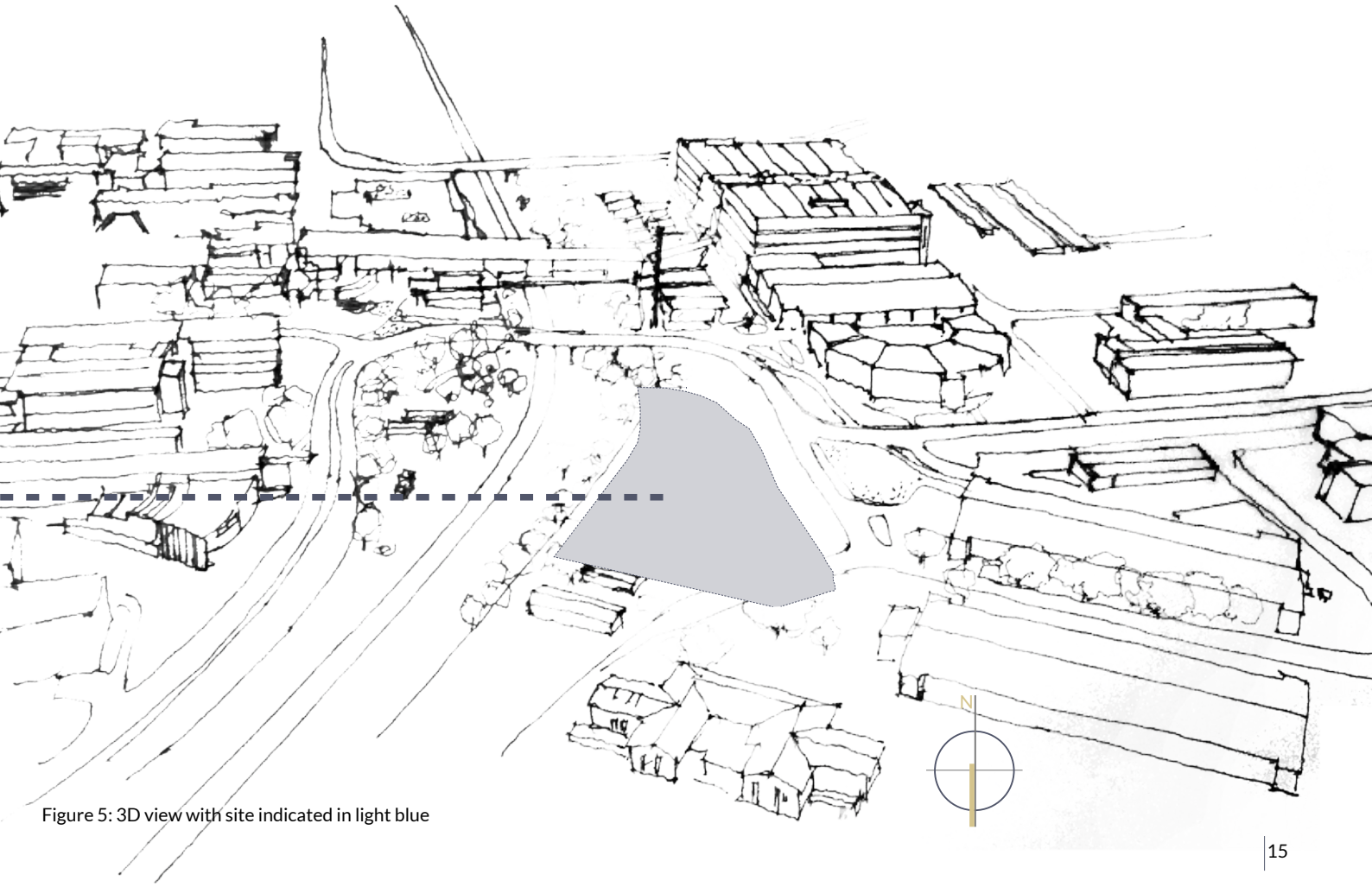


Figure 5: 3D view with site indicated in light blue

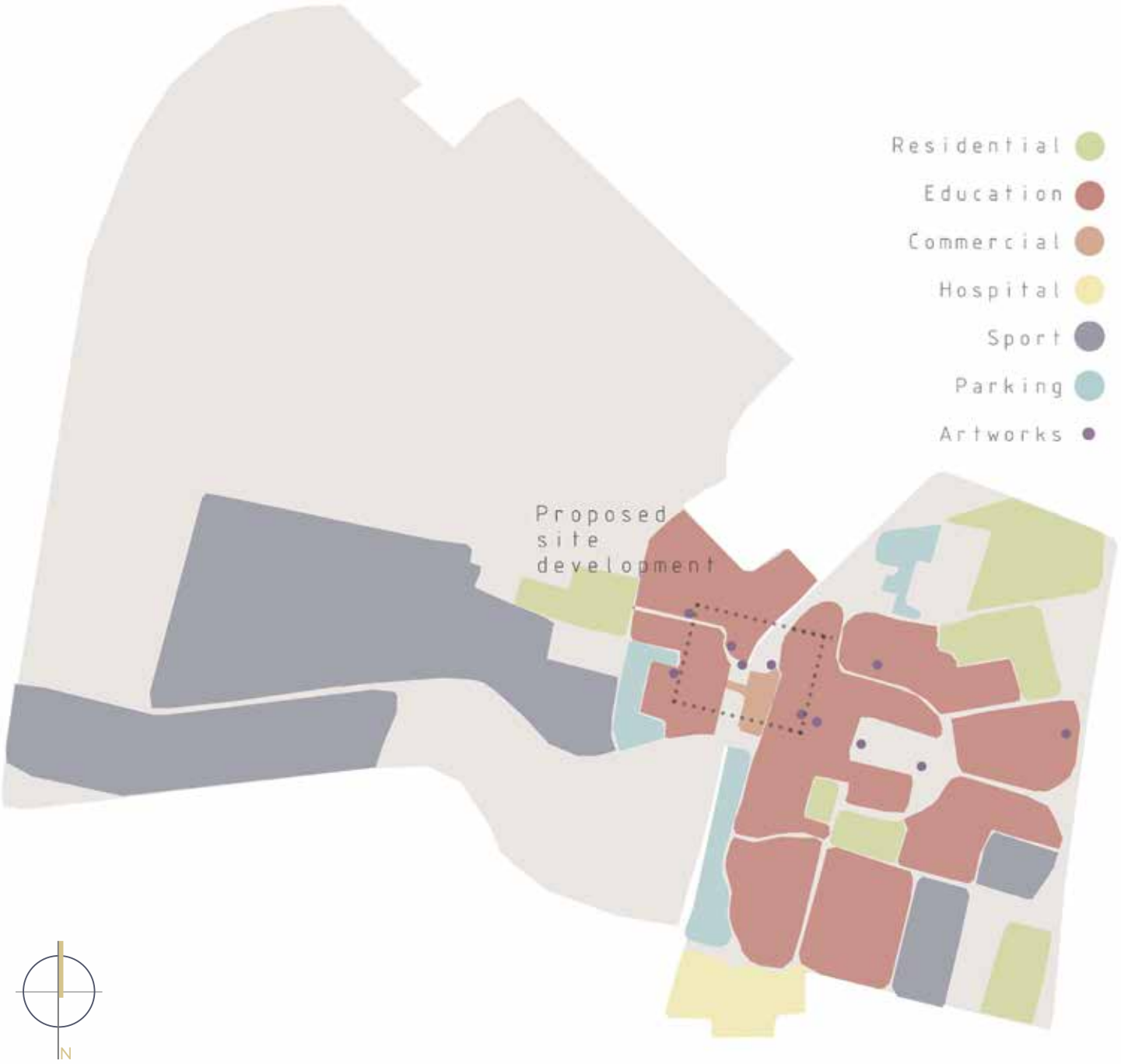


Figure 6: Regions on campus

Figure 7: Allocated parking areas surrounding site

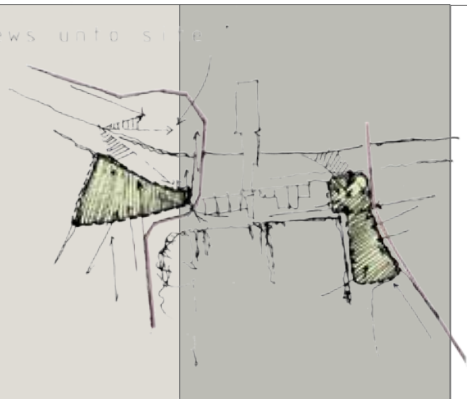


Figure 8: Views unto site

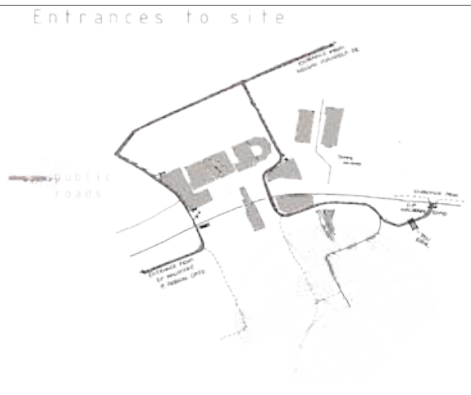
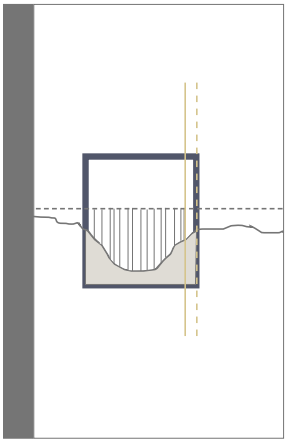


Figure 9: Entrances to site

2.1.2 SITE ANALYSIS



Campus layout

The campus is divided into two parts separated by DF Malherbe Drive. This separation is overcome by the two vehicle and pedestrian bridges and also the Thakaneng Student Centre bridge. The site for the proposed project is situated next to DF Malherbe Road in order to allow interaction of students as well as the public.

As seen on the large map on the left, the site is located within the educational center of the campus. The educational block (red) is the place where most movement and activity occur. The site is ideal as it allows a pedestrian pause space in between classes.

The three maps in the circles (figure 10, 11, 12) indicates the allocated built and unbuilt spaces. The site is an open and informal parking space in-between academic buildings. It is located opposite to the computer and study lab and en-route to the art department.

The site is surrounded by roads, making it easily accessible.

Figure 10: Public roads

Figure 11: Build form and green space

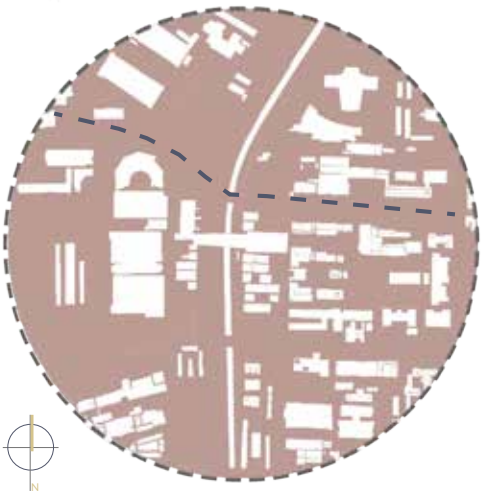


Figure 12 Open spaces with dotted line showing route to art department

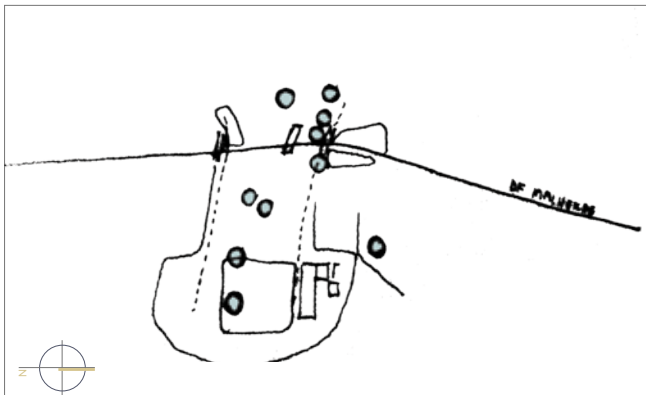
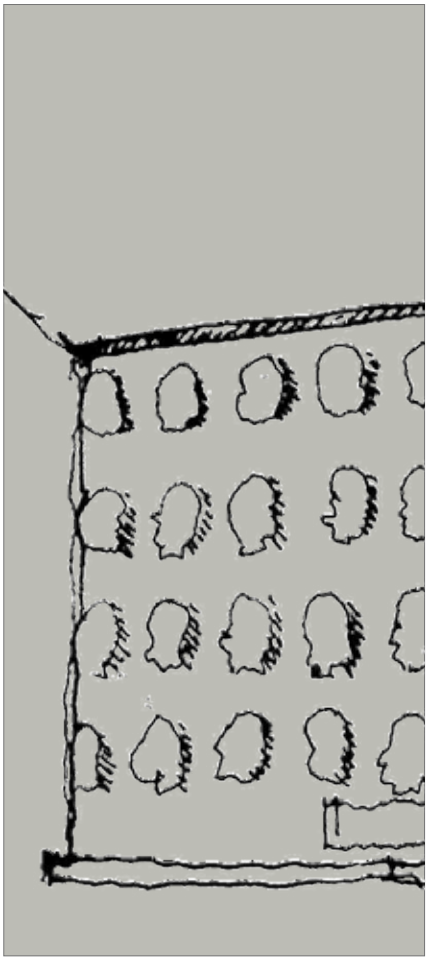


Figure 13: Positions of artworks surrounding proposed site



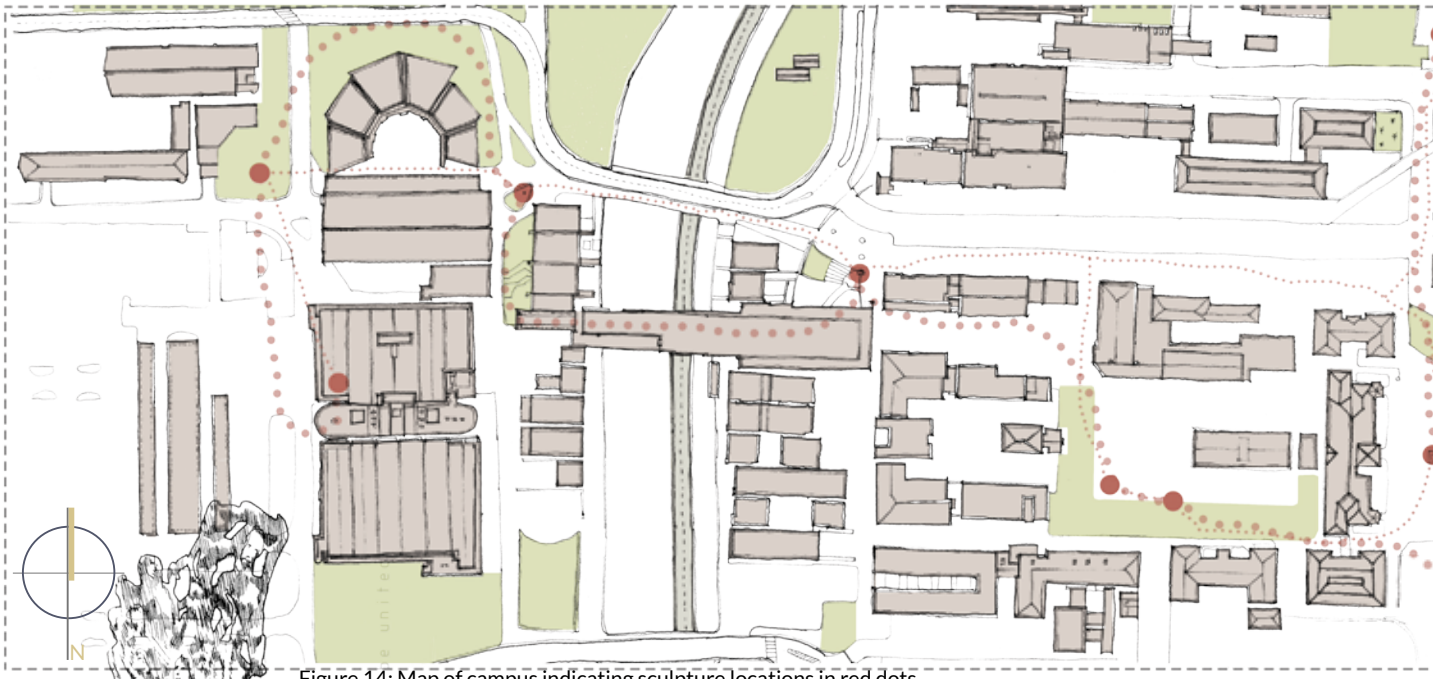


Figure 14: Map of campus indicating sculpture locations in red dots

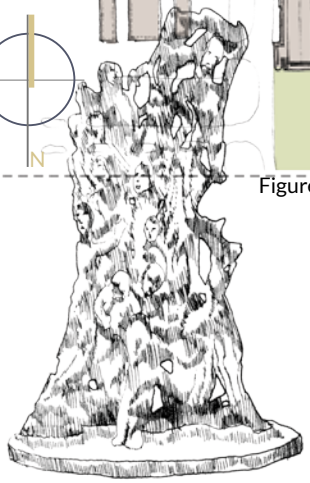


Figure 15: Sketch of Unity is power artwork

Figure 16: Sketch of Seeds artwork

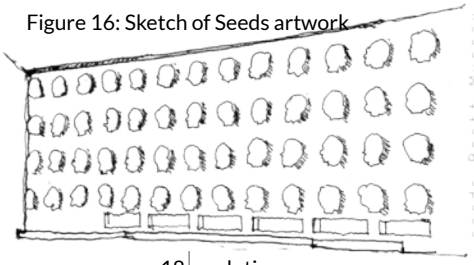
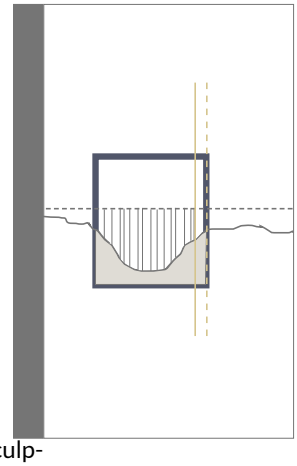


Figure 17: Sketch of Walking fish artwork

2.1.2 SITE ANALYSIS
Sculptures on campus



The sculpture project on campus includes a sculpture walk. The proposed site is alongside the way of the sculpture walk and two sculptures can be seen from the site. The proposed gallery will form part of this route and act as a nodal point for assembly. The sculpture walk can also extend into the existing project as the project includes a sculpture garden.

The sculptures were done by artists to create an unique and permanent public sculpture collection that is considered being context specific on the campus. The project mainly focuses on the set up of diverse sculptures that promote appreciation of cultural differences. Through this, a sense of belonging is initialized (De Jesus, 2016).

The sculptures are located at key places to entice dialogue and multicultural experiences between students.

The sculpture, Seeds by Brett Murray (figure 16), is opposite to the proposed site. The artwork consists of 52 laser-cut steel heads. The heads celebrate the youth and multi-cultural context of the university. The seeds portray a symbolic meaning of the sameness and difference needed for a seed of knowledge to grow. 'Unity is Power' by Noriah Mabasa (figure 15) also celebrates the gathering of many diverse people (De Jesus, 2016). These two sculptures are incorporated into the design through the allocation of spaces where people can come together to view art.

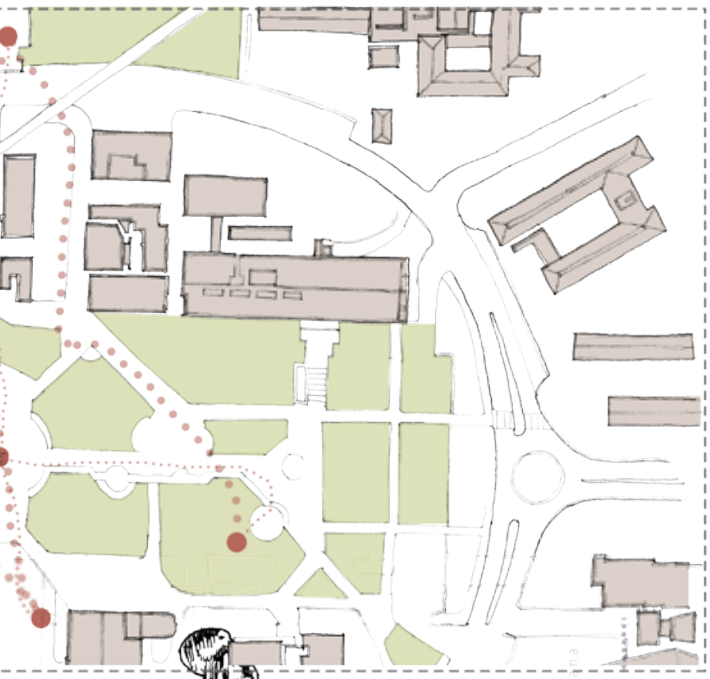


Figure 20: Sketch of Bull rider artwork

Figure 18: Sketch of Adam and Eve artwork

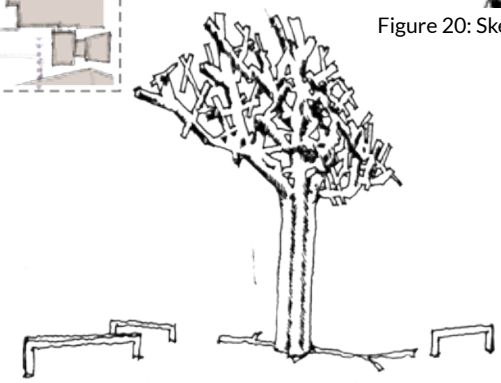


Figure 19: Sketch of Tree of knowledge artwork

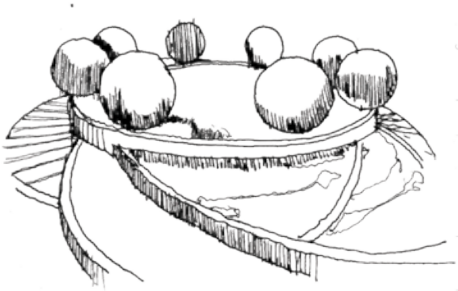


Figure 21: Sketch of Philosophers circle artwork

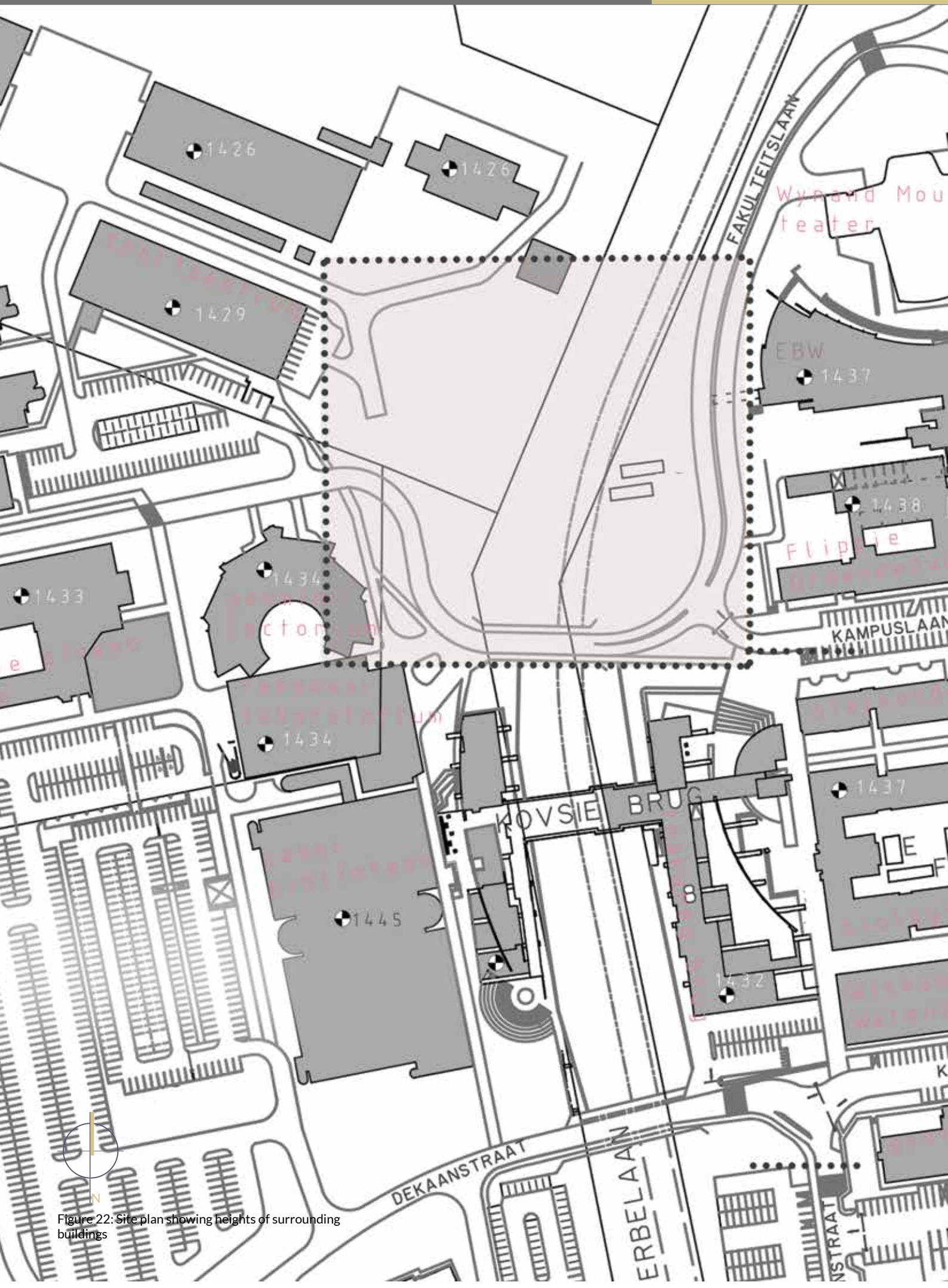
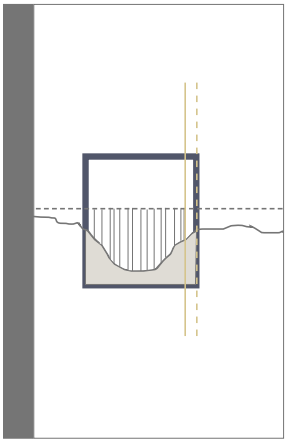


Figure 22: Site plan showing heights of surrounding buildings

2.1.2 SITE ANALYSIS
Quantitative information



The boundaries present on the site include the building line, the site boundary, the university boundary, a second municipal building line and the road boundary. The boundaries are shown in the figure 24 below.

The shadow boundaries shown in figure 23 does not have any influence on the site.

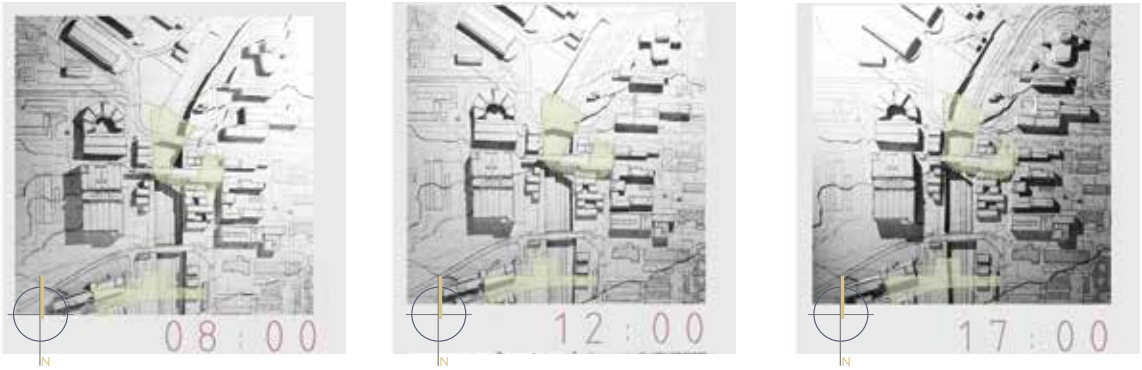


Figure 23: Shadow study of the effect of surrounding buildings on site

Figure 24: Boundaries present on site

Figure 25: Main pedestrian walkway across bridge next to site.

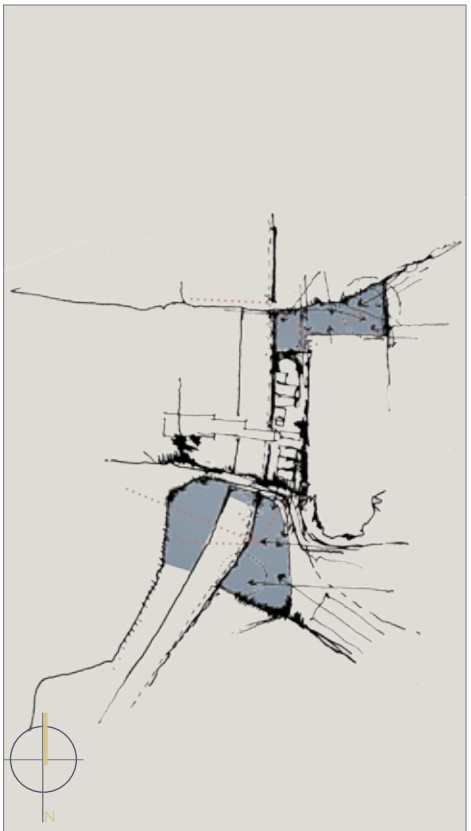
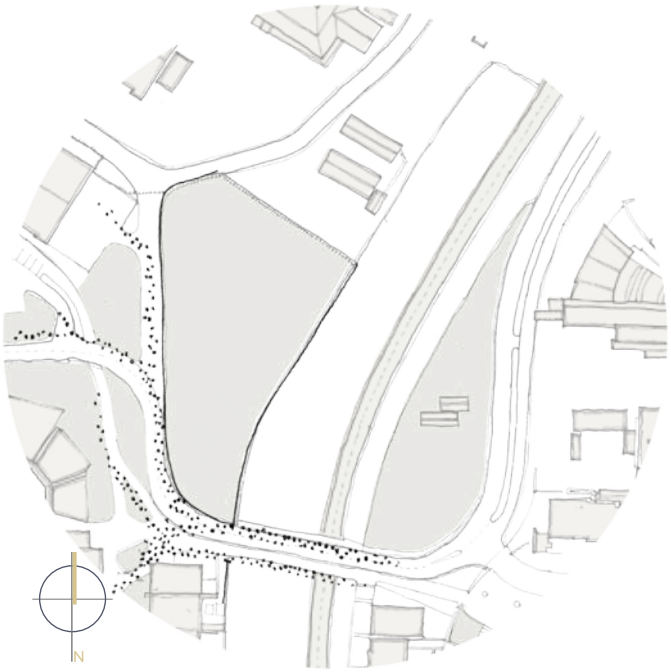


Figure 26: Nodal points on campus with pedestrian movement in-between.



Current pedestrian movement on proposed site.

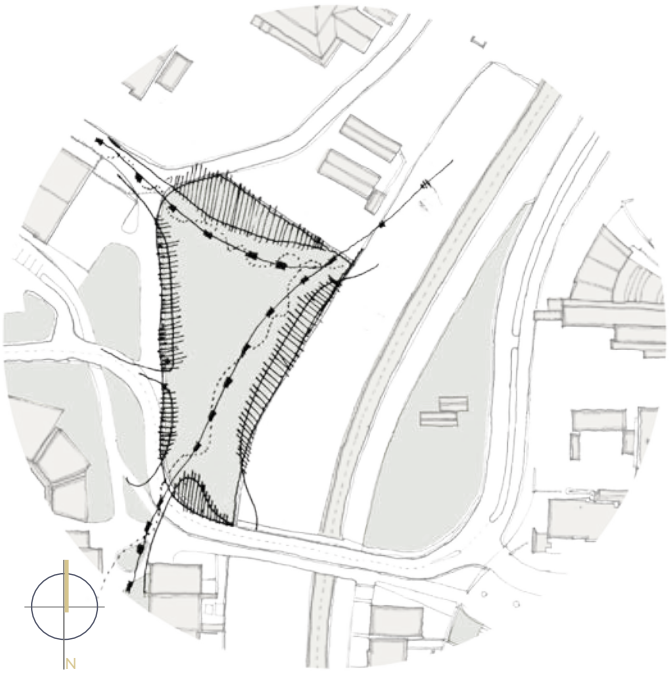
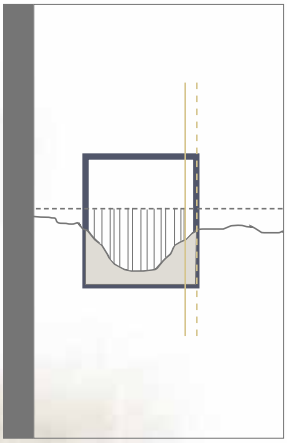


Figure 27: Proposed pedestrian movement on developed site.

Figure 28: Existing boundary on site blocking pedestrian movement.

2.1.2 SITE ANALYSIS

Pedestrian movement and micro site



The main pedestrian walkway on campus neighbors the proposed site. The pedestrian movement allows the proposed gallery to become a transient space rather than a destination building.

The existing route between the Thakaneng Bridge and the art department will be reinforced by the proposed landscaping of the art gallery.

Pedestrian movement between the campus and the surrounding Bloemfontein is restricted to the three entrances to campus. The proposed project will allow a fourth entrance which is conveniently placed between Nelson Mandela Drive and the Sasol Library.

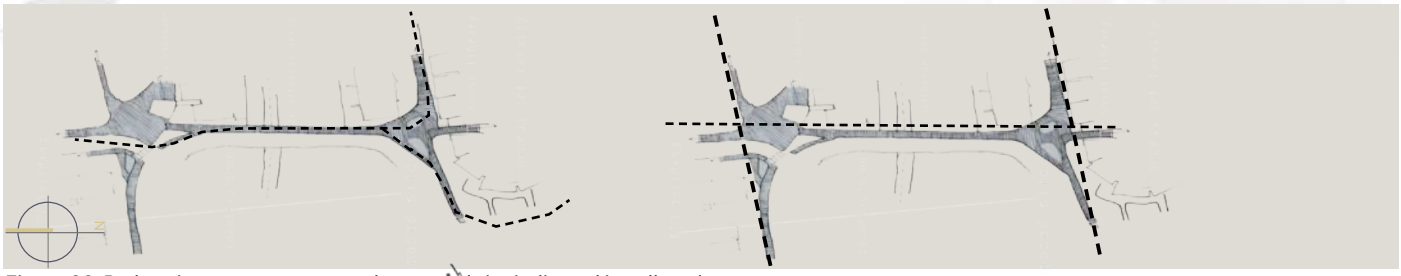


Figure 29: Pedestrian movement around proposed site indicated in yellow dots

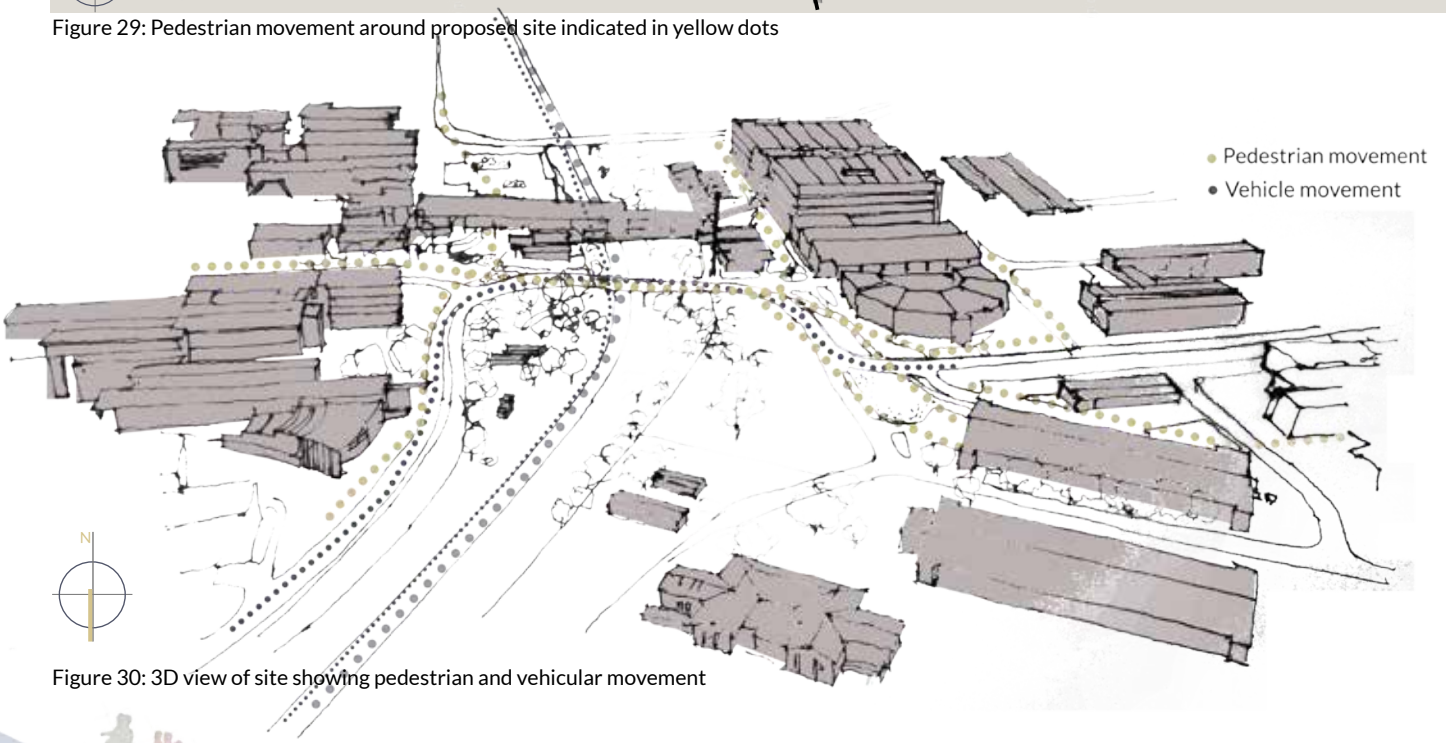
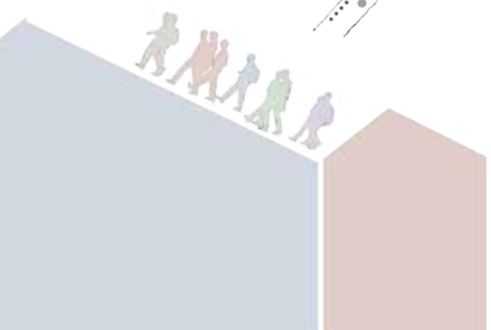


Figure 30: 3D view of site showing pedestrian and vehicular movement



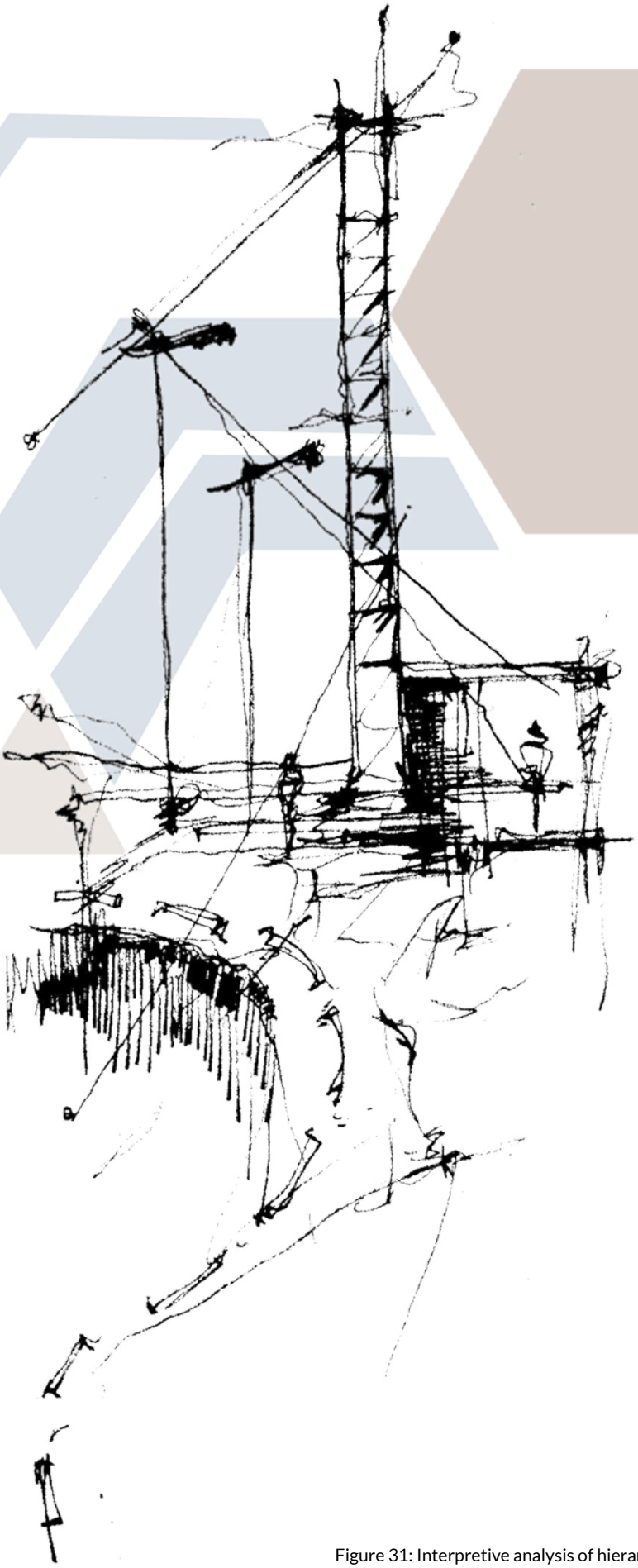
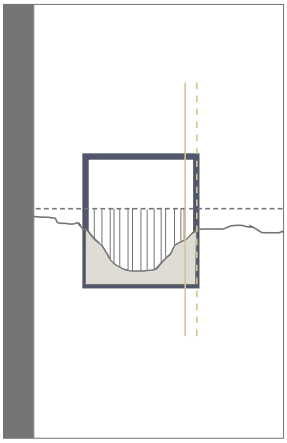


Figure 31: Interpretive analysis of hierarchy on site

2.1.2 SITE ANALYSIS

Qualitative information



The qualitative information includes the cognitive exploration of the site. The image on the left shows the interpretation of elements visible from the proposed site. The road leading past the site suggest a mental boundary between the site and the student centre opposite the road. The cellphone tower and street lights suggest hierarchy on the site. The site contains a sculptural quality as it went through a carving process when being formed.

Figure 32 shows the connection to the existing building across DF Malherbe Road. The building opens up toward the road and allows views of its interior.

The textures on site include existing paving, stones, and vegetation.

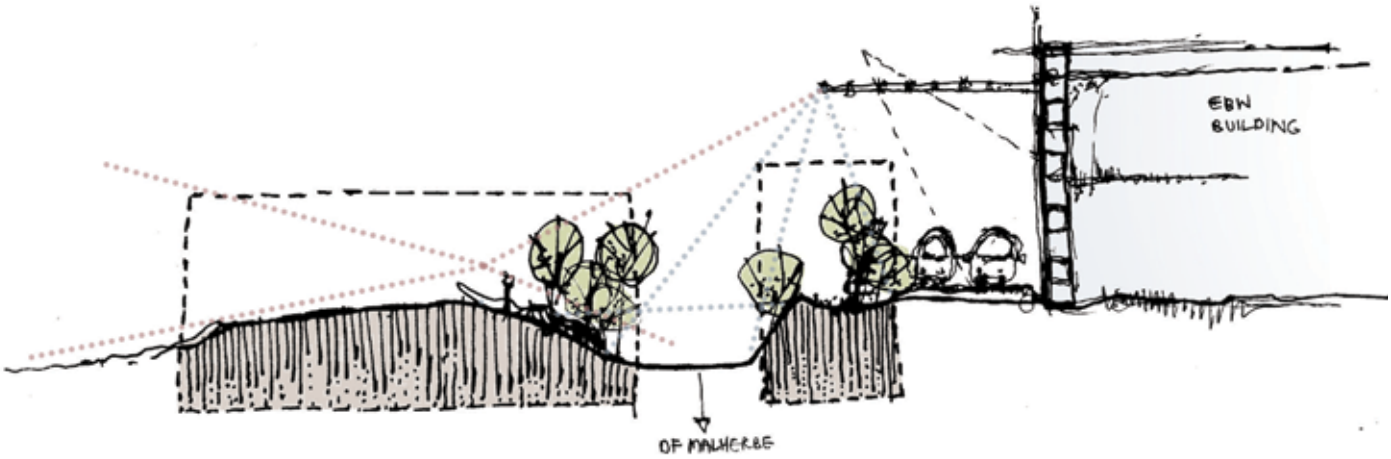


Figure 32: Connection to the existing buildings surrounding the site

Figure 33: Textures on site

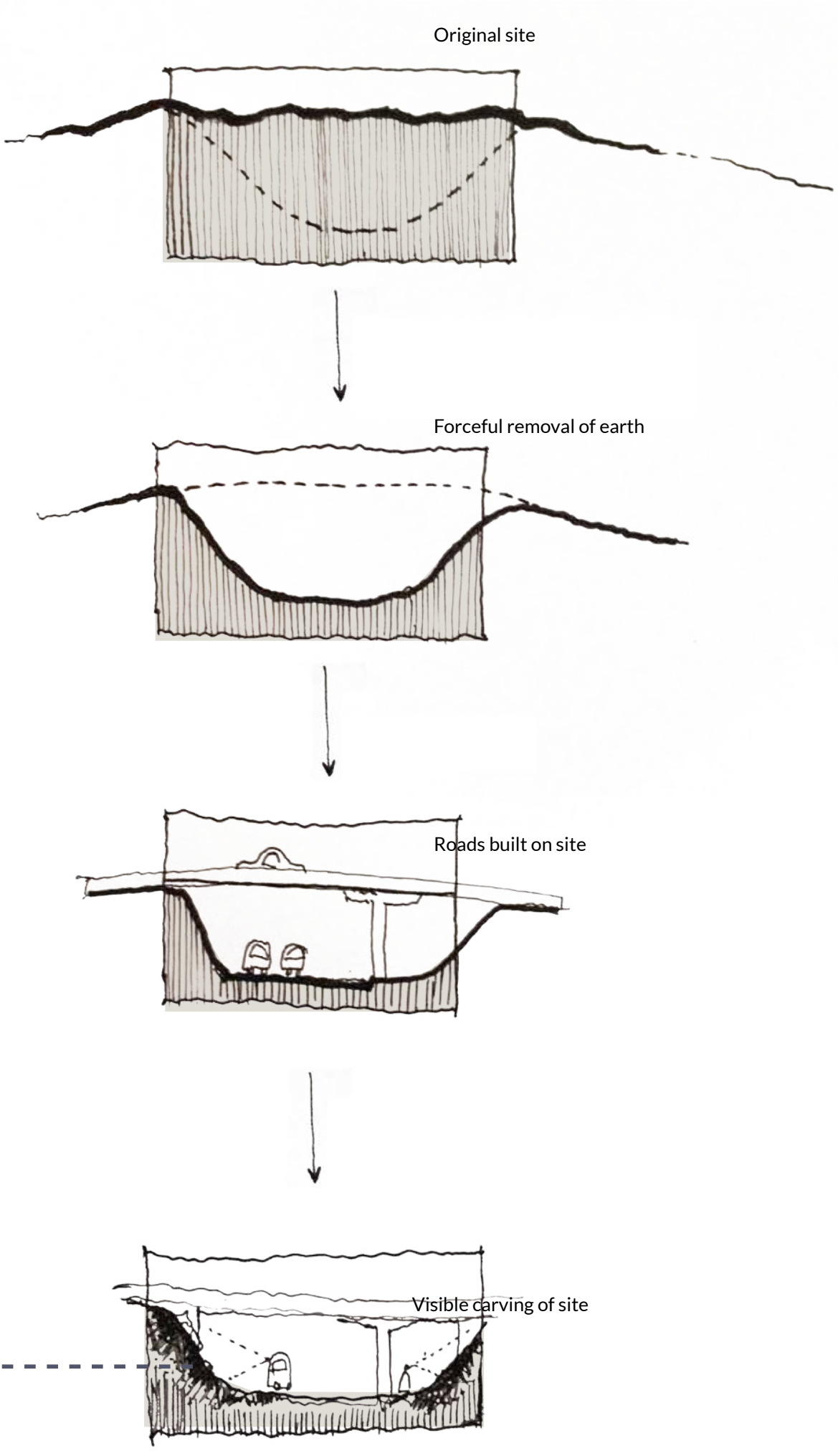
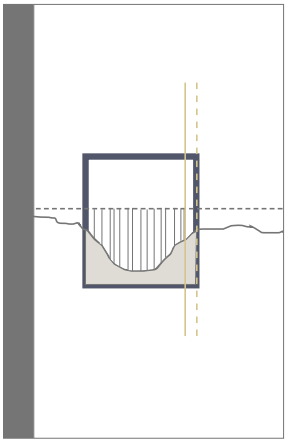


Figure 34: Process of carving the site

SITE ANALYSIS 2.1.2

Qualitative information



The formation of the site can be described as similar to the creation of a sculpture. The original site consisted of a block of rock formation. Through the creation of DF Malherbe Road, the site was sculpted to allow a clear path through the hill. Any unnecessary material is carved away.

The process of carving is visible at the rock formations on the sides of the road. Figure 34 shows the carved sides of the site.

This method of the making of places gives the site its sculptural qualities which will form part of exhibition space.

Figure 35: Carving process as seen on site from southern elevation

Figure 36: Carving process as seen on site from northern elevation

Figure 37: 3D view of site with DF Malherbe drive indicated in dark blue and Campus road indicated in brown

The images below are suggestions of the form that the building may take on the proposed site.

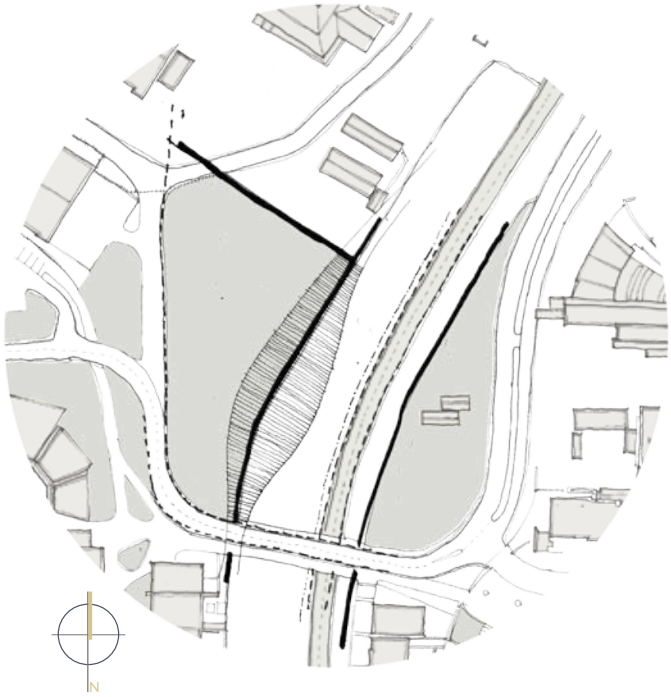


Figure 38: The development around the boundary of the UFS is shown in the image above.

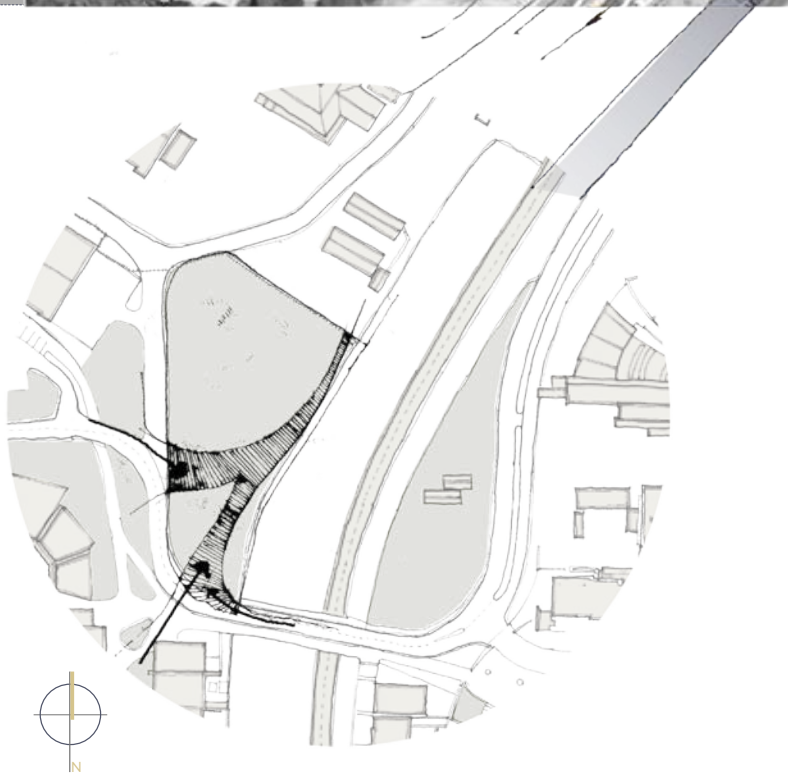
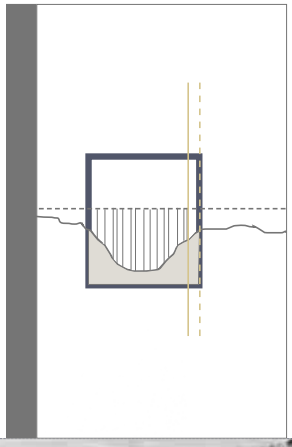
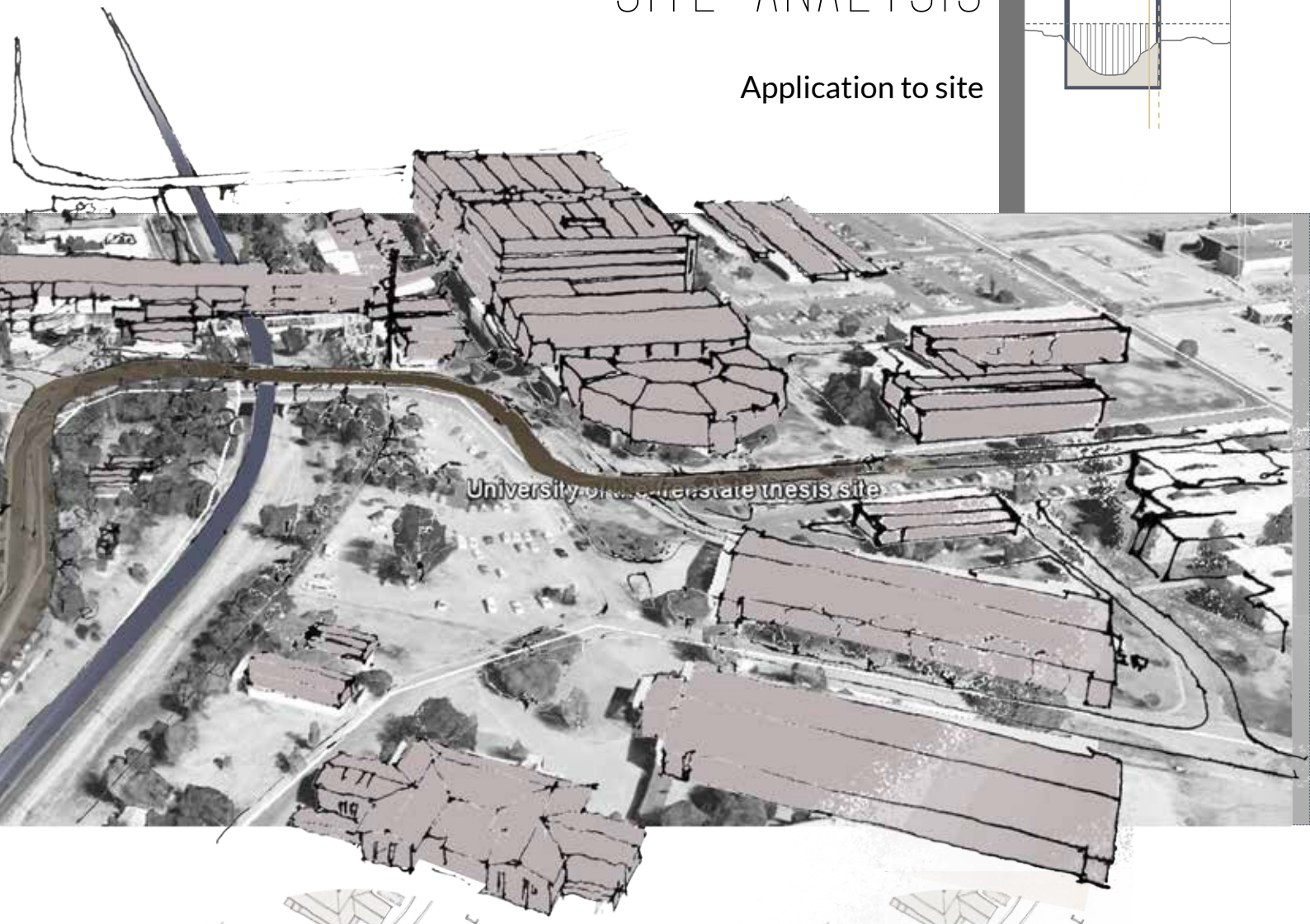


Figure 39: Entrances to site as potential morphology .

2.1.2 SITE ANALYSIS

Application to site





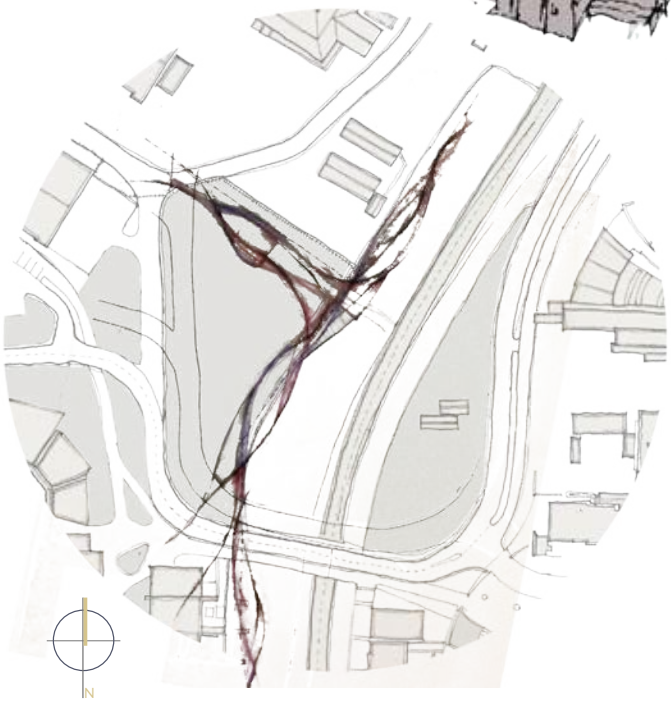


Figure 40: The boundaries of the site and possible development beyond them.

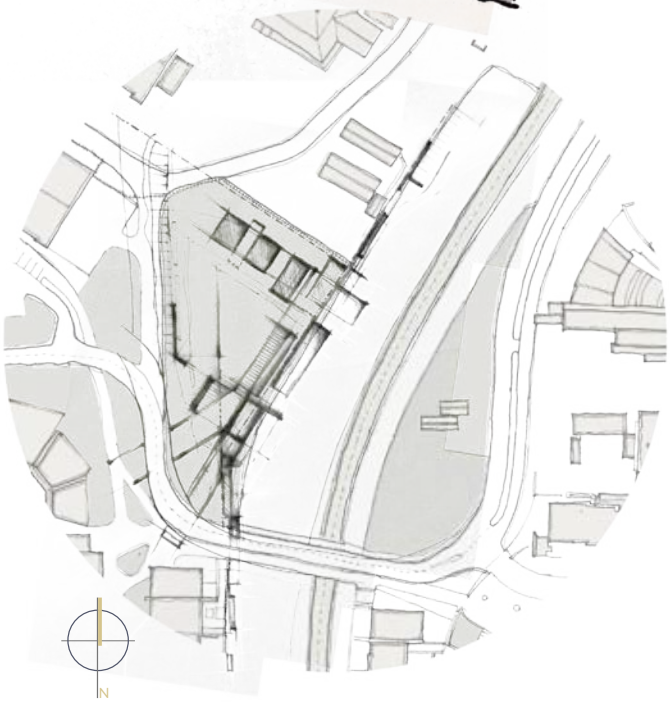
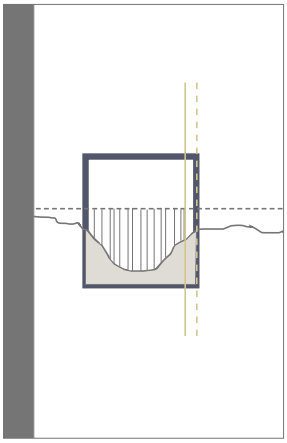


Figure 41: Typological placement of functions on site.

Figure 42: View from site

SITE ANALYSIS

Vegetation on site

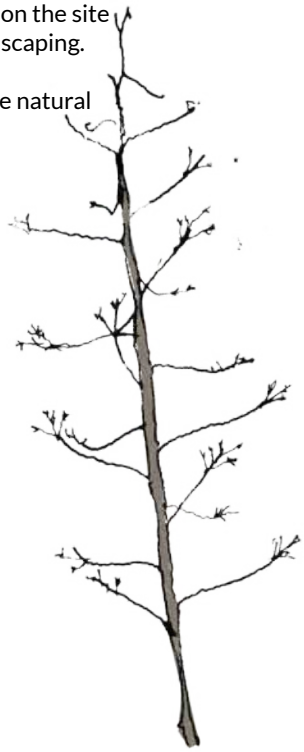


The vegetation on the site contributes to the sculptural quality of the site. The large cactus plant on the site will form part of the sculpture garden. The veld grass will be preserved as part of the natural landscaping.

The proposed building will be developed around any existing trees on site in order to preserve the natural vegetation. Proposed vegetation will include indigenous trees and scrubs. Figure 43 shows the vegetation currently found on site

Cactus

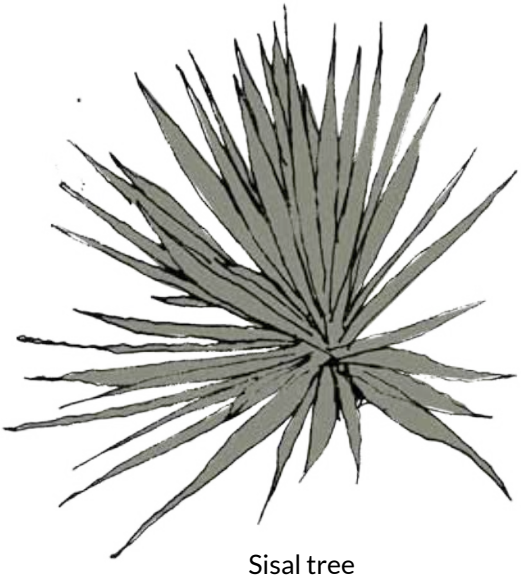
Karee tree



Sisal tree

Karee tree

Veld grass



Sisal tree

Figure 43: Vegetation on site

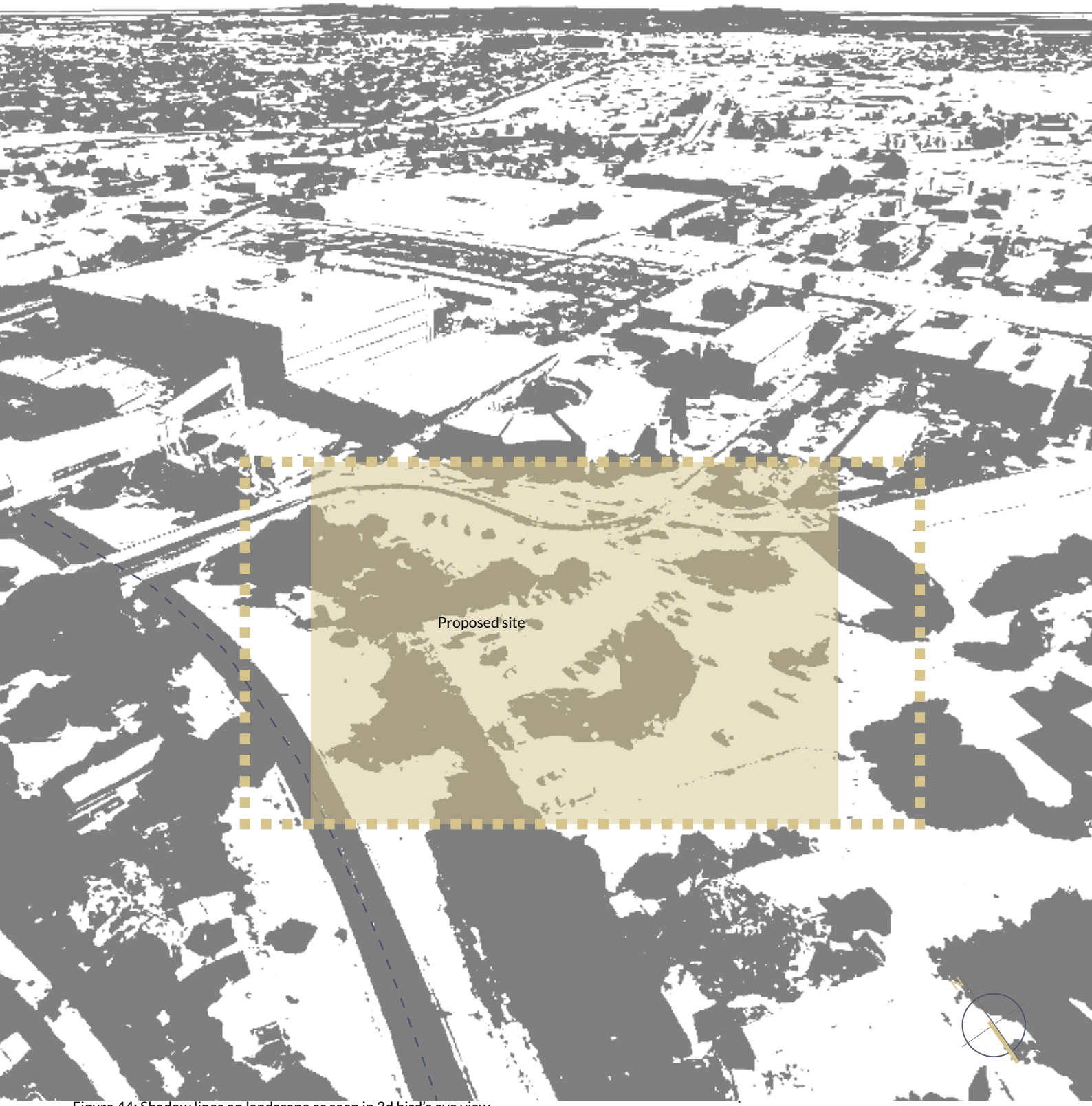


Figure 44: Shadow lines on landscape as seen in 3d bird's eye view

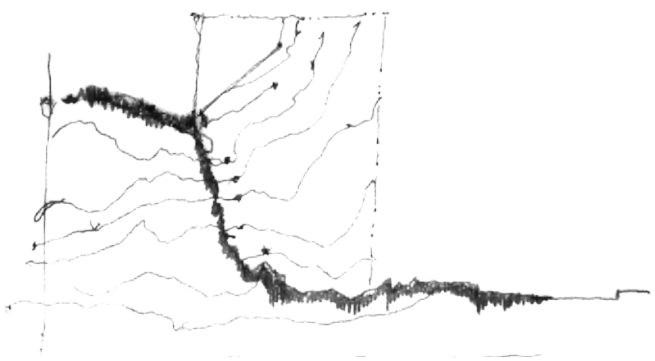


Figure 45: Effect of contours on shadow casting on site

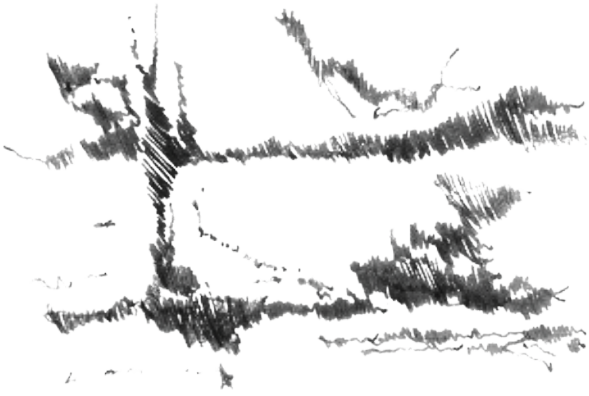
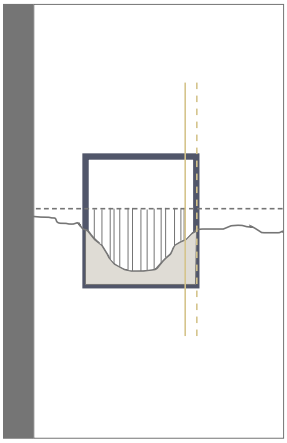


Figure 46: Classical landscape sun casting patterns on rock formation

2.1.2 SITE ANALYSIS

Classical landscape



The proposed site for the art gallery is classified as a classical landscape. The characteristics of a classical landscape include a warm temperate area with bright sun light.

The sunlight has a form-giving quality. The sculptural light allows the architecture to contain strong shadow lines. The typical architecture in a classical landscape adapts to the change in climate.

The layout of the classical landscape architecture follows the natural topography. The slope of the site will therefore be incorporated into the design of the building.

The classical landscape gives the perfect opportunity for light to sculpt the building.

"The earth sculpts the horizon without drama while the golden light of the sun answers gently" (Norberg-Schulz, 1980:47).

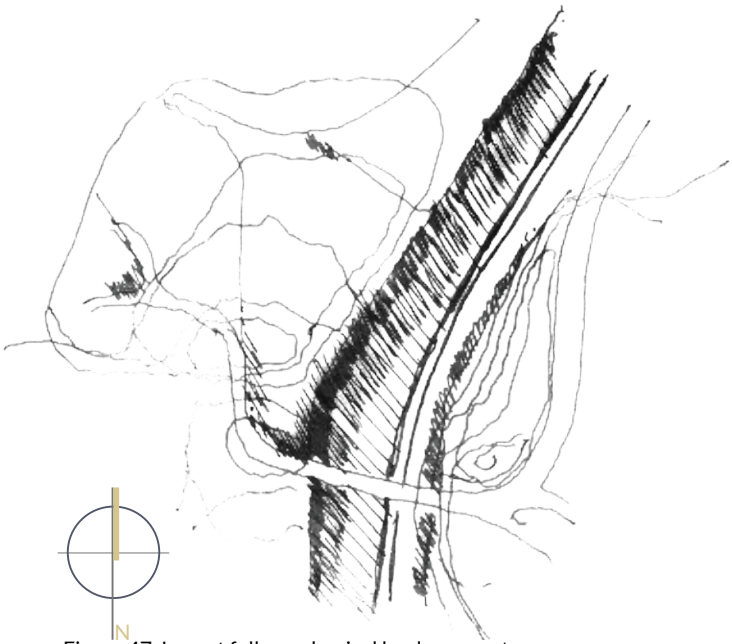


Figure 47: Layout follows classical landscape nature

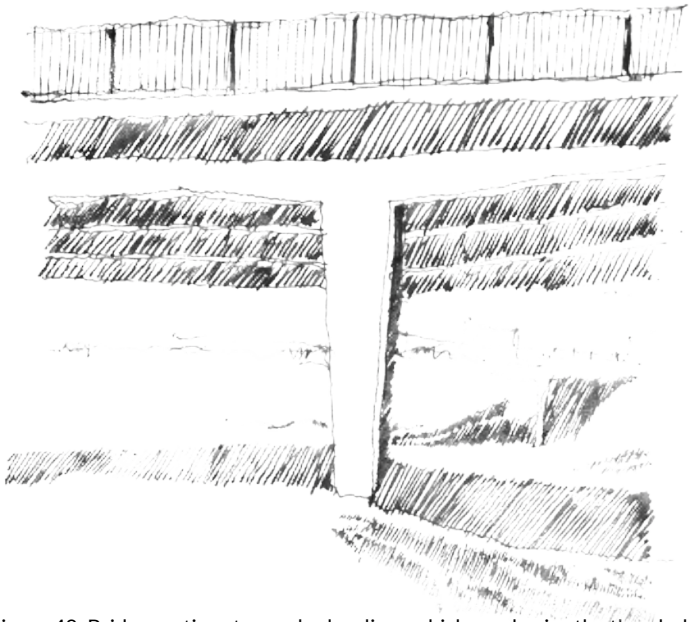


Figure 48: Bridge casting strong shadow lines which emphasize the threshold underneath the bridge

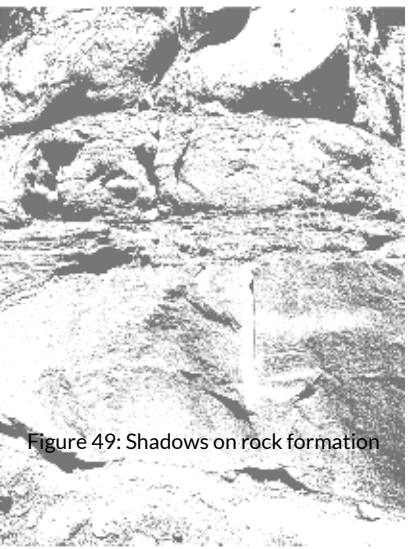


Figure 49: Shadows on rock formation

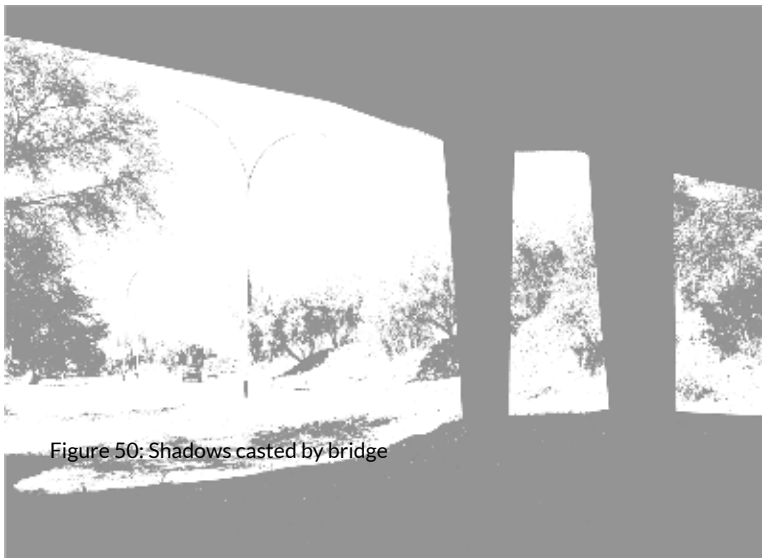


Figure 50: Shadows casted by bridge

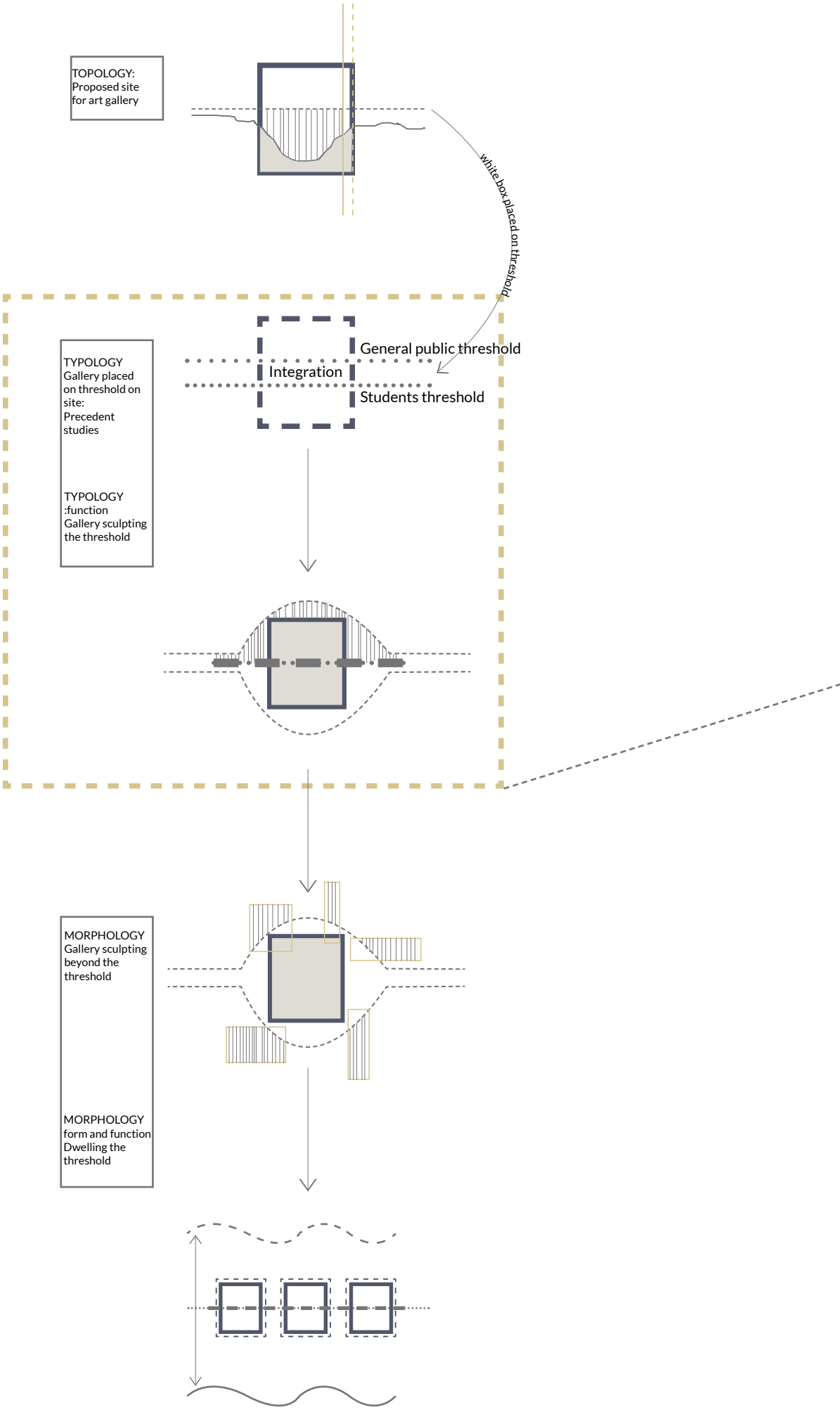
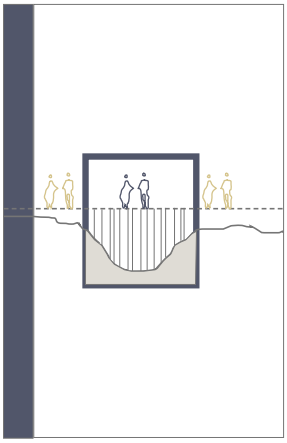


Figure 51: Document framework diagram

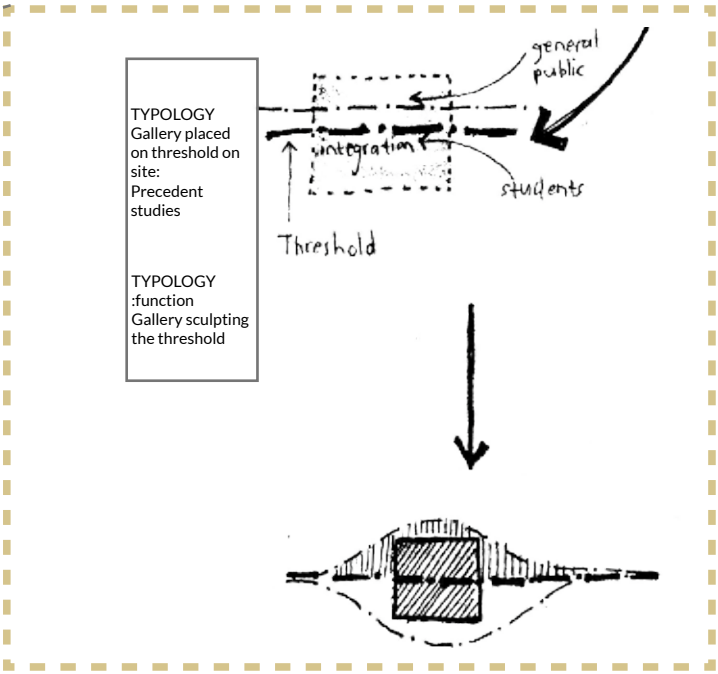
2.2.1 TYPOLOGY



Typology: Redressing non-place

The art gallery as a white box will be questioned through typological research. The aim of the project is to de-construct ideas around the gallery as an unapproachable institution.

The precedent studies will focus on the way in which a white box is designed within different contextual environments. The investigation will focus on the method of incorporating the surroundings into an art gallery without interfering with the viewing of art. The typology study will also look at the way a gallery is approached and entered. The challenge with the proposed gallery is that it has to accommodate an entrance for both students and the public. Therefore, the art gallery as a non-place will be redressed through its location.



The second part of the argument focuses on the function of the gallery and the influence of its placement on site. The site will determine the redressing of the proposed white box while the gallery is sculpting the ontology of the site.

INVESTIGATING THE CLIENT AND USER

The University of the Free State and specifically the Department of Fine Arts are the clients for the project with Angela de Jesus, the curator of the UFS, as the spokesperson.

The Johannes Stegmann Art Gallery on the UFS campus contains a permanent art collection that includes art by South Africans dating as far back as 1929. Other work are from surrounding areas such as Thaba'nchu. This collection is rotated between the main building, the Eeufees building and storage space (De Jesus, 2016). The proposed gallery will allow space for a permanent exhibition of these works for educational purposes.

The UFS is in the process of buying two major artworks by artist Willem Boshoff. These installations will be incorporated into the proposed project as a conceptual proposal for the purpose of this project.

Figure 52: Image of Word Woes exhibition (Boshoff, 2015)

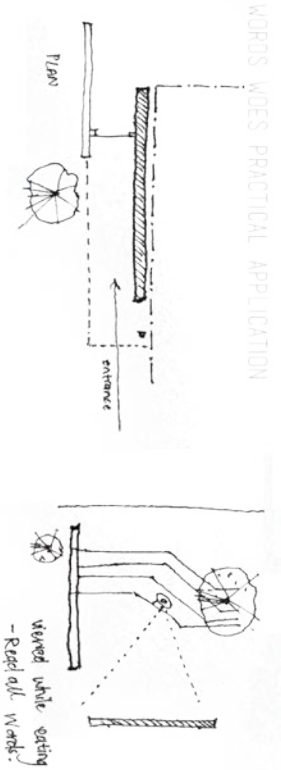
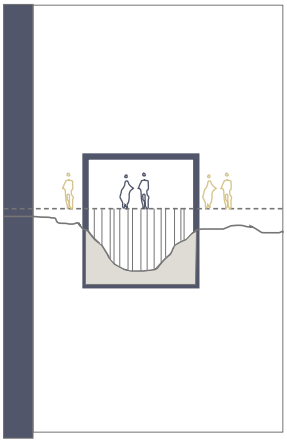


Figure 53: Application of Word Woes to site

"Word Woes 2015. The Brick wall of baked clay bricks that spell out singular words in a unique Afrikaans/English relationship. A text of 390 words spelled out by the bricks: English/Afrikaans words are spelled the same, but have different meanings. Each alphabet brick has a single upper-case letter, cast in intaglio relief Lines of bricks that can be added to bottom or top of work. Bricks can also be added to the sides of the work depending on its setting. The wall is constructed by a team of bricklayers, using scaffolds, wheelbarrows, brick force, and brick force ties to tie it to any existing wall. Cement are tinted to the color of the bricks using powder oxide Manufacture of bricks. Trevor Snijders, Company: Werk Trek of Vrek". (Boshoff, 2015)



Prison Sentence
"Date of first issue: 2003. Materials: Zimbabwe Black granite, Belfast Black granite, White marble Each panel 150cm x 100cm x 3cm (Some variables of 130 x 100cm were also made). Estimated weight 120kg per panel for granite panels of 150 x 100 x 3cm. The set earmarked for the Den Haag show is dated as 2010. It is number 4/5 and its size is 134cm x 100cm x 3cm. The material is Belfast Black granite." (Boshoff, 2015)

Figure 54: Prison Sentence artwork (Boshoff, 2003)

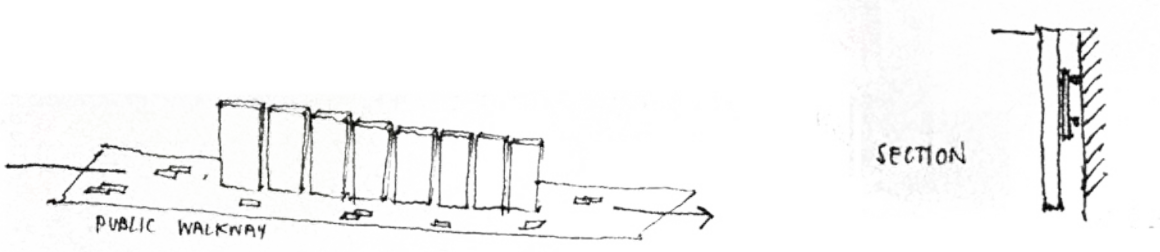


Figure 55: Application of Prison sentence to site

Figure 56: Angela de Jesus
(The Journalist, 2016: online)

Interview with Miss Angela de Jesus

Curator at the Johannes Stegmann Art Gallery on the campus of the University of the Free State

- UFS collection includes 1500 artworks
- Artworks must be available for academic research
- Develop an art centre but not in the traditional sense
- Learning skills, display work, performances
- Innovative and unique kind of art centre
- Integrating with other disciplines
- Addressing social and cultural issues
- Interacting with artworks
- Sculpture project on campus: interaction initiated
- Less alienated and create a sense of belonging
- Humanize the scale of the building
- Conversation and dialogue opening up
- Meeting space on campus

Functions:
- Temporary exhibitions (6 weeks)
- Student exhibitions - complicated installations and digital art
- Traditional permanent exhibitions
- Space for lectures and discussions

Storage archives:
- Accessibility of works
- Storage lifted from floor in case of water leakage
- Timber containers and drawers for drawings
- Storerooms to be 1:1 ratio to gallery space
- Correct temperature, no direct lighting
- Works separated according to medium

Interview with Katie Salzman

Architect involved with work on UFS campus

- Link building with art department on campus
- Include art studios for final year students
- Connect with the campus as the context

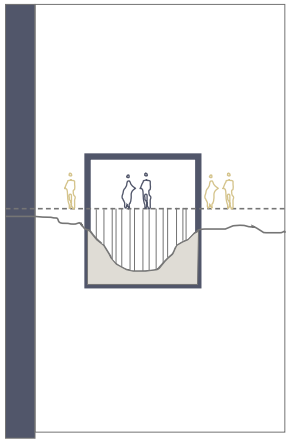


Figure 57: Willem Boshoff
(Watkykjy.co.za, 2015: online)

Interview with Willem Boshoff
Artist in residence at University of the Free State Art Department

- Work studio should double as exhibition space
- Practical movement of heavy sculptures
- Artworks contain words and letters
- Donating one artwork to the UFS (wind rose)
- People can watch him work - he likes to interact with his audience
- Include the community in his artworks

Interview with Martie Bitzer
Architect, artist and lecturer at UFS

- Network inside university and network outside
- Awareness of art on campus
- Interior and exterior art
- Art collection of the UFS stored away - art only has value if it can be seen
- Academic vs Humanities on campus
- Exhibition space for installation art
- Sculpture garden extending across campus

Interview with Celeste van der Merwe
Artist and art teacher at high school

- Questioning the white box
- Integration of art and architecture
- The need of the artist

Interview with Cari Niehaus
Art student at the University of the Free State Art Department

- Current facilities in the art department
- Extension of facilities
- Requirements for student exhibitions

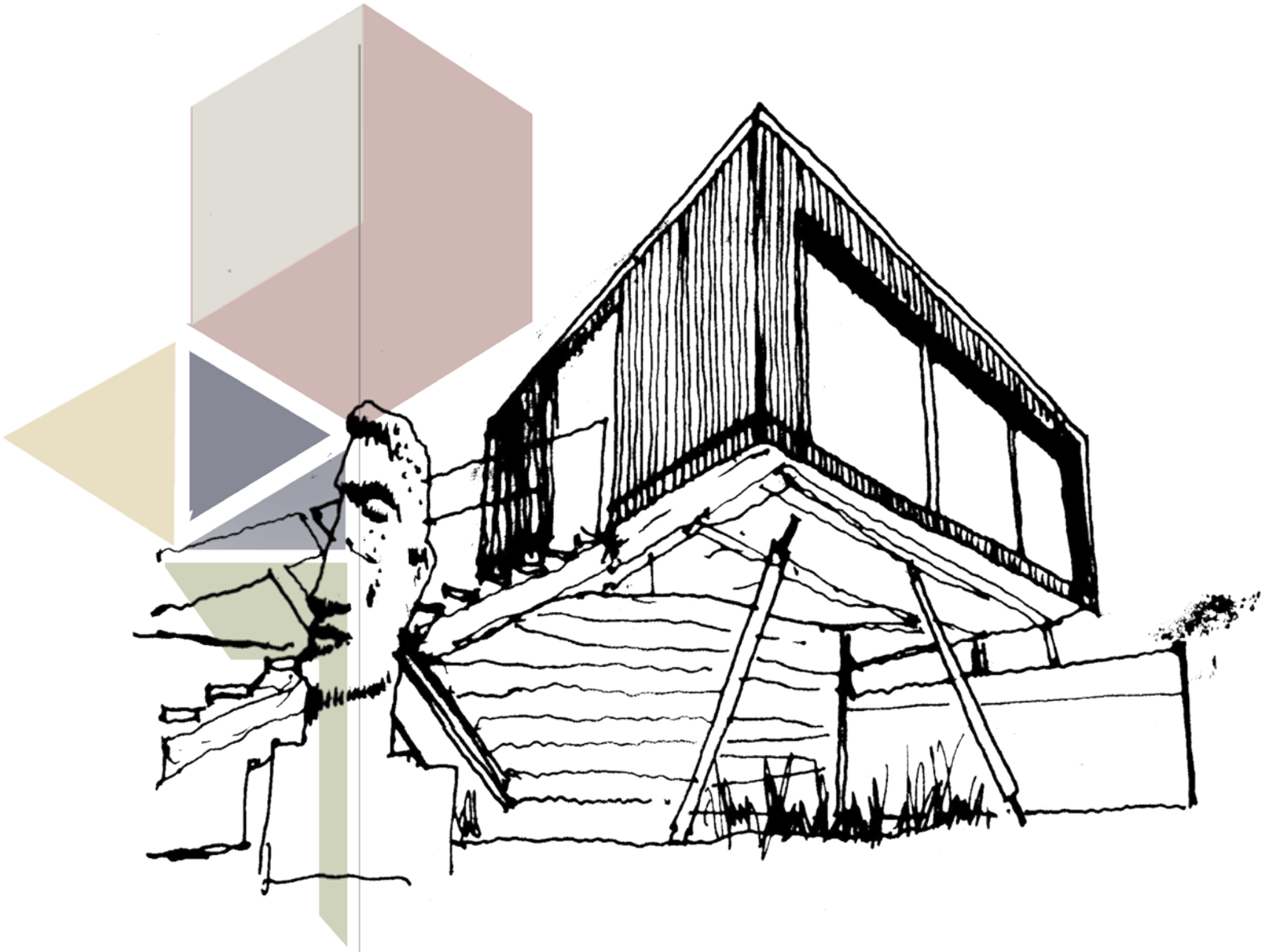


Figure 58: Sketch of Gallery on Leviseur

Gallery on Leviseur is a small art gallery on the corner of a semi-commercial street and a residential street. The gallery allows a view from the street into the main exhibition space in order to invite the passers-by into the gallery. This window (figure 62) gives an idea of the present exhibition and is also possible to view from a passer-by's car as it is close to a traffic light, creating a pause in the traffic.

The gallery includes an upstairs workshop space which is in itself a sculptural object (figure58).

The gallery contains two white boxes. The longitudinal gallery is closed off as a white box with only small window openings at the bottom. The other gallery is glazed toward the street to allow the context into the gallery space.

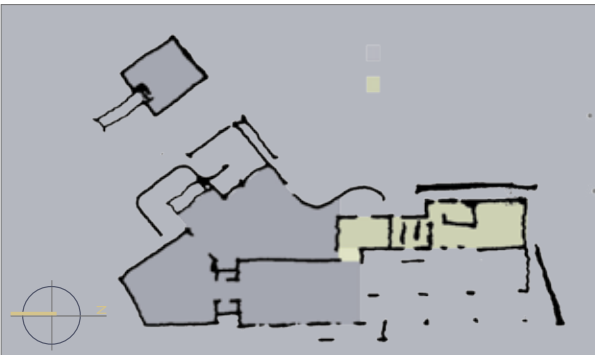


Figure 59: Plan of Gallery

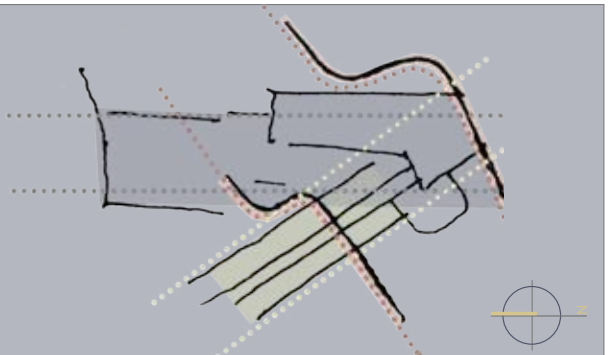


Figure 60: Grid imposed on floor plan

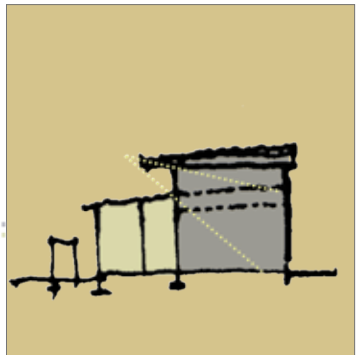
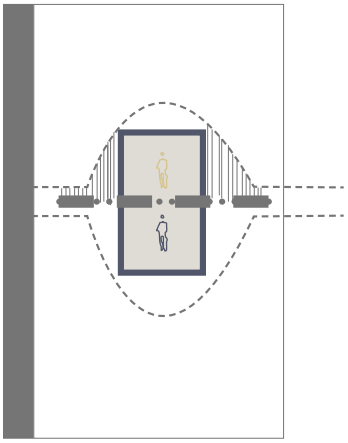


Figure 61: Sun angle influence

2.2.4 CASE STUDY: GALLERY ON LEVISEUR

Sergio Nunes Architects



The planning of the gallery was done in a way to integrate the interior with the exterior sculpture gardens through a visual connection.

The gallery has adequate interior natural light levels which were achieved by lifting the roof structure and inserting clerestory lighting. This ensured that there was enough wall space to display artworks. Low-level windows were inserted to allow light that bounces off the white surface into the interior space.

Figure 62: Dialogue between interior and exterior space of gallery

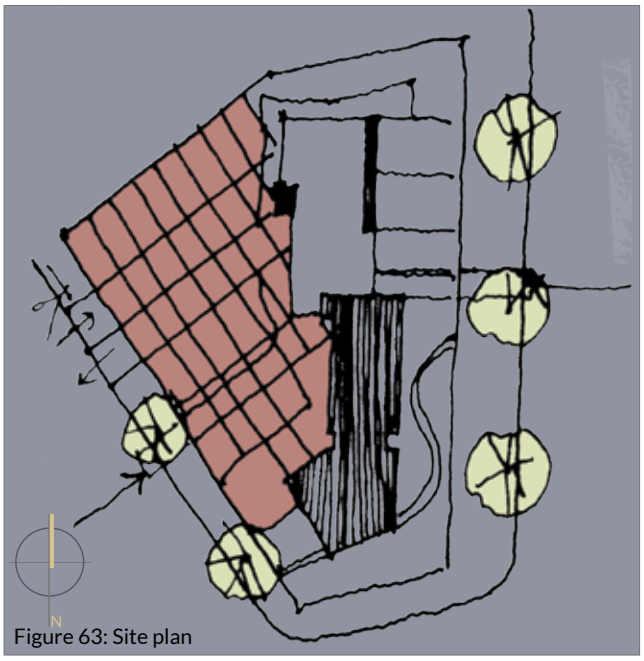


Figure 63: Site plan

Figure 64: View of exterior of art gallery

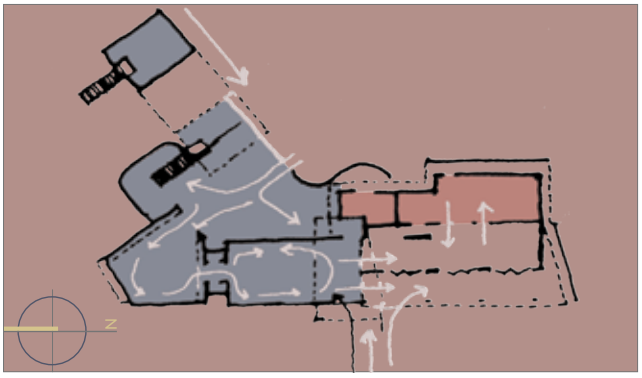


Figure 65

Figure 66: Workshop box

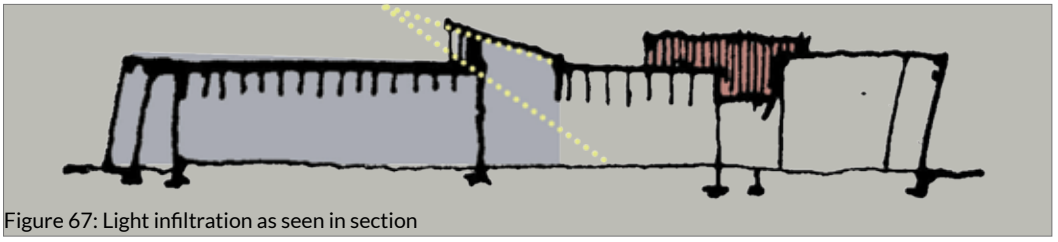


Figure 67: Light infiltration as seen in section

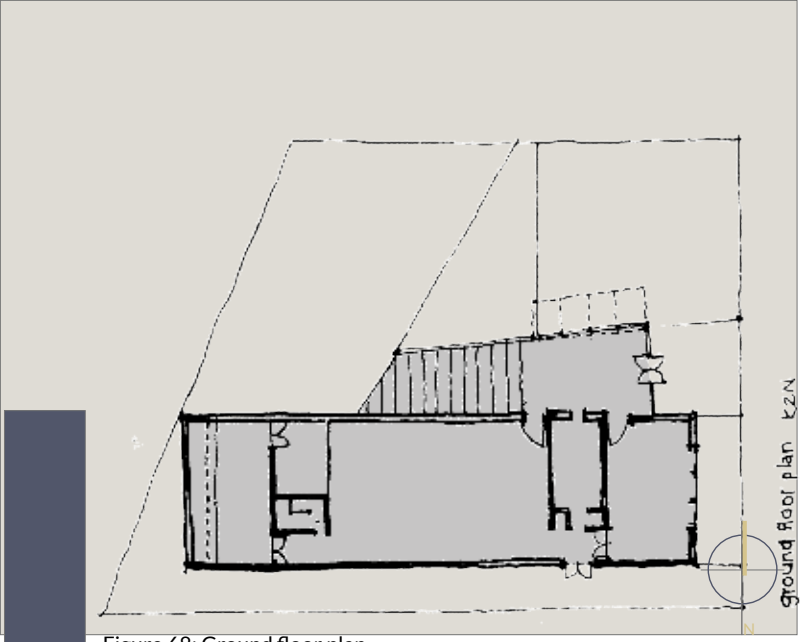


Figure 68: Ground floor plan

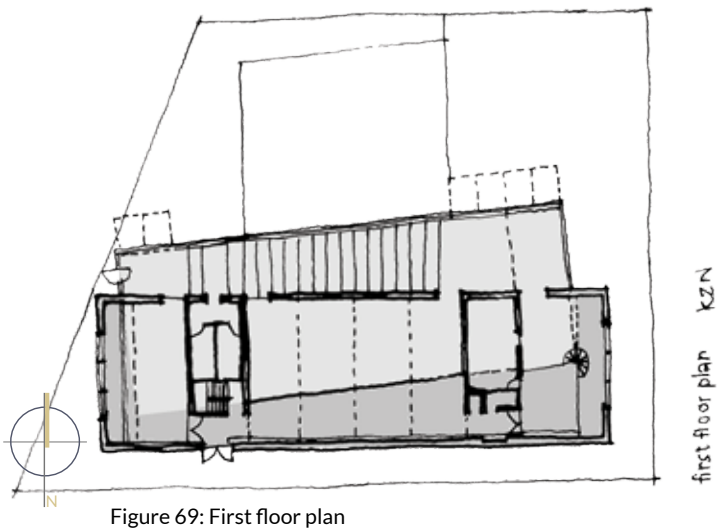


Figure 69: First floor plan

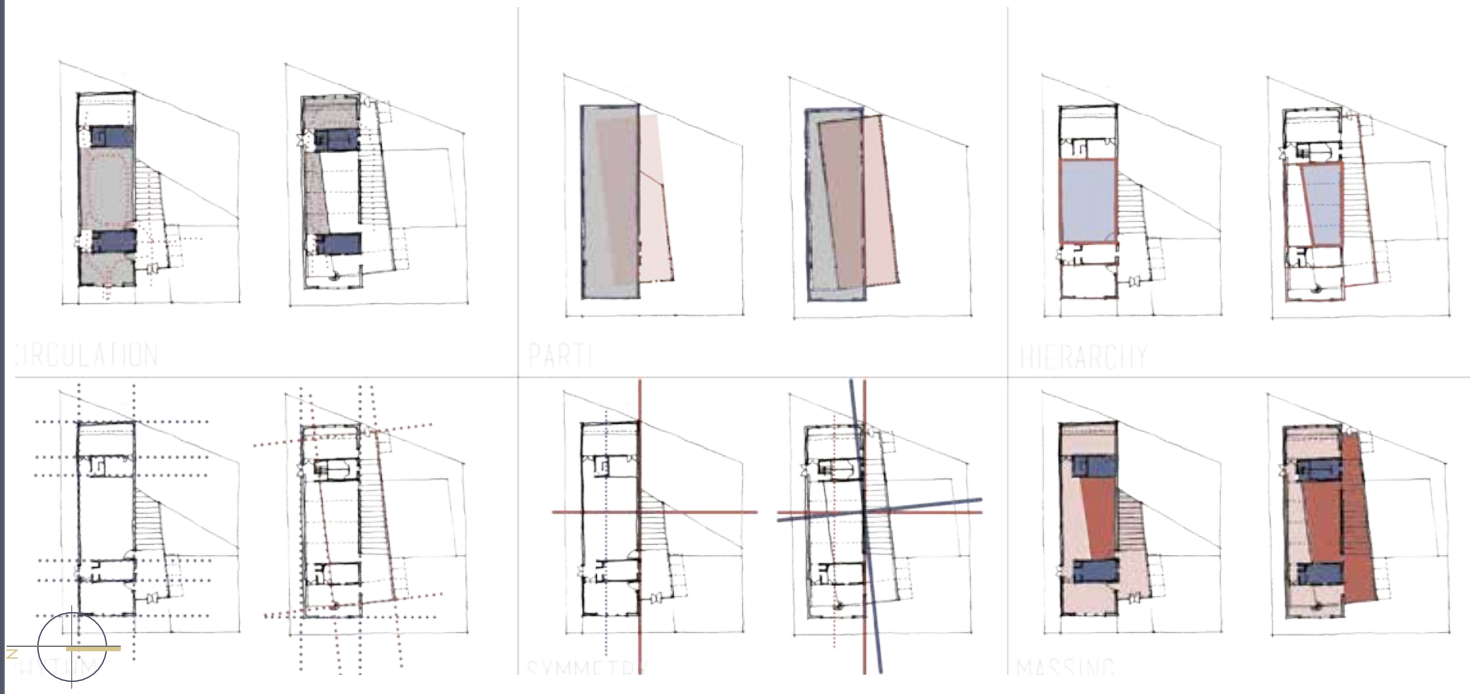


Figure 70: Analysis done on floor plan

Figure 71: Interior of first floor of gallery (Kznia.org.za, 2016: online)

Figure 72: Interior of ground floor of gallery (Kznia.org.za, 2016: online)

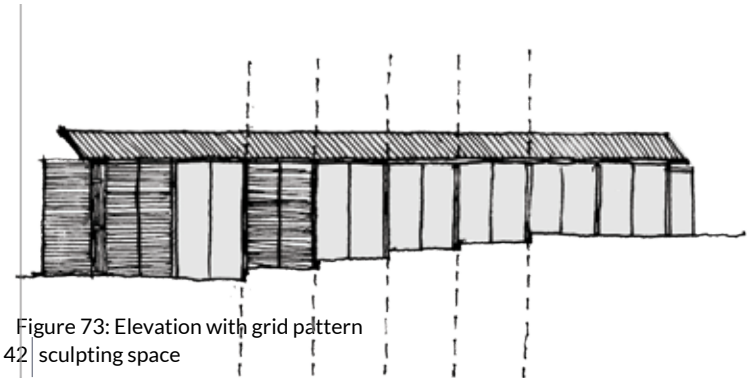


Figure 73: Elevation with grid pattern

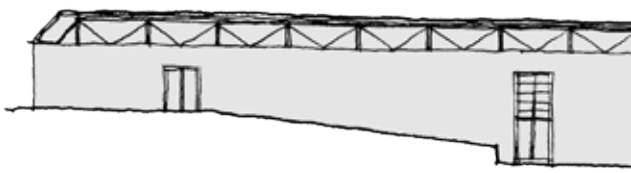
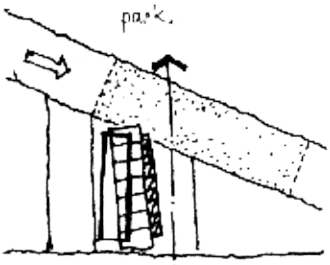


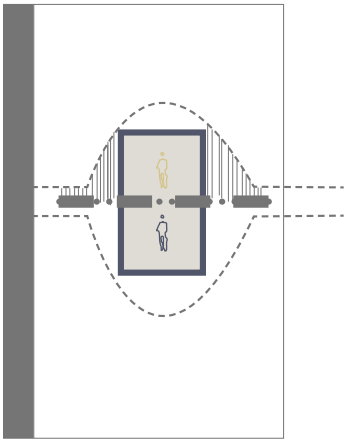
Figure 74: South elevation



2.2.4 CASE STUDY

KWAZULU - NATAL SOCIETY OF ARTS

Walters and Cohen architects



The Kwa-Zulu Natal Society of Arts is a small two story gallery with a coffee shop. The first and second story are integrated by means of a double volume space for visual connection.

The edge of the floor on the second story is articulated from the wall through glass panels to create a connection between the ground and first floor and also allows the flow of light between the two spaces.

The floor plan shows the interlinking of the gallery, the workshops, and the shop. The timber screens create a perforated threshold between the interior and exterior space. The timber screens allow a perforated experience of the location of the gallery. The screen creates small slits of image from the exterior context. From the outside, the perforated screens allow a view inside the gallery.

The entrance of the gallery is emphasized by its placement on site. The gallery is accessed on the southern elevation from the street. The gallery can be seen as a white box with an open side to the context. The louvers are placed on the eastern side and also opens towards the east.

The surrounding environment is therefore invited into the perforated edge of the white box.

Figure 75: Exterior of gallery (Kznia.org.za, 2016: online)

Figure 76: Interior relationship between ground floor and first floor (Kznia.org.za, 2016: online)

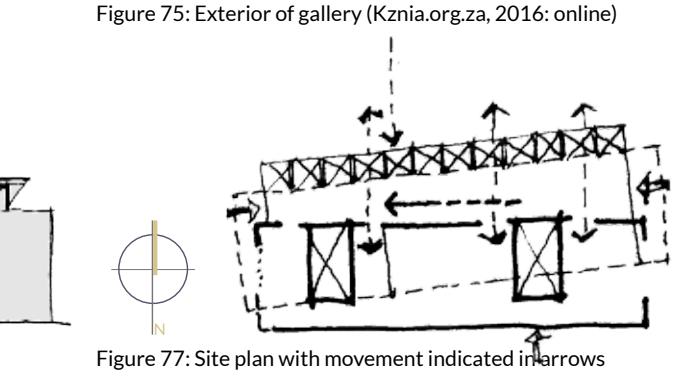


Figure 77: Site plan with movement indicated in arrows

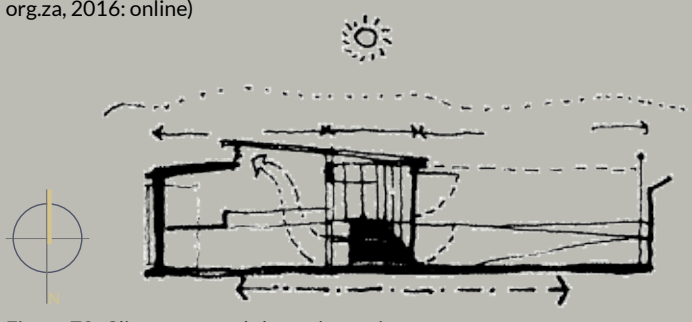


Figure 78: Climate control shown in section

The MBDA's Route 67symbolizes Nelson Mandela's 67 public years. It includes 67 public artworks. Local artists were asked to create art to symbolize the cities heritage and history. The route is created for pedestrians.

Figure 79: Analysis of how sculptures are placed within their context and the influence thereof (edited by author)

Figure 80: Mosaic patterns on stairs as part of route (Suzi-K, 2013: online)

Figure 81: Connection between building and sculpture (Pathfinda.com, n.d.: online)

Figure 82: Mosaic patterns on walkway (Suzi-K, 2013: online)

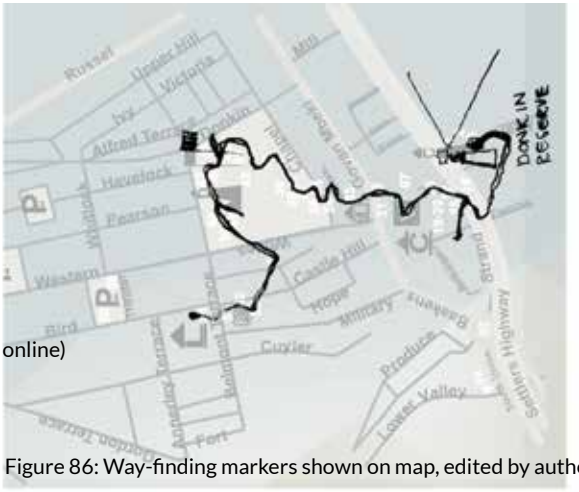


Figure 86: Way-finding markers shown on map, edited by author (Pathfinda.com, n.d.: online)

Figure 87: Interactive installation (Suzi-K, 2013: online)

Awareness through art positioning

Way-finding markers to guide the visitor through the route

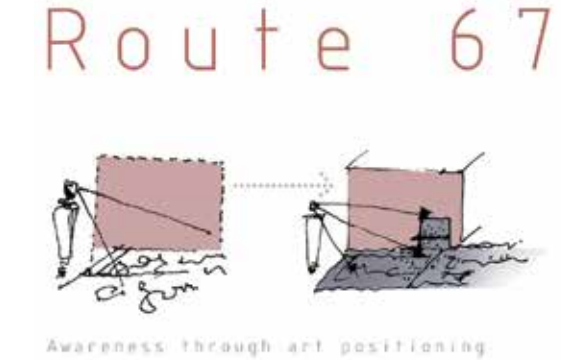


Figure 83: Awareness through positioning of art

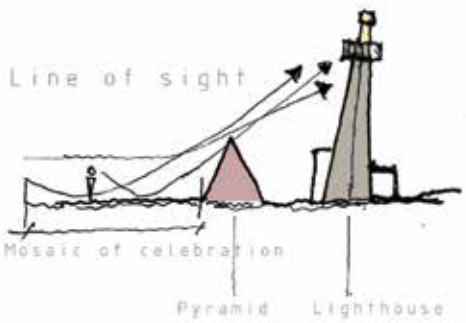


Figure 84: Line of sight influenced through hierarchy

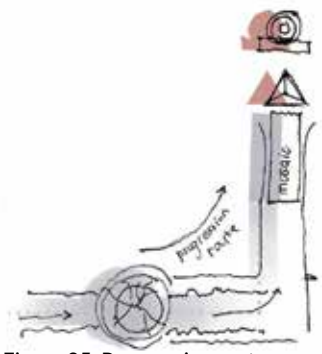
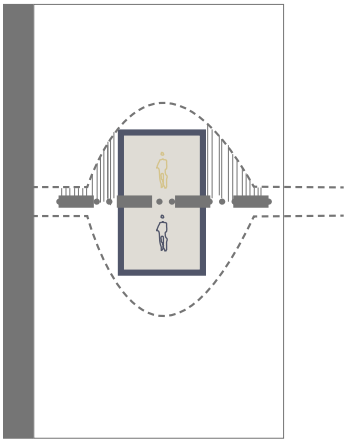


Figure 85: Progressive route

2.2.5 PRECEDENT STUDY
ROUTE 67
Mandela Bay Development Agency



"Visual arts, urban design and heritage assets have been combined into one experience which is aimed at merging all segments of the formerly divided art community. This route aims to exhibit the creative and artistic magic that still exists in the post-apartheid era" (Byram, 2014: online).

This precedent was done in comparison with the sculpture walk on campus. The awareness of art in a city is the emphasis of Route 67. These artworks are not confined to white box space and was placed with contextual awareness.

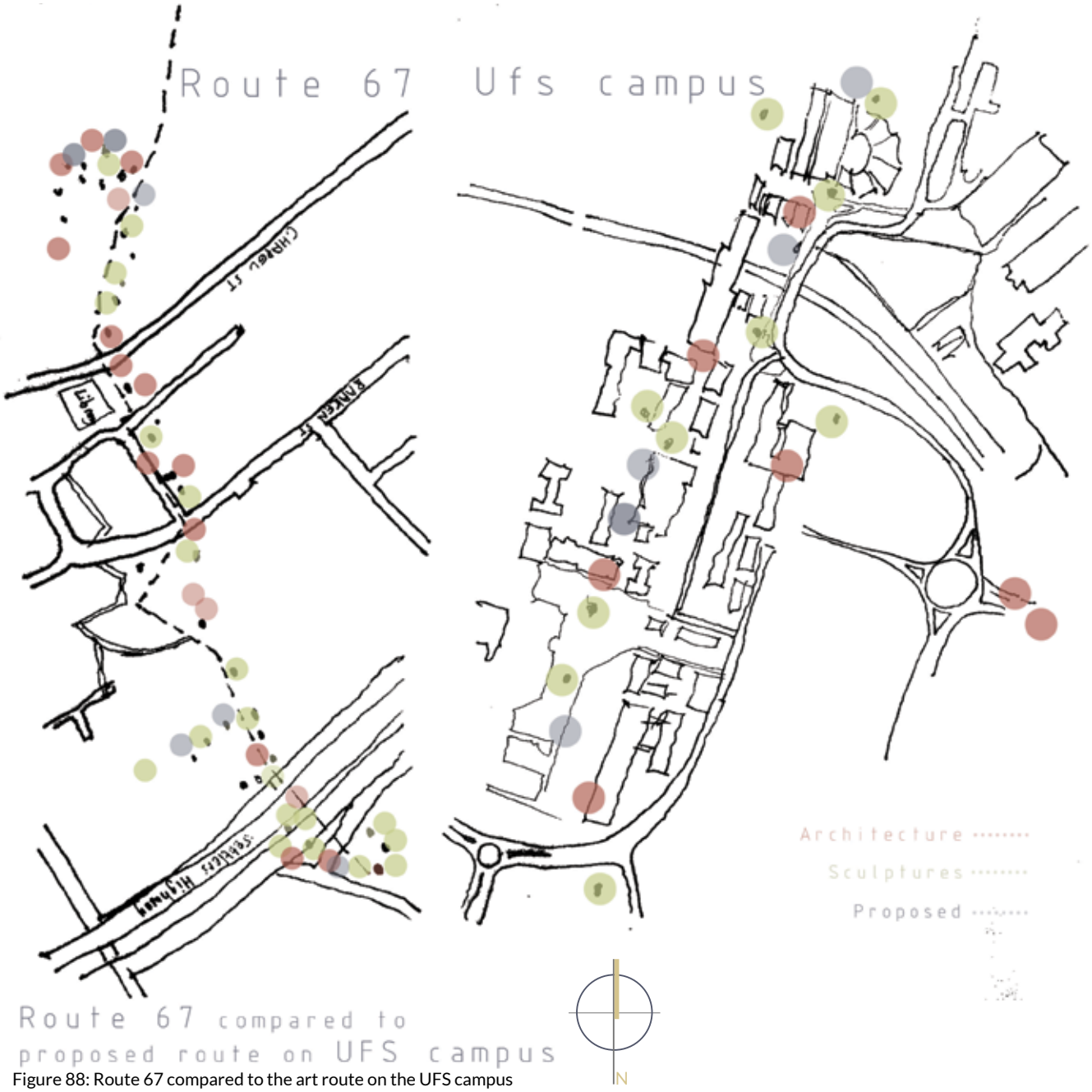


Figure 88: Route 67 compared to the art route on the UFS campus

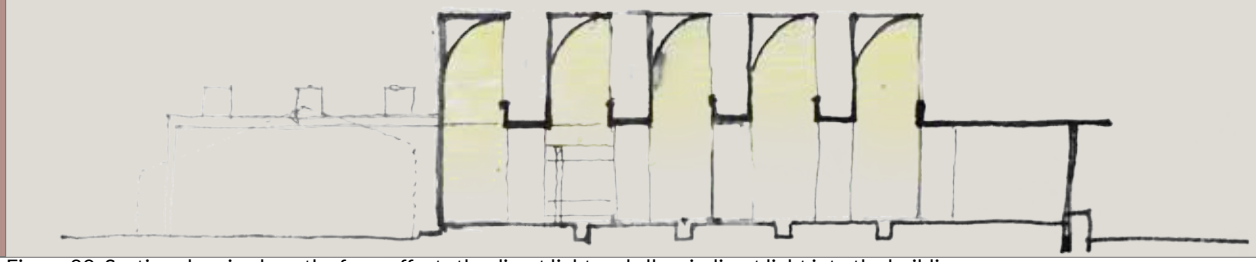


Figure 89: Section showing how the form affects the direct light and allow indirect light into the building

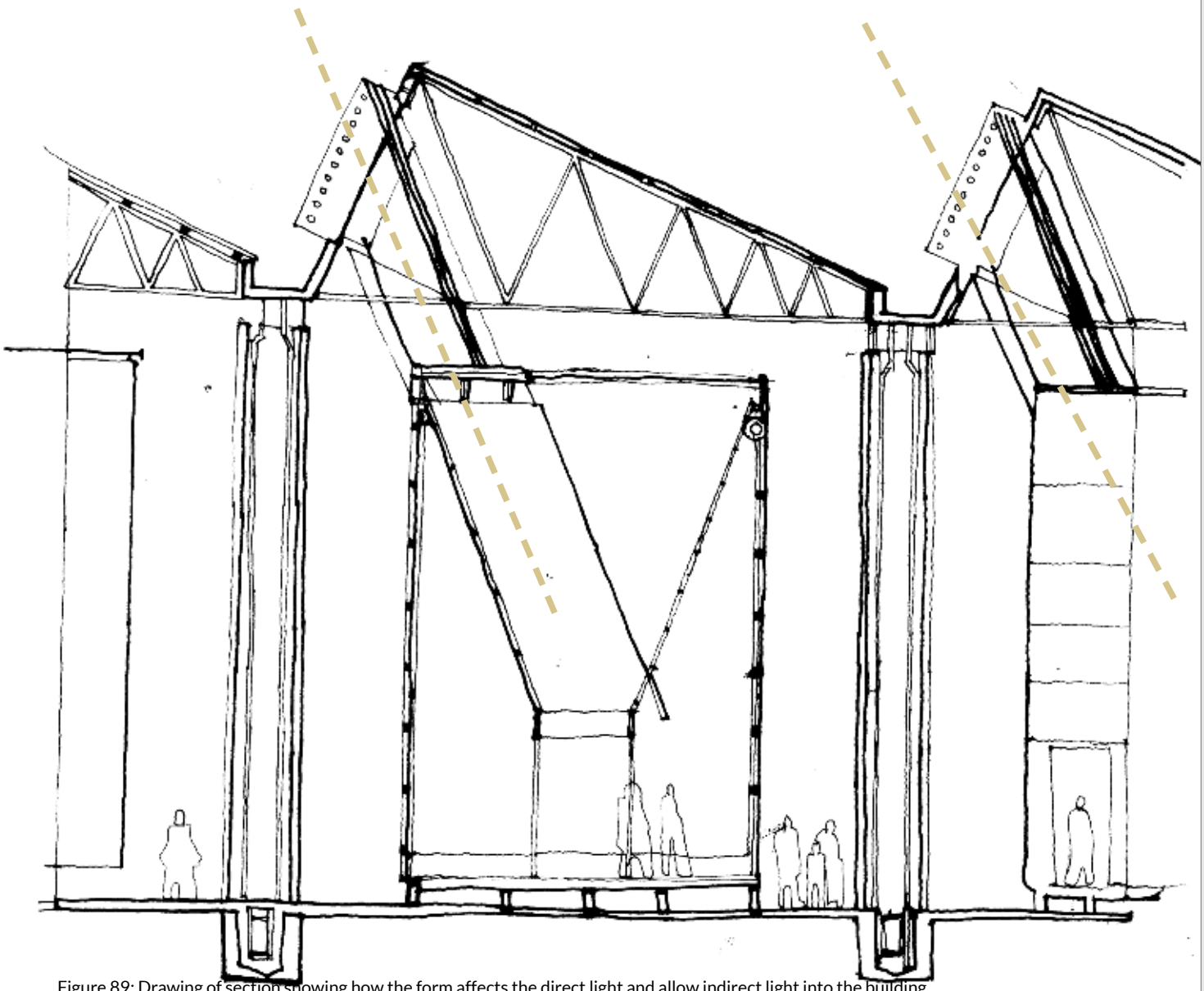


Figure 89: Drawing of section showing how the form affects the direct light and allow indirect light into the building

The red location art gallery allows natural light into the gallery space from the roof. This creates more space for art on the walls of the gallery as no windows are required. The gallery can be seen as a white box with an opening towards the roof of the building.

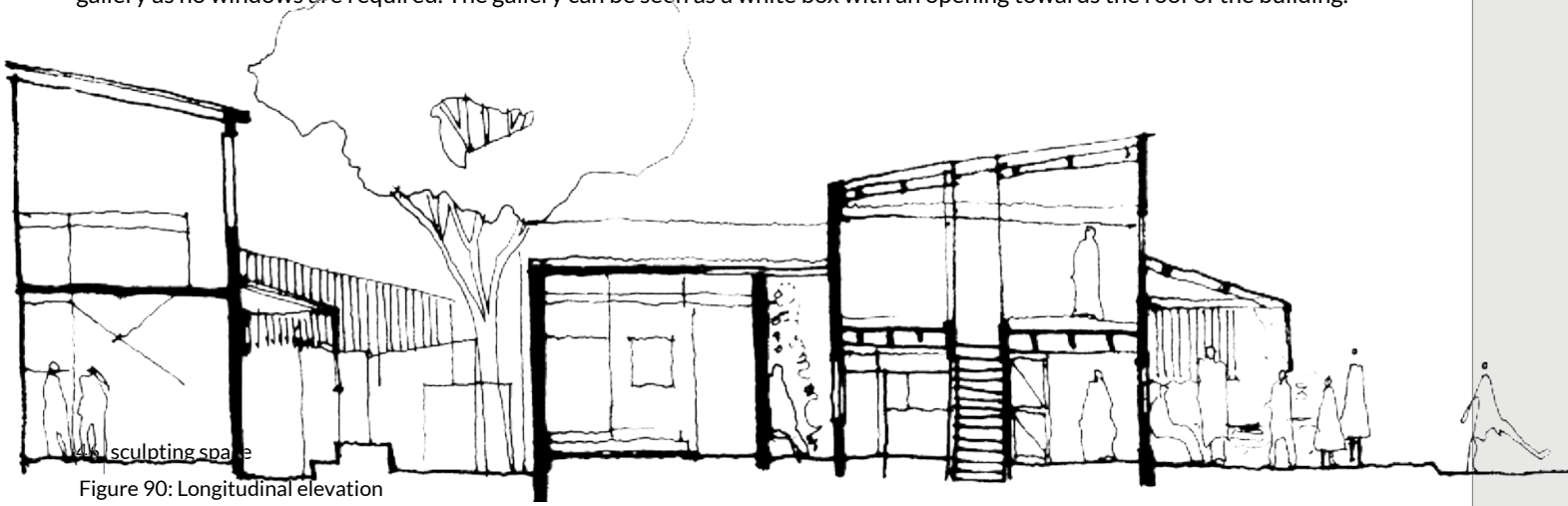
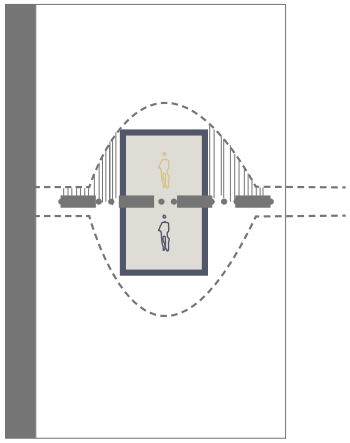


Figure 90: Longitudinal elevation

2.2.5 PRECEDENT STUDY
RED LOCATION ART GALLERY

Noero Architects



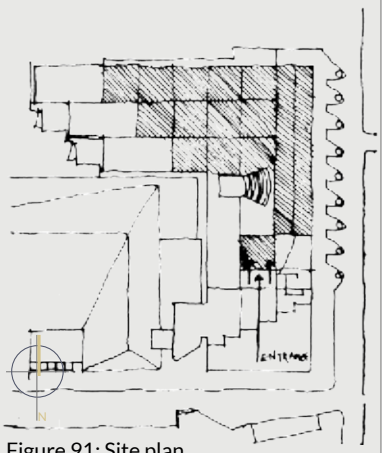


Figure 91: Site plan

The Red Location art gallery is placed within a specific informal settlement context. The Red Location community is a harsh environment with run-down shacks and no trees. To respond to its context, the gallery does not contain glass-box exhibitions but rather interactive exhibitions. The white box in a gallery is replaced by the memory box of the Red Location Gallery. The memory boxes are constructed of rustic steel and allow spaces for reflection in between the boxes. The memory boxes are the gallery's way of interacting with its environment (Joubert & Bakker, 2009: 83).

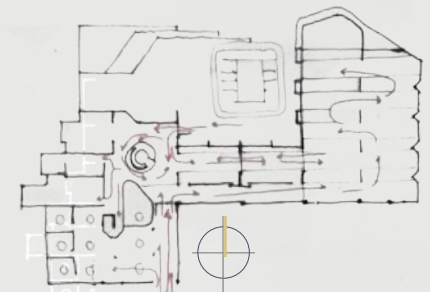


Figure 92: Circulation on floor plan

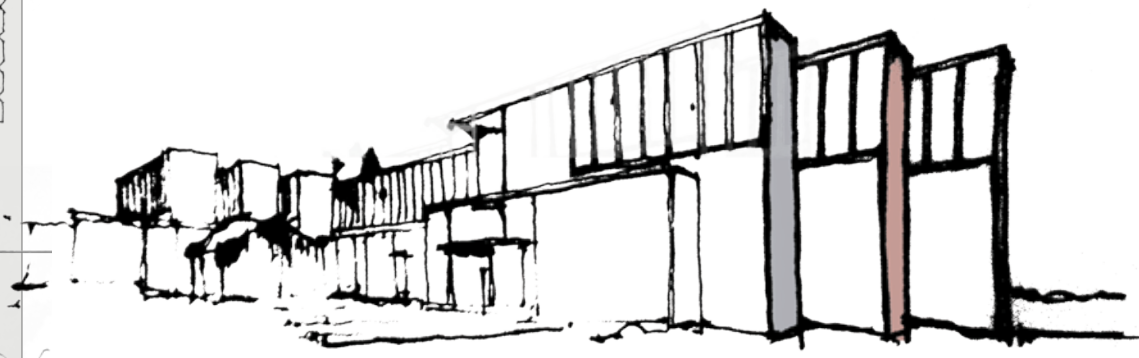


Figure 95: Exterior perspective

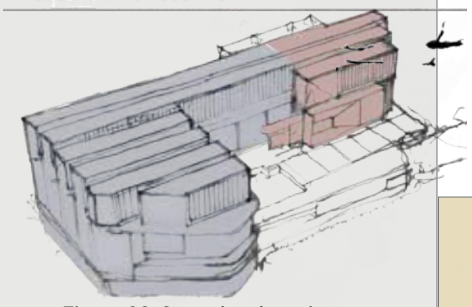


Figure 93: Served and service space

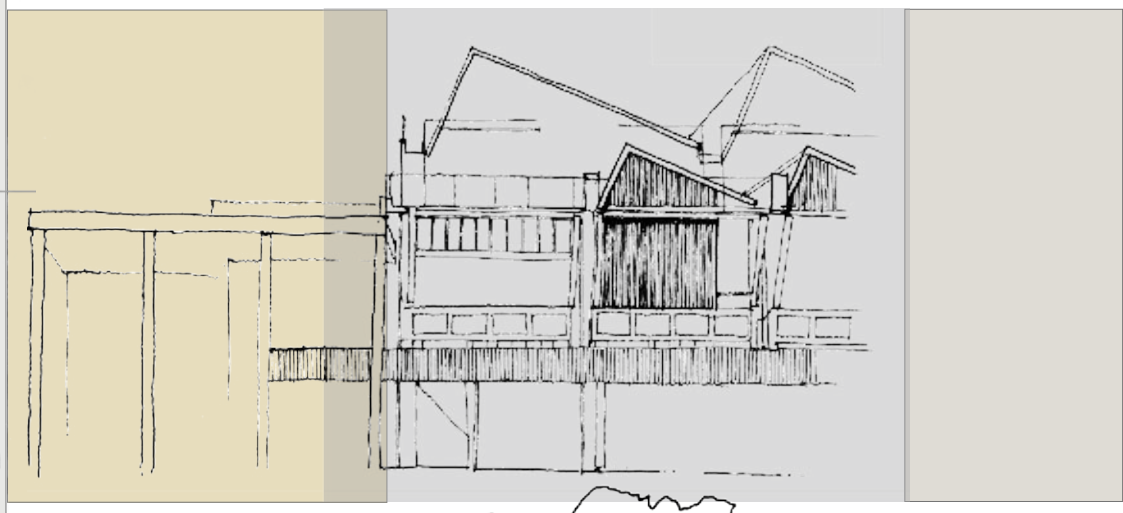
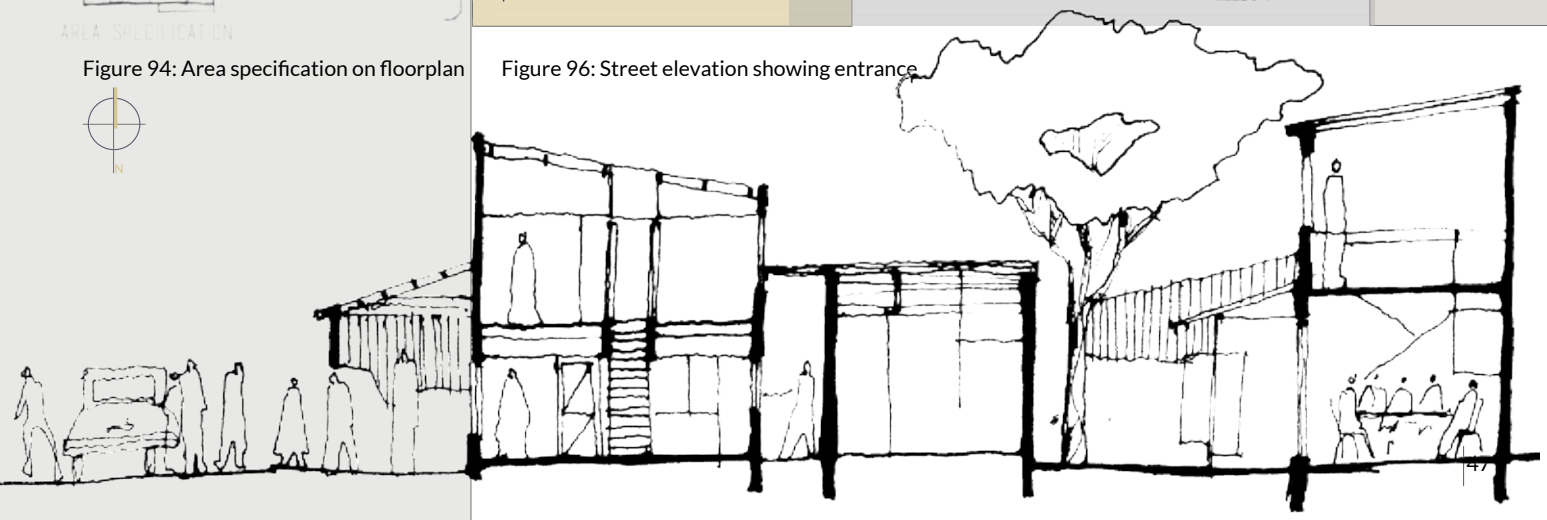


Figure 94: Area specification on floorplan

Figure 96: Street elevation showing entrance



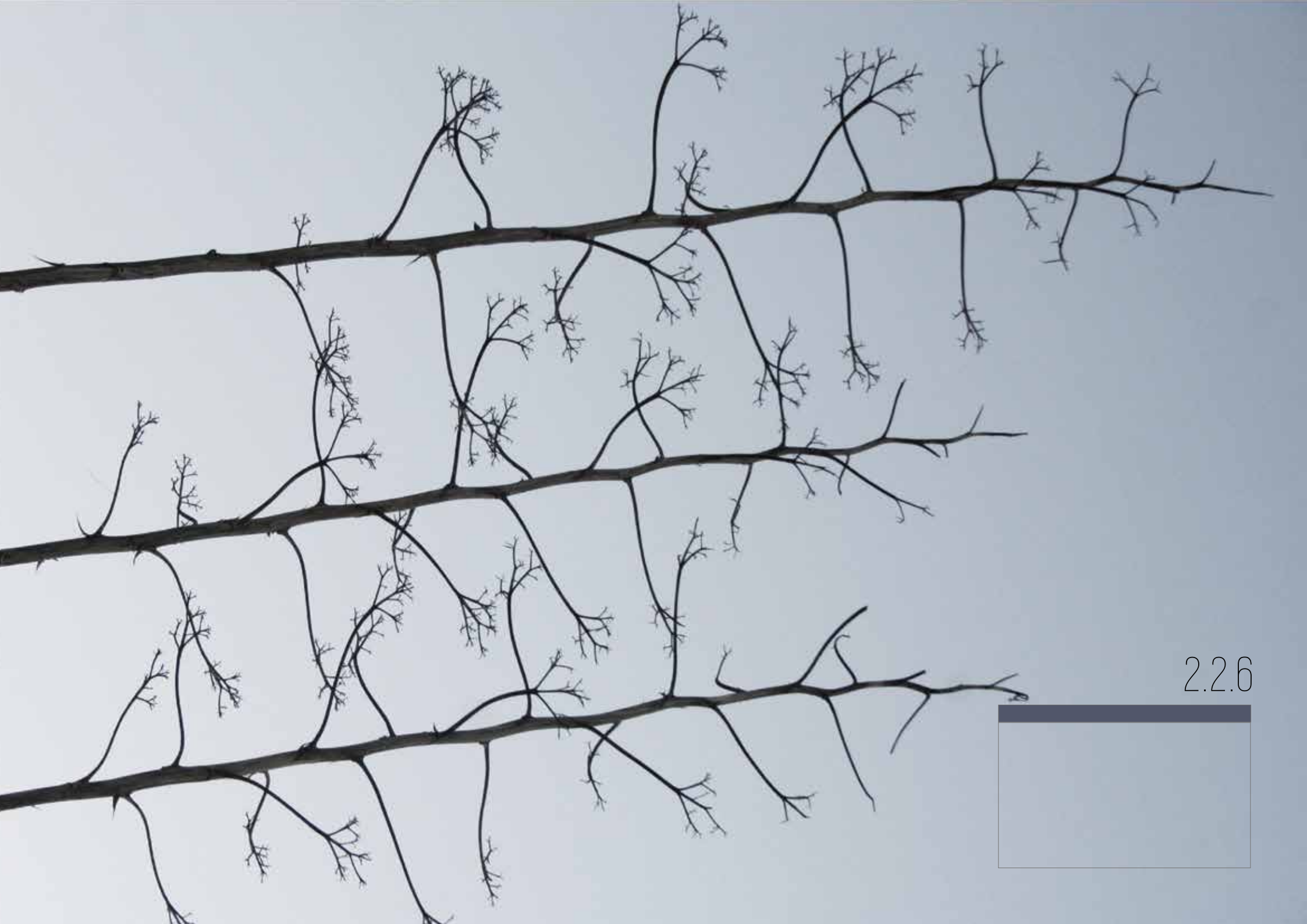
ART GALLERY ACCOMMODATION LIST

Total sq m for Art gallery: 2435,7 m^2

Total exhibition space: 580 m^2
Total storage space: 583 m^2
Space used for storage or exhibition: 398 m^2

Ground Floor:	**Total sq m: 1338.7**
Public entrance and security check	20 m^2
Main exhibition space	167 m^2
Gallery 2	178 m^2
Gallery 3	235m^2
Foyer north	34 m^2
Administration office	12 m^2
Curator office	13 m^2
Research office	15 m^2
Kitchen for restaurant	26 m^2
Restaurant seating space	101 m^2
Service courtyard	7 m^2
Storage	4.2 m^2
Toilets:	
Male toilets	8 m^2
Female toilets	12 m^2
Disabled toilet	3.5 m^2
Courtyard	5 m^2
Studios and workshops:	
5 Studios for phd students	100 m^2
Willem Boshof studio	78 m^2
Exhibition space	51 m^2
Student exhibition space	140 m^2
Toilets	
Male toilets	6 m^2
Female toilets	6 m^2
Corridor walkways:	
1	42 m^2
2	29 m^2
3	46 m^2

Basement Floor:	**Total sq m: 1097**
Foyer south	34 m^2
Foyer north	31 m^2
Visitor entrance	22 m^2
Main gallery 2	115m^2
Educational gallery 1	73 m^2
Educational gallery 2	33 m^2
Exhibition corridor	177 m^2
Archives	583 m^2
Additional storage	10 m^2
Toilets:	
Male toilets	7.7 m^2
Female toilets	8 m^2
Disabled toilets	3.3 m^2
Exterior:	
Sculpture gardens/ breathing pockets	400 m^2
Covered exterior workspace for students	175 m^2



2.2.6

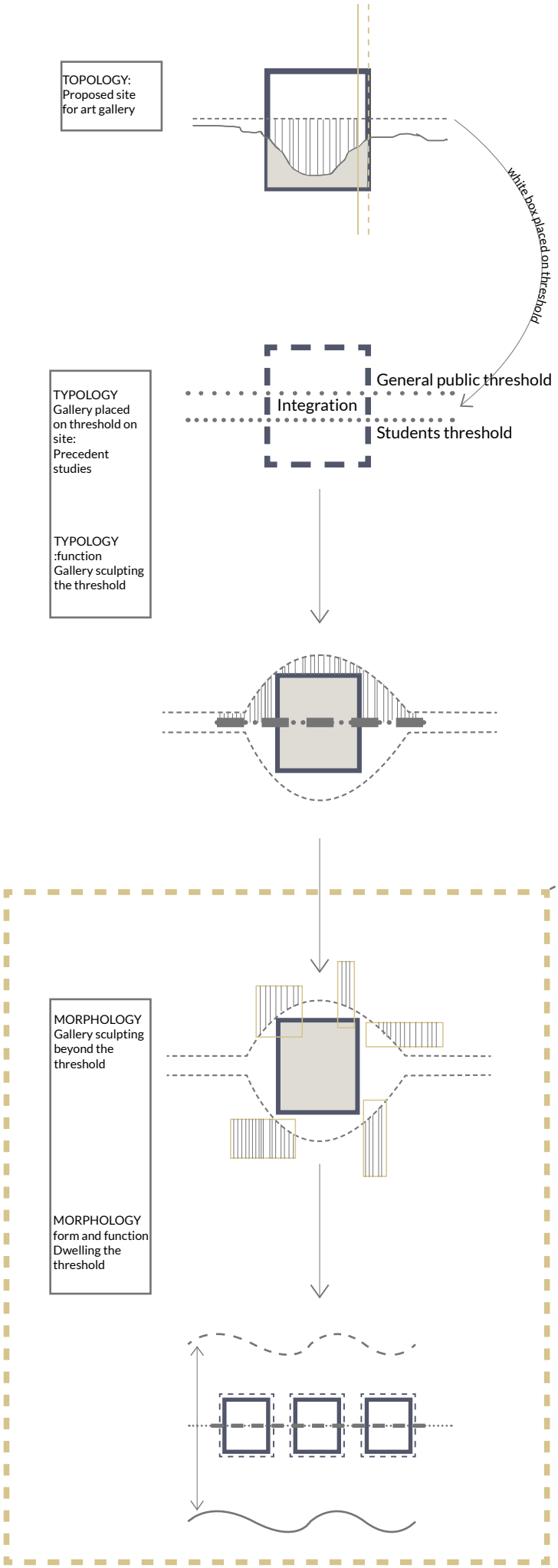
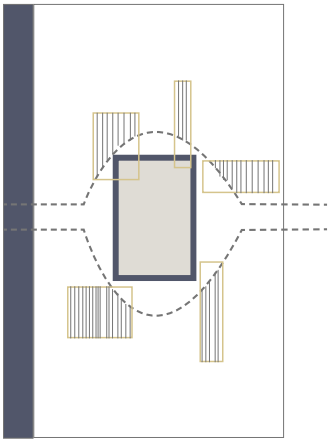


Figure 97: Document framework diagram

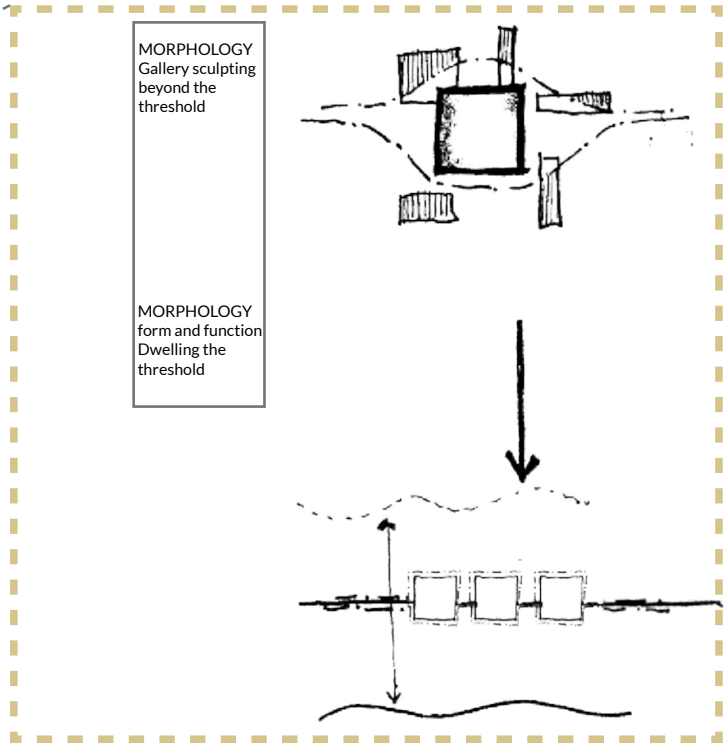
2.3.1 MORPHOLOGY



Morphology: Sculpting space
The morphology of the building is investigated by placing the build-form on the boundary of the University of the Free State. As the building becomes the boundary, it allows the visitor to dwell within the threshold, eliminating the harsh boundary that the University poses for security measures.

The morphology of the building consists of galleries with in-between breathing spaces. These breathing pockets allow the movement of light and shadow into the building. This visible movement of time ensures that the larger pictorial field beyond the boundary frame of the site is allowed inside the building.

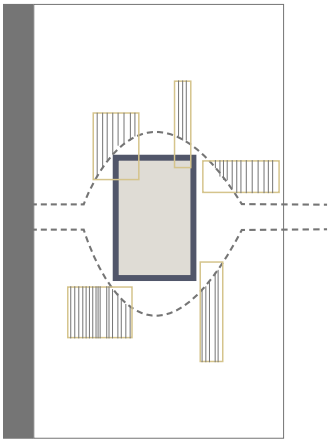
The symbiosis between the art gallery and the site is initiated through the sculpting process. The earth is sculpted by taking away and carving the building into the site while the sky is sculpted by adding built elements. The connection between the earth and sky is established within the gallery's space, being placed partially beneath the natural ground line while the dematerialization towards the light shafts allows the sky to connect with the earth.



The morphological part of the argument is initiated by allowing the gallery to sculpt its context. The building embodies the boundary and therefore becomes a space where the dwelling of the threshold occurs. The original boundary is displaced by the edge of the proposed gallery.

Figure 98: Touchstone

TOUCHSTONE 2.3.2



Through the touchstone, the way art is viewed through the white box theory is challenged.

Art is created to influence the way people see certain aspects of society. The problem that the touchstone addresses, is the way that people comfortably remove themselves from art through ignorance. The touchstone embodies this problem by placing the viewer inside the artwork.

For example, the artwork about a child being misused and controlled as a soldier (figure 101). When viewing the image one might feel sympathy for the child in the far away country where one is not involved. As soon as you see yourself inside the artwork and realize that it might have been a controlled version of you, then sympathy becomes empathy.

It is when we remove ourselves from artworks that we lose touch with what they represent.

The touchstone removes the thresholds that are placed between the viewer and the artist. Figure 99 shows the layers between the viewer, the art and the artist. The yellow dotted line indicates where the touchstone places the viewer. As the viewer is placed within the artwork, the boundaries between the viewer and the artist is dissolved.

Permission given by Lizaan Alberts for use of photo

Permission given by Coenraad Steyn for use of photo

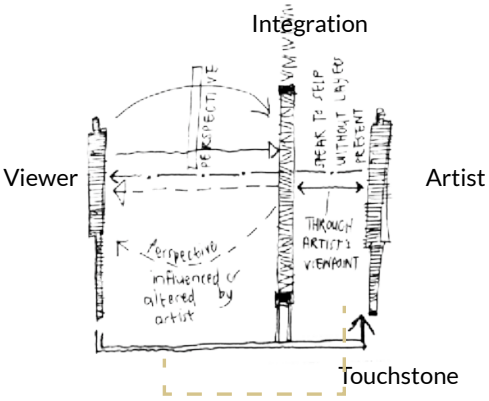


Figure 99: Touchstone explained

Figure 100: Image inside touchstone with example of touchstone use (Minh, 2015: online)

Figure 101: Image inside touchstone (Quiles, 2011: online)

Figure 102: Touchstone with back of images

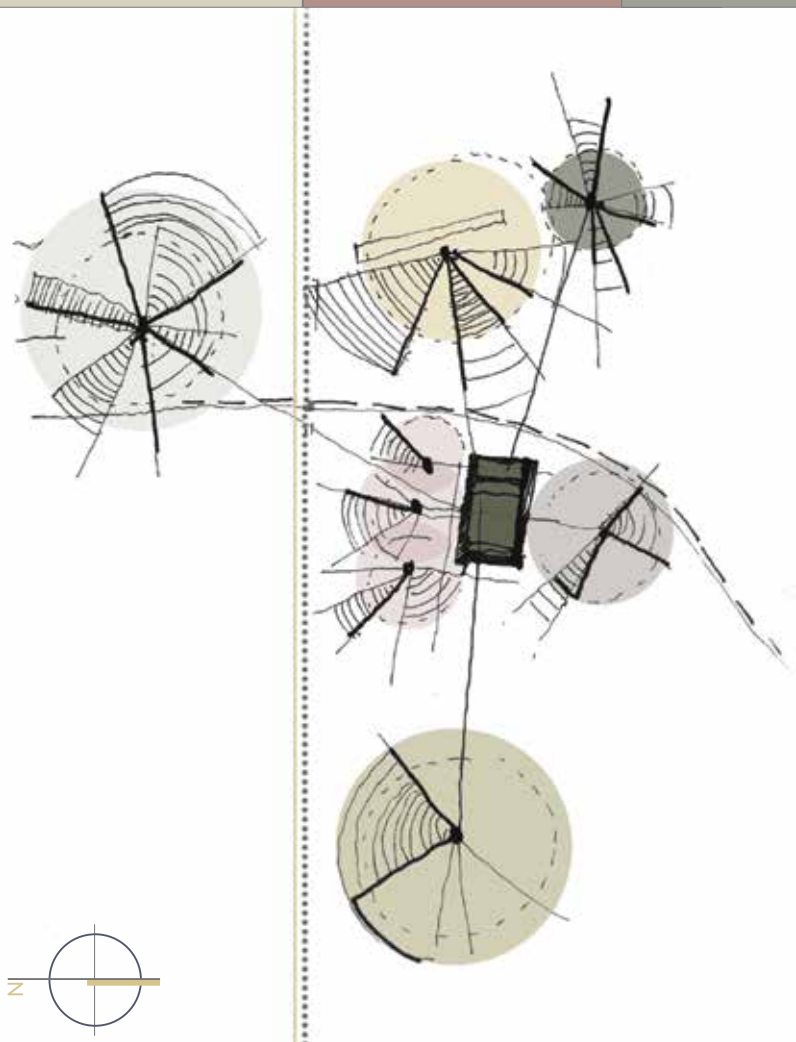


Figure 103: Static moments to represent archive while transient spaces represent gallery.

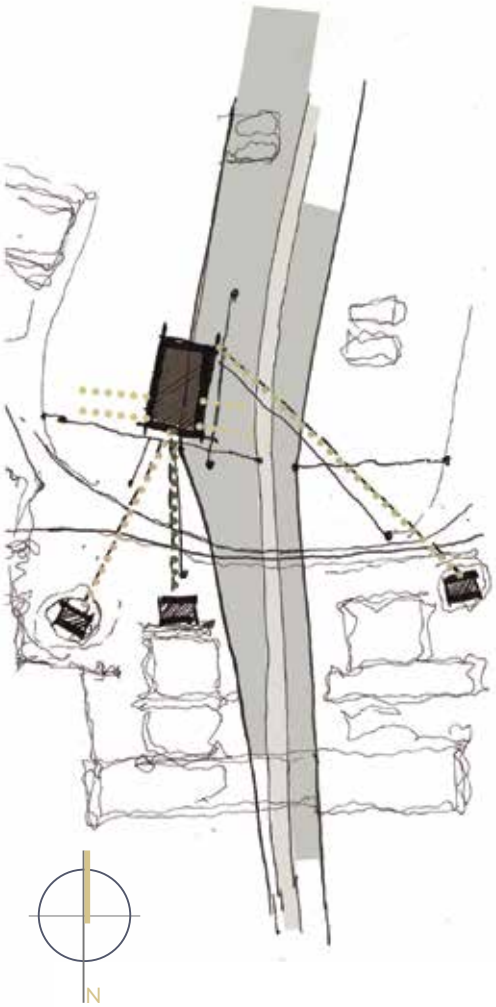


Figure 104: Nodal points as static moments defining surrounding space frames directed toward existing sculptures and potential new sculptures.

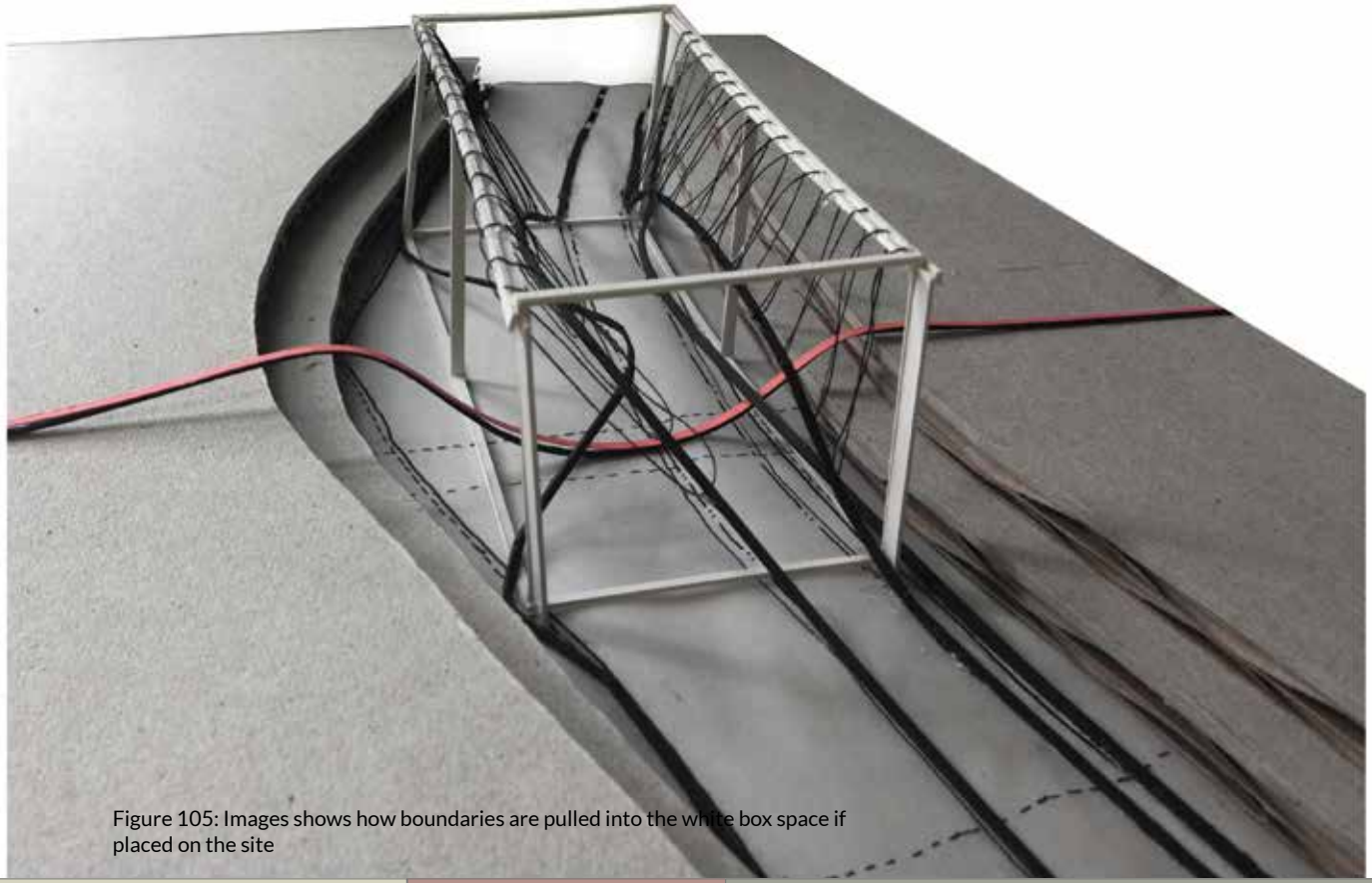
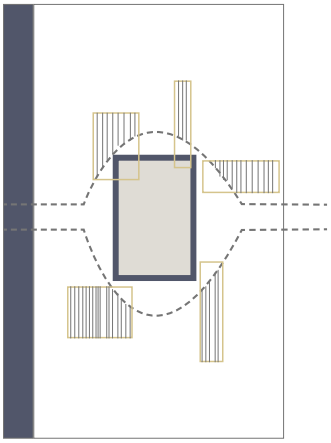


Figure 105: Images shows how boundaries are pulled into the white box space if placed on the site

2.3.3 CONCEPT 1
REDRESSING NON - PLACE



A non-place exist between the edge of DF Malherbe Road and the fence of the university. As it is not used by either the road or the university,it lays barren.

Another non-place is seen in the traditional art gallery: the white box. It carries the potential to become whatever the artist desires, but it remains an unused space in between exhibitions. Juxtaposing these two ideas, the white box is placed across the boundaries of the site. This placement invites the boundaries to dissolve the non-place. As the non-place disappears, the space is redressed by the desire of the artist.

The framed box (figure 105) indicates the tectonic nature of the proposed design. Breaking the white cube to allow interaction. The boundaries drawn into the white cube indicates the visual connection that the proposed building will establish.

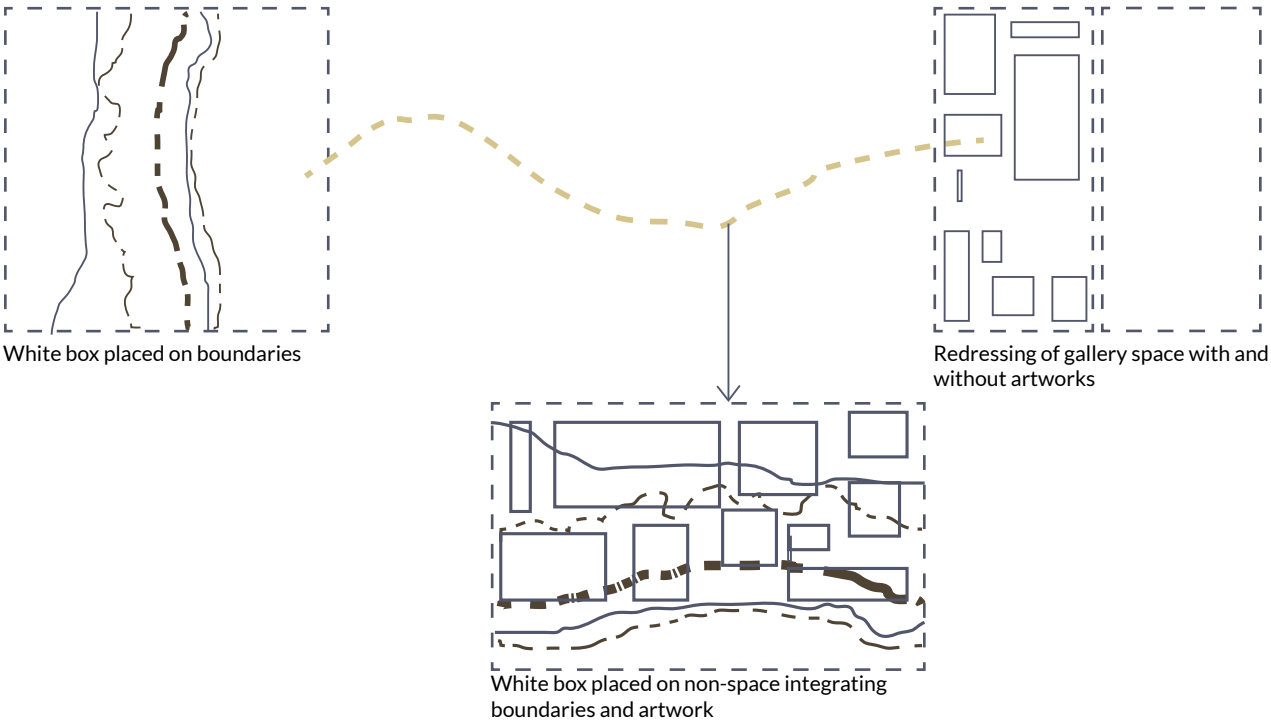


Figure 106: Diagram explaining two white boxes

Figure 107: Movement through the white box to create a transient space rather than a destination.

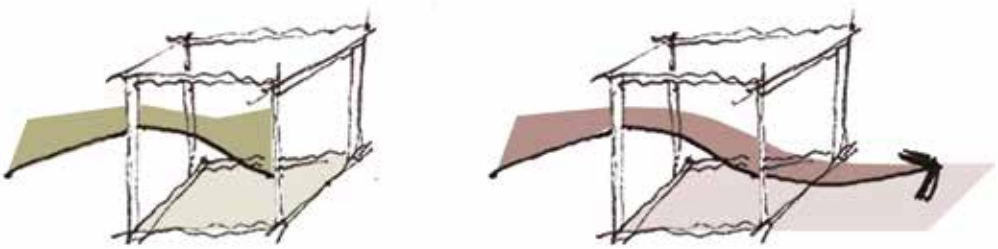


Figure 108: University boundary framing context of Bloemfontein.

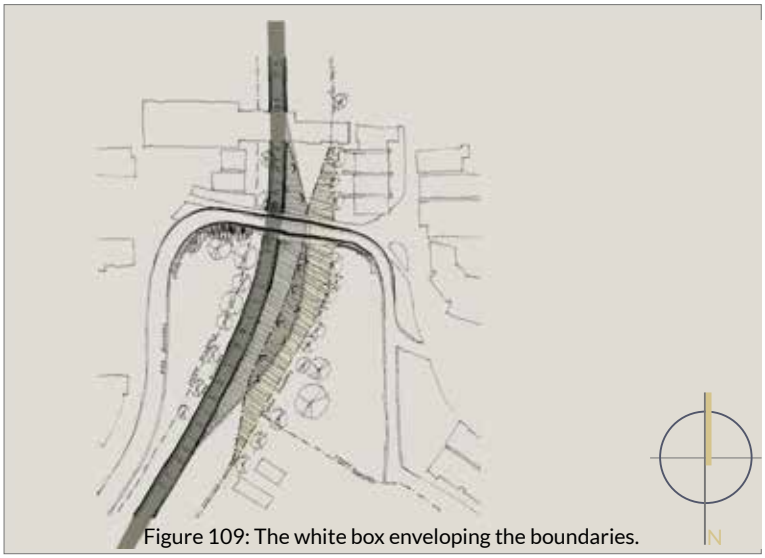


Figure 109: The white box enveloping the boundaries.

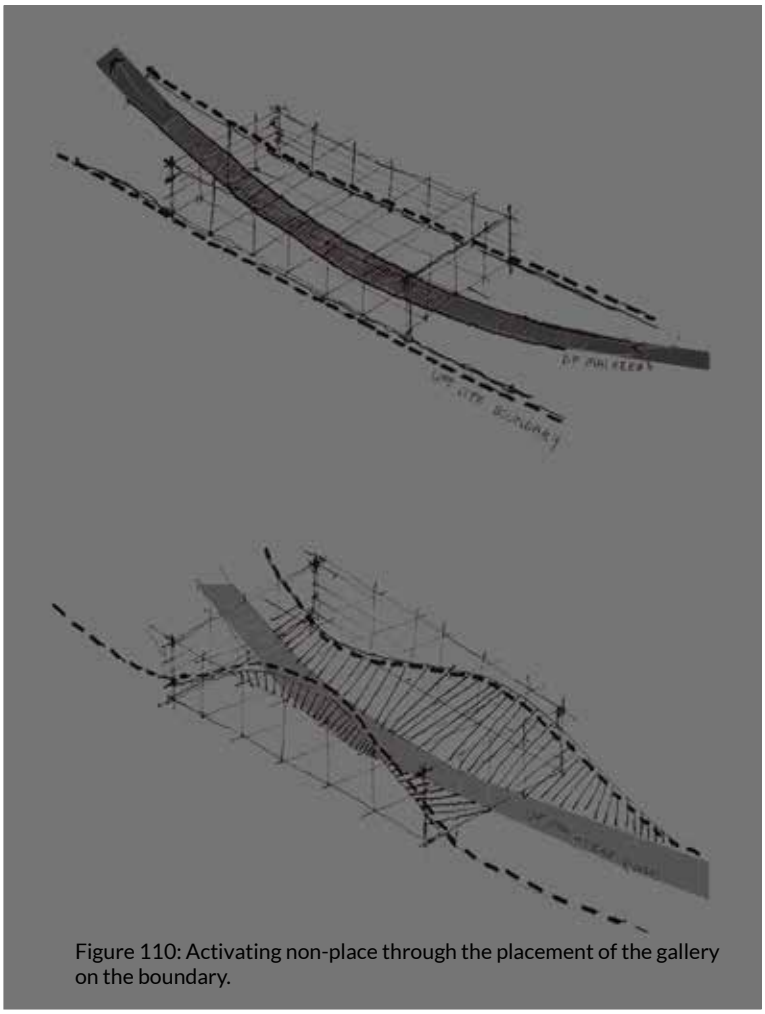


Figure 110: Activating non-place through the placement of the gallery on the boundary.

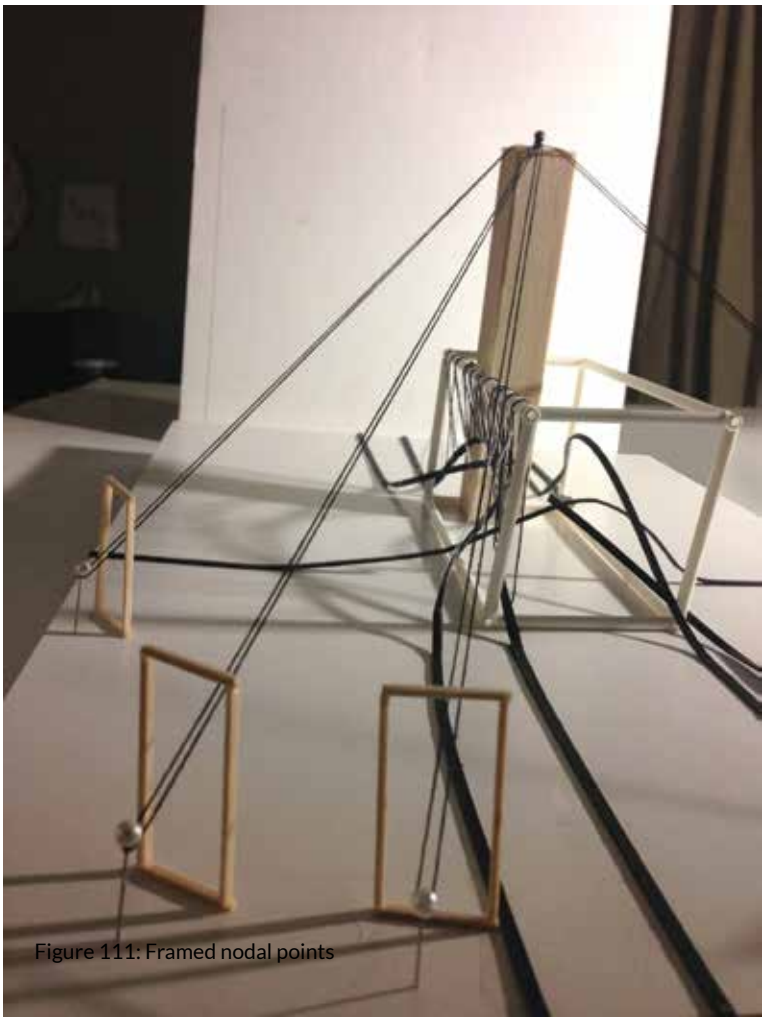


Figure 111: Framed nodal points

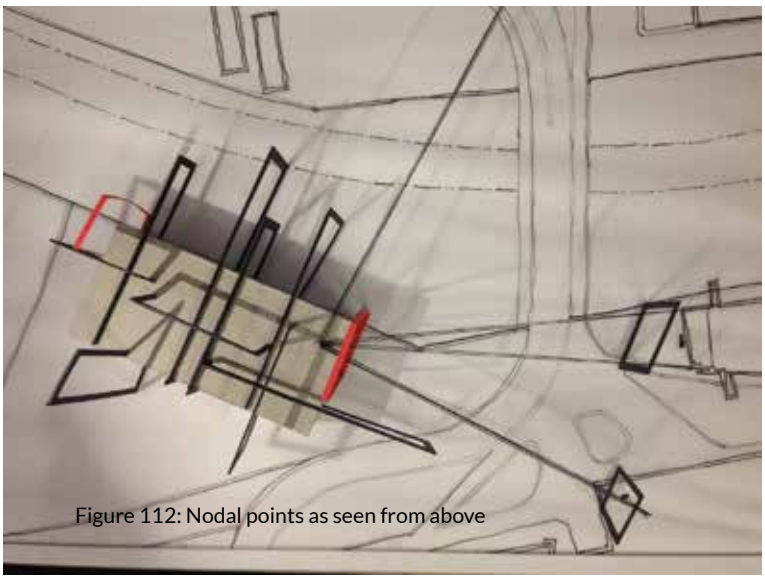


Figure 112: Nodal points as seen from above

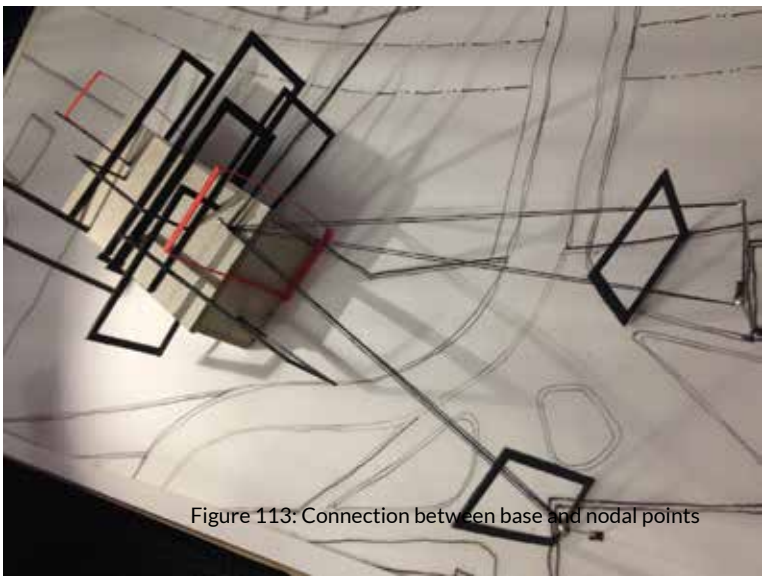
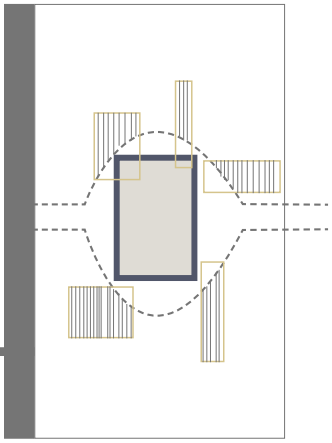


Figure 113: Connection between base and nodal points

2.3.3 CONCEPT 2
FRAMED MOVEMENT



The placement of a static point defines the space around it. A series of points will create visual movement as the eye follows the nodal points.

The frame concept allows the architecture to connect with its surroundings through the visual interaction between points of orientation. The frame pauses the movement to reveal something that was hidden or unnoticed.

The site holds several sculptures as nodal points. The architecture can interact with these artworks and propose new points in order to encourage the movement of art across the site. The gallery will act as the main nodal point on the campus as a larger site.

This concept also comments on the stereotomic and tectonic nature of the architecture. The accommodation list for a gallery requires an archive and storage with at least a 1:1 ratio to the exhibition space. The archive will have a stereotomic nature while the exhibition space is tectonic.

Movement is evident on the street-view (east) of the site. This movement will be used to allow interaction between cars and the proposed building. The pedestrian movement on the western edge will be integrated in a similar way but on a humanized scale.

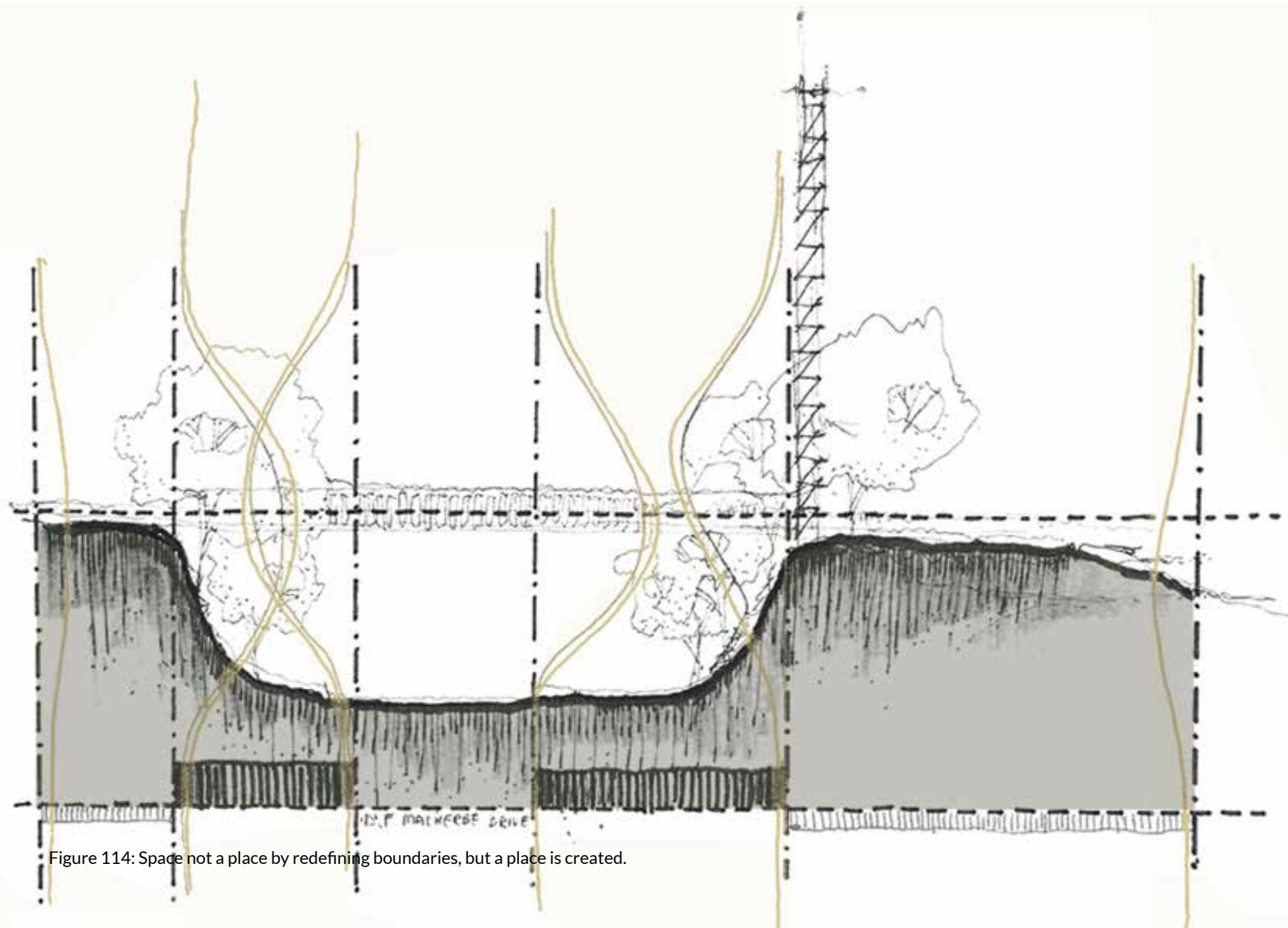


Figure 114: Space not a place by redefining boundaries, but a place is created.

Figure 115: Connection between viewer and sculpture

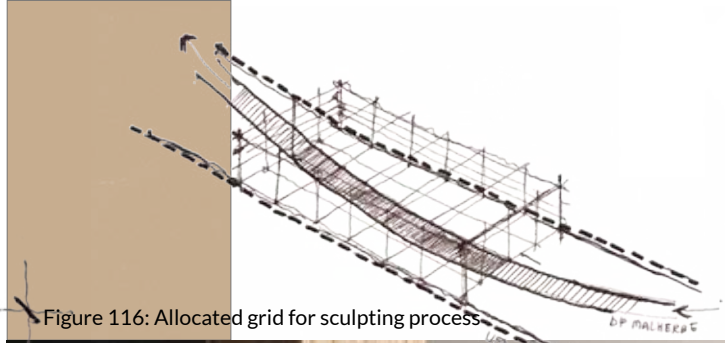


Figure 116: Allocated grid for sculpting process

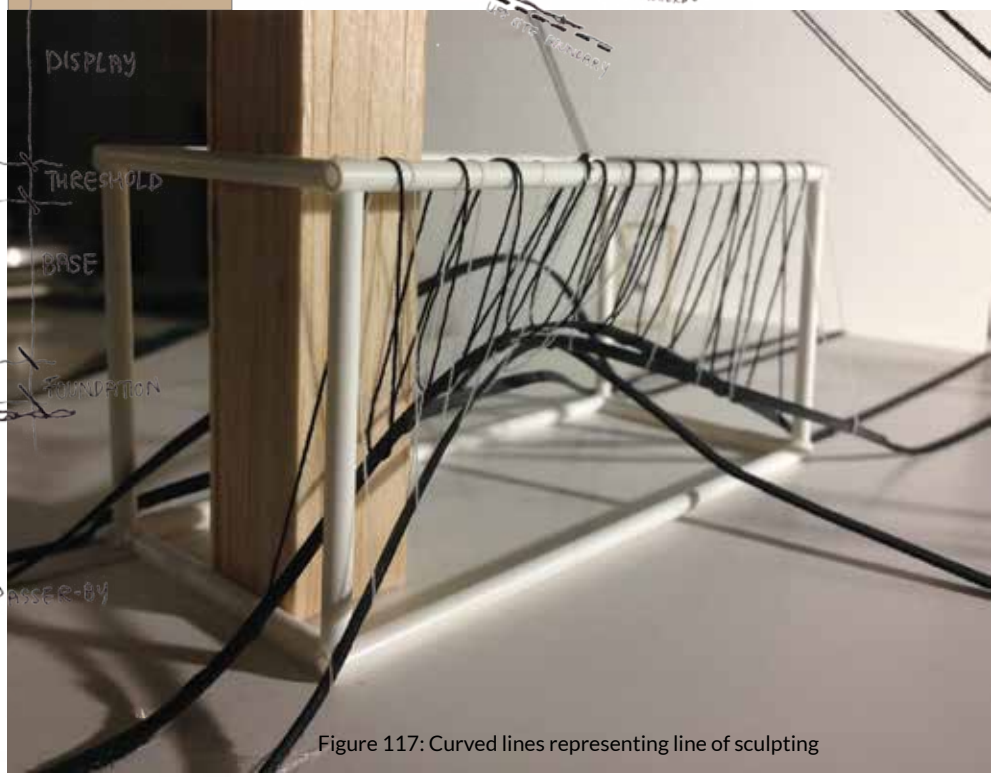


Figure 117: Curved lines representing line of sculpting

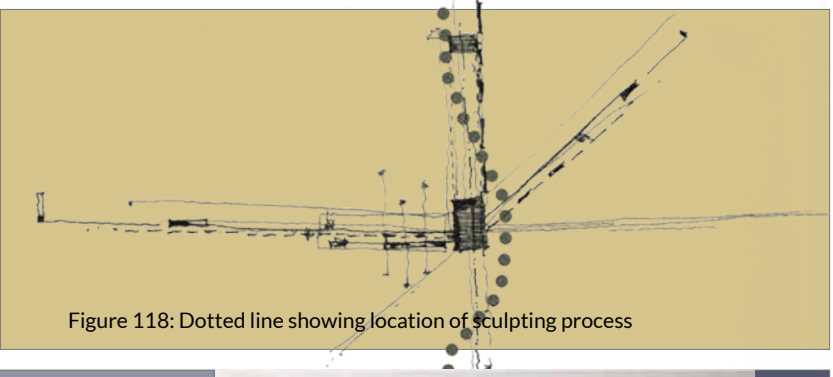


Figure 118: Dotted line showing location of sculpting process

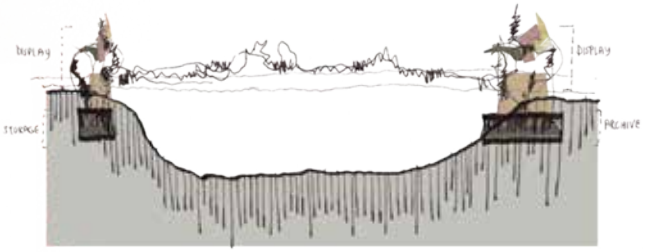


Figure 119: Sculpted connection between two sides of road

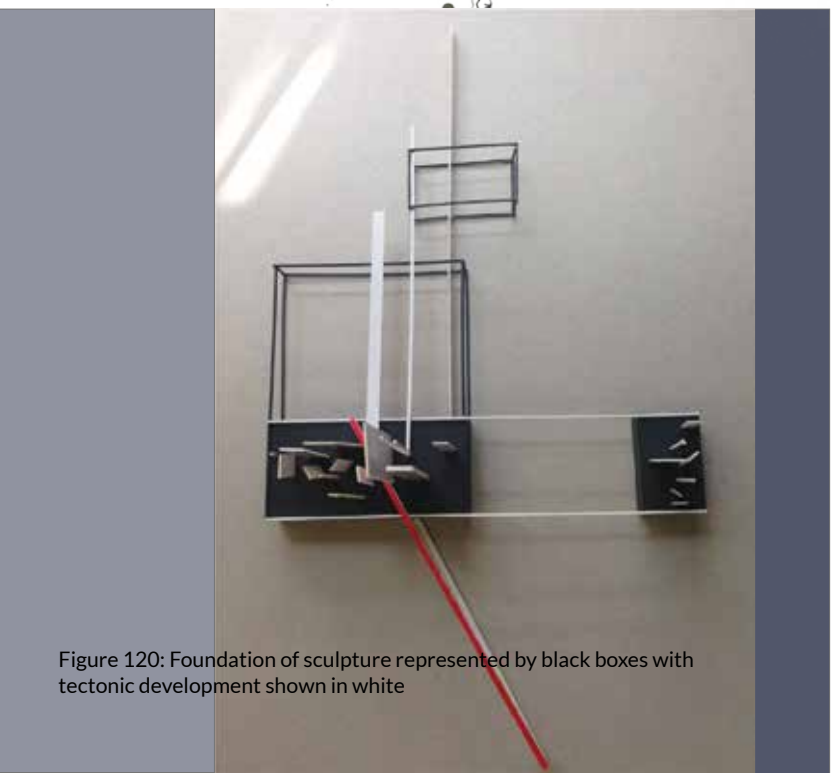


Figure 120: Foundation of sculpture represented by black boxes with tectonic development shown in white

Figure 121: Site before process of carving was initiated

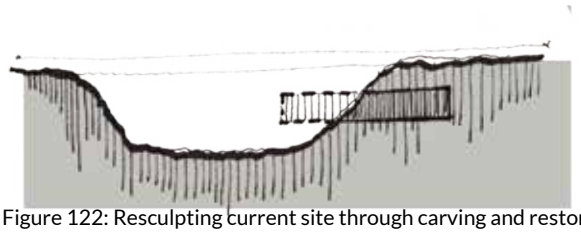
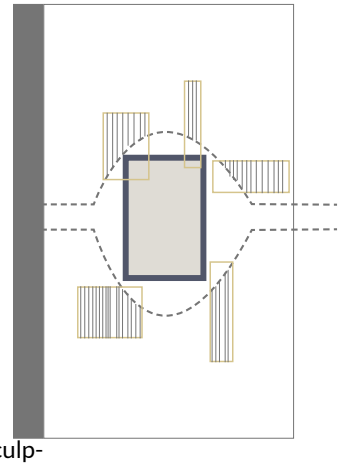


Figure 122: Resculpting current site through carving and restoring

2.3.3 CONCEPT 3 SCULPTING SPACE



A sculpture is made by taking a block of material and carving away all that is unnecessary until the desired sculpture is left. The proposed site was created in a similar way. The unnecessary ground was carved away, until the desired site for building the road was left.

The proposed design can be placed on the site and developed according to the tectonics of the sculpture (Figure 115). The foundation and base as the archive is placed underground or in a stereotomic nature involving the earth. The display spaces is designed as the head of the sculpture.

The sculpture is created through carving and restoring. The empty spaces being just as important as the filled areas. This concept can be translated into architecture as the built and unbuilt spaces being equally important.

The three concepts: Redressing non-place, framed movement and sculpting space is combined into one sentence: Re-sculpting non-place with framed movement. This concept will be further explored through the theoretical approach to the design of the proposed art gallery.

Re-sculpting non-place with framed movement.

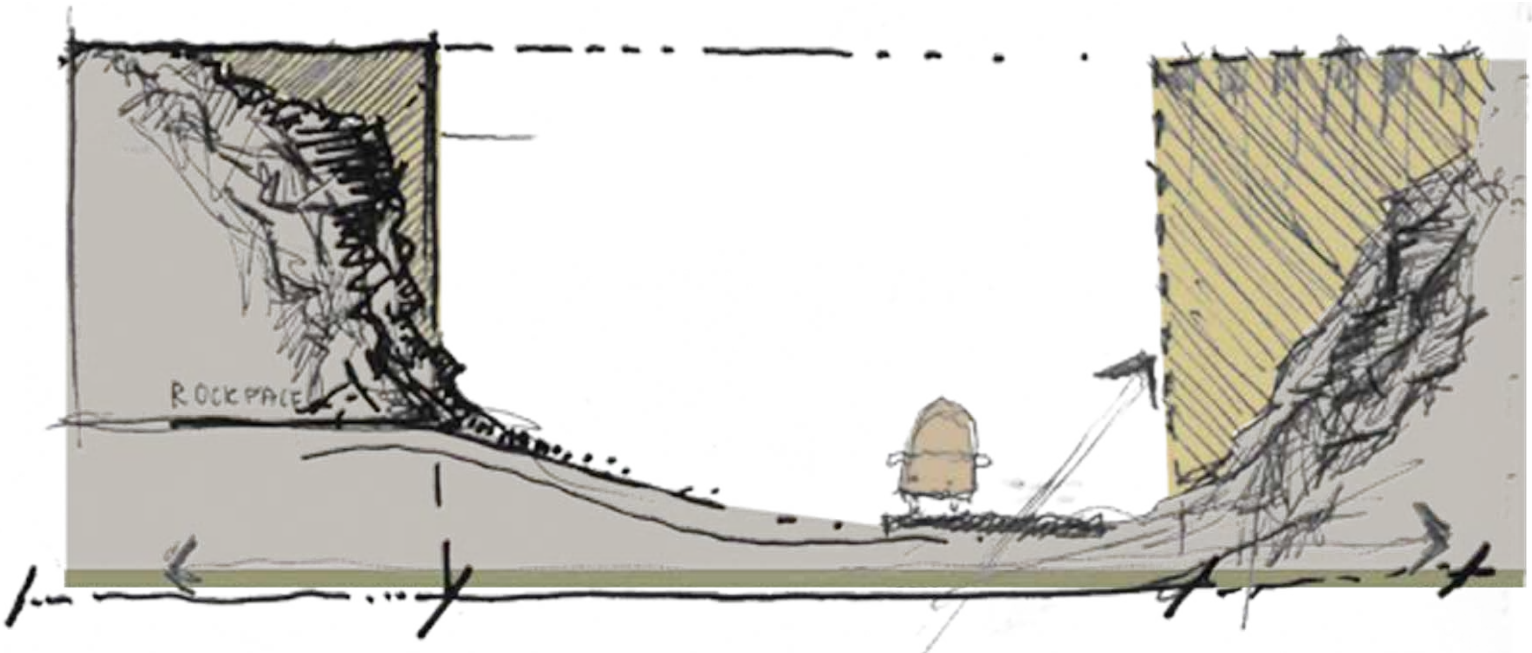


Figure 123: Yellow blocks showing original block out of which site was carved

Development of the argument:

The argument for the theoretical approach is initiated with the topology of the project. The site is analyzed with its existing boundaries and thresholds. The gallery is placed on the threshold of the site. The typology of a gallery is questioned and the white box theory is investigated. The white-box typology is placed on the edge of the site and the simultaneous sculpting of the context and the building is initiated.

Throughout this process, the gallery sculpts beyond its framed site unto the rest of the pictorial field of the context.

The interaction between the site, the boundary and the gallery is concluded as the gallery embodies the boundary placed on the site.

The gallery combines the vertical and horizontal boundaries visible on the proposed site. In that way the gallery connects the university with the city of Bloemfontein, and also establishes the connection between earth and sky.

TOPOLOGY:
Proposed site for art gallery

TYPOLOGY:
Gallery placed on threshold on site:
Precedent studies

TYPOLOGY
: Function
Gallery sculpting the threshold

MORPHOLOGY
Gallery sculpting beyond the threshold

MORPHOLOGY
form and function
Dwelling the threshold

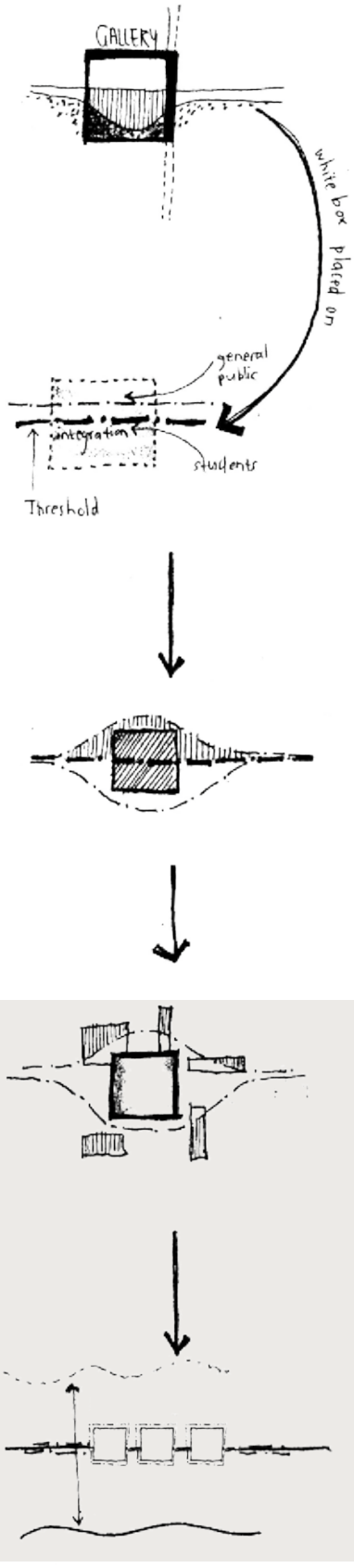
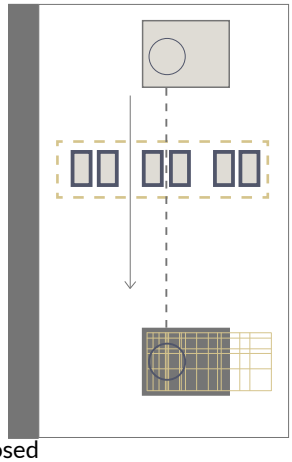


Figure 124: Theoretical framework diagram

2.3.4 THEORETICAL DISCOURSE



Places for viewing art create a stigma of layers around them which allows only an elite few inside. The proposed project aims to embody the thresholds created by a mindset around art galleries. While dissolving the mental boundaries, the location of the project will challenge the harsh edge of the UFS boundary.

TOPOLOGY: *Deconstructing thresholds*

In order to create a space that is perforated to the mind and body, one needs to investigate the existing thresholds and the obstacles they present. The literature by Edward Casey (2009) on the edges and the in-between will be studied in order to distinguish the layers of existence on the site.

The boundary line of the physical site, which is the wired fence, is suggested as the frame for the development of the project. Casey states that: "The edges of the painting serve more as frames than as limits" (Casey, 2009:1). Through applying this statement to the project one might say that the project should be framed within its boundaries, but not be limited to the provided edges. The painting may continue beyond its frame. The exact spatial position where the frame is overstepped can be explained through 'difference', a concept that refers to the process of deferral or carrying over.

Difference is explained by Michael Benedikt (1991:5) through the Japanese principle of 'ma'. 'Ma' can be defined as the interval in space, in time and in moment or place simultaneously. 'Ma' is found in the moment where the pendulum reaches the top of its arc and seems to pause for a moment before continuing downward. Ma is evident in the juxtaposition of elements. ("When Less is More: Japanese "MA" concept, minimalism & beyond", 2016: online). The moment between the one side and the other side of the threshold is an example of the principle of ma. The change of being inside and outside the UFS campus refers to the differences as the change occurs on a mental and physical platform. The harsh boundary of the campus defines it as a safety zone which is inaccessible without effort. The moment this boundary is crossed, an outsider, although being inside the boundary, may still feel excluded as the boundary states that they do not belong.

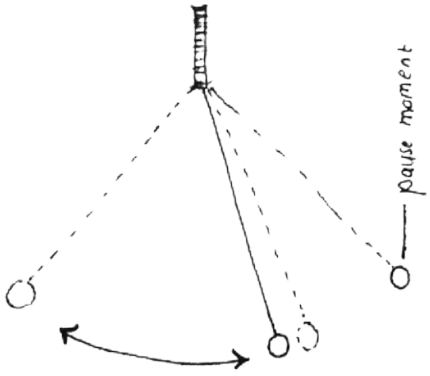


Figure 125: The image shows the concept of a pendulum as it can be interpreted through architectural analysis.

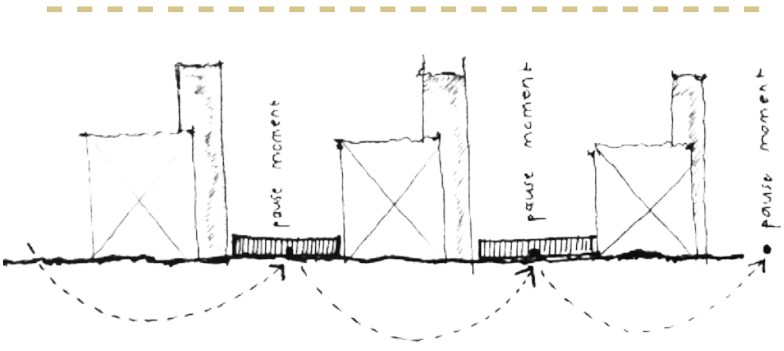


Figure 126: The pause space referred to as 'ma' is seen in the image as breathing space in-between functions.

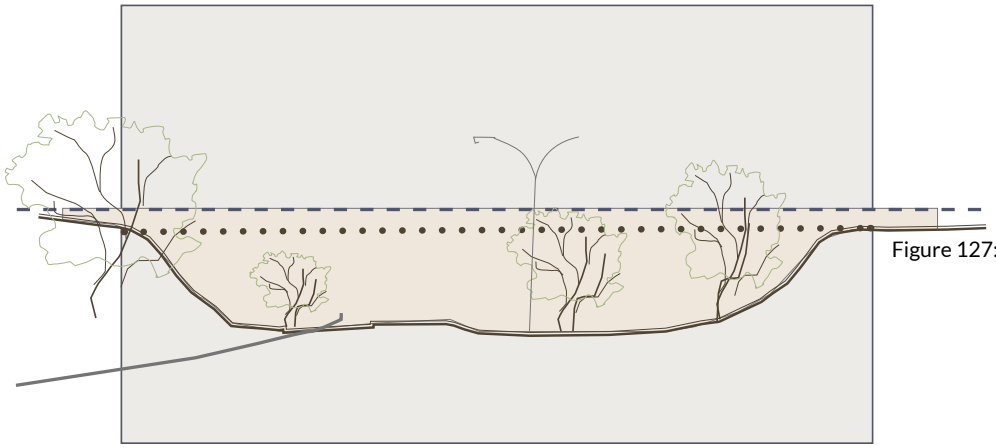


Figure 127: Proposed site for art gallery.

In an artistic approach, 'Ma' refers to the negative space surrounding a sculpture or image. The negative space is that which once was but is now removed in order to reveal something else. The revealing happens in-between that which is left (the sculpture) and that which is removed. The in-between space can be further explained through edges and the in-between space by Edward Casey (2009).

Casey (2009) speaks of two types of edges; the edges of mental space and physical edges. The edges of mental space are the "implicit tacit margins of mentation where intuitively or conceptually explicit mind cedes to place to something that is pre-conscious in status" (Casey, 2009:2). The physical or spatial edges are in contrast with mental edges. Mental edges have a temporality which stretches infinitely, steered by preconceived ideas. We find ourselves in between the visual and mental edges. These edges occur together as we distinguish between where the mental edge is and where the physical edge stops. The mental edge may stretch beyond the physical edge bounded by a fence.

These physical and mental edges are seen on the site for the proposed project. The thresholds created by the sculpting of the site influenced the making of the boundaries. The difference is studied through the traces evident in the distinction between the presence and absence. With reference to the proposed site for the project, its roughness has no value as being rough if there is no degree of smoothness to measure it to. The roughness reveals the tampering of the site, which was once a smooth object. The simultaneous presence of rough and smooth creates a sense of 'ma' that refers to the time of the sculpting process.

"The edges of the painting serve more as frames than limits"

(Casey, 2009)

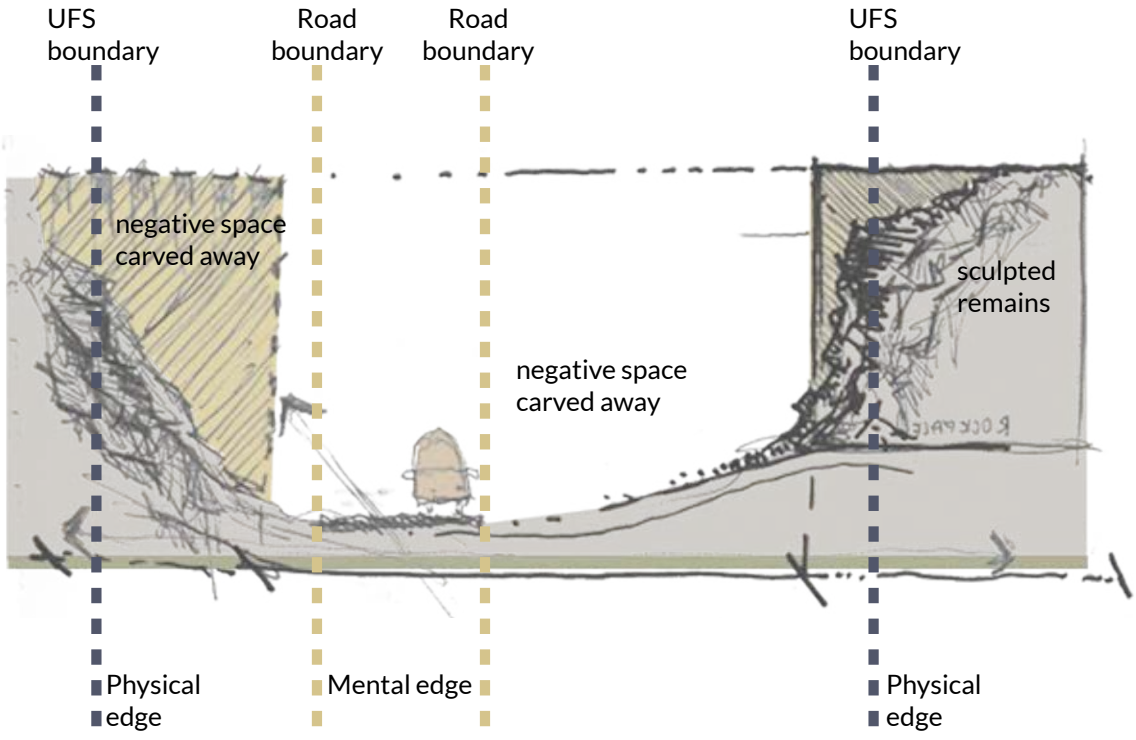


Figure 128: Boundaries shown on site section

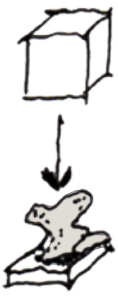
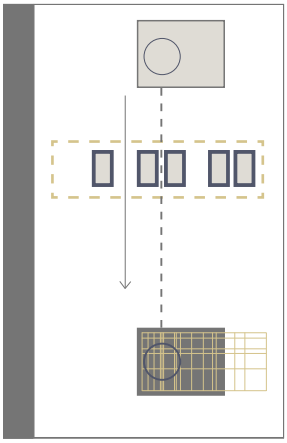


Figure 129: Process of carving a sculpture. A similar approach was applied to the proposed site.

THEORETICAL DISCOURSE

Topology: Deconstructing thresholds



The images below (figure 130,131,132) show the physical and mental edges present on site. The first two are physical edges created by the boundary fence of the UFS. The third edge is a mental edge, created by the bridge. The boundary on the eastern side, figure 130, between the road and the university poses as a physical barrier as one cannot move beyond the boundary. The mental boundary of the figure 130 stretches beyond the fence as it is porous and one is able to view outside the fence, or from the outside into the fence. Figure 131 shows the northern edge of the site which was closed off as Tempe owns the ground opposite to the fence. This boundary gives the viewer an interesting mental threshold as the road continues beyond the barrier. Figure 132 is a mental boundary as one move underneath the bridge to the other side. The bridge is not a physical boundary but a mental threshold to cross in order to extend one's view.

Figure 130: Boundary fence on east edge of site

Figure 131: Road closed off with fence on north side of site

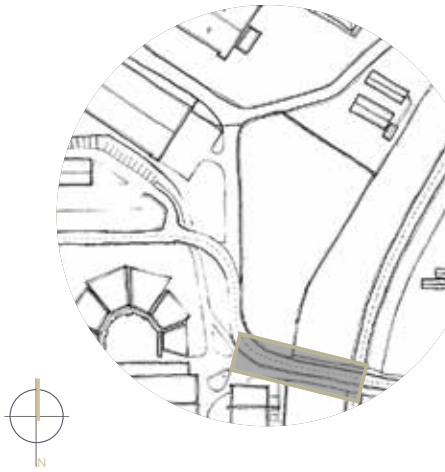


Figure 132: Mental edge provided by bridge

The in-between is found from the presence to the absence. In-between is explained by Casey (2009:3) as 'less determinate', where somewhere between two distinct positions does not indicate an exact position. For example, somewhere on the boundary between the UFS and the road does not give a measurable position.

This immeasurable position can be described as the concept, 'In-between' (Casey, 2009:3). Through the removal of the boundary fence, and the placement of the gallery unto the threshold suggests that the gallery itself becomes an in-between space. One cannot exactly measure if you are inside or outside the campus when visiting the gallery.

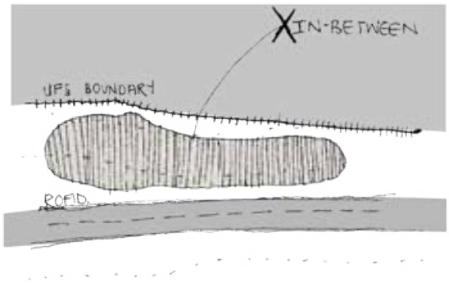


Figure 133 shows the in-between space located between the UFS boundary fence and DF Malherbe Road.

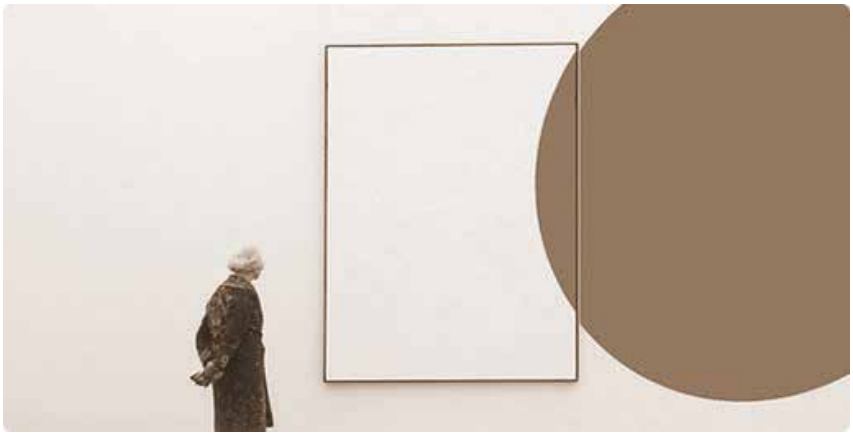


Figure 134: Image extending beyond its frame (Sener, 2016: online).

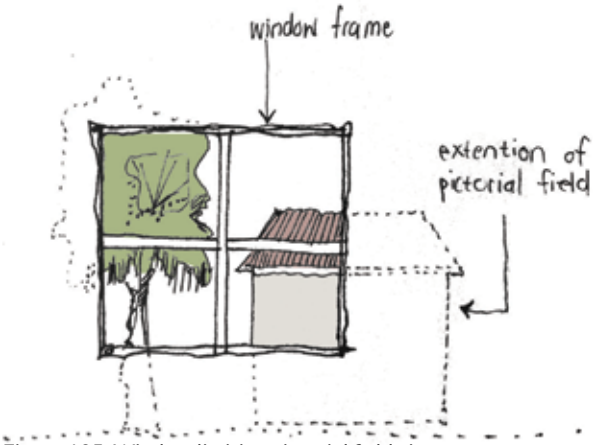


Figure 135: Window limiting pictorial field view

Aristotle said that to be in something is to be surrounded by it. This ensures that although the exact position inside or outside the campus is unclear, the fact that you are surrounded by the gallery space means that you are dwelling the threshold. The artwork inside the gallery space can be understood as being in-between in more detail. The in-between of an artwork suggests the space between the edge of the painting and surrounding frame. The inwardness of the artwork can only be known if the viewer allows the edges of his mind to extend beyond the frame into the painting (Casey, 2009:4).

> "The frame of the picture is as much a psychological container for the artist as the room in which the viewer stands is for him or her." (O'Doherty, 1999:online)

The extent to which one can be surrounded by or in-between the painting is explained through DuChamp's artworks. The anti-formalist tradition of stepping outside the frame of the painting is seen in DuChamp's installations: 1200 Coal Bags (1938) and Mile of String (1942). In these artworks, the gallery space itself is made by primary material; altered by art (O'Doherty, 1999: online). DuChamp used the ceiling as his canvas, a space which was unwanted by artists. Through utilizing the ceiling, the floor space was unobtrusive physically but obtrusive psychologically (O'Doherty, 1999: online). The process of 'difference' is now moved from the space between the painting and the frame to the space between the inside and outside of the gallery space in which the installation is presented.

These artworks were the beginning of the breakdown of the barriers of disinterest or disdain present in art galleries. Artists tried to carry on with this dialogue. In 1958, Yves Klein exhibited an empty gallery which he named "The Void" (Le vide). Arman responded to this in 1960 with an exhibition called "The Full" (Le plein). Arman wanted to dialecticize Klein's transcendental space by filling the same gallery space with garbage from the floor to the ceiling. (O'Doherty, 1999: online). The contrast between Klein's "void" exhibit and Arman's "full" exhibit contains a moment where 'ma' is present in their dialogue.

In 'Poussin's paintings', David Carrier explains that viewing a painting, one only sees a segment of a larger pictorial field. The frame cuts the imaginary world which extends beyond the frame. There is no definite picture to what lies beyond the frame, as this was the extent to which the artist shared his imagination (Carrier & Poussin, 1993). "Once you know that a patch of landscape represents a decision to exclude everything around it, you are faintly aware of the space outside the picture" (O'Doherty, 1999: 20).

Figure 136: Poussin's self portrait: View beyond frame includes the rest of the frames in the painting. (Poussin, 1650: online)

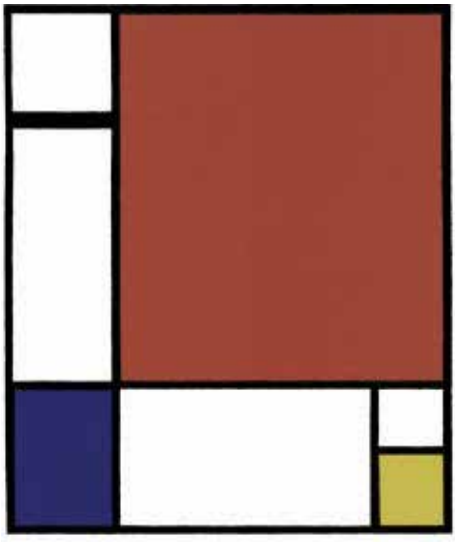
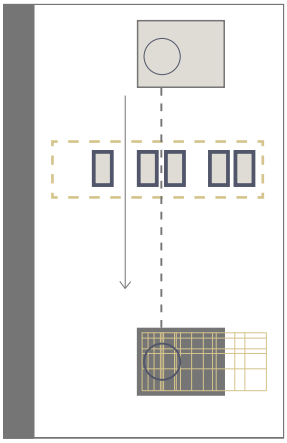


Figure 137: Piet Mondrian artwork. The artwork stops within the frame and does not suggest a larger pictorial field (Mondrian, 1929: online)

Piet Mondrian

THEORETICAL DISCOURSE

Topology: Deconstructing thresholds



Morris Louis (1960) places emphasis on the process of making art in his Alpha Phi artwork (figure 138). He left the greater part of the canvas open to illustrate that it is not about the subject, but about the strips forming a frame for the blank canvas (Lynton, 1980: 248). Instead of framing the artwork, the art itself becomes the frame to an imaginative image. The inside of the canvas is left to the imagination of the viewer.

A different approach is seen with a camera. When viewing a photograph (figure 139), the frame cuts off where reality extends. The pictorial field beyond the photograph can be colored in by the extended landscape which physically exists. The edge of the photograph was a primary decision by the photographer. Editing and cropping gives even more direct decision making to the artist.

In architecture, the site boundary as the frame sets the pictorial field, colored in by the designer. In the proposed project, the site allows a view beyond the cropped site. The visitor may dwell beyond the set limits of the boundary fence.

Poussin's self-portrait (figure 136) is an example of an artwork that hints towards an extending landscape as the frames in the background are incomplete. The frames extend the imagination of the viewer as it suggests a world beyond the frame of the painting. In Piet Mondrian's artwork (figure 137), there is no extension as the boundaries are clear within the frame of the work.

The extension of the frame can be applied to the proposed site (figure 140). When viewing the site within its 'frames' , which is its boundaries, the site is seen without any context. It exists by itself without the influence of surrounded buildings. The site viewed in context of its surroundings explains the picture beyond the frame.

Figure 138: Art itself becomes the frame (Louis, 1960: online).

Figure 139: Edge of photograph is not the edge of the pictorial field (Lawrence, 2016: online).

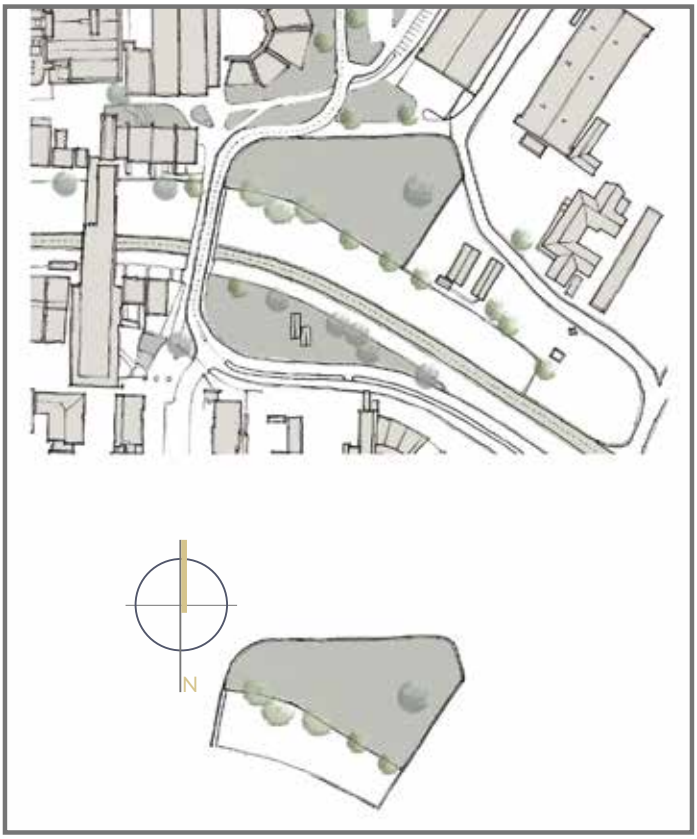


Figure 140: Site as seen with pictorial field beyond frame and without.

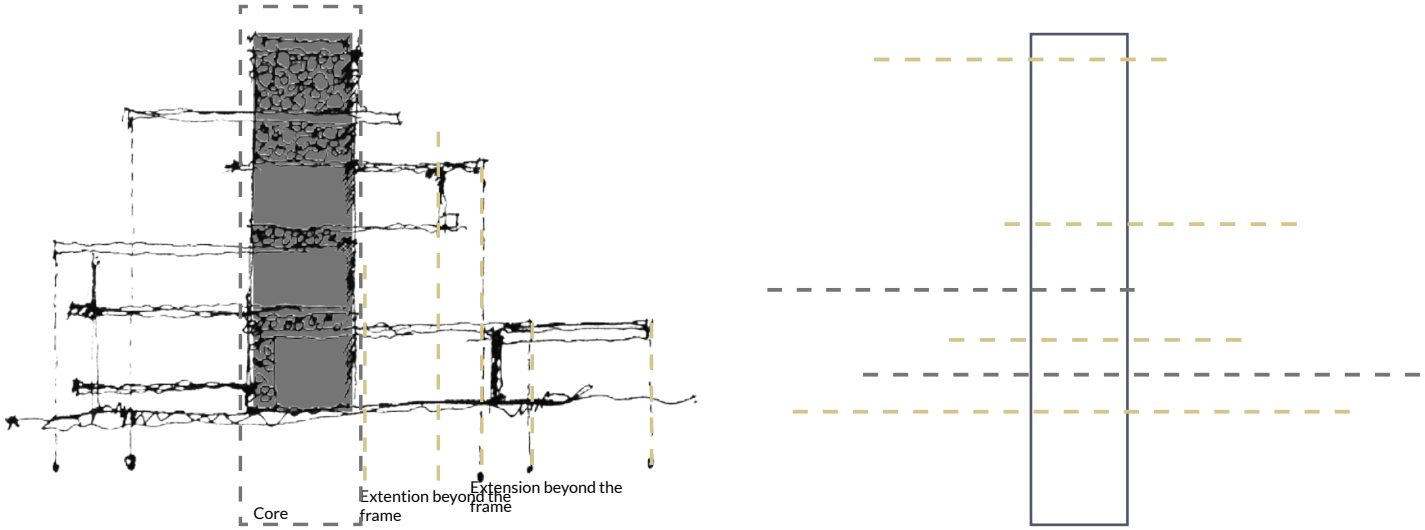


Figure 141:Roofs extending beyond boundary of building

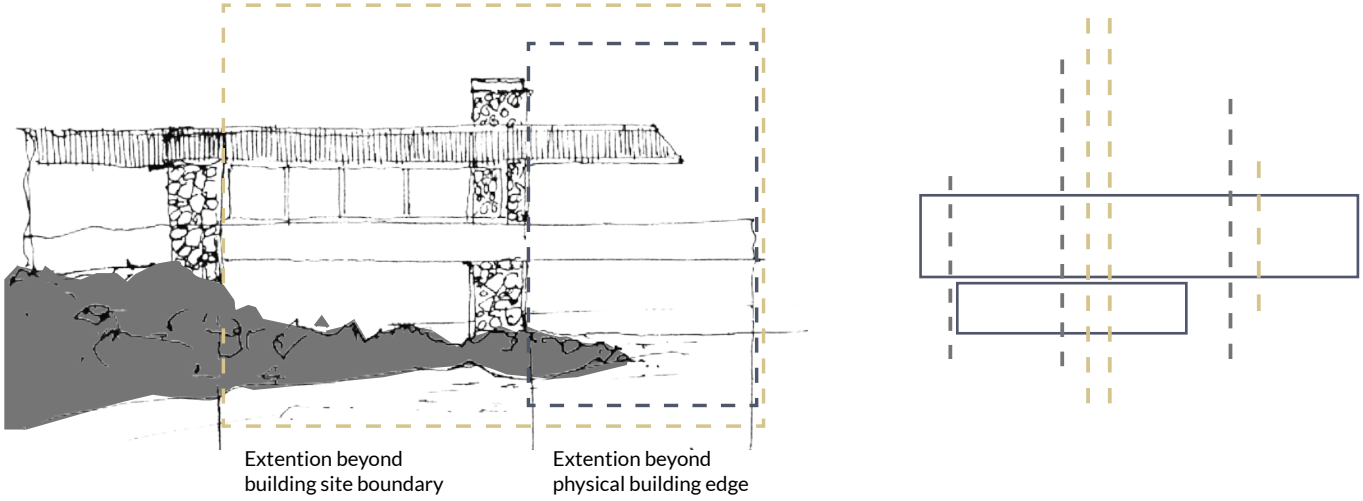


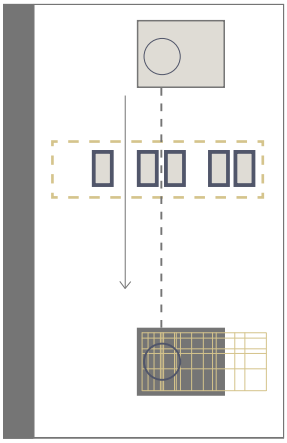
Figure 142: Building extending beyond the site boundary

Figure 144: Corner window in Falling water by Frank Lloyd Wright (Lykantrop, 1937: online)

Figure 145: Research tower by Frank Lloyed Wright, and example of a building that stretches beyond its edges.
(Lengkapku, 2015: online)

THEORETICAL DISCOURSE

Topology: Deconstructing thresholds



The architecture of Frank Lloyd Wright can be seen as an example of buildings that stretch beyond its frame. The Research Tower (figure 145, 141) is an example of this, as it consists of a giant stack from which the tower's floor slabs cantilever and spread like tree branches (Lengkapku, 2015:online).

The cantilever of a building extends beyond the physical edge of the building, which can be seen as the boundary of the building. The cantilever allows the visitor to dwell beyond the threshold of the building. The horizontal planes extend infinitely parallel to the ground to allow freedom of space as well as belonging to the earth (Norberg-Schulz, 1980:67).

The concept of architecture extending beyond its boundaries is explained by Benedikt as architecture under erasure. He explains this concept by referring to Wright's work. An example is the corner window (figure 144). The corner of the wall is absent, but still suggested through the glass panels. The corner is present, but at the same time also absent. The presence of glass in architecture is useful because of its absence. The glass wall creates a boundary, which is not there. The bands of glass used by Wright creates horizontal freedom in space as the wall is no longer there to enclose space, but it is used to direct space (Norberg-Schulz, 1980:67).

In the proposed design, the edge of the site is seen as the boundary. The building will extend beyond the boundary to dissolve the non-place on the other side of the fence. The site slopes where the fence is placed and therefore the building can cantilever across the boundary.

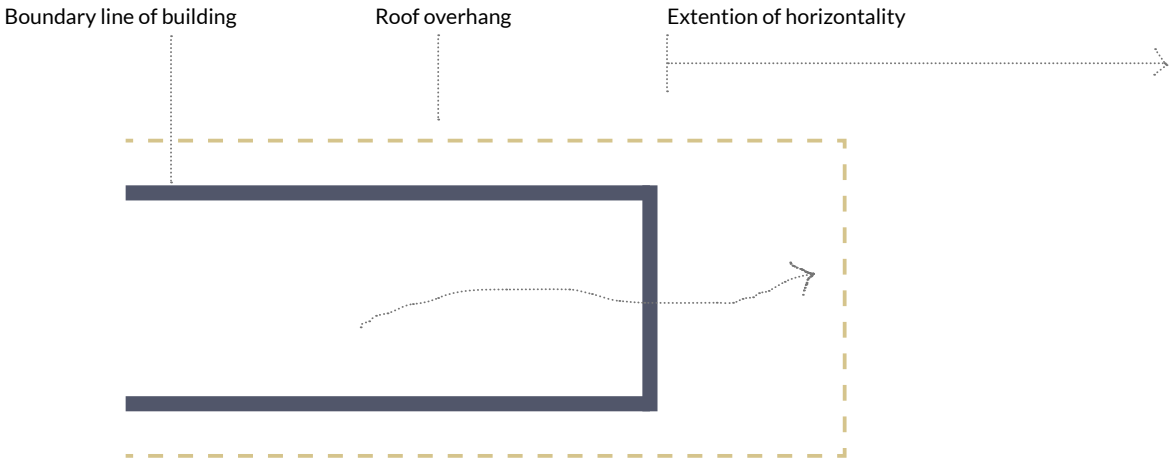


Figure 143: Extention of overhang beyond the boundary line of the building

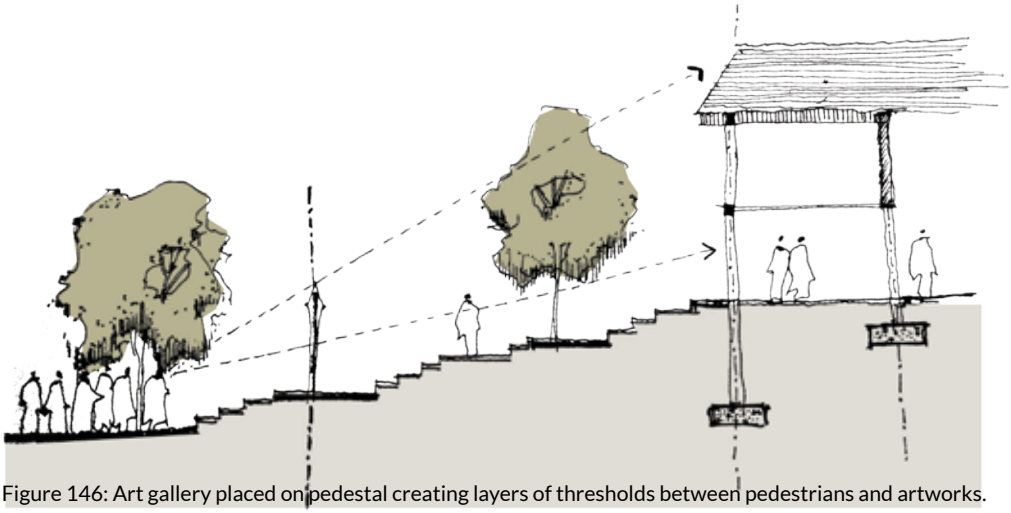


Figure 146: Art gallery placed on pedestal creating layers of thresholds between pedestrians and artworks.

The design of a building beyond its physical frame can further be developed as it oversteps the frame of its traditional function and form. The interaction with the context of the white box, sculpts the function of the design.

The typology of an art gallery in a traditional sense is a large open room which can be organized and redressed according to each different exhibition. This room is known as a white box (figure 147) that usually consists of white plastered walls, white ceilings and timber floors or carpets. The gallery as a whole is positioned on a pedestal with an elongated important entrance to impose its value in hierarchy (figure 146). This system of hierarchy places great importance on artworks, but also suggests that only important people may enter. Deridda (Benedikt, 1991:18) criticizes these hierarchical systems in the sense that one dominates the other with more presence. He suggests that deconstruction aims to find what is suppressed through a hierarchy system in order to undo the hierarchy and reverse what was placed in hierarchy. This is done in order to find hidden truths.

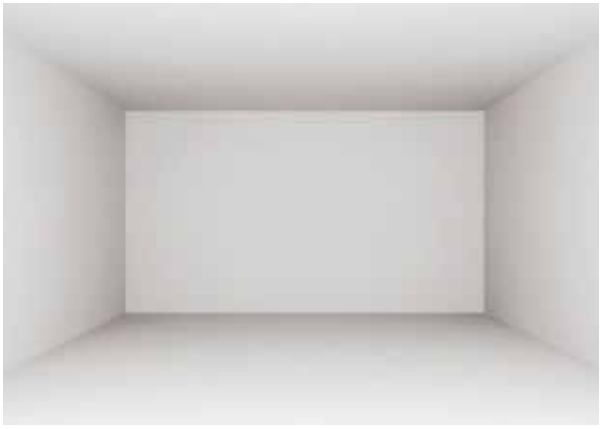


Figure 147: Traditional white box
(Latest Home Decor Interior And Furniture, 2016).

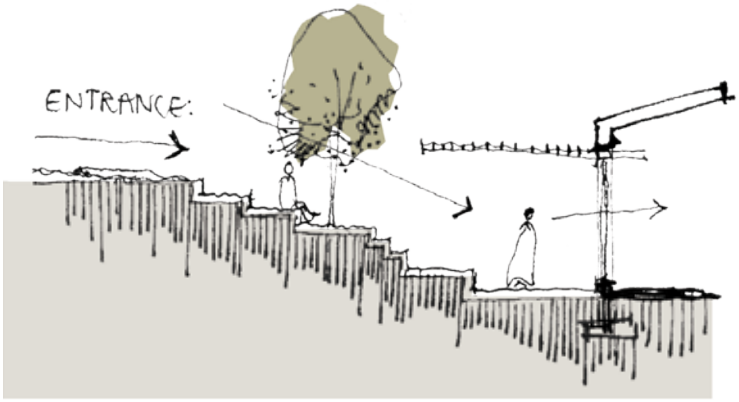


Figure 148: Deconstruction of entrance into gallery.

Before the 18th century, art exhibitions were only for the rich (figure 149). It was only during the enlightenment period that the middle class were exposed to wealth. According to Matthew Craske, art galleries after the enlightenment period had a subconscious slogan inviting people inside. It stated that the world of the street were inferior to the world of art inside the gallery which they were about to enter (Craske, 1997: 175).

The hierarchy of galleries is constructed in a way to keep the outside world outside. No windows to view inside, walls are painted white and the ceiling becomes the only light source. The reason would be to allow the art a world of itself. A world where time does not touch the art and art is free to take on its own life. The only time allowed is the time period which the work is from (O'Doherty, 1999:online).

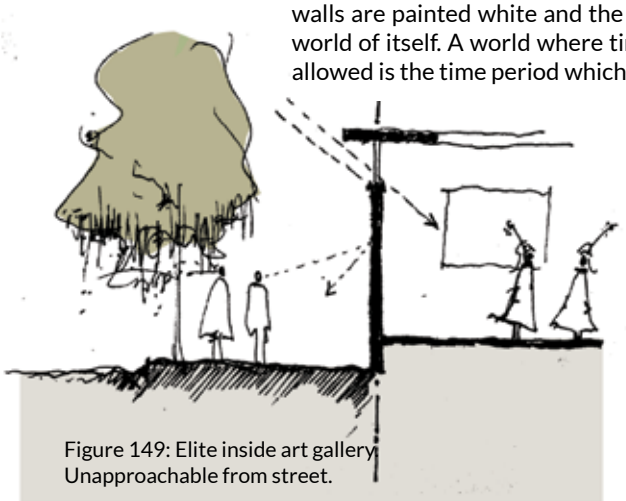
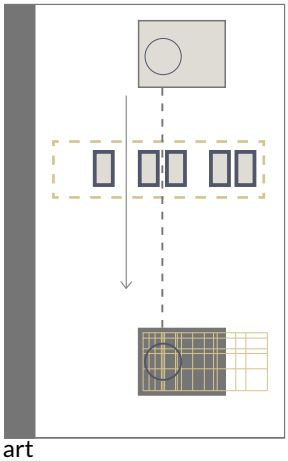


Figure 149: Elite inside art gallery.
Unapproachable from street.

THEORETICAL DISCOURSE

Typology: Redressing non-place



O'Doherty explains the problem with the white box from the eye of the visitor: "Presence before a work of art means that we absent ourselves in favor of the Eye and the Spectator" (O'Doherty, 1999:online). The eye, indicating the disembodied faculty that relates to visual means and the spectator meaning the bleached out life of the self from which the eye comes forth (figure 150). According to O'Doherty, a person dies when entering the white cube and all that is left is the eye and the spectator.

> "We give up our humanness and become the cardboard spectator with the disembodied eye" (O'Doherty, 1999:online).

Furthermore, he means that people are not themselves when they enter a gallery space. They speak in a lower voice in order not to disturb the art. They do not laugh, drink, eat or sleep there. The reason, according to O'Doherty, is that the white cube contains a myth that we are only there as spiritual beings with the eye of the soul as our only activity. This is the type of behavior required by the white cube.

The white cube became the central material and expressive mode for art. Artists have to consider the white cube exhibition space when expressing their work of art unto a canvas that cannot be too large or it will not fit on the exhibition wall. The white cube can be seen as a device that wipes out the past and wipes the slate clean after each exhibition. The cube creates a space without context. The art relates only to that which the artist chooses to display.

The deconstruction of the white box gallery space is initiated by placing the important white boxes on a hierarchal low point (figure 152). On the chosen site for the project between DF Maherbe Road and the UFS fence, the space can be classified as non-place as it does not serve either side with any function. The white-box gallery spaces are placed on the non-place on site. In this way, the reversal of importance is used to dissolve the non-place by redressing it with another type of non-place which is the white box. Displacing the white-box to a definite context creates a space without hierarchy, as the context creates the hierarchy of a space.

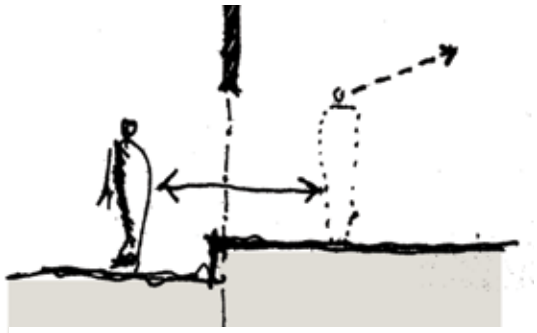


Figure 150: The spectator leaving the human outside.

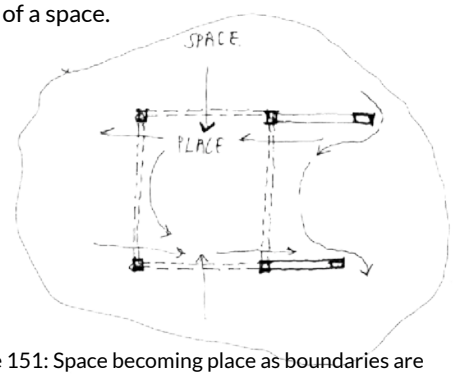


Figure 151: Space becoming place as boundaries are enforced.

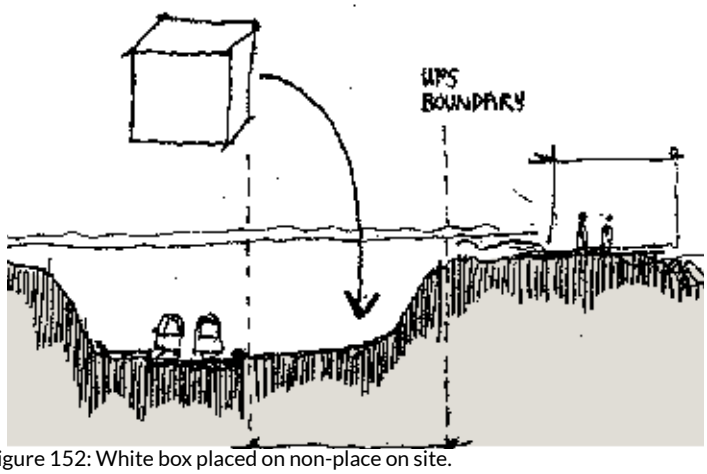


Figure 152: White box placed on non-place on site.

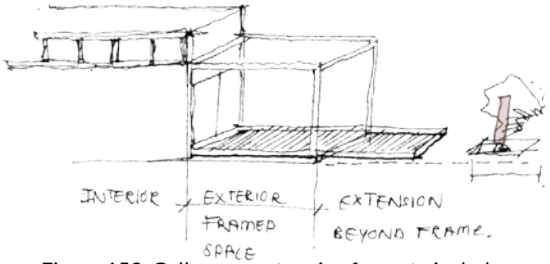


Figure 153: Gallery overstepping frame to include context.

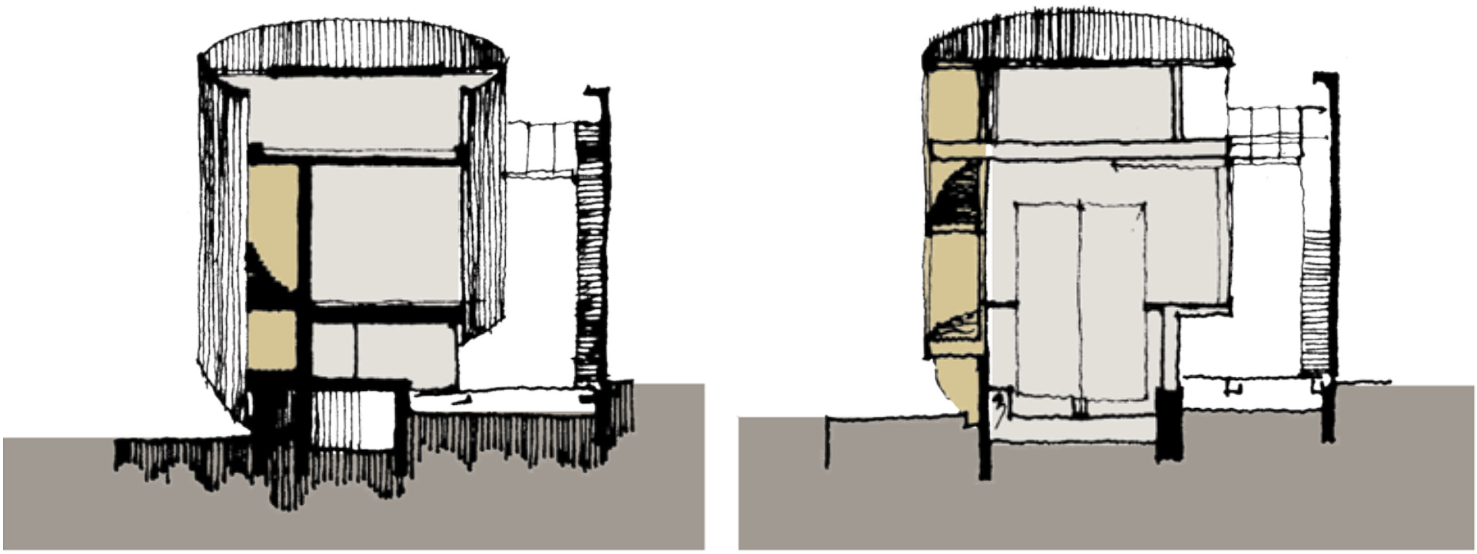


Figure 154:Section through gallery showing circulation in yellow and porous screens on the edge of the circulation.

Figure 156: Photo of circulation and porous screen casting shadows (Kasten, 2014: online).

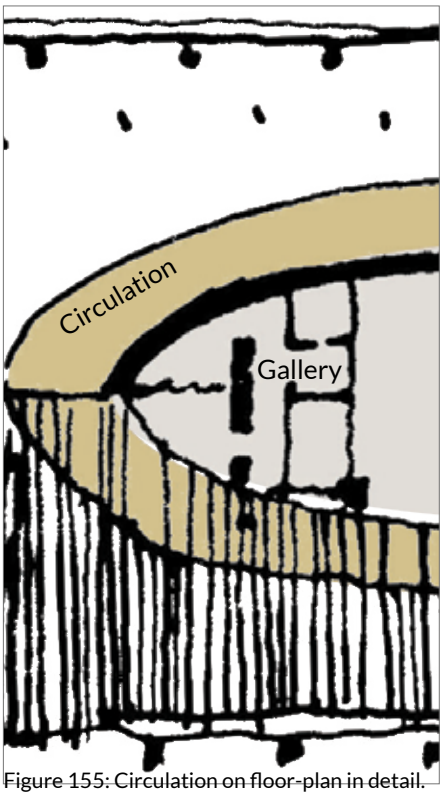


Figure 155: Circulation on floor-plan in detail.

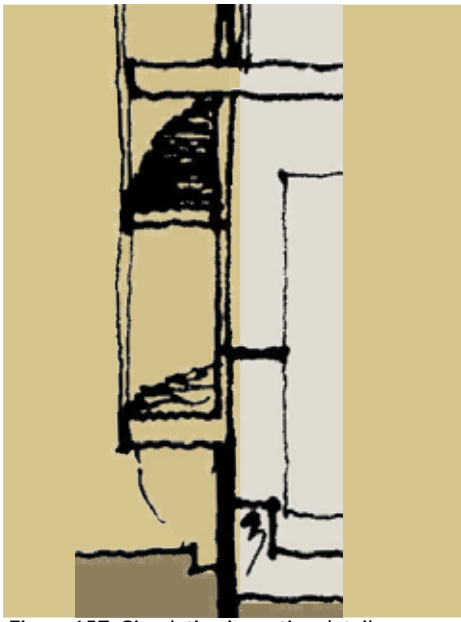
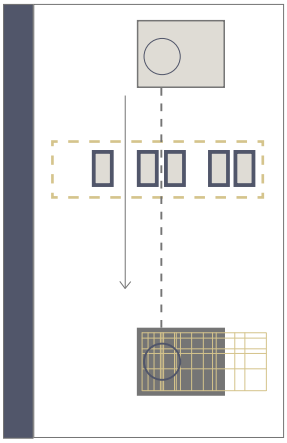


Figure 157: Circulation in section detail

THEORETICAL DISCOURSE

Typology: precedent



The proposed site is next to a busy road and the gallery will have a long facade to intrigued pedestrians inside. To achieve this, the edges of the gallery should be porous and inviting. The Circa Art Gallery in Johannesburg is studied as an example of a gallery with porous edges to allow interaction between the inside and outside of the gallery.

Through the allowing porous edges (figure 156), the typical white-box is deconstructed as the exterior is allowed within the gallery. The Circa Art Gallery is situated on the corner of two streets. The circulation of the gallery is placed on the exterior facade. The circulation is shown on the drawings in yellow. The circulation is used to create an interaction between pedestrians, visitors and art. The artworks are secured in another circle inside the circulation path (figure 158, 159). The porous edges intrigue passing pedestrians as the louver screens allow glimpses inside the gallery space. Although it does not show any of the artworks, the gallery itself poses as a sculpture.

One is aware of the reality beyond the frame of the building. The circulation space oversteps the boundary of the building in two ways. Firstly, the practical aspect is the cantilever across the stereotomic mass and secondly, the mental porous skin allows the mind to wander beyond the edge of the site.

Therefore, the Circa Gallery is an example of a gallery, represented as a white box, that is designed beyond its frame in order to sculpt the boundary and in that way, establishing a connection between art and the street activities.

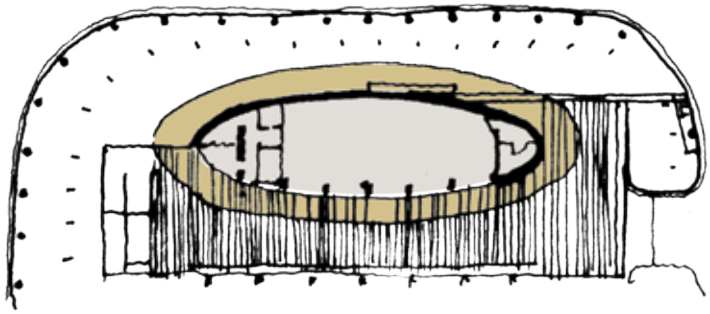


Figure 158: Ground floor plan with circulation indicated in yellow.

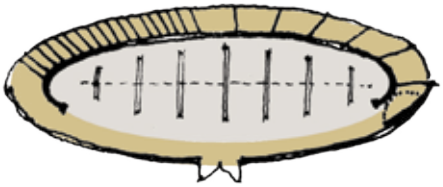


Figure 159: First floor plan with circulation indicated in yellow.

Figure 160: Interaction between interior and exterior through porous screen (Lafarge, 2016: online).

Figure 161:Building as sculptural object (McLaren, 2014: online).

"Earth first of all gave birth to a being equal to herself, who could over-spread her completely, the starry heaven." -Hesiod (Norberg-Schulz, 1980:24).

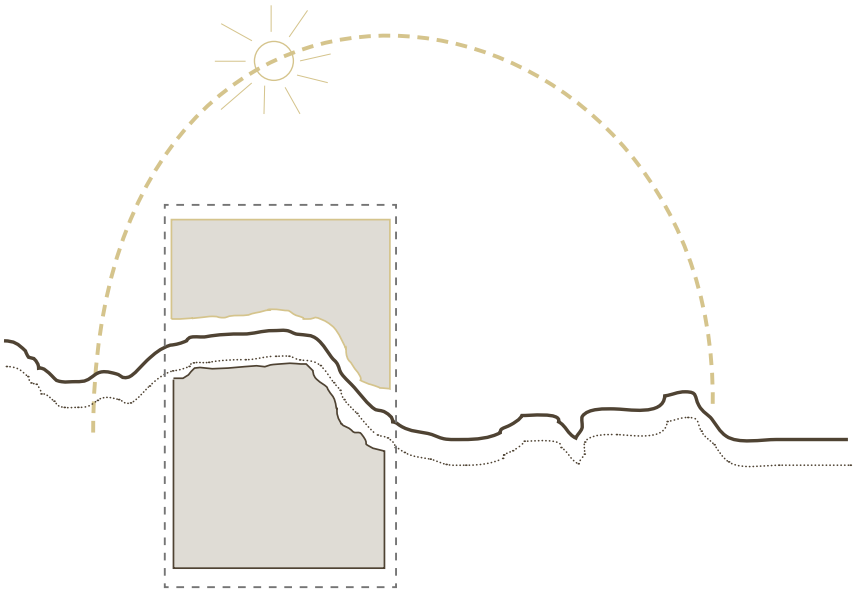


Figure 162: Earth and sky is placed within one frame

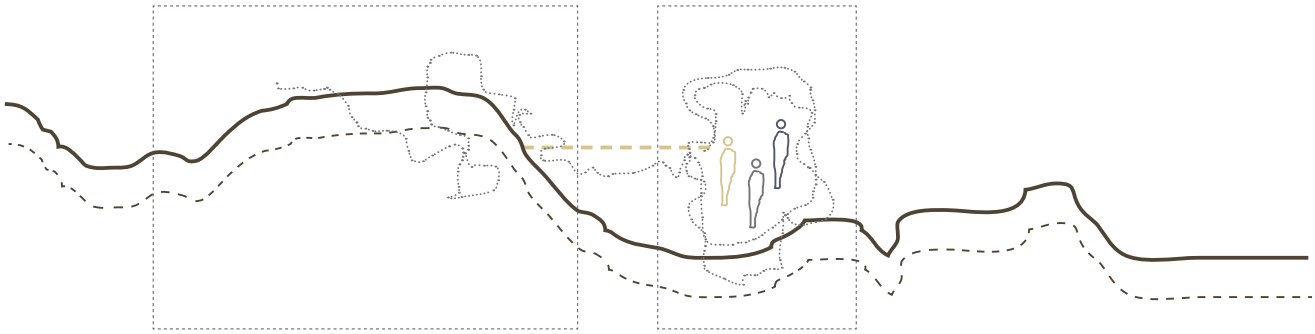


Figure 163: Relationship between man and nature

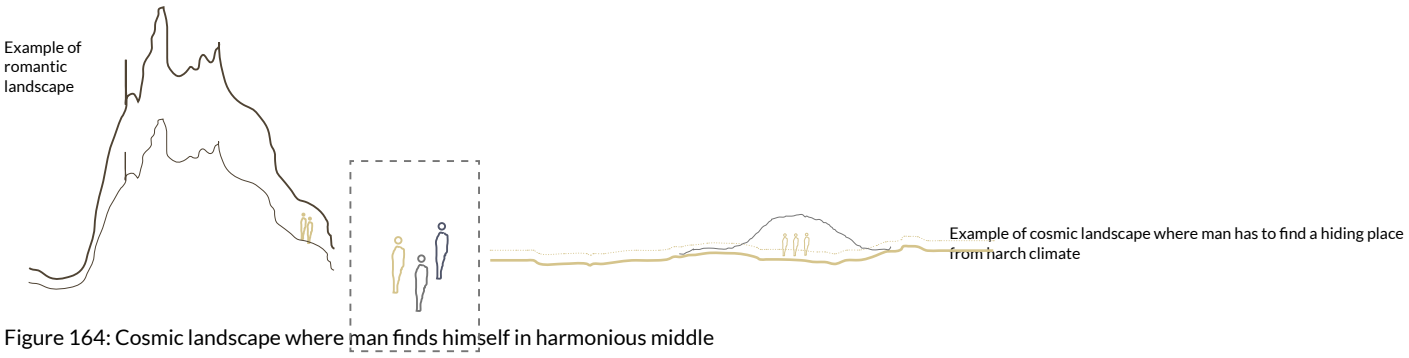


Figure 164: Cosmic landscape where man finds himself in harmonious middle

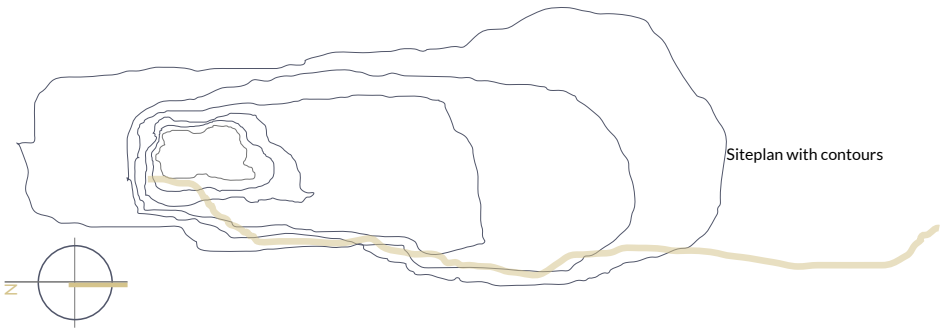
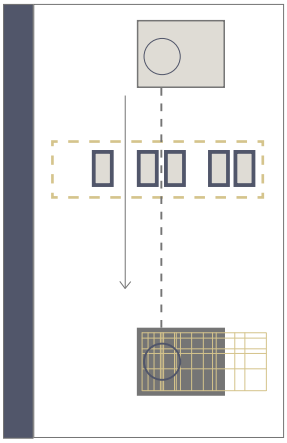


Figure 165: Yellow line suggests how the architectural layout should follow the natural landscape

THEORETICAL DISCOURSE

Morphology:
Sculpting the classical landscape



The sculpting of the classical landscape suggests that the earth and sky is placed within one frame to become a world (figure 162). The relationship between man and earth, and man and sky places the process of the sculpting of the landscape within a unified frame (figure 163). Heidegger states that the earth is the serving bearer and the sky is the vaulting part of the sun, the light and dusk of day. He continues to say that us being on the earth means dwelling, and on the earth automatically means under the sky. Norberg-Schulz says that for a person to be able to dwell between earth and sky, man has to understand the two as well as understand their relationship. With understand, he means that man has to experience the meaning (Norberg-Schulz, 1980:23).

In the classical landscape, man places himself as an equal partner with nature. Nature becomes a friendly compliment to his own being. This suggests simple and stable relationship (Norberg-Schulz, 1980:46).

Norberg-Schulz continue to say that the classical landscape makes a human fellowship possible. The individual is not absorbed by an abstract system such as a romantic landscape and he neither has to find a hiding place from the climatic conditions of the cosmos landscape. Therefore Norberg-Schulz suggests that a human can truly gather with nature in a classical landscape (Norberg-Schulz, 1980:46).

The equal relationship between man and nature in the classical landscape allows man to define natural places that indicate the genius loci of a place. Man does not have to rise from macro to micro, but finds himself in the harmonious middle where he can reach in or out (figure 164) (Norberg-Schulz, 1980:48).
Man may sculpt the horizontal surface without interrupting the nature of the classic landscape.

The classical landscape express the reconciliation of earth and sky (Norberg-Schulz, 1980:47).

The placement of architecture within the landscape suggests an 'inhabitated landscape', or a landscape that is understood within the relationship between earth and sky (Norberg-Schulz, 1985:47).

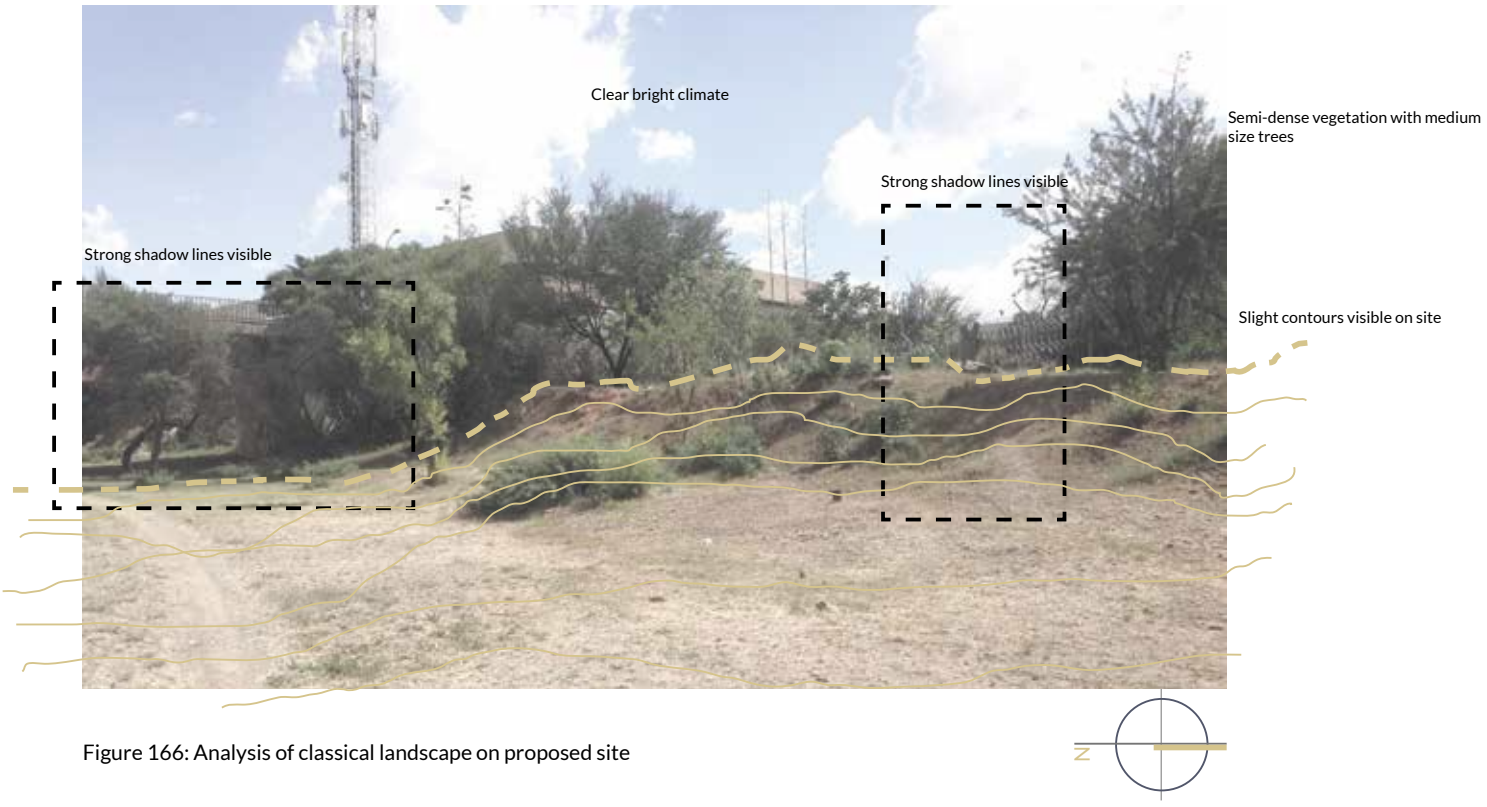


Figure 166: Analysis of classical landscape on proposed site

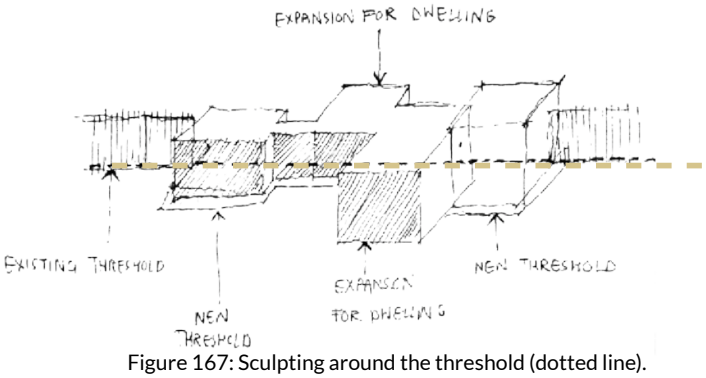


Figure 167: Sculpting around the threshold (dotted line).

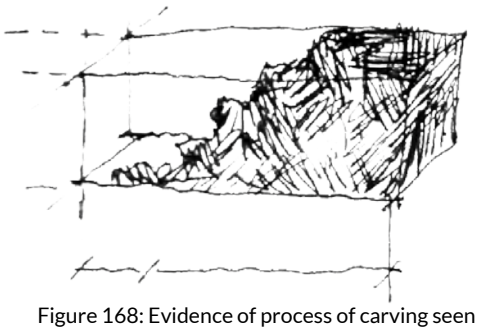


Figure 168: Evidence of process of carving seen on site.

Morphology: Sculpting space

The morphology of the proposed project is derived by means of sculpting the site around the threshold of the boundary of the campus. Through sculpting, the building becomes the threshold. According to Muzzonigro, in order to dwell the threshold, the boundary between self and the other must be perforated. On the proposed site, the boundary between the university and the city must become perforated in order to allow dwelling on either side of the fence.

Turner states that during the process of liminality, the passage becomes status less (Turner, 1969:online). Through embodying the threshold, the liminal process is captured with the functions of the art gallery.

This concept allows the dwelling of the threshold to occur. Heidegger considers dwelling as essential to a human being (Heidegger, 1971:online). Thus, it is the act of dwelling that implies a building as a consequence. Bhabha (cited in Rutherford, 1998) describes the concept of dwelling the threshold as an approach of the other through a process of mutual awareness. This mutual awareness will occur on the proposed site. From campus, the public road is viewed as the other, while the public views the university as the other. The morphology of the building encapsulates both sides and provides views into both sides of otherness through the spatial planning.

The morphology of the proposed building will be created through the process of carving. According to Adrian Stokes, Architecture vivifies the process of carving through the materials in which they are embodied (Kite, 2009: 156). Stokes uses the example of Nicholson's work to explain the sculpting process where there is evidence of the profound human actions of making and the reliefs for their tactile realizations of the steps of architectural surfaces (Kite, 2009: 156)

The work of Willem Boshoff, artist in residence at the UFS, will be incorporated into the design of the building. The artwork, Words Worth (figure 170), was done with the help of a community project in Richmond where people made clay bricks with their hands. Letters are carved into the clay bricks by means of a handmade timber mold. The handwork allows the viewer to notice the evidence of human involvement in the architecture.

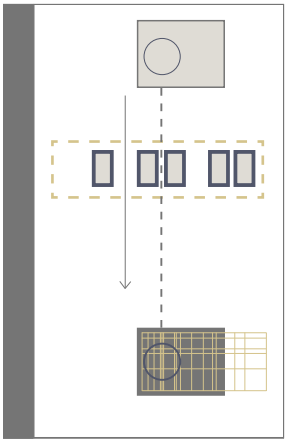

Ben Nicholson
May 1965 (white relief - Vasilios 2) (1965)

Credits: Bequeathed by Felicitas Vogler 2007
Figure: 169: Process of carving as noted by Adrian Stokes (Nicholson, 1965: online).


Figure 170: Process of making visible. (Boshoff, 2015).

THEORETICAL DISCOURSE

Morphology: Sculpting space



The process of carving is continued with the sculpting of shadows and light in the building. As the building sculpts the earth to settle within the surface, light sculpts the roofs to allow itself inside.

The visible movement of time created by the play of shadows ensures that the larger pictorial field is allowed inside the building and specifically the breathing pockets. The play of shadows and time is visible in the orientation of a building.

"Architecture which enters into a symbiosis with light does not merely create form in light, by day and at night, but allow light to become form." Richard Meier (2016:online)

The morphological approach to the project is to manipulate basic architectural elements in order to create light shafts and shadow lines. The archetypes are sculpting away the sky while being sculpted by light. Louis Kahn stated that "The sun does not realize how beautiful it is until after a room is made. A man's creation, the making of a room, is nothing short of a miracle. Just think, that a man can claim a slice of the sun" (figure 171) (Louis Kahn, 2010:online). The gallery spaces in the proposed project will aim to claim a slice of the site and fragment it to allow indirect light to flood the artworks.

By allowing the sun streams into the building, the shadow pattern traces the sun across the sky, articulating the dialogue between the architecture and the context.

Figure 171: Example of allowing light to contribute to the morphology of the building (Couture, 2013: online).

Figure 172: Slice of sun allowed into the building through design methods.

As mentioned before, the form of the building is generated through sculpting the sky and the earth. The process of sculpting begins with a solid element. The artist carves away pieces of the element until he is satisfied with the result.

Sculpting the earth would be to carve beneath the natural ground line. The ground is then replaced by the building mass and the line is sculpted into a new form in order to adapt to the building. Benedikt uses Libeskind's City edge project to explain the symbolic breakdown of the wall that is affected by introducing bars set up a subversion of the walls, defined by the bar itself. The wall is replaced by the bar (Benedikt, 1991: 22).

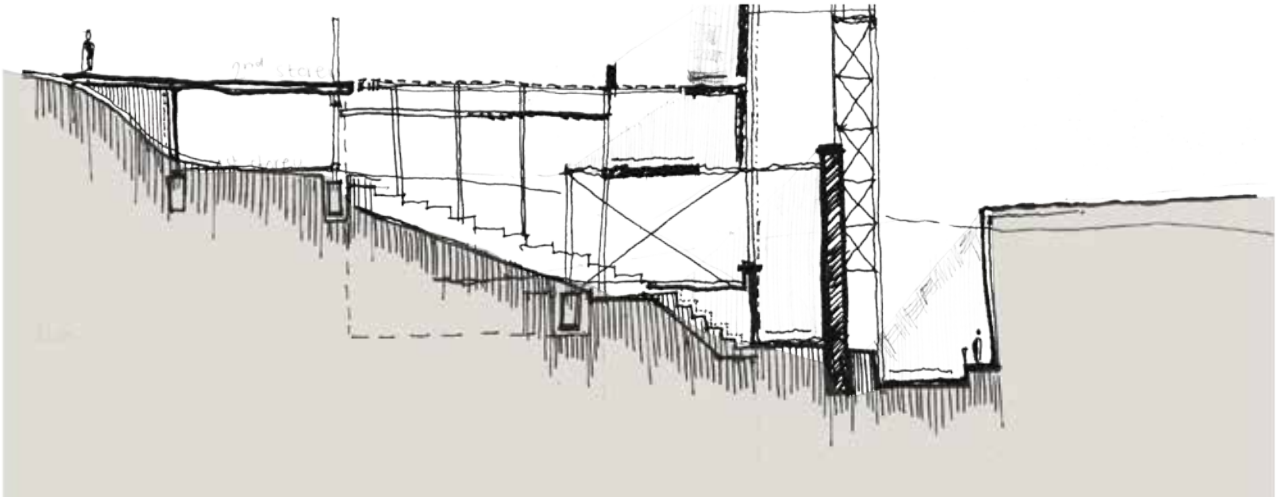


Figure 173: Natural ground level sculpted to allow building beneath ground line.

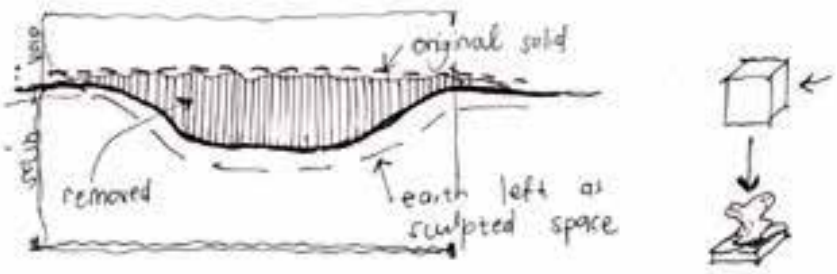
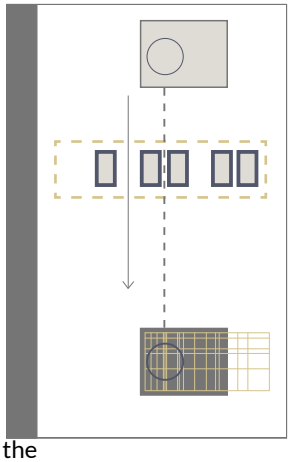


Figure 174: Sculpting earth applied to the proposed site.

THEORETICAL DISCOURSE

Morphology: Sculpting space



The process of sculpting or removing from the sky would be to add elements. When adding roof structures, the sky is removed from the viewer standing underneath it. According to Benedikt (1991:26), architecture becomes juxtaposed taxonomies between protection of the sky to the openness. The sculpting of the sky contributes to the morphology of the project as it suggests the shape of the covering of the building. Moreover, it also predicts the amount of light that is allowed into the gallery space. The deterioration of a solid element allows the sky into the building.

The connection between the sculpting of the sky and the earth is explored by O'Doherty (1999:online). He compares the gallery space with the Paleolithic painted caves of the Magdalenian and Aurignacian ages in France and Spain. These caves contained paintings and sculptures that were deliberately set off from the outside world and were difficult to access as they were far from the entrances of the caves. These ritual spaces were believed to connect heaven and earth. As these spaces contained higher metaphysical realms, it had to be sheltered from change and time. The segregation of the space made it a non-place where space-time is symbolically annulled. Today, the gallery space has a similar approach as the effects of change are deliberately disguised. The gallery attempts to cast an appearance of eternity which surpasses social values and artistic values. The proposed gallery connects the earth and the sky, enabling a person to stand inside the archive, underneath the natural ground level, and experience a piece of sky through the light shafts.

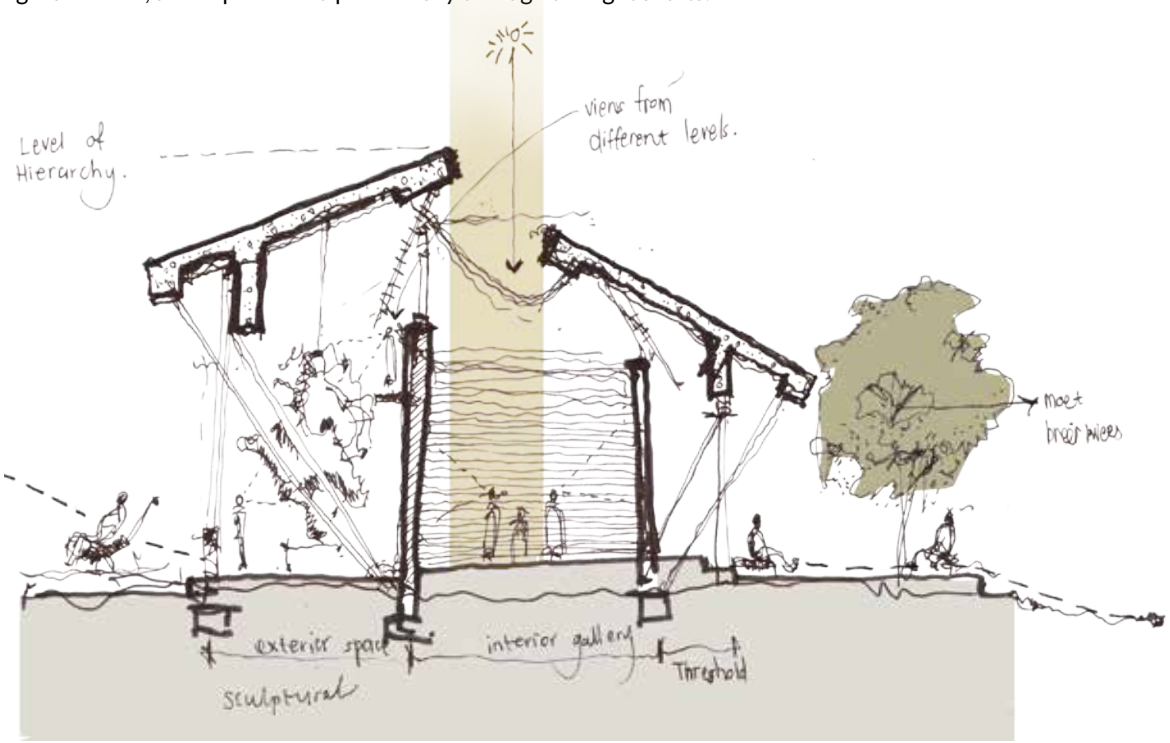


Figure 175: Sculpting of sky

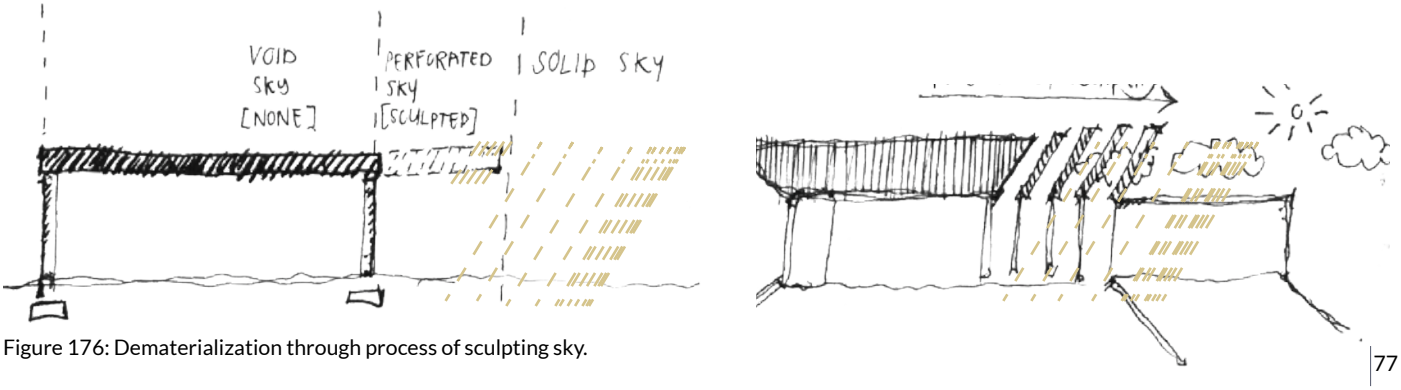


Figure 176: Dematerialization through process of sculpting sky.

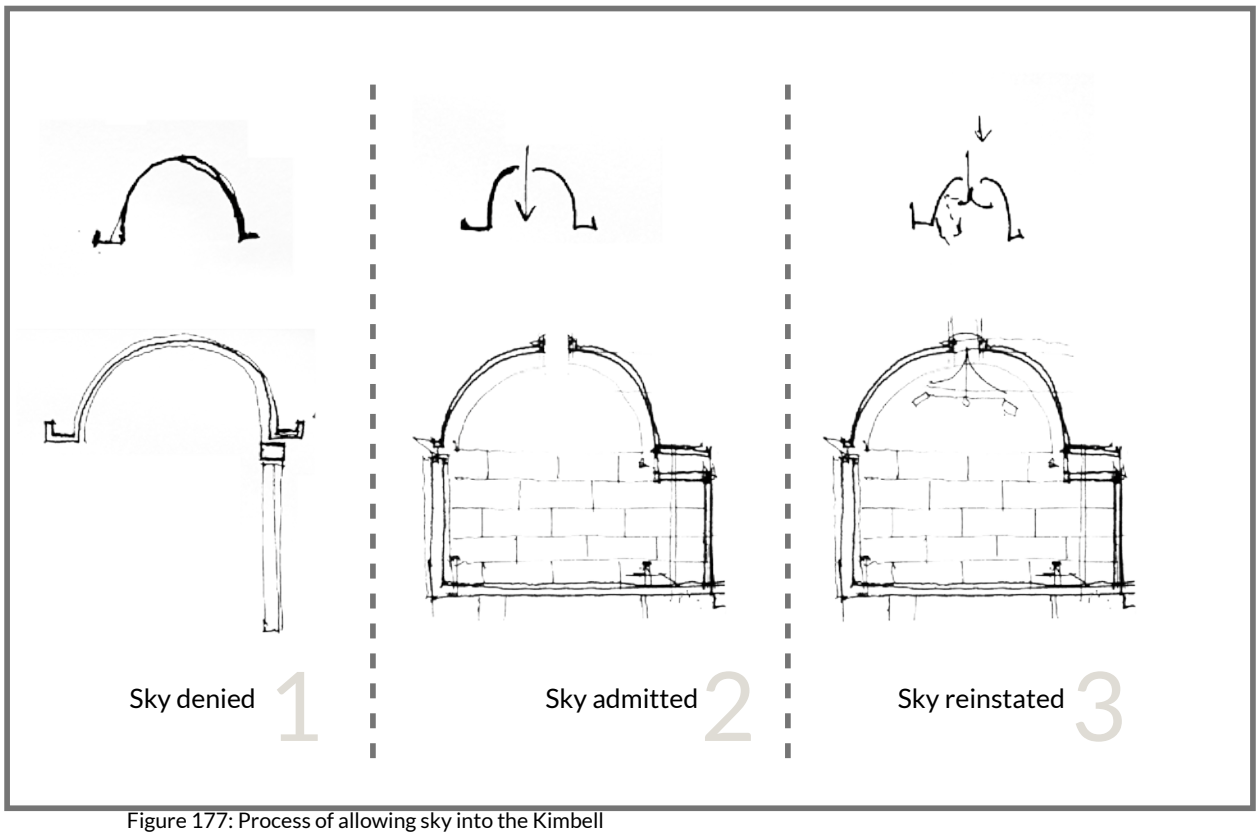


Figure 177: Process of allowing sky into the Kimbell

Precedent for Morphology:

The Kimbell Art Museum by Louis Kahn is an example of the structure and morphology that is designed with light as the denominator.

Kahn designed the vaults as a closed dome to imitate the sky. The solid object denied the sky and did not allow any light inside. He designed an opening at the top of the vault to admit sky into the gallery space. This admittance of sky allowed too much light into the building and he then closed the opening with metal reflectors to allow indirect light to flow down the sides of the dome. This was done to reverse the effect of too much light and reinstate an accurate proportion of sky into the space (Benedikt, 1991: 35).

Through this effect, a connection between earth and sky is established where one is aware of the sky while being inside the building. The connection between earth and sky is enhanced at the entrance portico of the gallery. The veranda allows a slice of light to fall unto the walkway of the entrance. Figure 178 shows the moon-shaped light on the walkway.

A section through the building (figure 179) shows that each separate gallery space contains a vault with sky emitting construction.

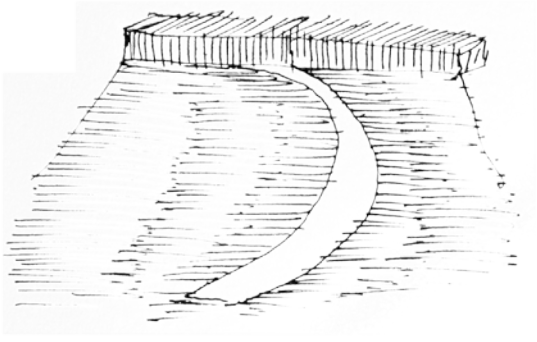


Figure 178: Slice of light at entrance.

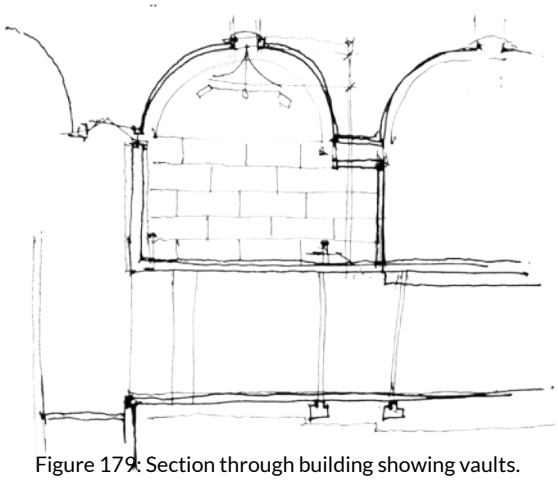


Figure 179: Section through building showing vaults.

THEORETICAL DISCOURSE

Morphology: Precedent

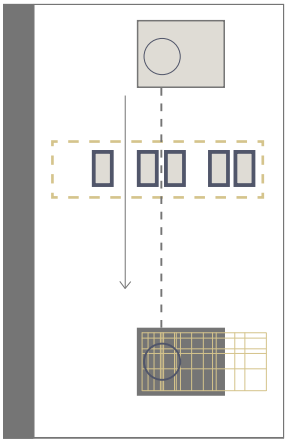
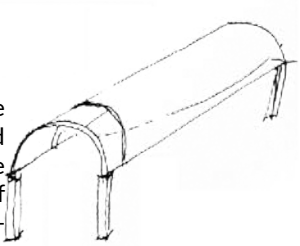


Figure 180 shows how light is applied to allow the principle of 'ma' into the design. The small glimpse of light can be seen as a moment of pause and will disappear as soon as the sun moves. The service space between each vault (seen in the image right below) also applies 'ma' to the building. It can be seen as a breathing space in-between each gallery space and becomes the threshold from one gallery to the next.

In conclusion:
Through the literature investigation, it is evident that the placement of the art gallery on the boundary of the university will result in a space where dwelling can occur on the threshold. This process of dwelling is enhanced through the carving of the site and removal of harsh boundaries and edges. As the art gallery oversteps the boundaries of its frame, it involves both the pedestrian student and the public passing by, in the process of sculpting space. The visitor is invited to witness the making of an artwork as the building embodies the threshold.



Vault shown in 3D

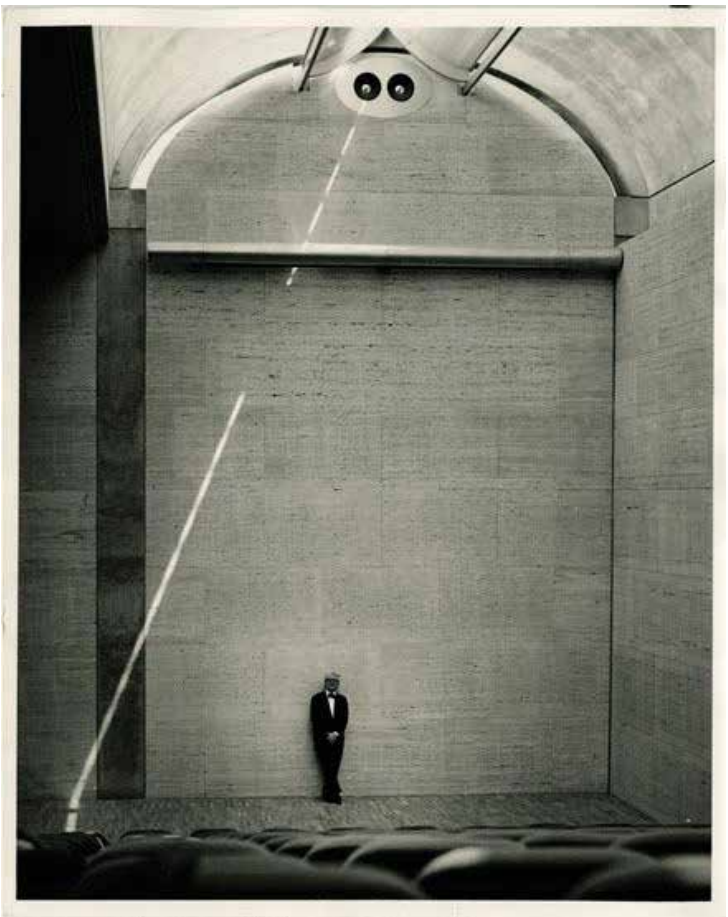


Figure 180: Kimbell Art Museum interior (Fracalossi, 2011: online).

Figure: 181: Principle of 'ma' applied (Ohdesignblog, 2012: online).

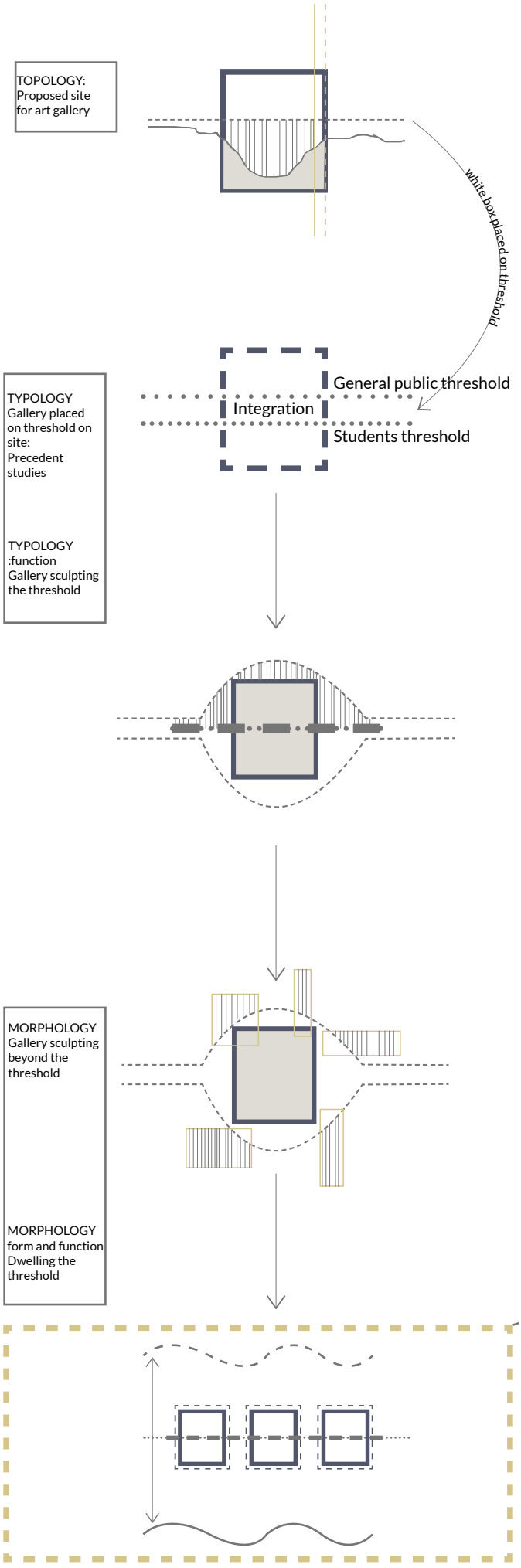
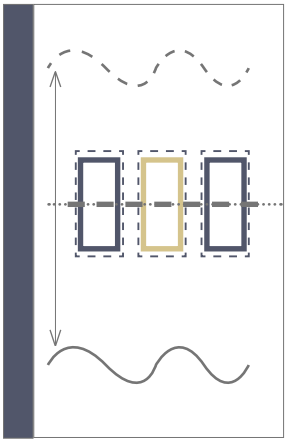


Figure 182: Document framework diagram

2.4.1 TECTONICS

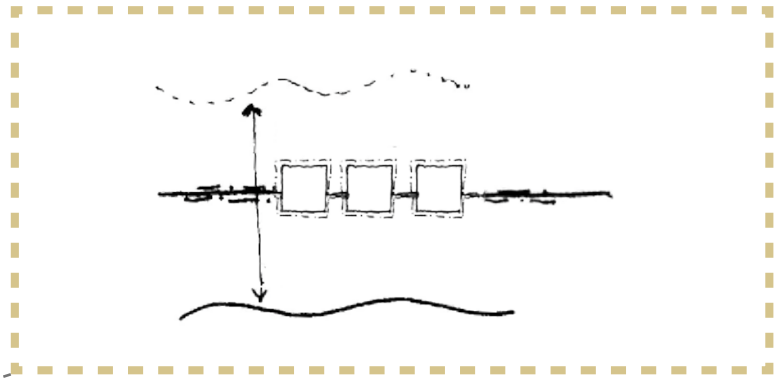


Tectonics:

The research of tectonics of the proposed design is the study of the concept and building requirements of an art gallery.

The structure touchstone will be discussed as the concept for the tectonics.

The University of Johannesburg Art Centre will be studied as a case study with a similar typology as the proposed design. The functions and technical aspects of the design is similar in terms of the use of material and construction methods.



In relation to the argument, the tectonic part of the document will refer to the last part of the diagram where the gallery becomes the threshold. This part of the document will focus on how the gallery embodies the threshold in a practical manner.

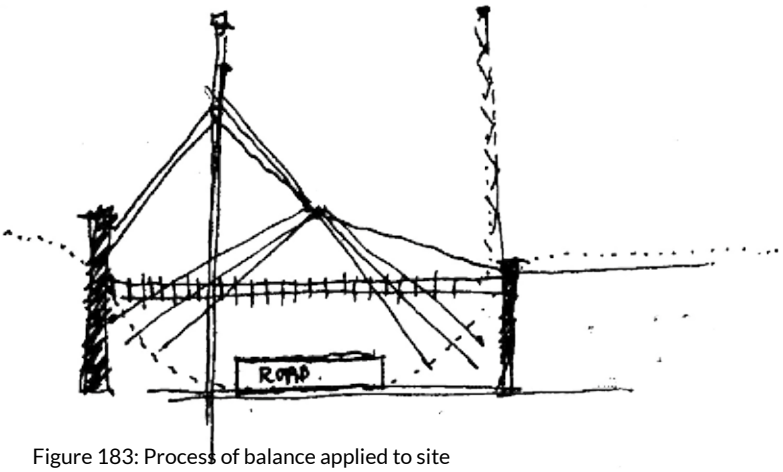


Figure 183: Process of balance applied to site

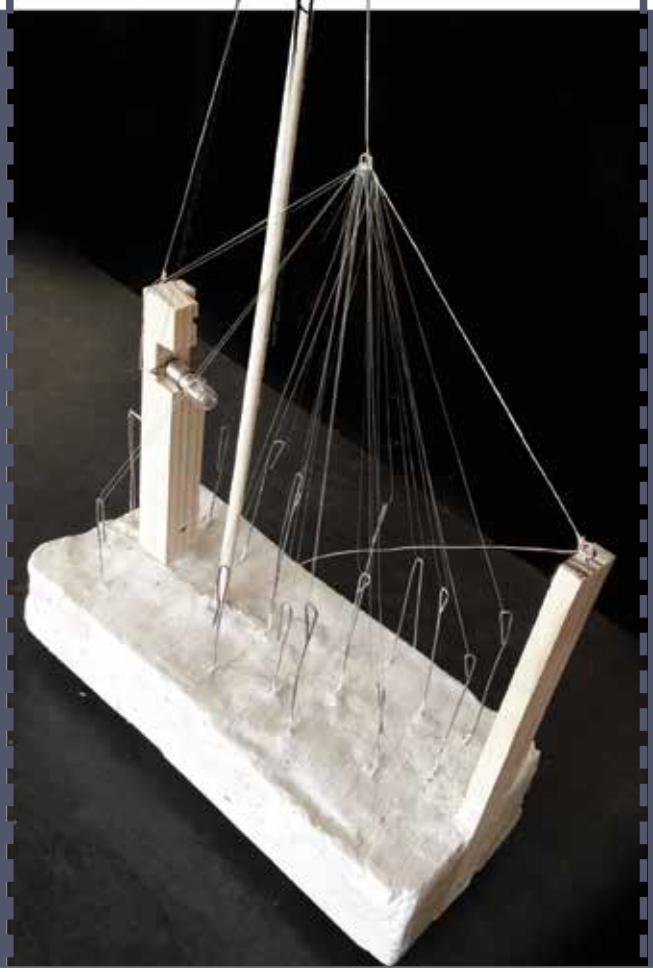
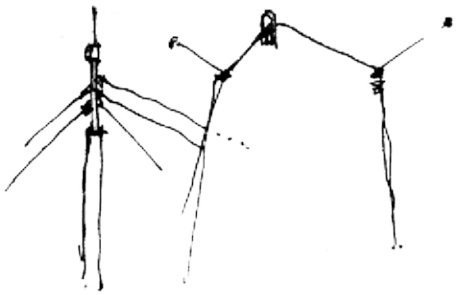
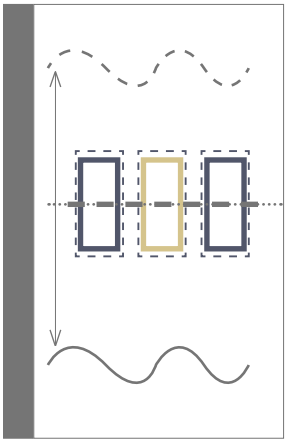


Figure 184: Touchstone

Figure 185: Touchstone



2.4.2 STRUCTURE TOUCHSTONE



The structure touchstone expresses the importance of balance between the tectonic and stereotomic elements in a design. The touchstone has a copper wire that connects the stereotomic and tectonic elements together. A light is switched on as soon as these elements touch. The light allows the tectonic and stereotomic elements to cast shadow and design form.

The moment when the wires connect can be seen as the moment of 'ma' in the touchstone.

Therefore, the concept of the touchstone allowing light as the morphologic denominator and balance between tectonic and stereotomic elements.

Figure 186: Touchstone

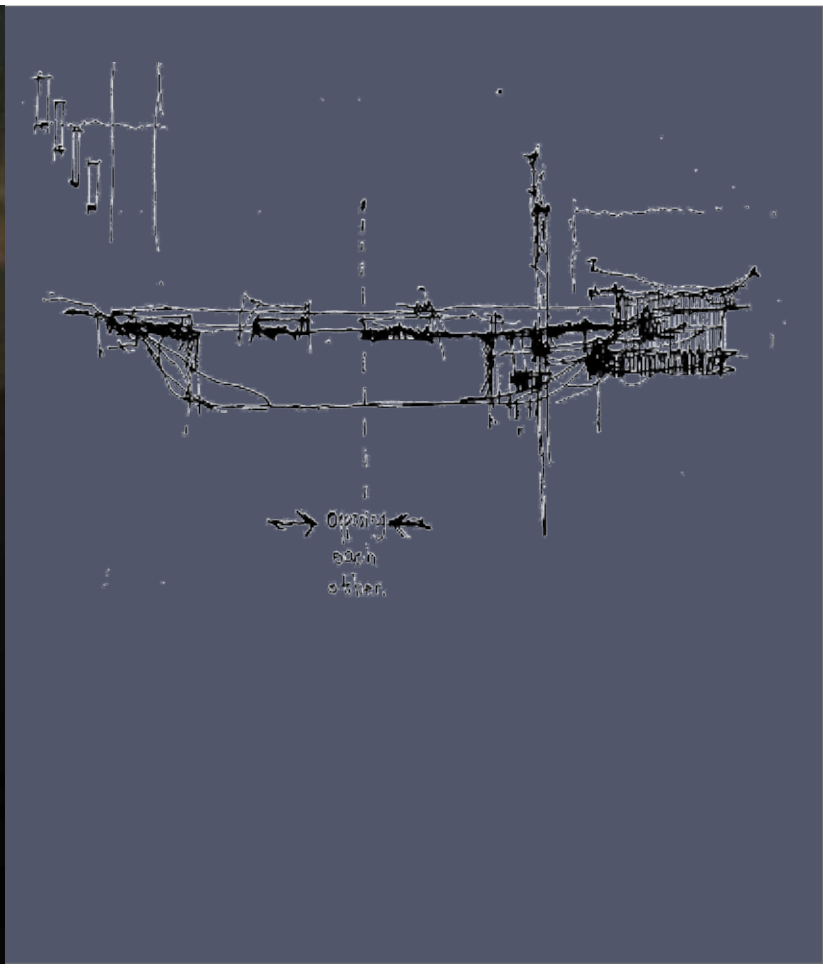
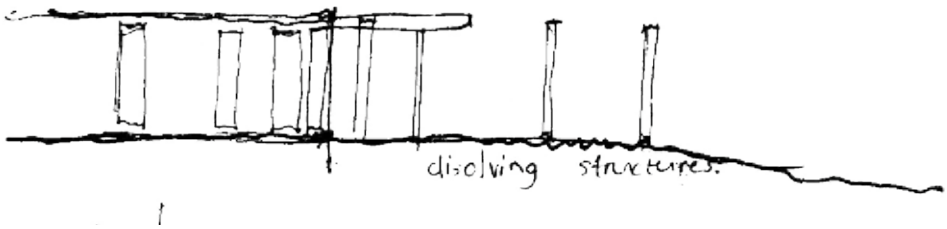
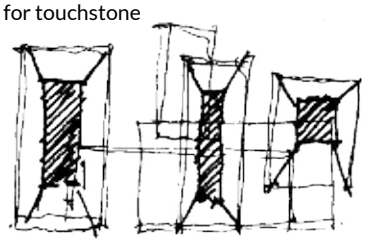


Figure 187: Concept sketches for touchstone





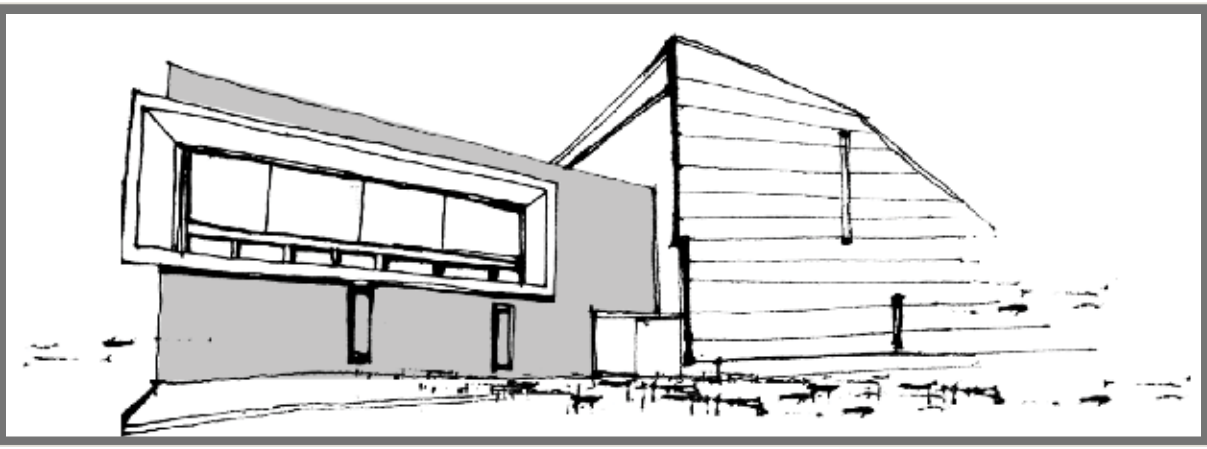


Figure 188: Exterior perspective

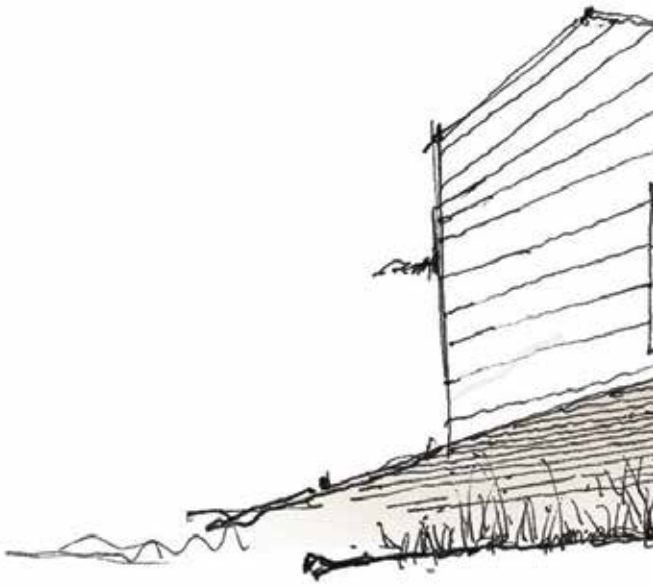


TABLE OF CONTENT

2.4.3

TECTONICS

CASE STUDY

UNIVERSITY OF JOHANNESBURG ART CENTRE

Mashabane Rose Architects

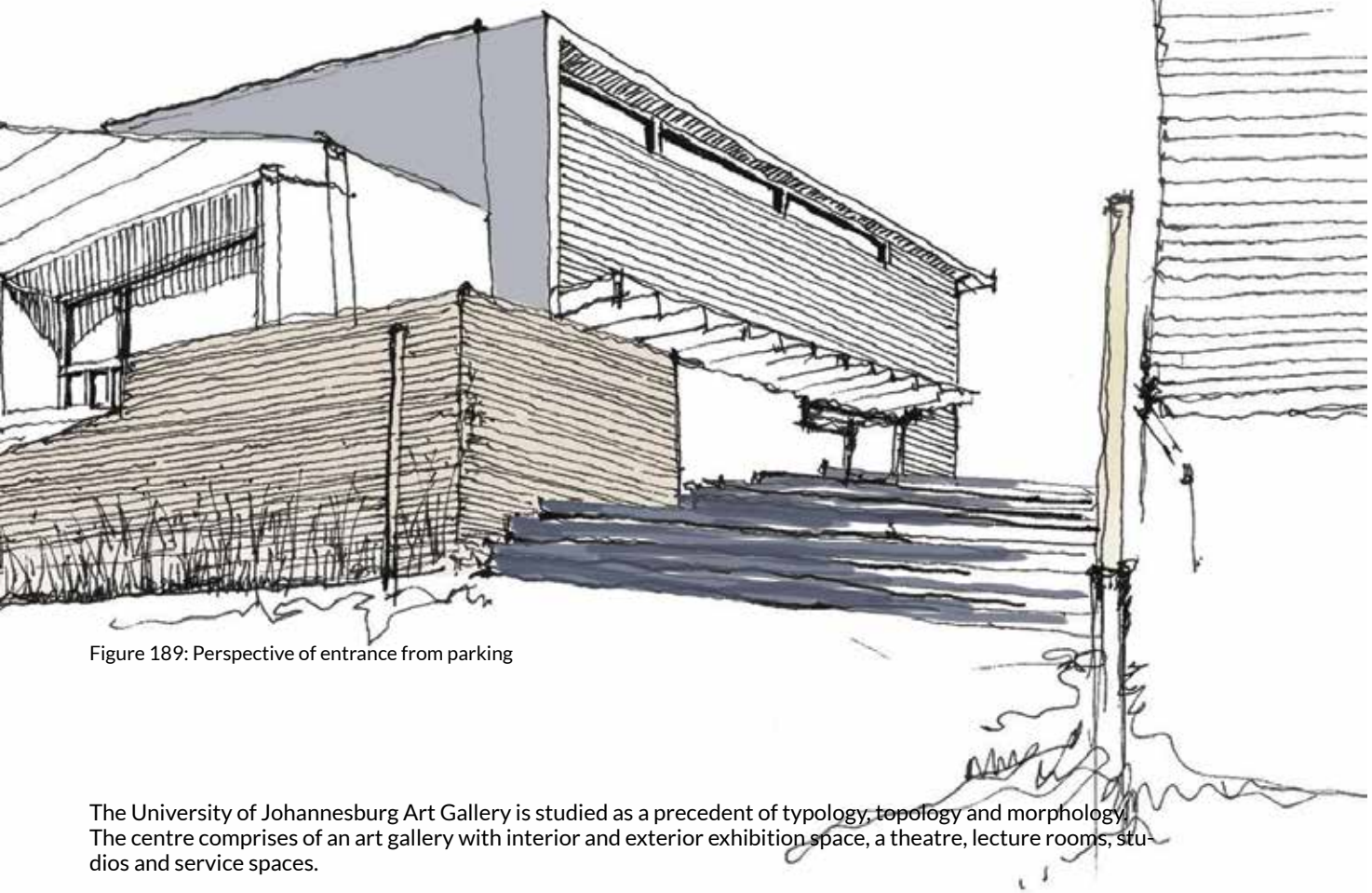


Figure 189: Perspective of entrance from parking

The University of Johannesburg Art Gallery is studied as a precedent of typology, topology and morphology. The centre comprises of an art gallery with interior and exterior exhibition space, a theatre, lecture rooms, studios and service spaces.

The centre is located on the periphery of the campus of the University of Johannesburg and the busy Kingsway Avenue. The topology is studied as the proposed design project, located on the periphery of University of the Free State Campus and DF Malherbe Road.

The morphology and construction methods are studied as a South African example of the overall state of art galleries and theatre spaces.

The UJ Art Centre was designed by Jeremy Rose from Mashabane Rose Architects in collaboration with Justus van den Heever and Petronel Moolman. The construction was finished in 2006. The total floor area of the building is 3,200 m² (Phaidon, 2016:online). The total construction cost of the building was R81,783,693.

The center enhances its environment through the use of space, connection to surrounding architecture and functional contribution to the community.

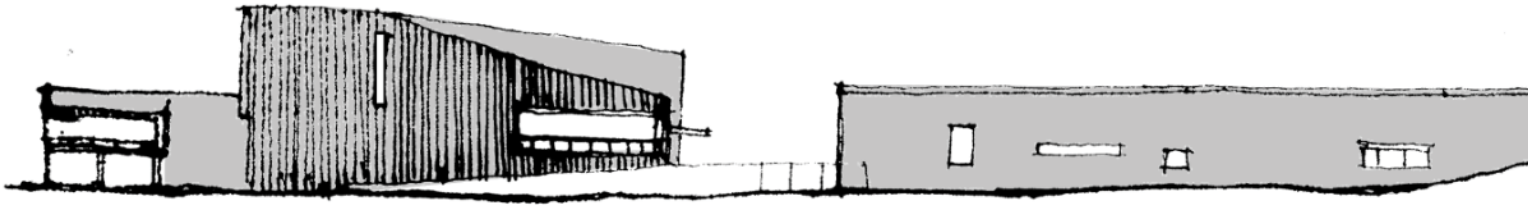


Figure 190: Elevation

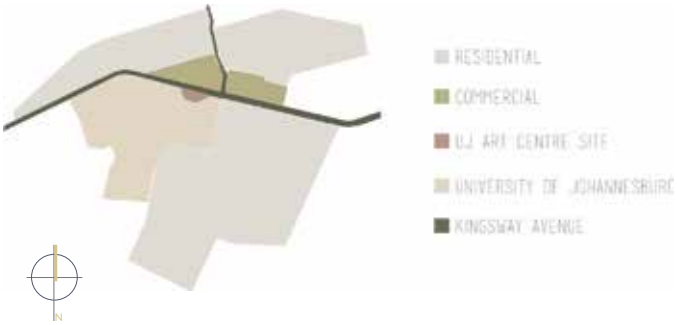


Figure 191: Location

Figure 192: Orientation and sun angle

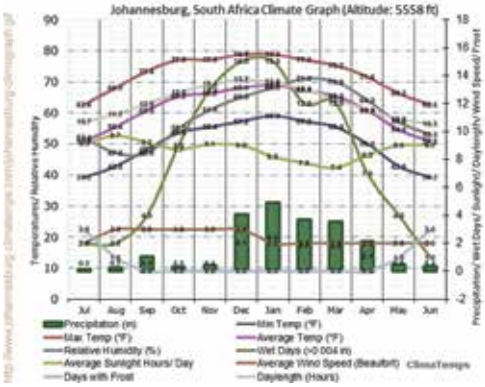


Figure 193: Graph showing climate of Johannesburg (Climatemps, 2016: online)

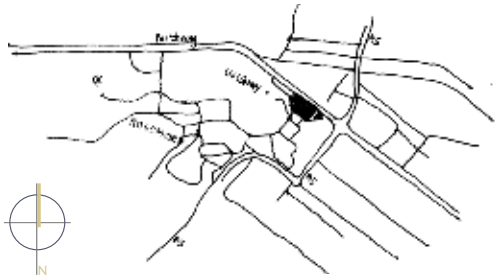


Figure 194: Map of location of site

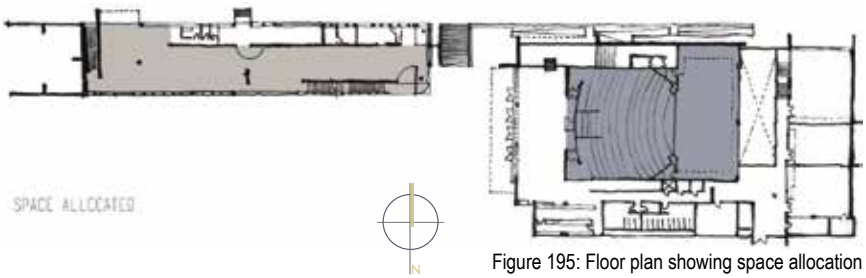


Figure 195: Floor plan showing space allocation

Occupancy Classification	Class of Occupancy	Total Population Allowed	Population	Sanitary Facilities Required
A1	Entertainment and Public Assembly (Pubs etc.)	Number of fixed seats or 1 person per m² if there are no fixed seats.	Staff Public	Table 6 1 WC + 1 WHB (M) 1 WC + 1 WHB (F)
A2	Theatrical and Indoor Sport (Cinema etc)	Number of fixed seats or 1 person per m² if there are no fixed seats.	Staff Public Participants in Sport	Table 6 Table 7 (peak) Table 7 (off peak) Table 8
A3	Places of Instruction (Educational Institutions)	1 person per 5m²	Staff Students	Table 6 Table 7
A4	Places of Worship (Church)	Number of fixed seats or 1 person per m² if there are no fixed seats.	Staff Public	Table 6 1 WC + 1 WHB (M) 1 WC + 1 WHB (F)
A5	Outdoor Sport	Number of fixed seats or 1 person per m² if there are no fixed seats.	Public Participants in Sport	Table 7 (peak) Table 7 (off peak) Table 8
B1 – B3	Commercial Service (All risks)	1 person per 15m²	Staff Public	Table 6 1 WC + 1 WHB
C1	Exhibition Hall	1 person per 10 m²	Staff Public	Table 6 1 WC + 1 WHB (M) 1 WC + 1 WHB (F)
C2	Museums	1 person per 20 m²	Staff Public	Table 6 1 WC + 1 WHB (M) 1 WC + 1 WHB (F)
D1 – D4	Industrial (All Risks) (Factories etc)	1 person per 15 m²	Staff Public	Table 6 No separate provision
E1	Place of Detention	2 persons per bedroom	Number to be provided depends on type and design. Table 5 may be used as a guideline.	
E2	Hospital	1 person per 10 m²	Number to be provided depends on type and	

Figure 196: Table with user requirements (SANS, online)

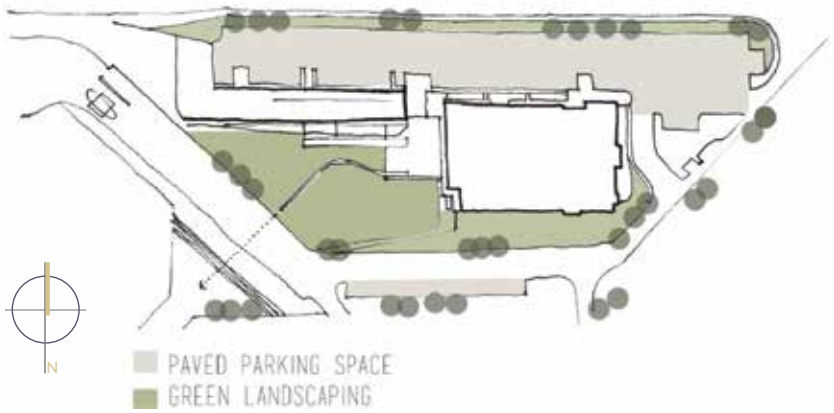
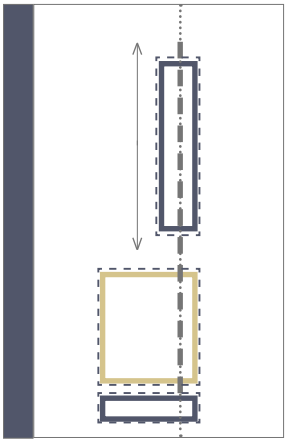


Figure 197: Paved and green space allocation.

TECTONICS

ENVIRONMENT AND MICRO - CLIMATE
USER BEHAVIOR AND BUILDING REQUIREMENTS



LOCATION
The project is located in Gauteng on the University of Johannesburg Campus. The site is on the periphery of the campus, along Kingsway Avenue. The site is surrounded by a parking lot on the northern side and residential housing on the eastern side. The southern side is allocated for parking for campus buildings, which is situated on the western side of the art centre.Kingsway Avenue is one of the main roads connected to the M1. It is a very busy road during daytime. It is for this reason that the parking of the art centre is located on the northern side of the building, next to the road.

ORIENTATION
The project is orientated with its elongated edge towards north to allow for optimum natural daylight to filter into the building. The orientation is also influenced by the road on the northern side. The east to west orientation places the building in rhythm with its site along Kingsway Road. The western facade of the building is the smallest elevation to block the western sunlight. The orientation of the building is done according to its functions, with the service spaces on the southern side and the served on the northern side.

CLIMATE
Gauteng in South Africa has a mild climate which is never humid or uncomfortably hot. The warm and wind-free summers allow for exterior space to utilize. Winter days are cold with clear skies during the day, offering daylight lighting solutions throughout the year. The favorable exterior climate allows the open-air informal amphitheater and exterior meeting space as a pre-foyer. The landscaping surrounding the building adds to an enjoyable outside atmosphere.

FUNCTION
The building combines a performing arts centre with an art gallery and also to include new public space and green space accessible to students and visitors. The position of the art centre near the main entrance to the University of Johannesburg poses it as a welcoming building for the university. This communication to the main entrance is enhanced through a large concrete frame window, offering glimpses into the studio space of the dancers inside the art centre (Joubert & Bakker, 2009:152). The theatre which is the largest space in the design is also used as a bistro gathering space for students and lecturers.

ACCOMMODATION LIST
The accommodation list includes the theatre, gallery and lecture rooms with their service areas: (Joubert & Bakker, 2009:152). Theatre with 436 seating space, Sculpture garden on the roof of the gallery, Foyer to serve theatre, Art gallery, Curator's office, workshop space, Courtyard, Backstage, Orchestra pit, Rehearsal space, Teaching space, Dressing rooms, Offices, Toilets

AREA REQUIREMENTS
The facilities required by an art gallery includes collection facilities with sufficient storage space. The size of storage should be in ratio 1:1 to the exhibition space (De Jesus, 2016). The storage should include separate allocated areas for sculptures, paintings, and more, with protection against water leakage, fire, etc. The storage space should be well-ventilated in order to reduce dust gathering. Administrative facilities such as an office for the curator, research space and reception should be included. The exhibition space should be designed in order to allow the flow of circulation between people entering and exiting. The exhibition space should be wide enough to allow visitors to view the art from a decent distance without people moving between the visitor and the artwork.

SITE DEVELOPMENT
The site is situated on the boundary of the University of Johannesburg giving the building the opportunity to communicate to the general public moving on the road. It also neighbors the pedestrian bridge across Kingsway Road to student parking on the opposite site of the road. The building connects to the pedestrian bridge through the roof garden flowing. The site is further developed with grass terraces forming a natural amphitheater that can be used in summer months.
Land art and water sculptures lead the way to the main entrance of the building. The water feature is entitle "Tidal Bodies". The linear form of the water feature contributes to the linearity of the landscaping. (Richards, 2006:online).
The northern side of the site is developed for parking space as the building opens up to the southern side, the northern façade becomes the backside of the building.

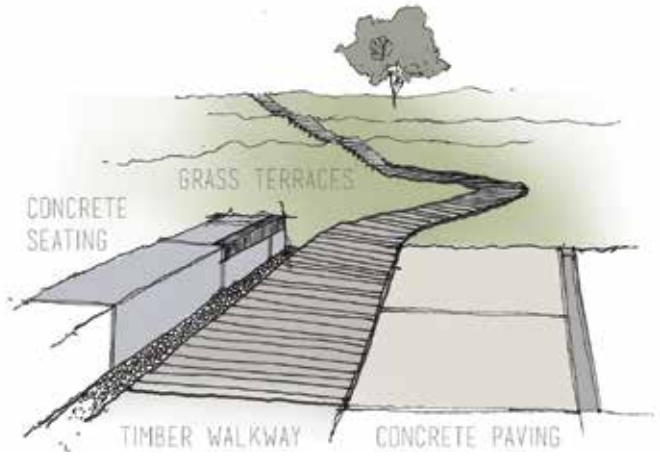


Figure 198: Detail of timber pathway connecting to concrete courtyard.

Figure 199: Landscaping details (Phaidon Atlas, 2006: online)

Figure 200: Landscaping detail of water feature (Phaidon Atlas, 2006: online)

Figure 201: Landscaping details of timber walkway (Phaidon Atlas, 2006: online)

Figure 202: Landscaping details of artworks (Phaidon Atlas, 2006: online)

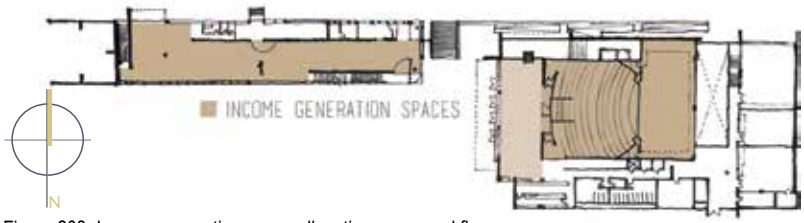


Figure 203: Income generating space allocation on ground floor.

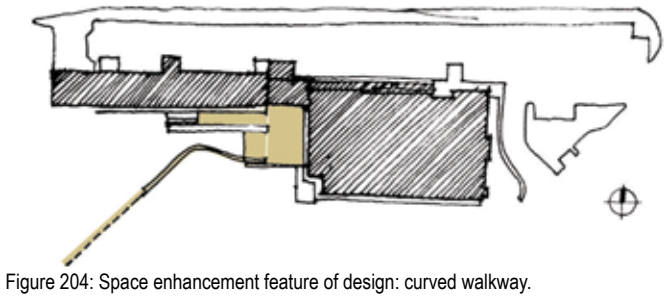
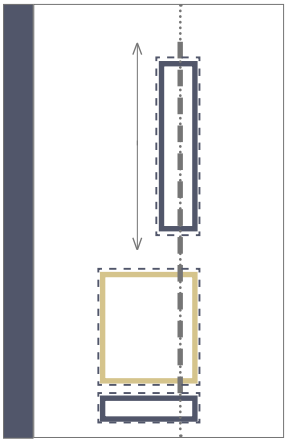


Figure 204: Space enhancement feature of design: curved walkway.

Figure 205: Curved walkway connecting with main buildings (Phaidon Atlas, 2006: online).

TECTONICS

SITE PLANNING AND LANDSCAPE DETAILING
UTILITY AND SPACE ENHANCEMENT



LANDSCAPE DETAILS

The design of outside spaces with land and sculpture art, together with the architecture, creates a setting where the appreciation of the arts is enhanced. The landscape design creates a visual link to the main buildings of the campus. (Greeninc, 2016:online). Landscape details include the land art done on site by Strijdom van der Merwe. Landscaping was continued on the green roof of the gallery space. The roof garden is accessible and visible from the pedestrian bridge as it is on the same level. Specific attention was given to the detailing of tectonics. Articulation can be seen where the pathway to the main entrance connects with the finished concrete surface. It is separated with a small linear gap with small stones.

The design contains a route journey and experience which is a signature of Mashabane Rose's feature. The journey begins at the pedestrian bridge crossing Kingsway Avenue which leads pedestrians from the parking space unto the sculpture garden on top of the roof of the gallery. From here, a staircase leads the way to the courtyard between the gallery and the theatre (Joubert & Bakker, 2009:152). The second journey is from the main campus buildings. A pathway leading down the terraces and sweeping dramatically before reaching the paved courtyard. This pathway places emphasis on the link between the art centre and the iconic Louis Kahn inspired buildings by Willie Meyer Architects (Joubert & Bakker, 2009:152).

LANDSCAPE DETAILS

The project is enclosed with a green bowl of terraces. The terraces was created by stockpiling topsoil before the construction of the art centre. The contractor provided rough terrace levels and the landscape architects had to make it work by adding additional soil. The bowl effect and the curved pathway are the only rounded lines in contrast with the linear lines dominating the design (Richards, 2006:online).

Artist Strijdom van der Merwe installed three different land-art sculptures on the site. The artworks were created by marking patterns on the grass. He cuts the patterns out of the already planted lawn and placed bark chips in the openings. The artist's idea was for the grass to grow over the images in time to establish its ephemeral qualities. (Richards, 2006:online). The surrounding trees were articulated by the placement of square concrete slabs around the tree rather than encasing the tree with round encasements. The plants in beddings are all indigenous and consist mostly of grasses and aloes (Richards, 2006:online). A bore-hole on campus is used for irrigation (Richards, 2006:online). The concrete courtyard contains poetry granite strips with quotations in different language by poets, including John Adams, Jan Blom, HC Groenewald, etc (Richards, 2006:online).

ECONOMIC

The image shows the area allocated to income generation. The gallery space and theatre charges entry fees which contributes to the functioning of the building. The classrooms are used for university academic purposes. The theatre space is used as a bistro for students and lecturers which makes in an economic space as it is multi-functional. A deli is situated in the foyer of the theatre with seating space in the courtyard. The gallery functions as a commercial space if the artworks are for sale. This is decided by the artist.

ENHANCEMENT

The space is enhanced for visitors to appreciate the artworks on display, being the land art outside, the sculptures and paintings inside and the dance studios with framed boxes for viewing from outside. The northern facade is shielded from the noise of traffic though stereotomic masonry construction. The southern facade of the building opens up to the garden space in order to allow interaction between the interior and exterior. The vast windows of the art gallery encourage dialogue between the artworks and the surrounding landscape. The simplicity of the design allows optimal concentration on the displayed objects.

The courtyard, as seen in the image, serves both the gallery and theatre. A lot of attention was given to the detailed design of this space in order to enhance the sense of arrival of the visitor. The theatre is placed in the center with service and circulation spaces around it, because of the theater's needs for mechanical ventilation and lighting for optimal experience.

MORAL FACTORS

The design of the art gallery had to relate with the brutalist main buildings on campus, designed by Willie Meyer, as these display a large part of the history of the environment. The connection to the brutalist buildings can be seen through the heavy stereotomic nature of the building with brick and concrete as the building materials. The connection is further enhanced through the pathway linking directly to the entrance of the main buildings.

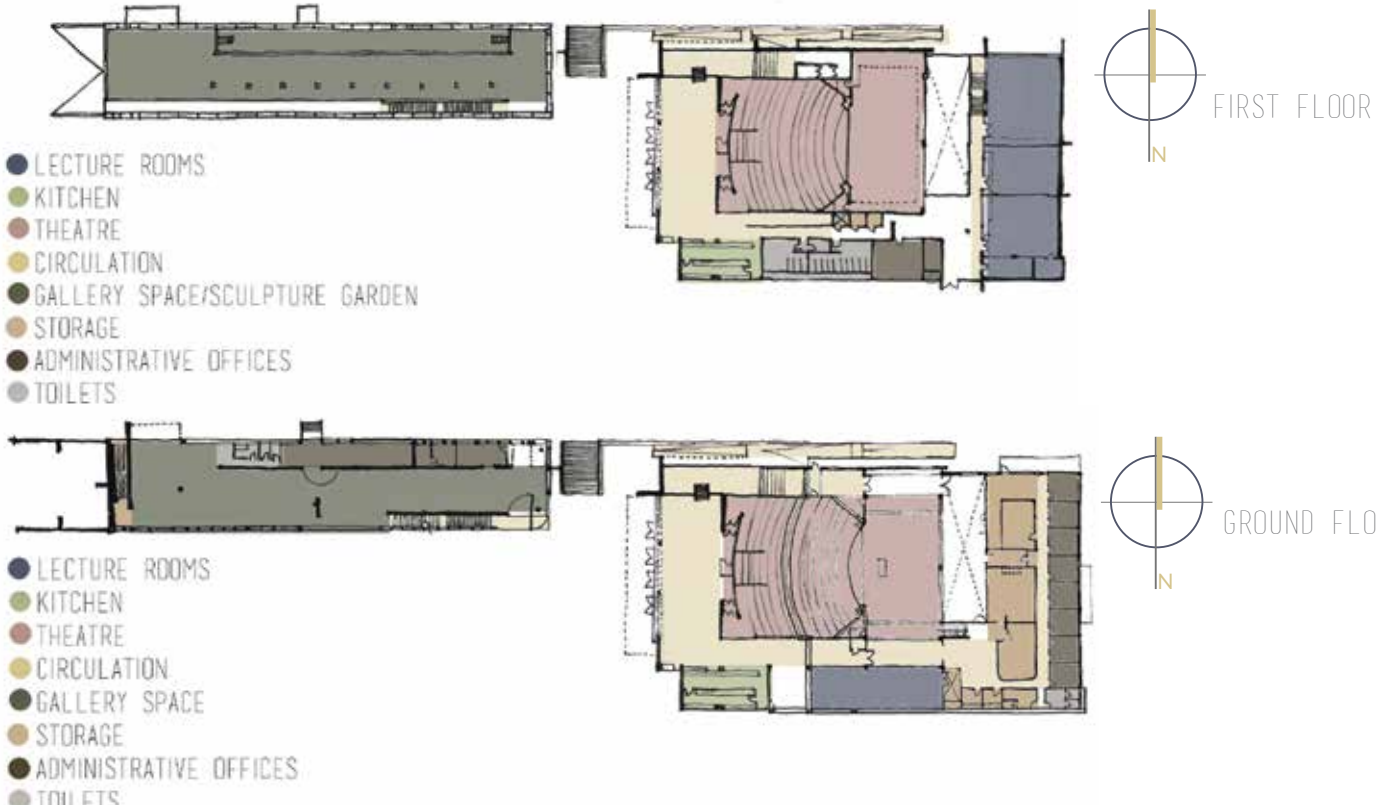


Figure 206: Ground floor and first floor

Figure 207: Art centre in relation to surrounding context, bird's eye view (Googleearth, 2016: Online)

Figure 208: Morphology of Art Centre (Googleearth, 2016: online)

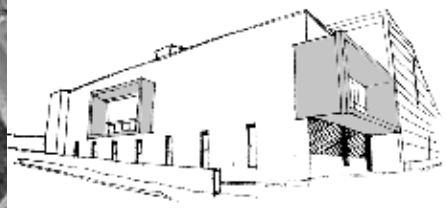


Figure 209: Morphology of Art Centre with punctured boxes

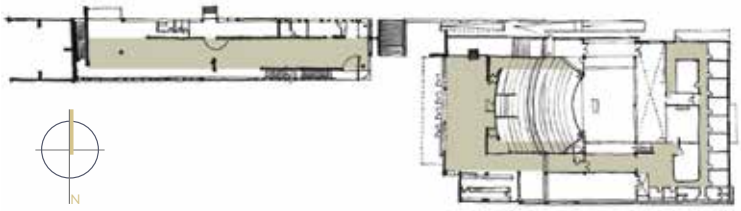


Figure 210: Horizontal circulation on ground floor plan.

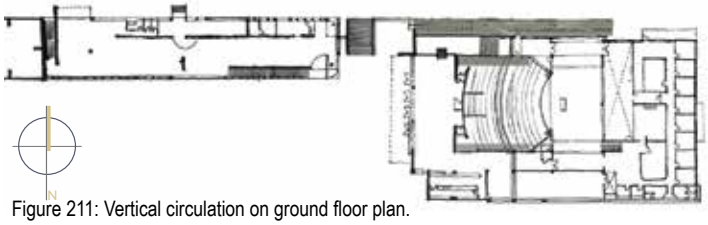


Figure 211: Vertical circulation on ground floor plan.

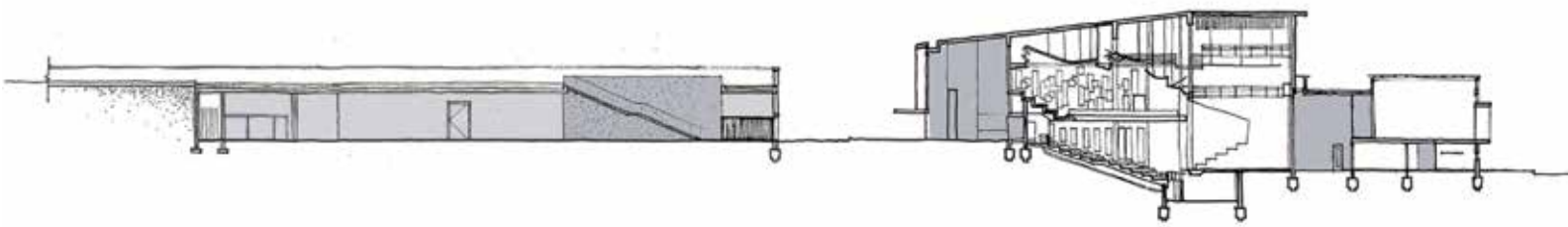
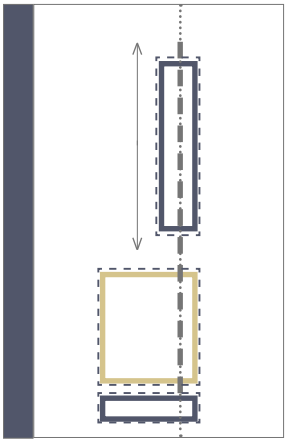


Figure 212: Circulation as seen in section of building

TECTONICS
FORM AND FUNCTION
CIRCULATION



CONTEXT
The project is located in a suburban part of Johannesburg on the campus of the University of Johannesburg. The northern side of the site borders with Kingsway Avenue. The northern area of the site is allocated to parking space for the gallery. The visitor's parking for the University is situated across Kingsway Avenue. This parking space can be used for the gallery should there be too little parking. The southern side of the building contains a pedestrian walkway and trees, creating a natural viewpoint from the windows of the gallery. Beyond the trees are more parking spaces allocated to students attending classes at the main buildings of campus.

The main buildings are situated on the western side of the art centre. The large brutalist style of the buildings created the opportunity for the art centre to relate to the scale and material use. The influence of the main buildings is clear in the use of material and scale of the art centre. The concrete shell surrounding the theatre relates directly to the concrete use of the main buildings (Joubert & Bakker, 2009:152). The scale of the art centre respects the size and hierarchy of the main buildings. This was done in order to preserve humane qualities to the site, inviting visitors to view the art.

MORPHOLOGY
The morphology of the massing of the art centre places it as a landmark or sculpture in its context as it does not have any direct neighboring buildings to relate to. The elongated narrow form of the art gallery, with the theatre as the head of the space, suggests progressive linear movement. This movement supports the circulation function of the building as it draws the visitor through the exhibitions towards the theatre and studios as the climax to the design.

The large solid form with punctured windows allow visual connection between the surrounding pathways and garden space, while it encourages dialogue with the pedestrian passer-by's. The form is simplistic in order to emphasize its function. An example of this is the viewing boxes of the dance studios. The viewing box reveals the function of the building as a performance center. The same principle is applied at the art gallery. A large window reveals part of the exhibition inside to intrigue the outside viewer to come inside. The rest of the fenestration is done in strip forms to create rhythm around the facade of the building and allow sufficient light into the administrative offices as seen in the image.

HORIZONTAL CIRCULATION
The circulation in a gallery space is usually longitudinal with two exits. The reason being the flow of circulation between the entrance and exit. Wide enough space is required to allow pleasant viewing for visitors. Depending on the size of the art exhibited, enough space should be allowed for the visitor to distance themselves from the art piece for a full perspective of the image.

Enough space is required behind the viewer for circulation purposes. If the gallery contains exhibition walls on either sides, the viewing and circulation needs to be adapted accordingly. A voluminous foyer allows the 436 theatre visitors to enjoy a drink at the deli before the show. The foyer serves as the main circulation space into the theatre with direct access doors between the theatre and the foyer (Joubert & Bakker, 2009:152).

VERTICAL CIRCULATION
The vertical circulation in the building consist of stairs and ramps to allow access for persons using wheelchairs. Circulation is concentrated on the northern facade of the building. Services such as circulation is usually placed with services on the southern side of a building, but the ramps at the UJ Art Centre forms a part of the design of the northern facade. The stairs leading to the main building are also an iconic feature of the design.

The image of the section through the building shows the circulation areas. The gallery on the left side serves as a circulation space as a whole, as circulation is required for its function. The theatre on the right side shows the circulation surrounding the theatre to allow movement through the building without interrupting the theatre.

APPROACH
The access to the building is a main part of the circulation journey experience through the curving pathway. This pathway includes vertical and horizontal circulation that allows the visitor to meander through the land art and water feature before being welcomed in the courtyard.

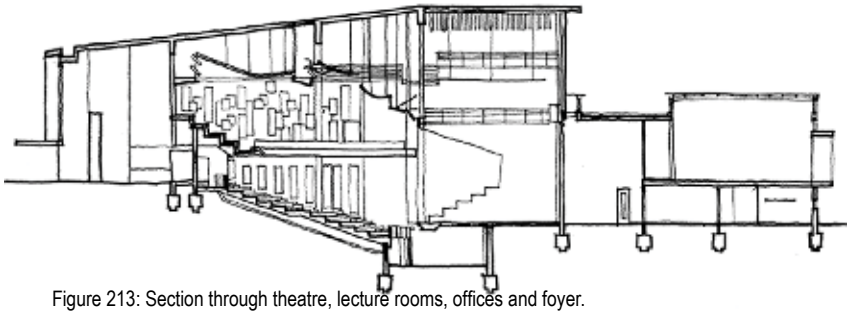


Figure 213: Section through theatre, lecture rooms, offices and foyer.

Figure 214: Building materials used in construction (Phaidon Atlas, 2006: online).

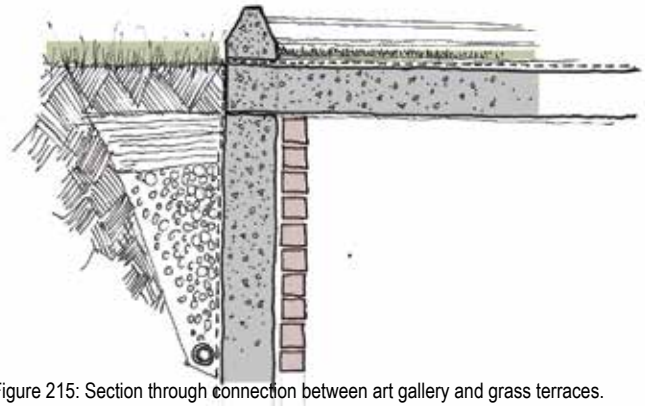


Figure 215: Section through connection between art gallery and grass terraces.

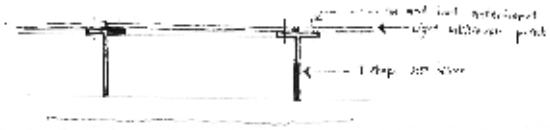


Figure 216: T-channel steel beams with PVC sheeting as shading device.

Figure 2187: Relationship between interior and exterior (Phaidon Atlas, 2006: online).

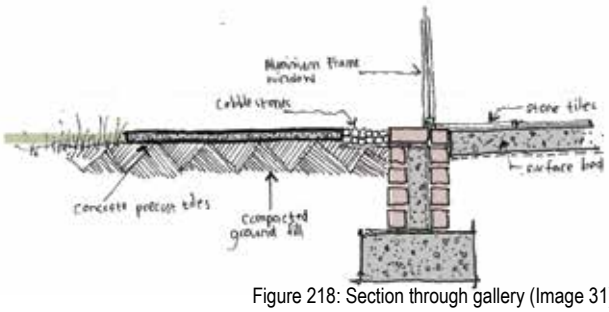


Figure 218: Section through gallery (Image 31).

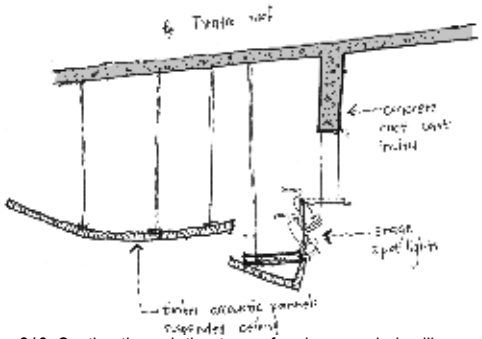


Figure 219: Section through theatre roof and suspended ceilings.

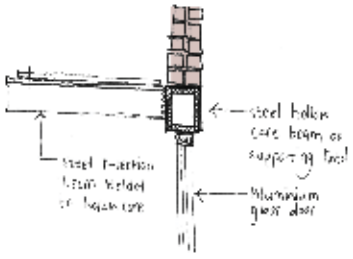


Figure 220: Section through foyer shading structure.

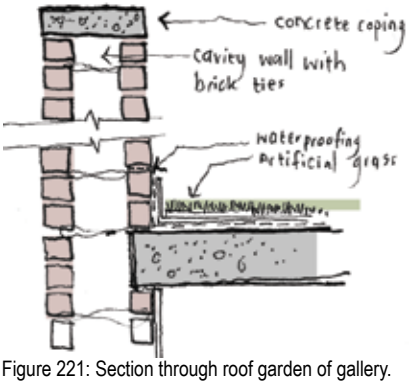


Figure 221: Section through roof garden of gallery.

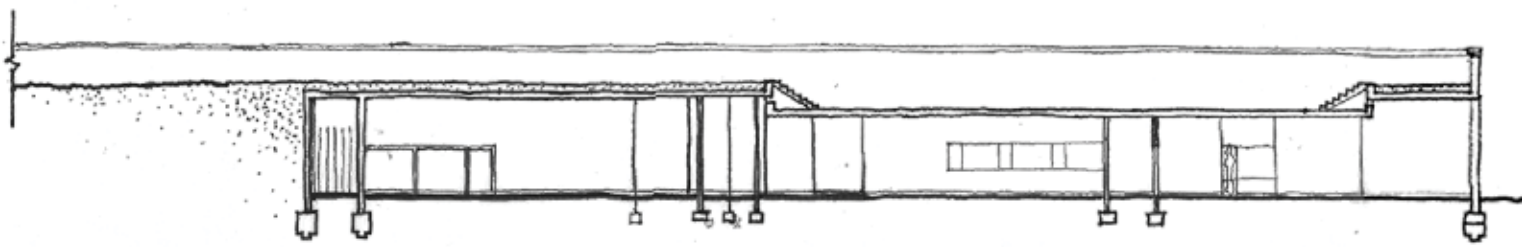
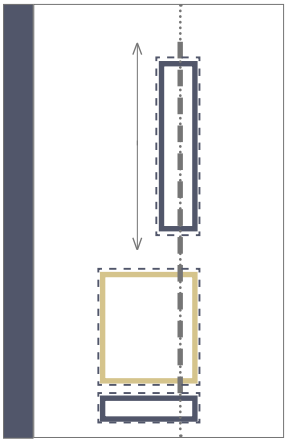


Figure 222: Longitudinal section through gallery

TECTONICS
STRUCTURE DETAILS



STRUCTURE SYSTEM

The structure of the building is monolithic construction consisting of masonry brick and concrete as the primary building materials. The section through the theatre (Figure 213), shows the double volume foyer at the entrance. The ceiling of the theatre consists of suspended timber panels which are specifically designed for acoustic enhancement. The panels reflect the sound from the stage into the audience. Timber is an excellent material for sound panels as it vibrates with the sound wave and enhances its tone and volume.

The monolithic construction is evident at the heavy concrete viewing boxes floating on the facade of the red brick construction. The inside of the box contains light tectonic structure details, including steel frames with fenestration. The connection between the stereotomic and tectonic is evident throughout the design. The design consists of stereotomic masses with punctured tectonic elements in order to reveal the interior to a passer-by.

The stereotomic nature is evident in the way the gallery space connects with the earth. The gallery becomes integrated with the earth as the western end is constructed as a basement. The green roof is integrated with the grass area next to it which links to the pedestrian bridge. The approach to the connection was to treat it as a basement construction with a drainage pipe and gravel. The connection between the real grass and the artificial grass was articulated by a concrete pre-cast element as seen in the image.

Building materials include timber and steel. The shading device in front of the main entrance is constructed of steel T-section beams welded to a hollow core steel lintel. The steel beams are covered with PVC panels in order to allow diffused light into the foyer. The only fenestration in the foyer is that of the glass doors, it is therefore the only natural light source into the foyer space. The main structure of the building is a braced reinforced concrete frame with masonry infill panels. Red face-brick in running bond is used throughout the project (Phaidon Atlas, 2006).

DETAILING

The structural elements of the gallery was carefully designed in order to create articulation between the elements that would enhance the inside-outside experience of the visitor, while viewing the interior artworks and exterior land-art. The image shows the articulation between the elements. The section explains the construction of the details. The cobble stones has both practical and aesthetic worth. The cobblestones lead water away from the structure while it also separates the walkway from the glass panels.

The lower panel of the fenestration is placed almost flush with the floor to enhance the dialogue between the interior and exterior. The gallery walls are all cavity walls with brick-ties. The cavity of the foundation wall is filled with concrete to create a moisture barrier. One of the main concepts that the project consists of is the cobblestone detail and brick detail that contributes to the linearity of the building. The long window also adds to the concept of linearity.

The entrance to the theatre is articulated through the shading device as previously mentioned. A section through the wall shows the steel hollow core beam to which the T-section steel beams are attached. The interior of the theatre is furbished with timber paneling. The section through the concrete roof with timber paneling shows how the panels are suspended from the roof. The mechanical lights are mount in line with the timber paneling. The lights are controlled automatically, but it must be accessible for maintenance. The section through the gallery shows the linearity of the plan. The green roof contains a stepped level which is used for recreation and relaxation. The green roof is seamlessly integrated with the surrounding grass as seen on the section. The concrete roof is constructed of reinforced concreted cast in-situation. The roof spans a large distance from east to west but the distance from north to south is short enough that no columns are needed to support the structure.

The image shows a detail of the green roof with brick wall as balustrade. The face-brick wall is protected with a concrete coping. The cavity wall has a thickness of approximately 300mm. This is done for both practical and aesthetic reasons. The walls are used as seating space on the roof. Part of the gallery is underground and in this case the cavity wall acts as a moisture barrier.

The green roof contains artificial grass which does not need maintenance. The use of artificial grass became advantageous in the sense that the structure of the concrete slab did not need to accommodate for the load of an organic grass roof.

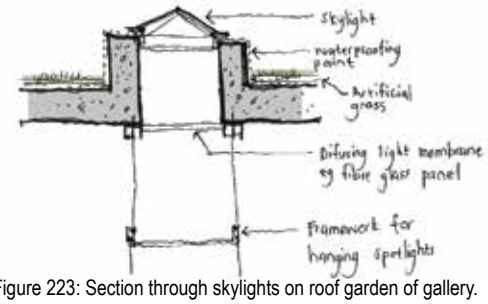


Figure 223: Section through skylights on roof garden of gallery.

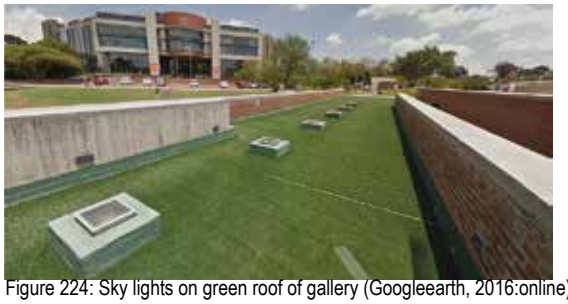


Figure 224: Sky lights on green roof of gallery (Googleearth, 2016:online).

Figure 225: Interior of gallery with skylights seen as striplight (Phaidon Atlas, 2006: online).

Figure 226 and 227: Location of AC units on building facade (Googleearth, 2016: online).

Figure 228: Location of services on southern facade (Googleearth, 2016: online).

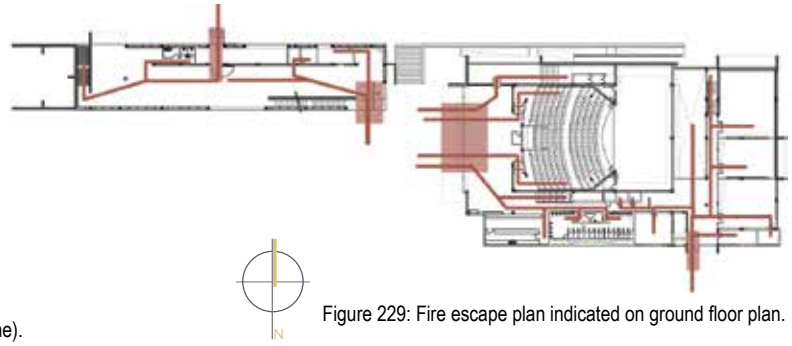


Figure 229: Fire escape plan indicated on ground floor plan.

Figure 230: Fire door on southern facade of building (Googleearth, 2016:online).

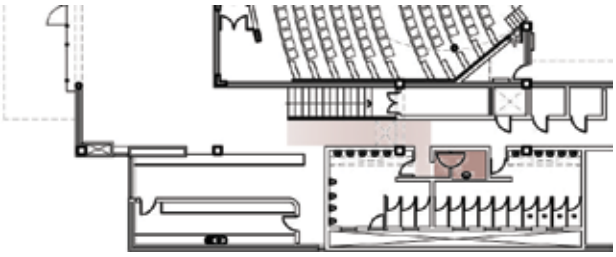


Figure 231: Location of disabled facilities (Phaidon Atlas, 2006) edited by author.

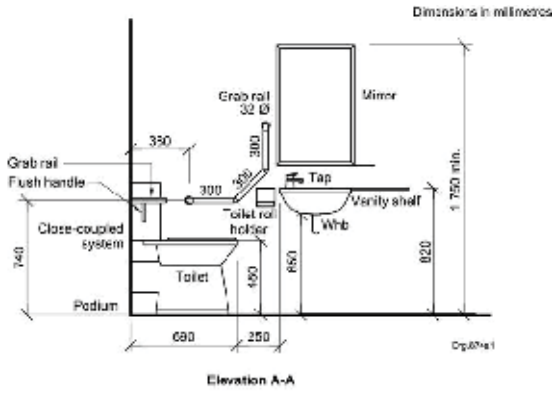


Figure 232: Section through disabled facilities (Sans ,2006: part S).

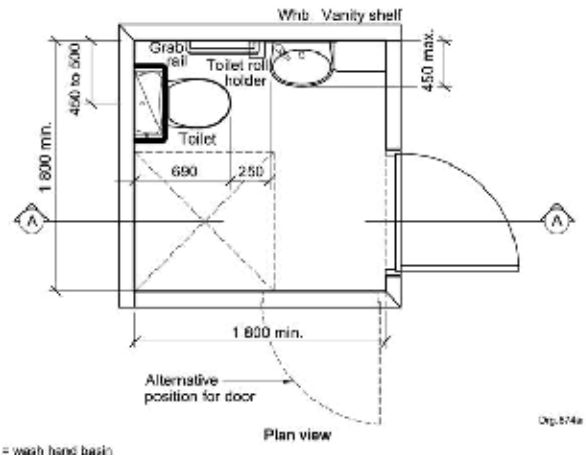
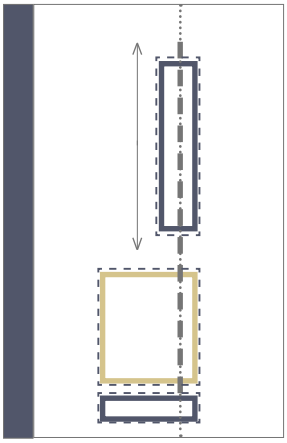


Figure 233: Disabled facilities plan (Sans ,2006: part S).

TECTONICS

STRUCTURE DETAILS
BUILDING SERVICES
BARRIER FREE ENVIRONMENT



LIGHTING

The art gallery contains skylights to allow diffused natural light into the gallery space. The skylights are installed on the roof garden as seen in the image. The skylights are prefabricated and installed on site. Concrete casings are cast in situ onto the concrete roof. A PVC panel is installed flush with the bottom of the concrete roof slab. The panel diffuses the direct natural light to allow soft light into the gallery space as direct light might harm the artworks. A suspended frame is attached to the concrete roof underneath the PVC panel of the skylight. The frame carries small spotlights throughout the gallery space. These mechanical spotlights are placed on rails to be movable in order to accommodate any size and spacing of exhibition. The spotlights provides the exact spaces where artworks are displayed with sufficient lighting. The type of light bulbs used must be specified by a specialist as it may damage the artwork if it is not installed properly. Halogen lights for example may gradually burn away material with its UV and heat properties. Lights should be equipped with UV filters or LED bulbs should be used (McKeough, 2015:online). Mounted spot lights should be adjusted so that the light beam hits the center of the artwork with the fixture of the light-bulb at a 30 degree angle. The frame of the artwork should not cast shadows on the painting and therefore, the lights should not be too close to the artwork. If the lights are mounted too far, the light will cast a reflective glare (McKeough, 2015:online). The skylights are placed approximately two meters apart on the roof. In the interior of the gallery it is seen as a long strip light which contributes to the the linearity of the design. Natural light is seen as the best type of lighting to use in order to illuminate artworks. The strip skylights can be compared to tracklights which is also a popular choice for illuminating art. Tracklights are used for its minimalist look (McKeough, 2015:online).

HVAC

The installation of air conditioning systems provide ideal conditions for preserving art works. These systems distribute chilled air or hot air as required for a comfortable environment. Air is drawn from outside to allow fresh air into the interior of the space. The air-conditioning systems at the art gallery is situated on the exterior of the wall on the northern side by the parking area. The reason for this is because of the limited space allocated in the ceiling for services as the building has a concrete roof. The ceiling of the gallery space is therefore unfinished concrete. The theatre is mechanically ventilated with vents on the southern side of the building. The kitchen is also mechanically ventilated with a vent on the southern side as seen in the image.

WATER

Water systems in the art centre is connected to the municipal water line. The irrigation system uses the borehole on campus as an alternative source. Water sources are needed on the southern side of the theatre for the toilets and kitchen. The gallery uses water sources on the northern side where its services are located. The building connects to the municipal sewer line. The image shows the duct of the toilets with air vent.

FIRE

Fire exits are indicated with red blocks on figure 229. The fire escape routes are shown in red lines. According to the South African Standards, devices for fire detection should be installed ,including smoke detectors, thermal detectors, flame detectors and fire-gas detectors. As the building has two stories it should thus be provided with two escape routes. Two escape routes should also be provided if the traveling distance to the nearest escape door is more than 4m. The total traveling distance from any point in a room to an exit door should not be more than 15m according to the regulations. The total traveling distance from any point to the exit door should not be more than 45m. Hose reels must be installed on every floor and in every 500m². Any hose reel installed must be able to reach any point in the building (SANS, 2011: Part T-Fire Protection).

DISABLED FACILITIES AND ACCESS

All rooms are designed to be accessible for visitors with mobility impairments. As a public building, it is required by the law to be designed as a barrier free environment. The parking is fully accessible for wheelchair use. The ramps on the northern side of the building can be used as access to the courtyard from the parking area. The ramps are designed with a minimum gradient of 1:8 with space for resting as required. The indoor space of the gallery is on one level with a smooth floor finish without any obstacles. The theatre space contains steps, but special access is provided for wheelchairs on the southern side of the theatre space.

Disabled toilets are provided in the theatre building. The door to the toilet is about 950mm wide with adequate space for turning. The door must open to the outside for safety precautions should the person inside fall. The toilet seat must be 470mm high with hinged handles. A wheelchair friendly basin is also a requirement. The mirror must be situated at an appropriate height. The surface of the theatre building is smooth with no obstacles.

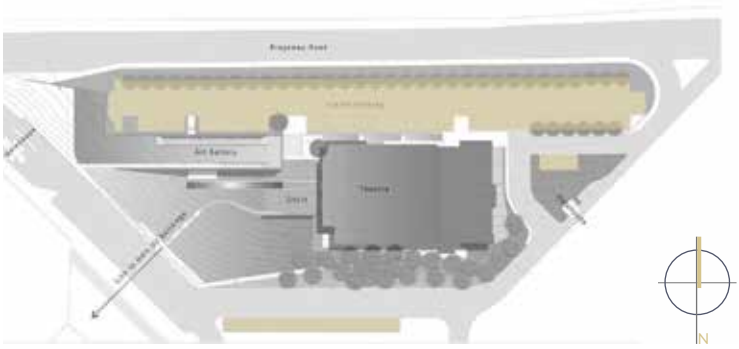


Figure 234: Parking areas allocated for Art centre shown in yellow Phaidon Atlas, 2006: online) edited by author.

Figure 235: Parking areas surrounding Art centre shown in yellow (Googleearth, 2016:online) edited by author.

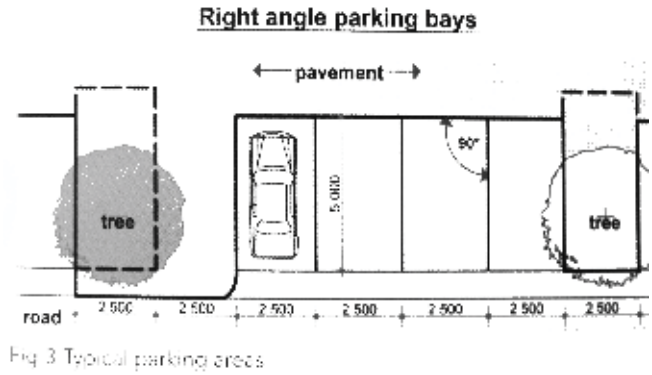


Fig 3 Typical parking areas

Image 49: Right angle parking bays by regulation (Schmidt & Pinheiro, 2013).

Figure 236: Site development 2001, 2004 and 2006 (Googleearth, 2001, 2004, 2006: Online).

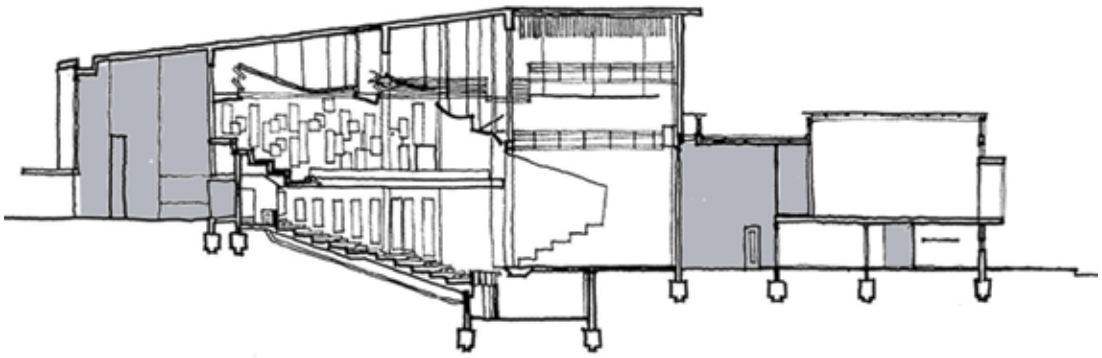


Figure 237: Section through theatre

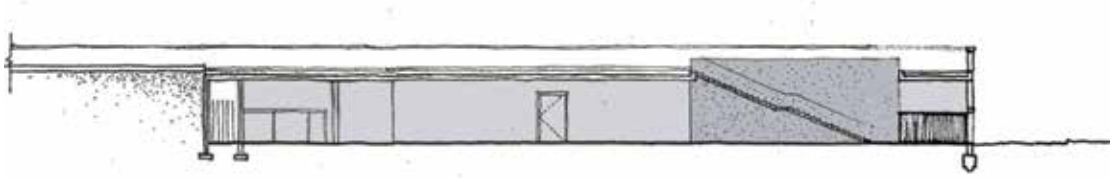
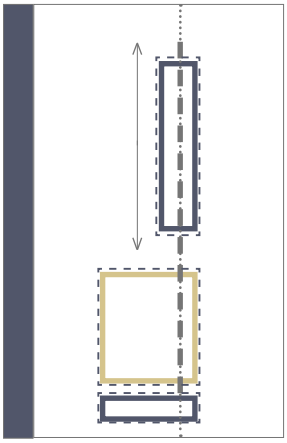


Figure 238: Section through gallery

TECTONICS
PARKING
SUSTAINABILITY



NBR REGULATIONS
According to the National Building Regulations, the parking for the art centre is the size of a standard parking space which is 2.5m wide x 5m long with an aisle of 7.5m in-between rows of parking for vehicle access (Pinheiro, 2013: 537). The average per head-on parking space required for a public building is 11,52m² (4.8m x 2.4m, with 6.1m clear zone).

There are 436 seating spaces in the theatre, thus, 5022 m² (11.52 m² x 436) parking space is needed. There are 152 parking spaces allocated for the use of the art centre which is insufficient, therefore the parking bay across the street may be used for the overflow of parking. The image shows the parking space in yellow blocks. The parking is sufficient for the daily use of the studios, lecture rooms and offices. The gallery and theatre are used for events where the surrounding parking of the campus may be used.

LOCATION
The image shows parking bays (yellow) surrounding the site (red) which can be used if the parking at the art centre is not sufficient. All of these parking areas are located behind boomed gates and is therefore relatively safe. Parking guards may be appointed during theatre shows. The image shows the layout of right angle parking bays with measurements according to the Architective (Schmidt & Pinheiro, 2013: 537). All of the parking spaces in the parking bay of the art centre, as well as the surrounding parking bays, are right angle parking.

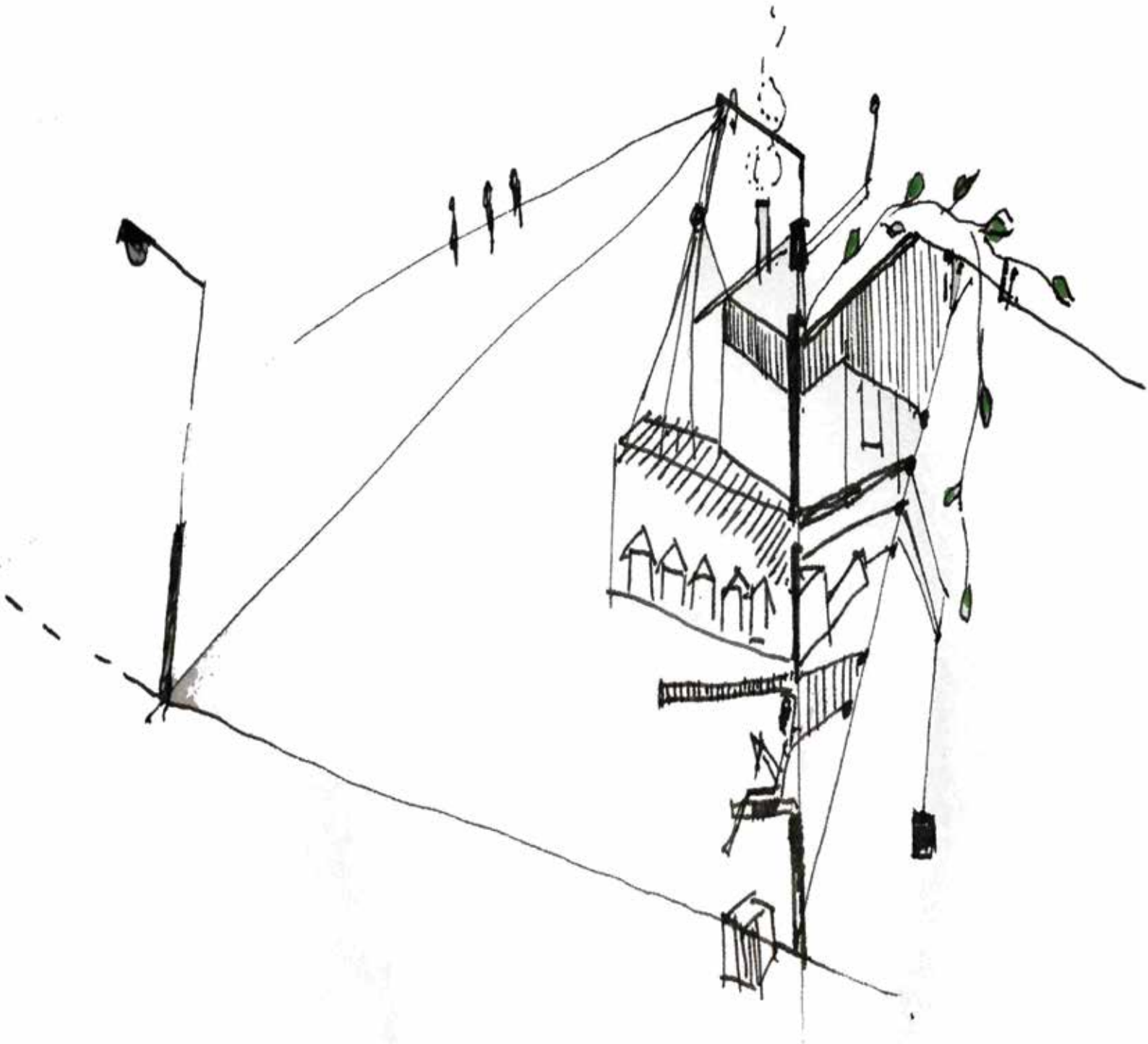
BUILDING METHODS
The project will include local laborers in the construction phase in order to involve the community. Materials known to local unskilled builders are used in order to be able to use local workforce in the construction of the building. Standardized materials will be used for the reason that it is readily available, economical, and local laborers know how it works. The design of the building is done in such a way that creative and innovative ideas can be done using standardized sizes and materials. Through involving the community, a sense of ownership is created among the users of the building. The building has an economic responsibility towards the members of the community to ensure that they also benefit from the project. Local artists may benefit from the building by displaying and selling their art in the gallery.

Students in the dance and drama school may have performances in the theatre. The theatre may also be used for community fund raising projects. The public gardens and recreational space is part of the building's contribution to its community. The gardens are accessible for all campus users and visitors. Figure 236 shows the building site development before, during, and after the construction of the UJ art centre.

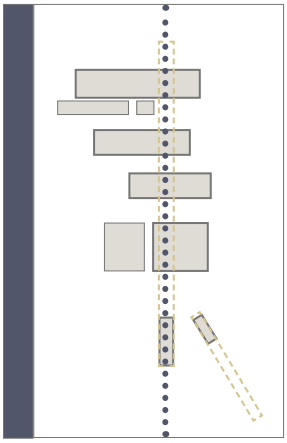
SUSTAINABILITY
Sustainable design is a method of designing buildings to comply with the principles of social, economic and ecological sustainability. The sustainability of a design can be measured in four aspects: conservation, environmental, societal and economical sustainability. Conservation sustainability is achieved by improving and complimenting the existing architecture on the site and the immediate context. The design does not overpower any existing structures but contributes to humane architecture through its choice of scale and material.

Environmental sustainability includes the use of passive ventilation and limiting fenestration on the western side of the building. The cavity walls contribute to the sustainability as it reduces the heat gain and loss inside the gallery. Natural lighting is used in most of the offices, lecture rooms and gallery space in order to reduce the use of artificial lights during daytime. Features that contribute towards the effective use of daylight inside the building are high ceilings with tall windows and interior light surfaces to reflect incoming light. The amount of light that a window admits into the interior has to do with the 'sky factor'. Windows at lower levels, where clear sky is only a minor proportion of the view they frame, admit less light than those higher up. Enlarging windows by raising their height will result in brighter conditions than widening will (Conran, 2010:online).

CONCLUSION
In conclusion, through critical analysis of the University of Johannesburg Art Centre, important design decisions can be derived. The UJ Art Centre is a fully functional building which contributes greatly to its context through the way it is integrated with the site and its surroundings.



2.5 TOWARDS A DESIGN METHODOLOGY



TOPOLOGY

The boundaries on site creates a longitudinal line which becomes a design denominator. The carving of the site can be explored through sculpting the building into the earth. The placement of the proposed design will dissolve the non-place on site.

The deconstruction of the edges can be achieved through creating porous edges to entice dialogue between the pedestrian and the art. The connection between the interior and exterior should also be porous.

The design of the building beyond the pictorial field which the boundary fence provide, will be explored.

TYPOLOGY

The gallery, as a white box within a specific context, will be explored in the design of the proposed gallery. The white box will be deconstructed to address the exclusivity of the system.

The principle of hierarchical reversal will be applied to the design in order to deconstruct the layers of approach present at an institution.

MORPHOLOGY

The morphology of the building includes the design of breathing pockets to apply the Japanese principle of 'ma'. The embodiment of the threshold will be achieved by placing the functions of the building along the existing boundary of the UFS that runs through the proposed site.

The design of the morphology is approached through sculpting the earth and sculpting the sky, with the proposed building as the connection in-between.

TECTONICS

The principle of 'ma' will be applied to the articulation between the tectonic elements of the proposed design. The tectonic application will focus on a sculpted structure that allows the uninterrupted viewing of art.

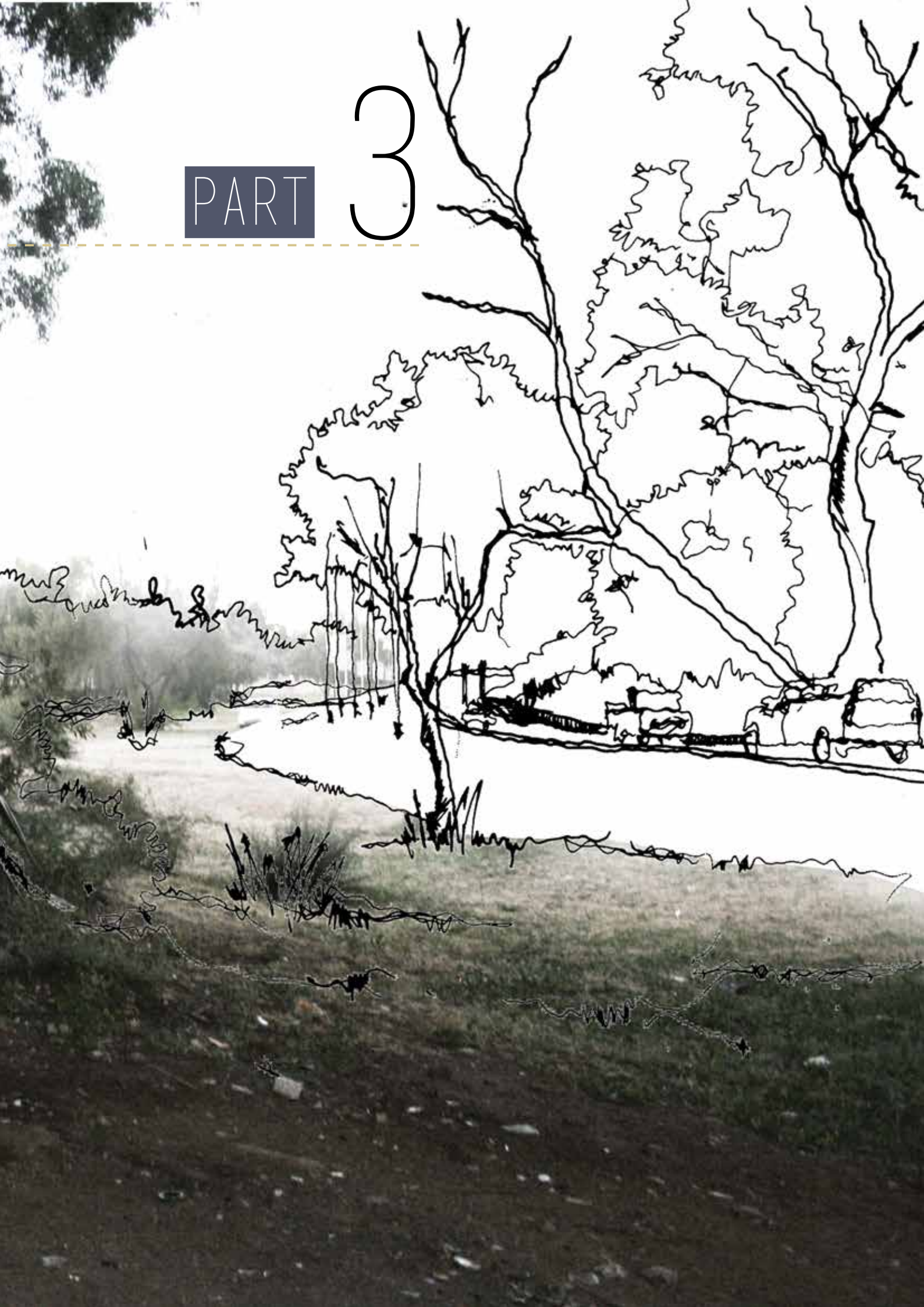
PART 3

Design and technical synthesis:

Design process
Towards a final design solution

Technical resolution:
Technical report

PART 3



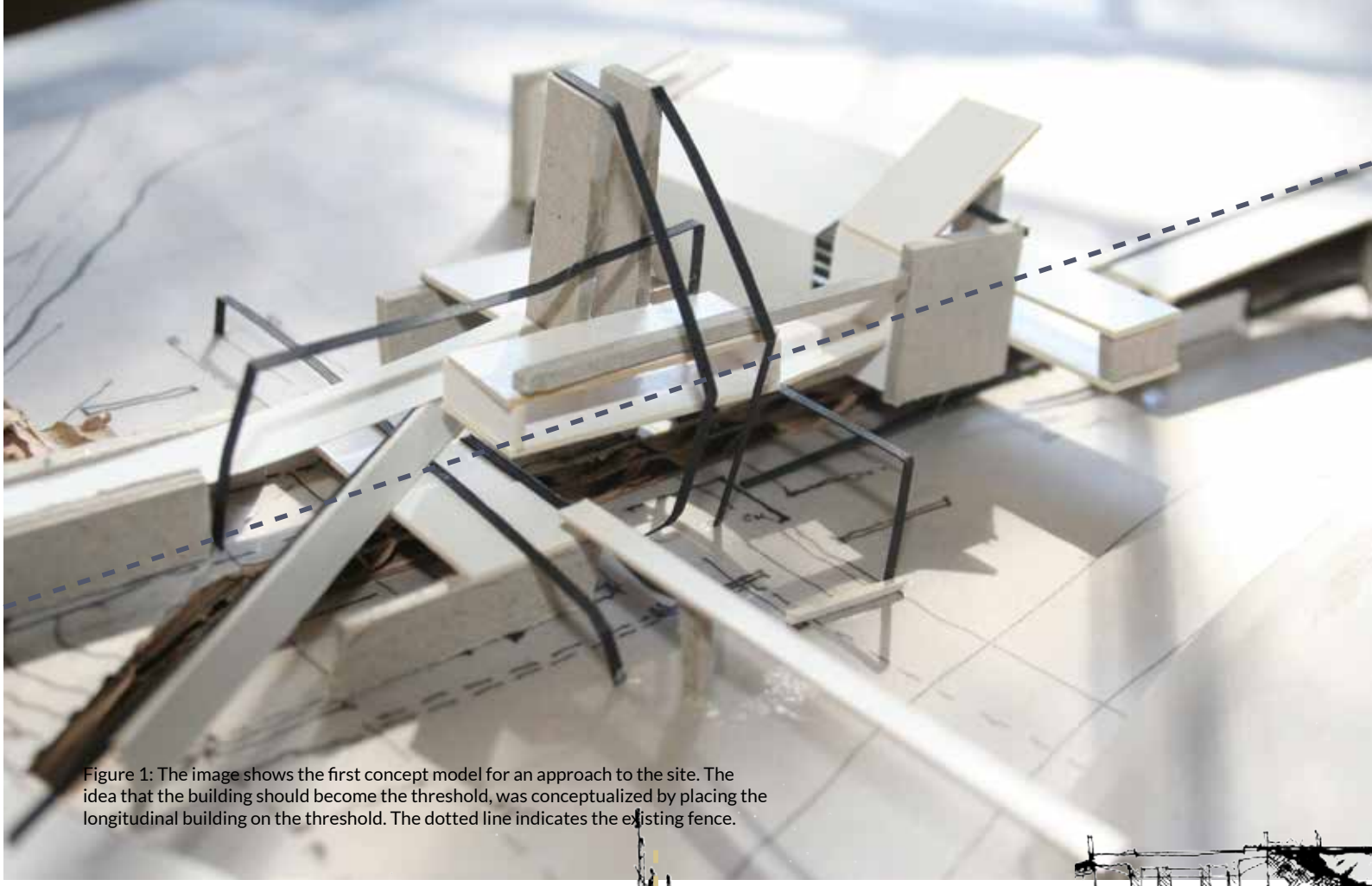
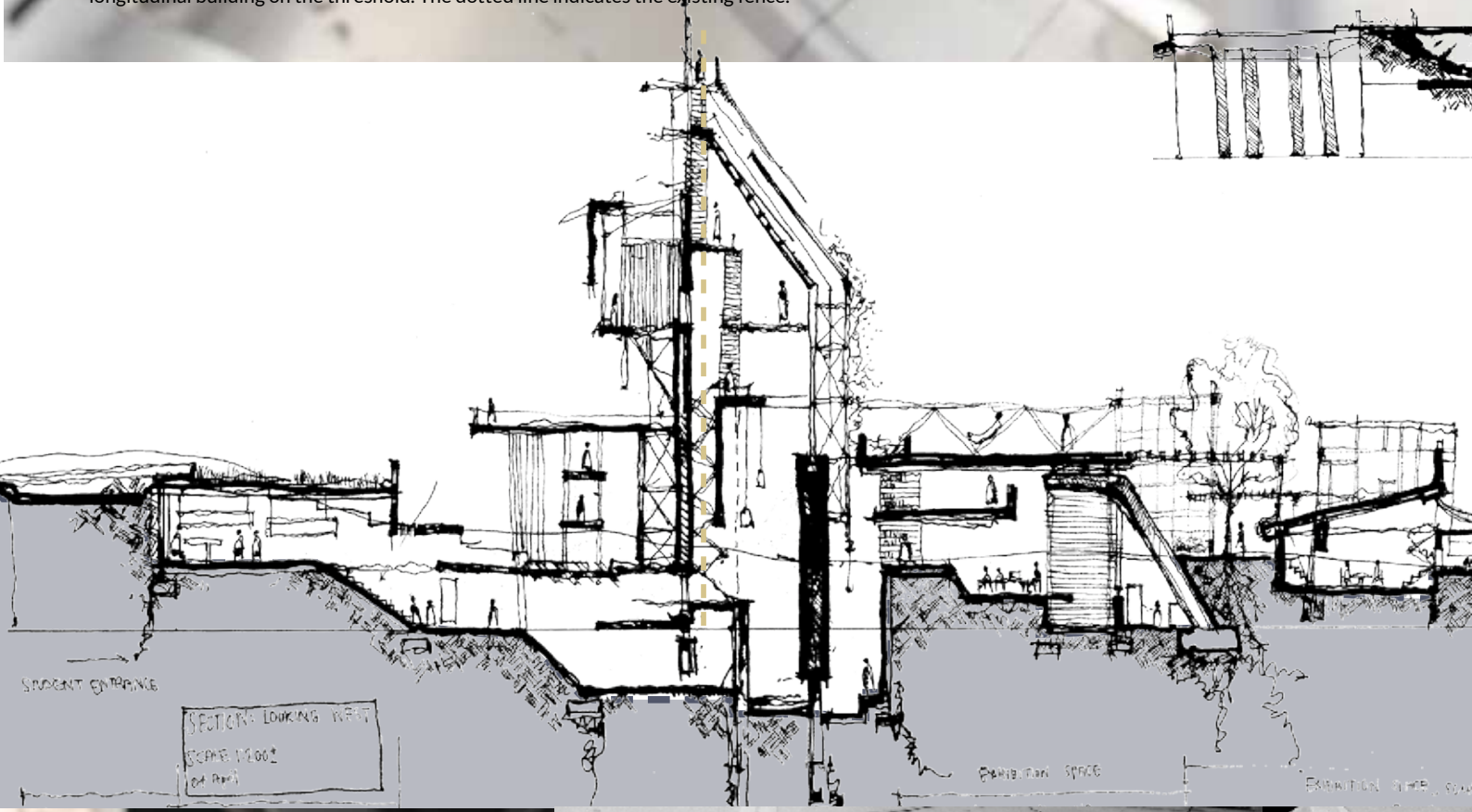


Figure 1: The image shows the first concept model for an approach to the site. The idea that the building should become the threshold, was conceptualized by placing the longitudinal building on the threshold. The dotted line indicates the existing fence.



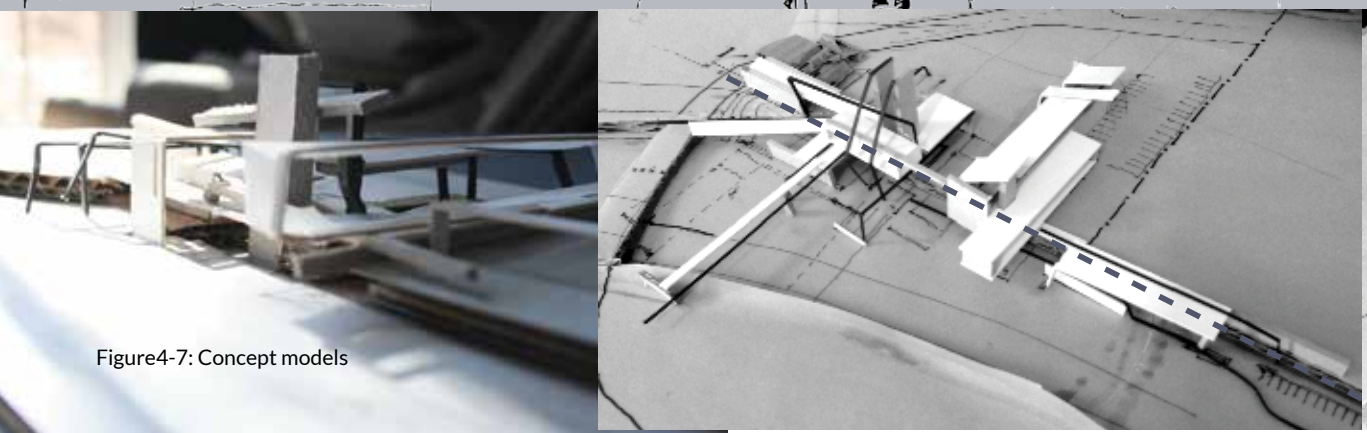
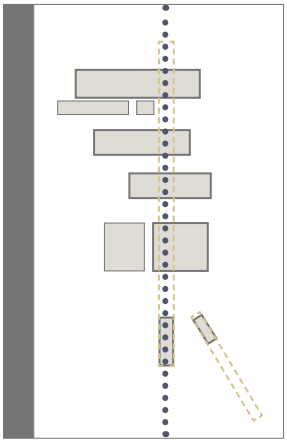


Figure4-7: Concept models

DESIGN SYNTHESIS

Initial conceptual sketches and model



Part 3 consist of the conceptual design process and the application of research from part 1 and 2. This part displays the decision making and re-evaluating process of the design.

The sections in figure 2 and 3 were the initial approach to the gallery. A building that sculpts the earth and allows exciting exhibition spaces.

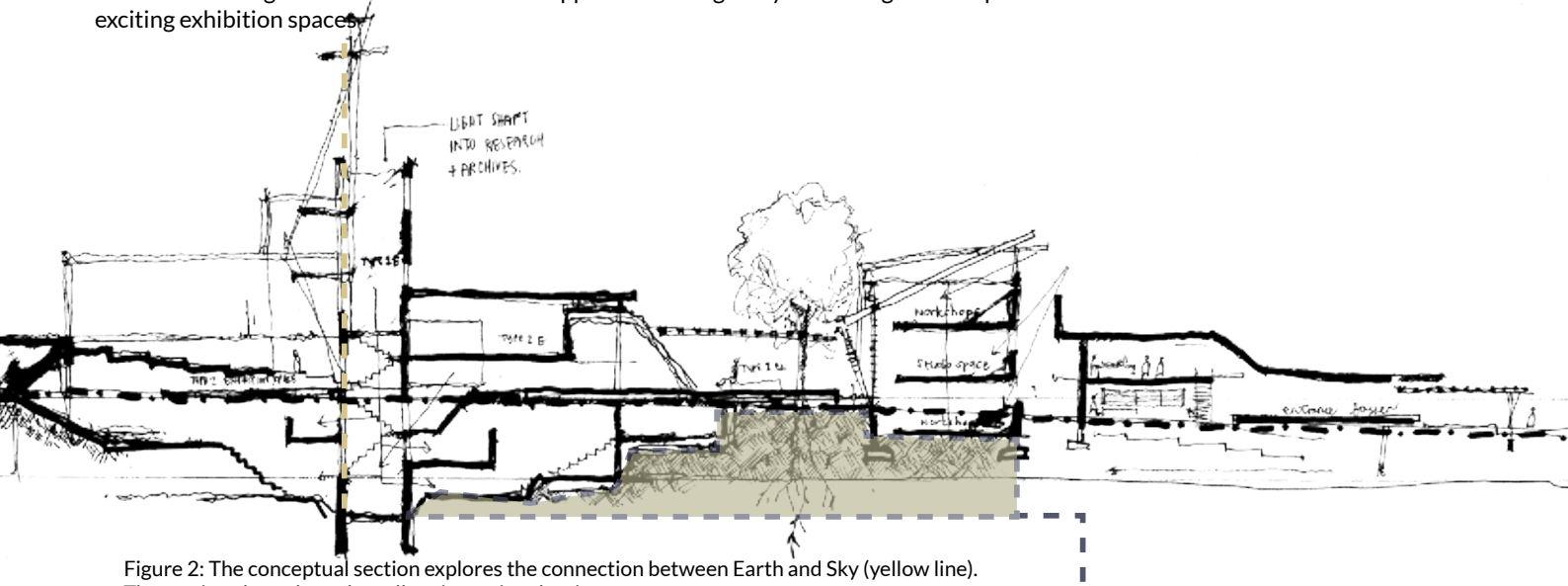


Figure 2: The conceptual section explores the connection between Earth and Sky (yellow line). The section shows how the gallery is carving the site.

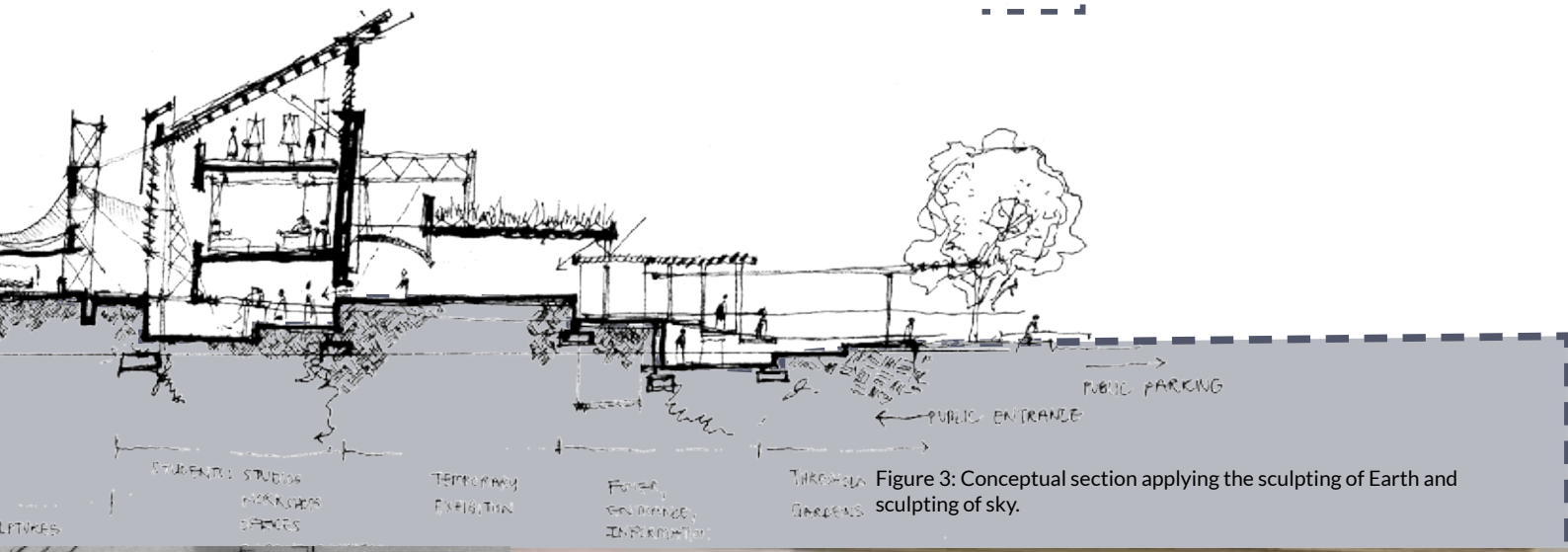
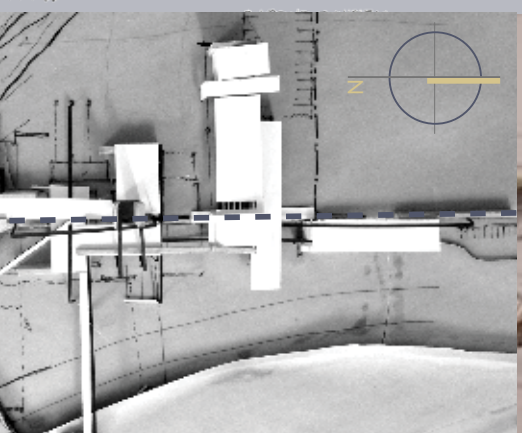


Figure 3: Conceptual section applying the sculpting of Earth and sculpting of sky.



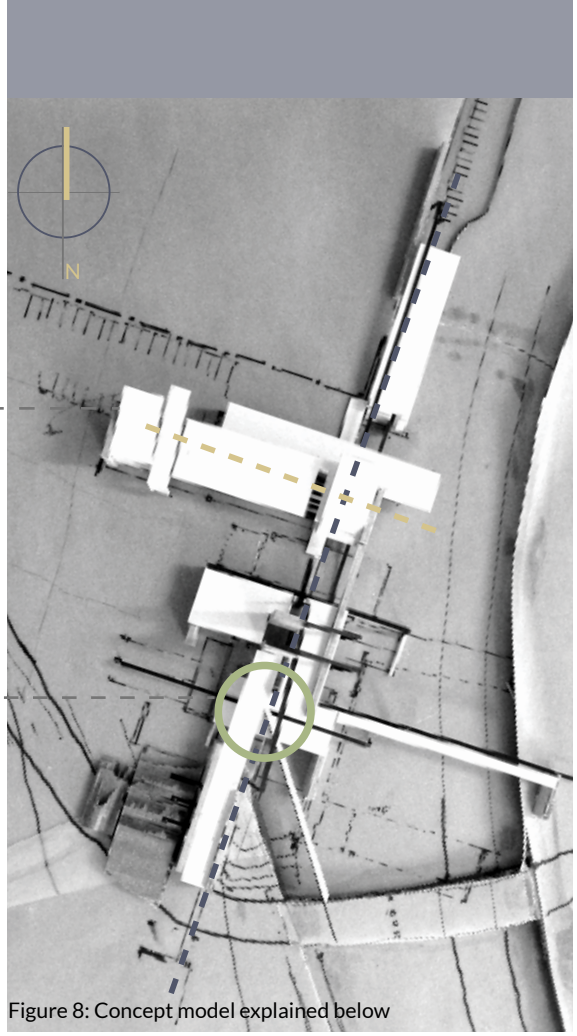


Figure 8: Concept model explained below

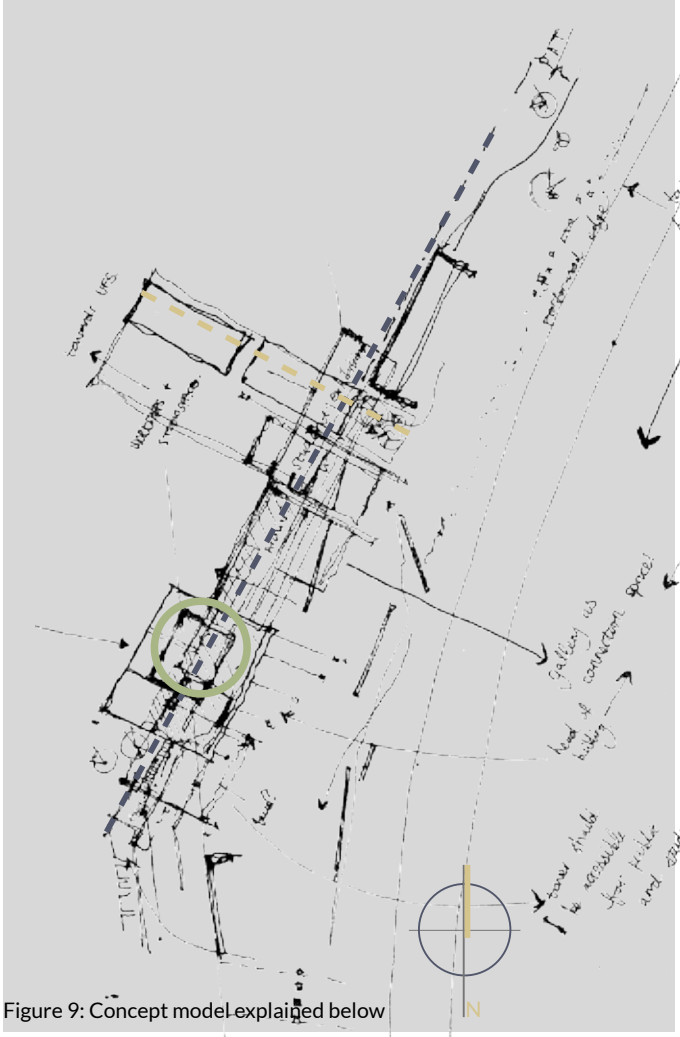


Figure 9: Concept model explained below

The initial floor plan (seen on the image on the right) shows the development of the plan beyond the edge of the boundary line of the university.

The gallery spaces are placed perpendicular to the ufs boundary. The largest mass of the building is seen on the northern edge of the site (yellow dotted line). This will be developed into the studio and workshop space.

The point of hierarchy is placed on the southern part of the site, where this will become the entrance to the building. The hierarchy point is shown in green.

This stage finalized the overall logic placement of the design masses.

The design will be developed.

Figure 10: Development of figure 9

Initial conceptual floor plan

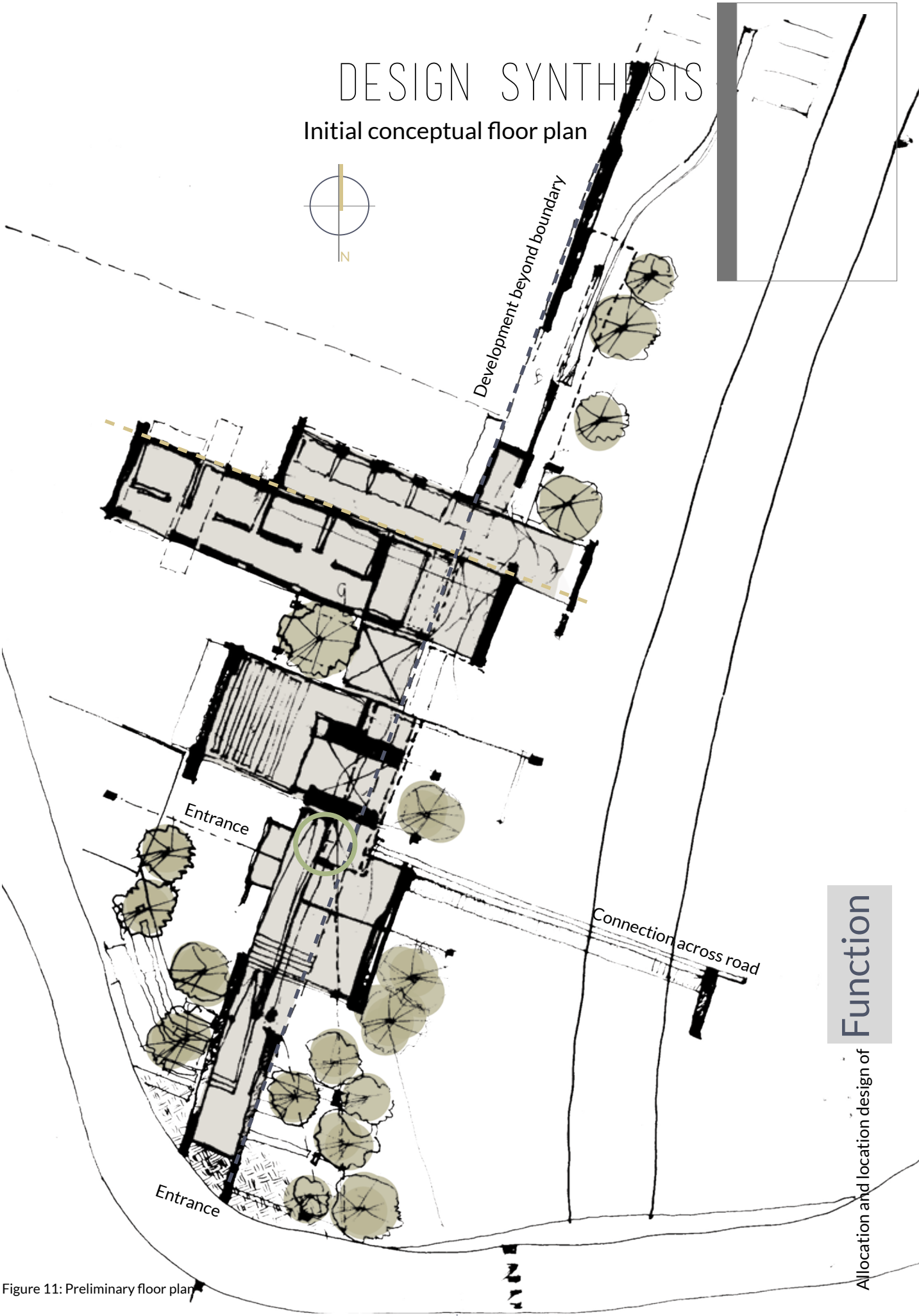


Figure 11: Preliminary floor plan

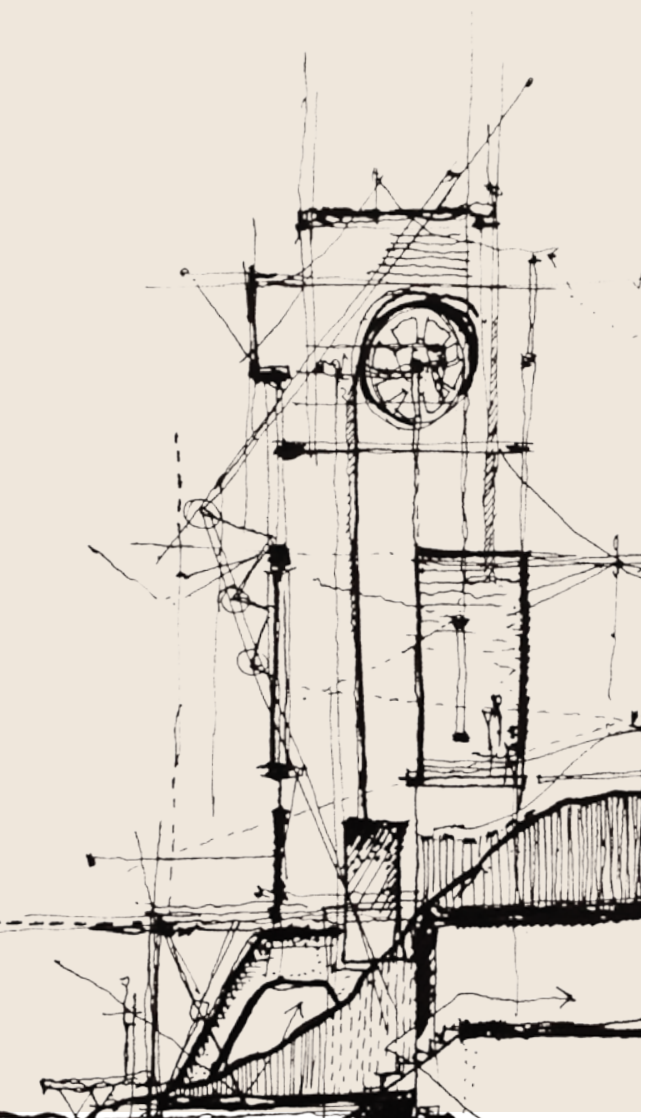


Figure 12: Part of section showing entrance to building from campus

Figure 13: The proposed project aims to embody the boundary of the University of the Free State in order to develop the harsh edge into a perforated entrance through the art gallery.

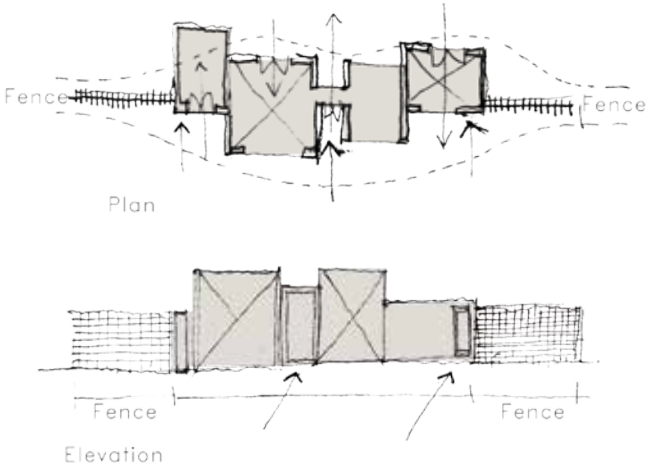


Figure 13: The project aims to embody the boundary of the University of the Free State in order to develop the harsh edge into a perforated entrance through the art gallery.

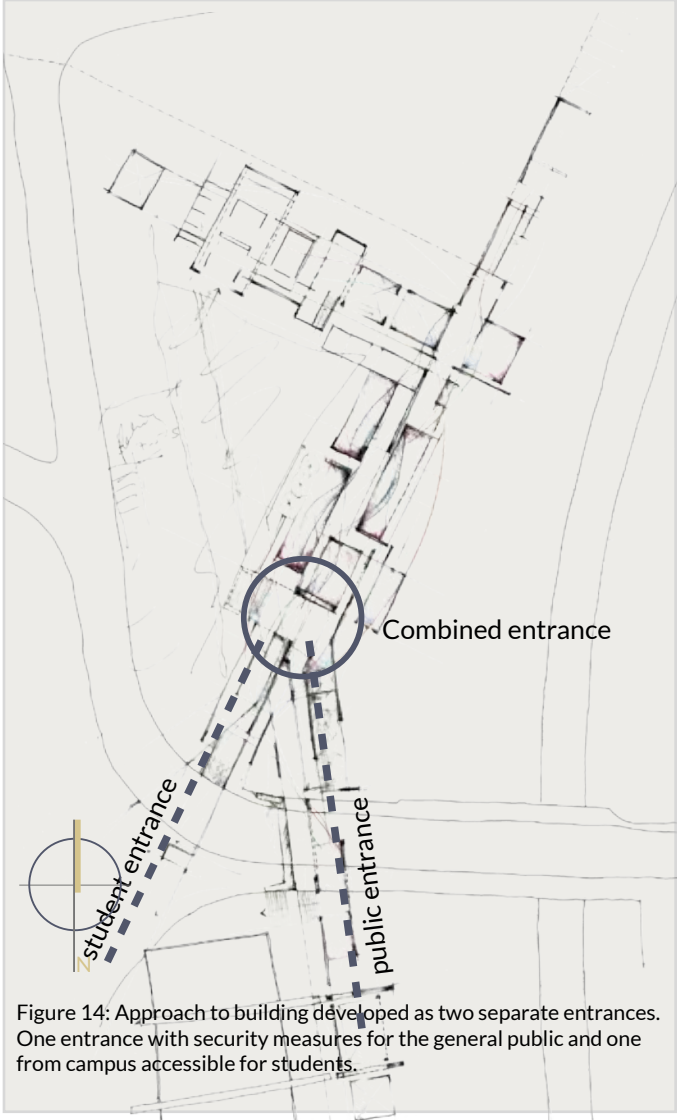


Figure 14: Approach to building developed as two separate entrances. One entrance with security measures for the general public and one from campus accessible for students.

Figure 15: Development of the studio and workshop space into functional space.

DESIGN SYNTHESIS

Floor plan development

Figure 16: Circulation route developed in relation to two entrances.

Figure 17: Development of gallery spaces and entrance foyer.

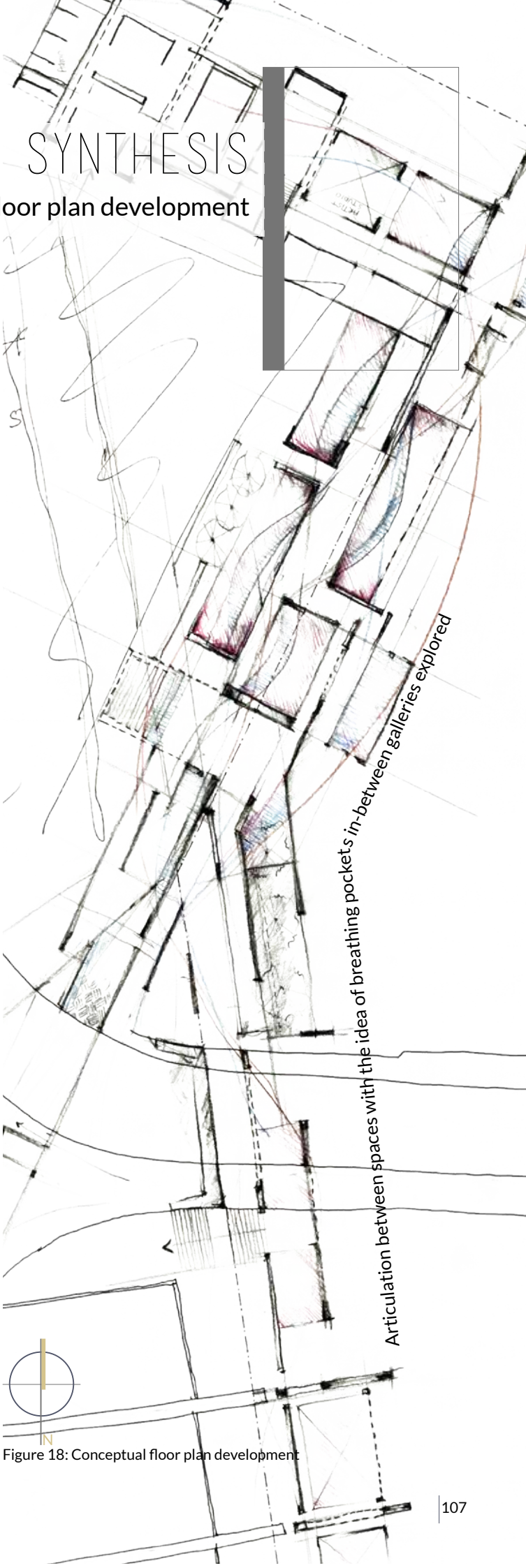


Figure 18: Conceptual floor plan development

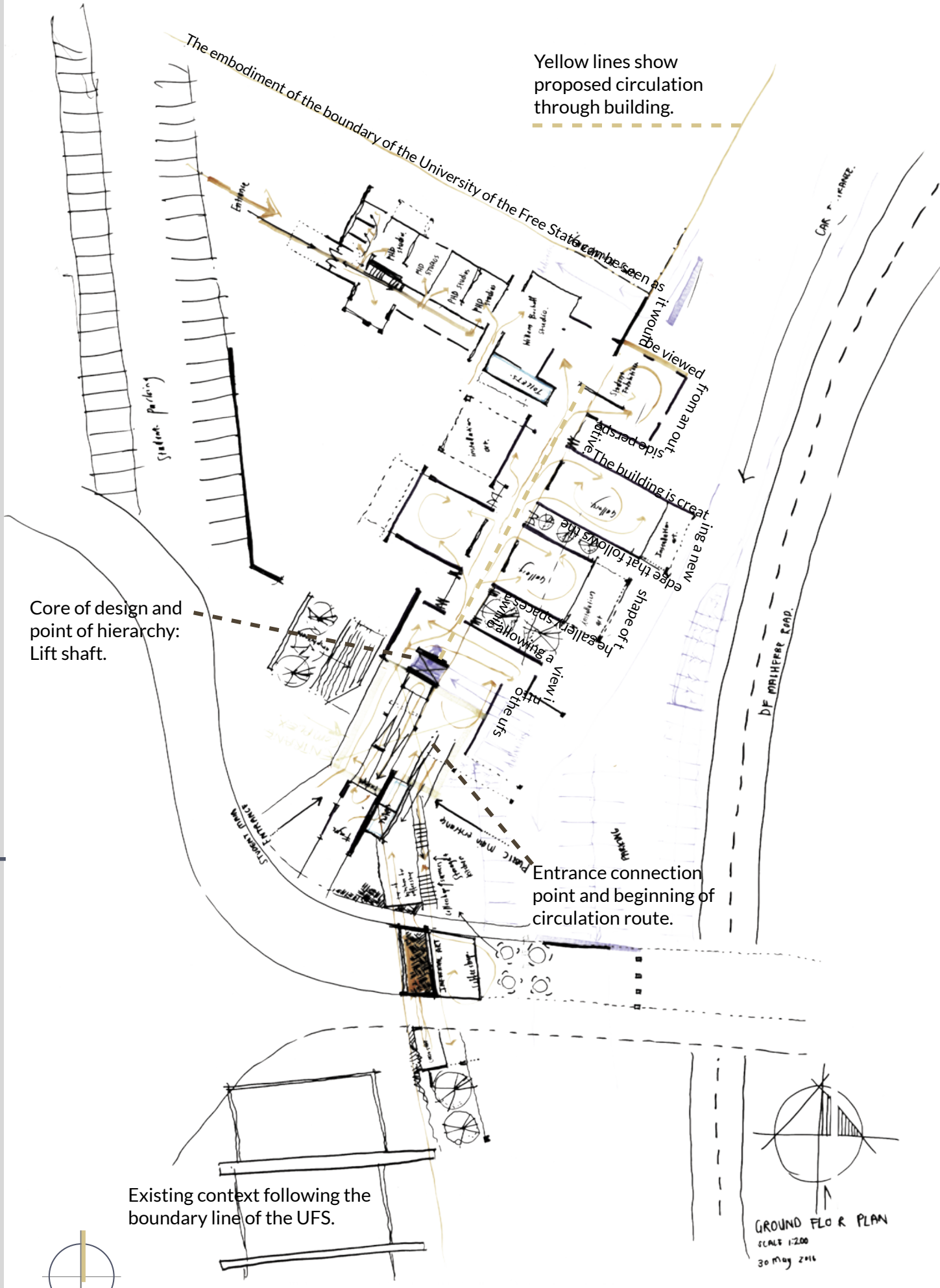
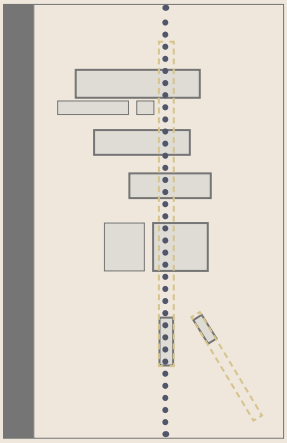


Figure 19: Circulation process analysed

DESIGN SYNTHESIS

Floor plan development



Allocation and location design of Green breathing space

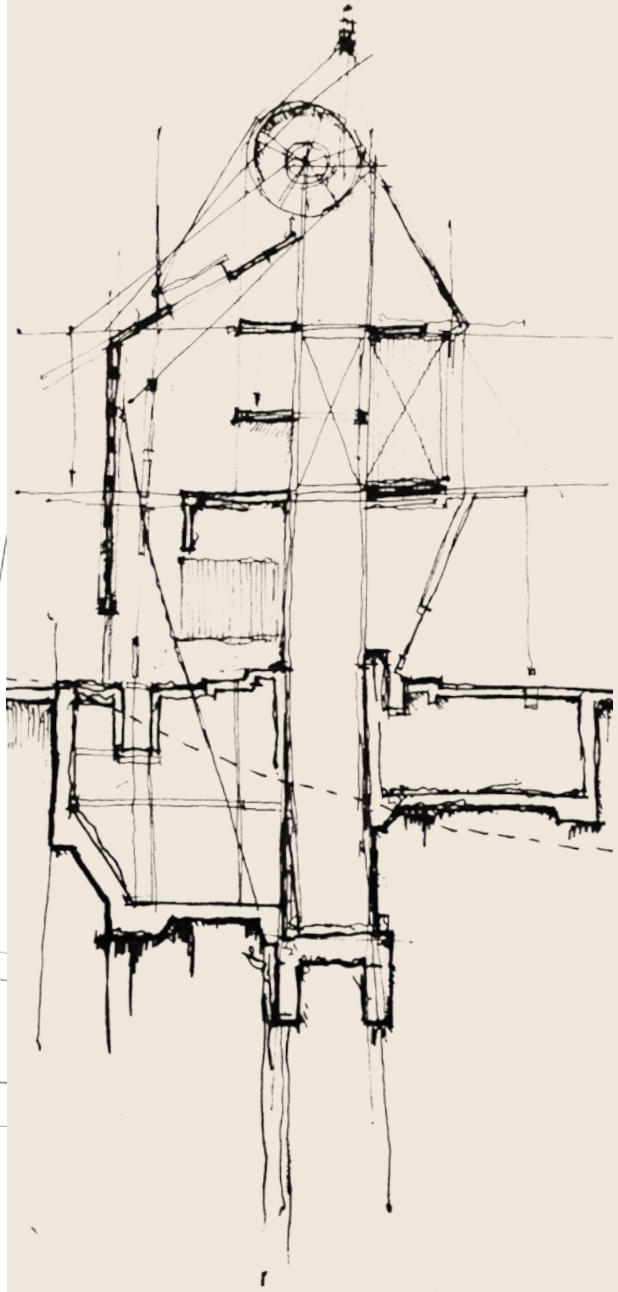


Figure 19: Green space analysed

Figure 20: Conceptual section

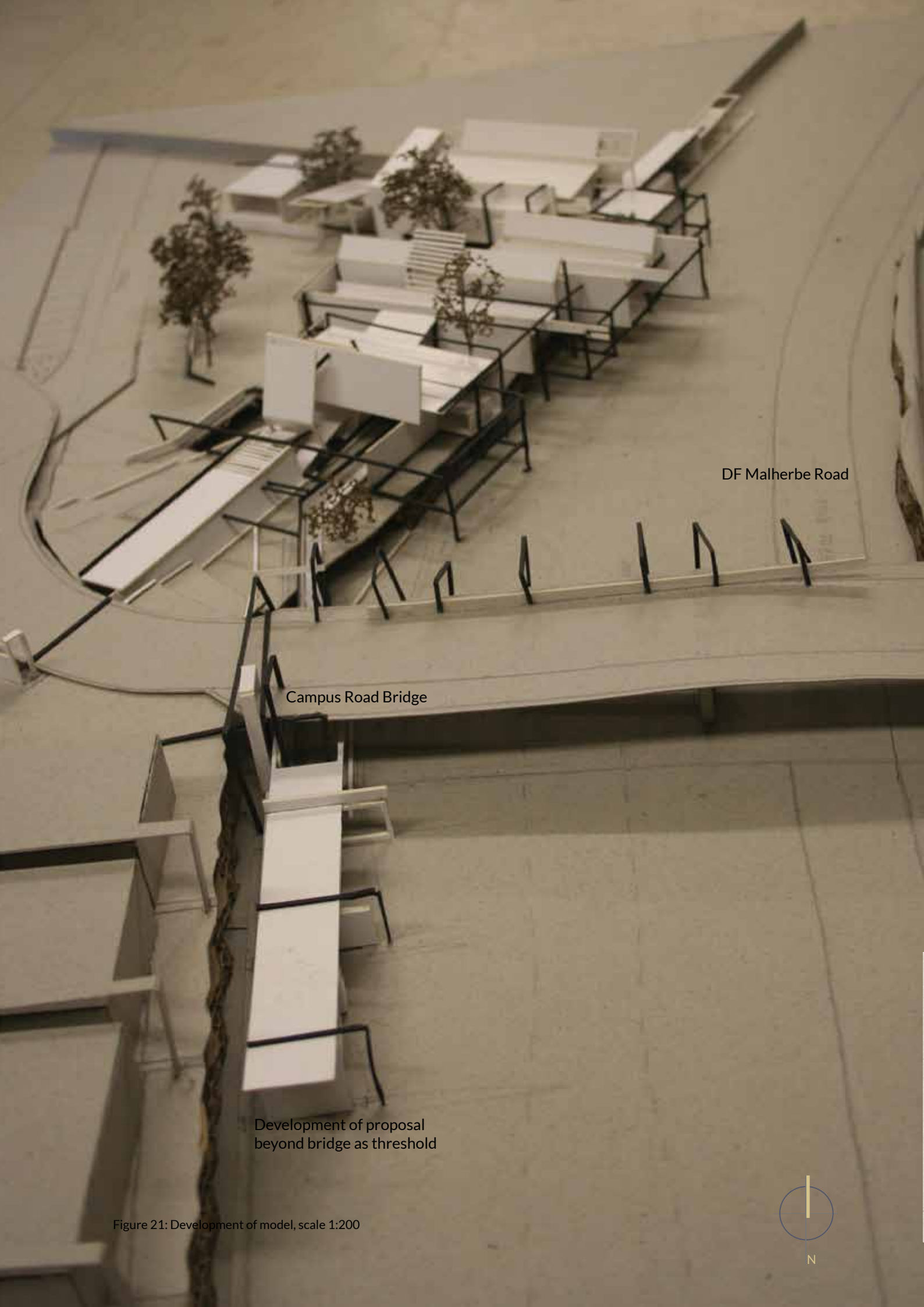


Figure 21: Development of model, scale 1:200

DESIGN SYNTHESIS

Model and 3D development

Figure 22: Development of model, scale 1:200

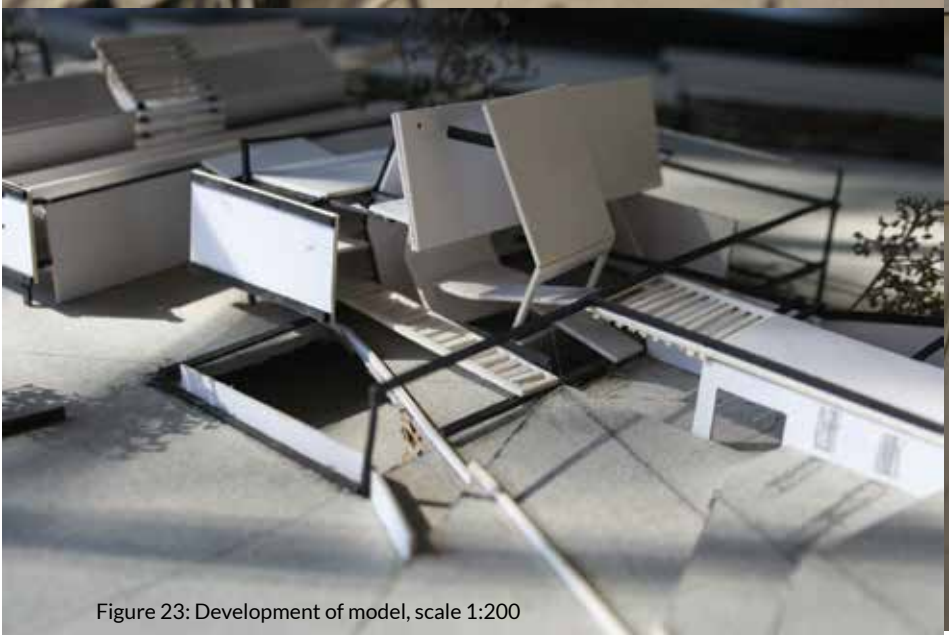


Figure 23: Development of model, scale 1:200

Figure 24: Development of model, scale 1:200

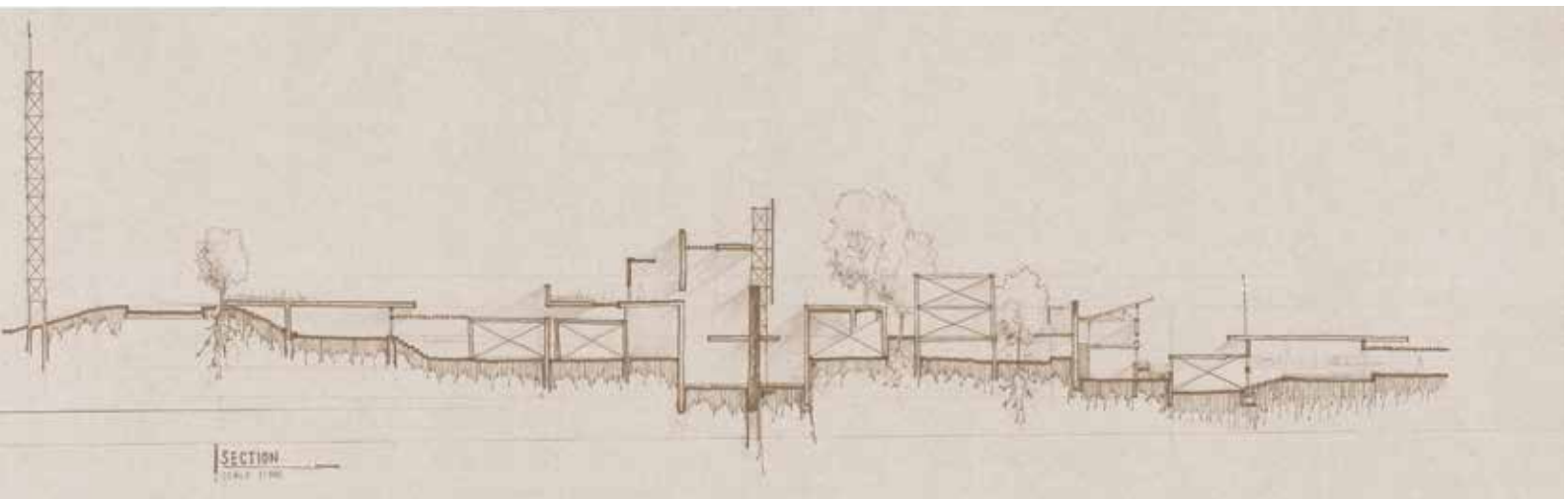


Figure 25: Development of section

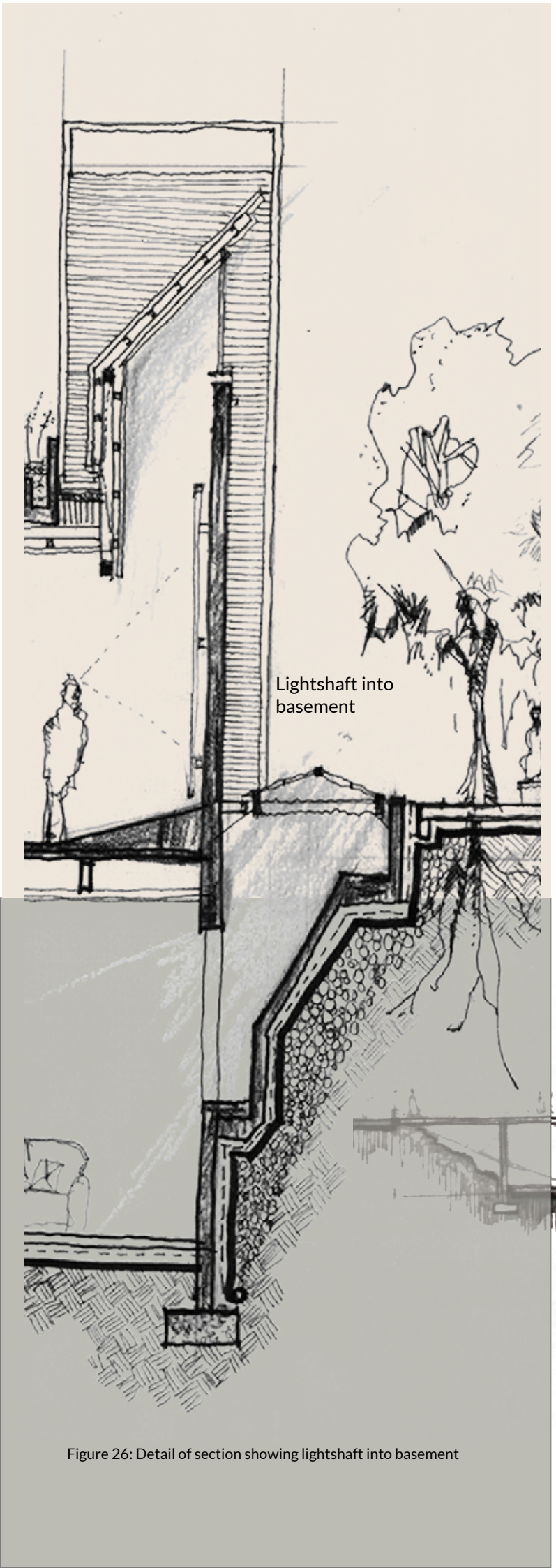


Figure 26: Detail of section showing lightshaft into basement

The floor plan developed into separate gallery spaces with breathing spaces in-between. These pause spaces are utilized as dialogue and recreational space and also functions as courtyards to allow light infiltration into the galleries.

The section below shows the development of the separate galleries and in-between planted areas.

The galleries are connected with the main circulation walkway that runs from north to south through the whole of the development.

The walkways are lifted from the ground floor to allow light into the basement of the building.

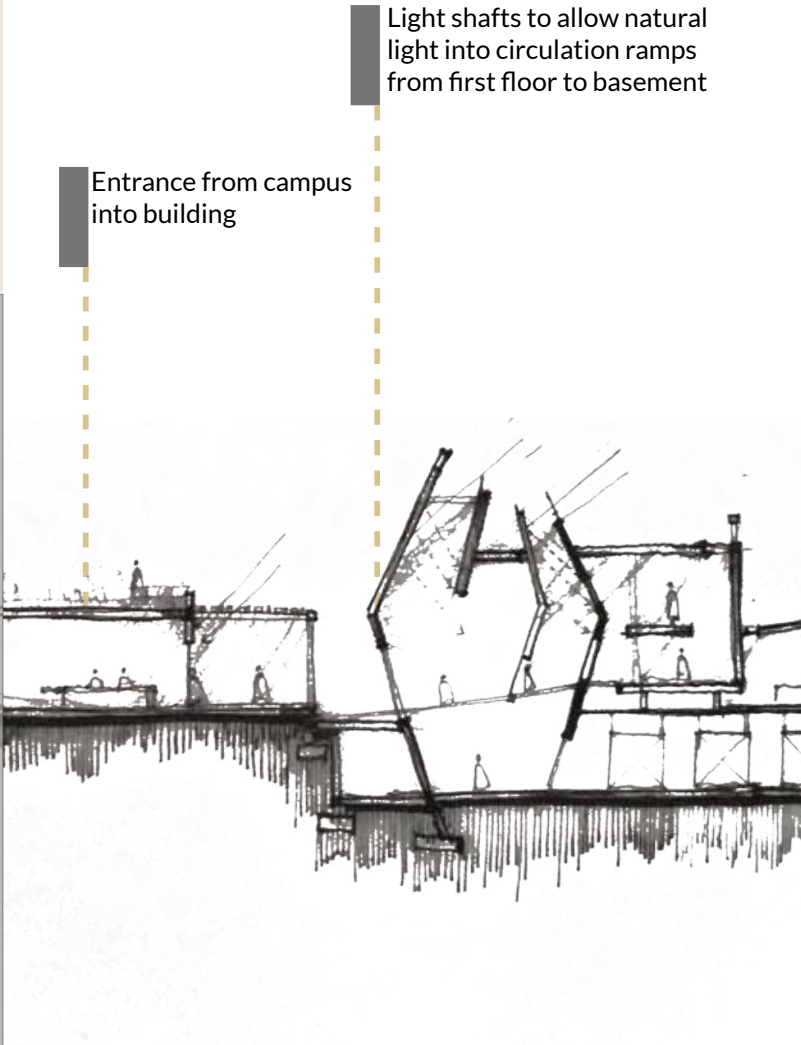


Figure 27: Development of section with light boxes

DESIGN SYNTHESIS

Floor plan and section development

Section line

Figure 28: Development of floorplan

Proposed entrance from northern edge for general public

N

Gallery with indirect lighting

Pause space

Workshop and studios

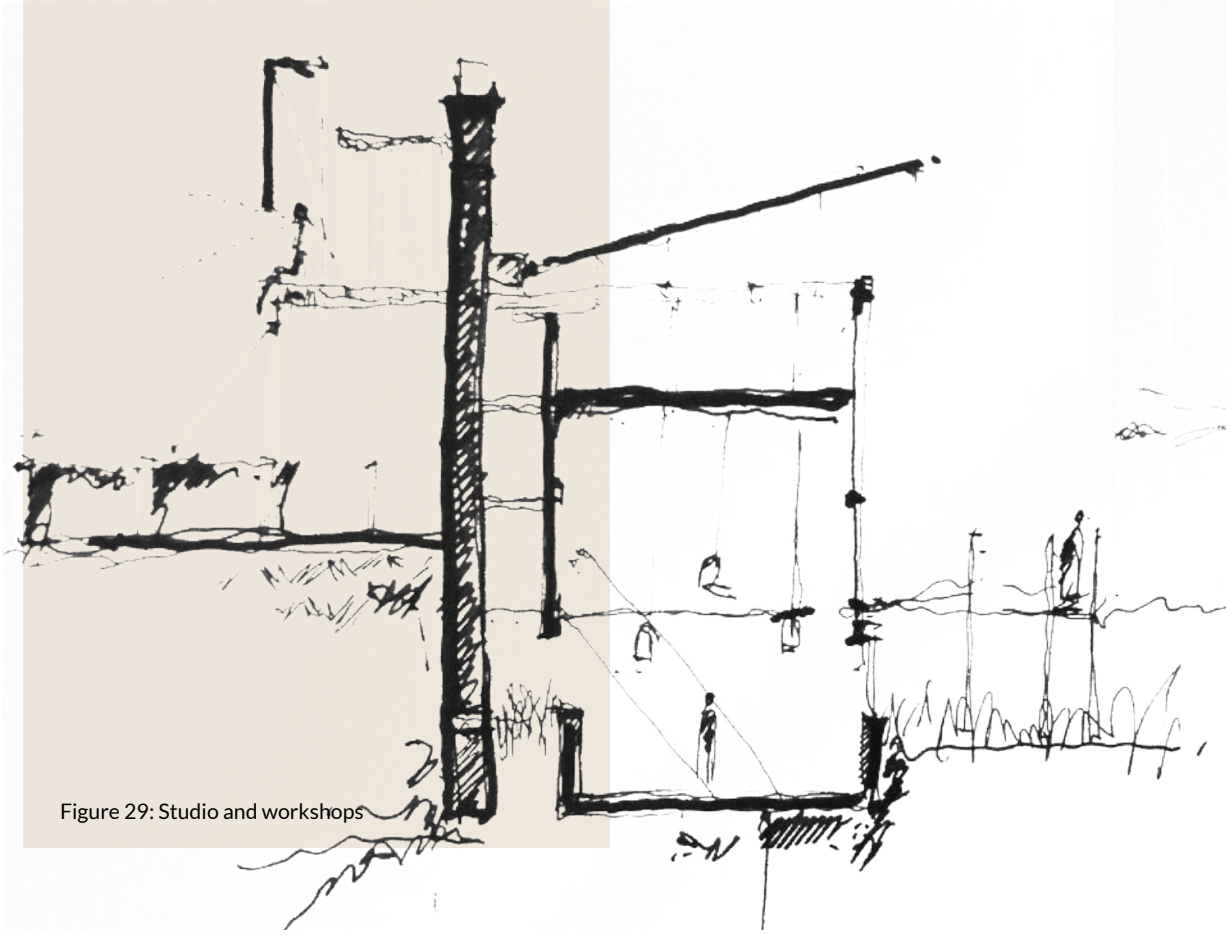
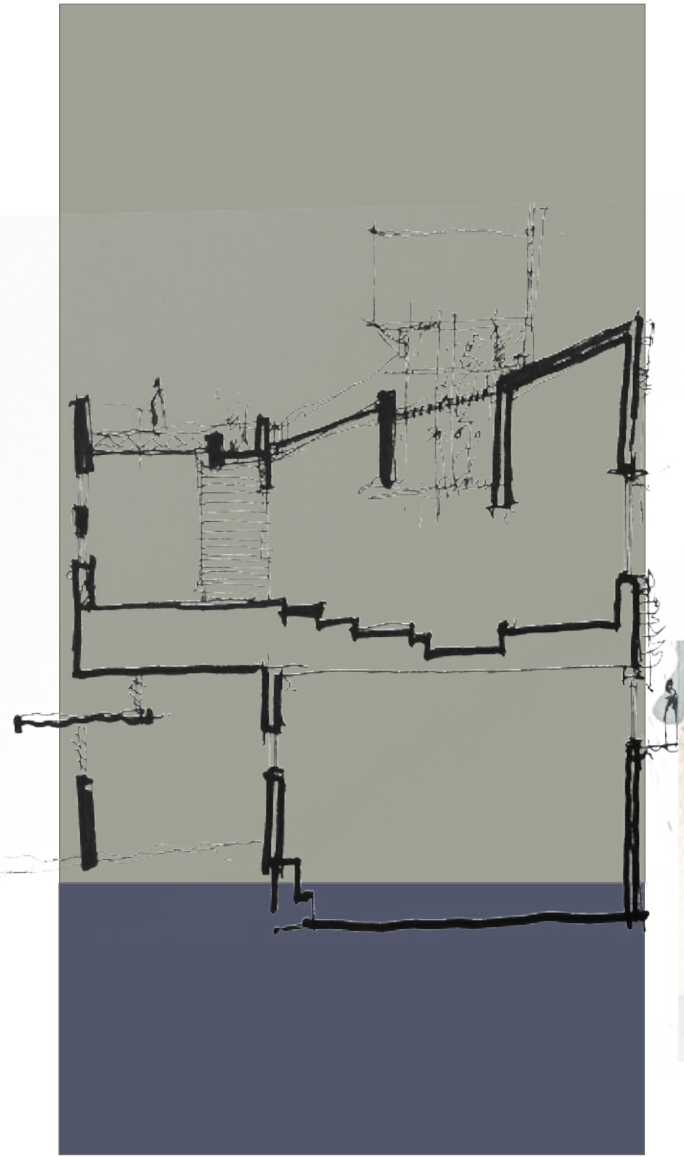
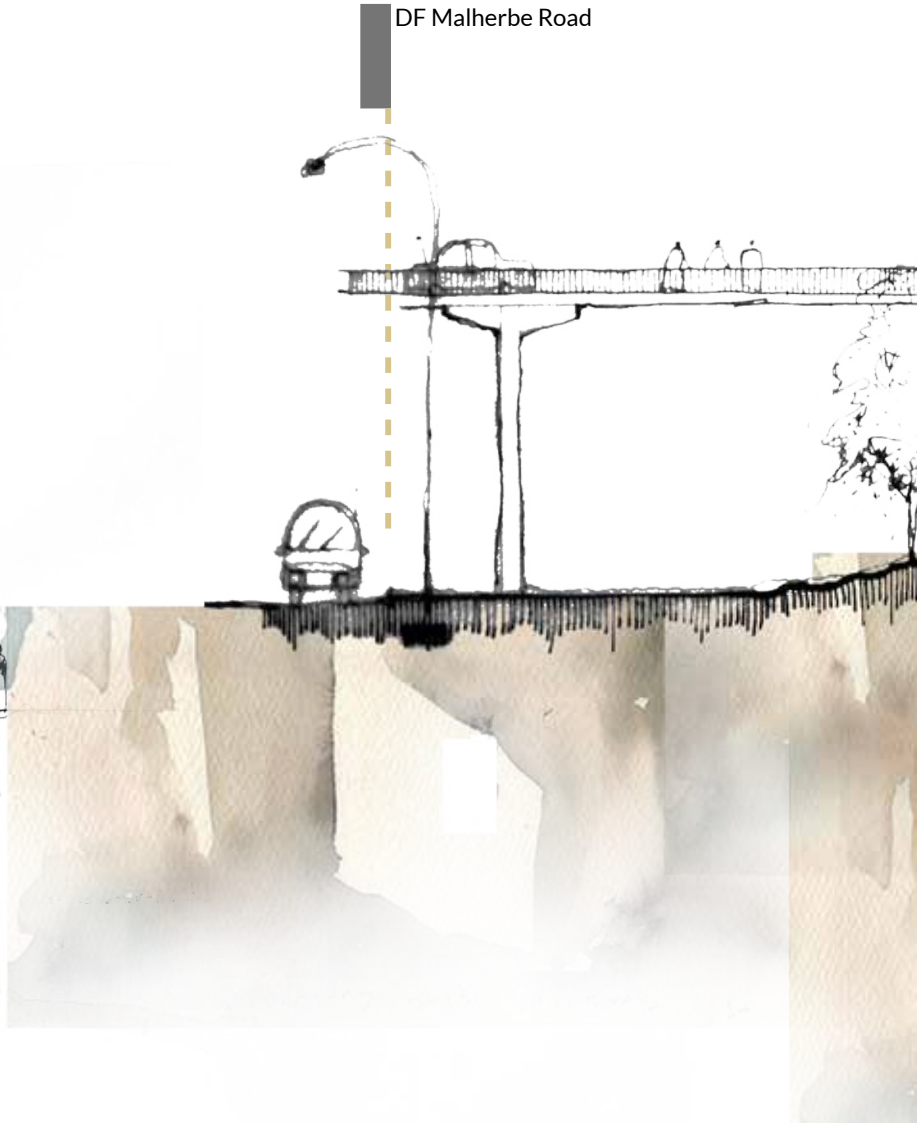


Figure 29: Studio and workshops

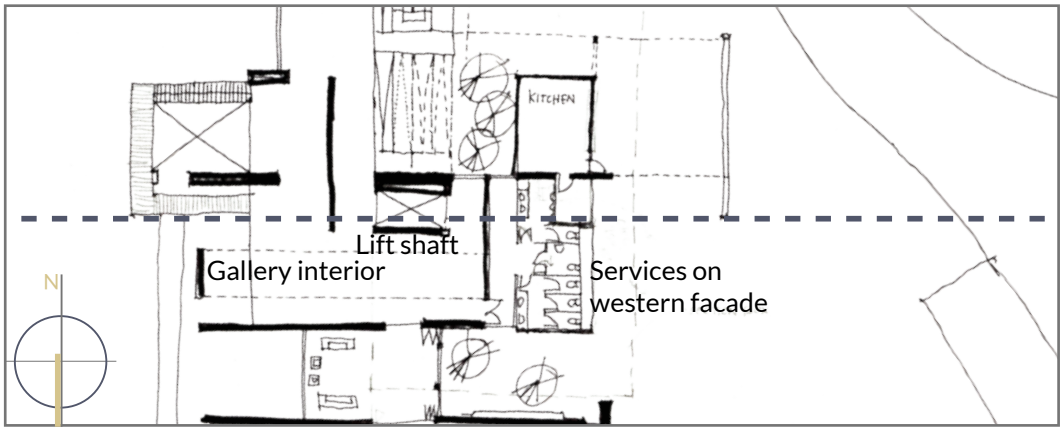
Figure 30: Conceptual sections through workshop and studio

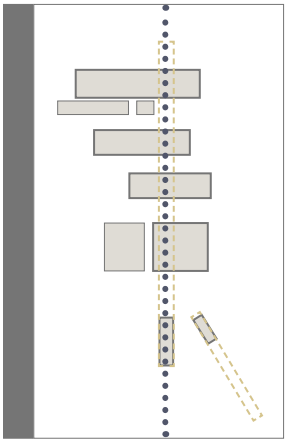




DESIGN SYNTHESIS

Floor plan and section development





Section

Figure 31: Section shown in figure 32 indicated on conceptual floor plan

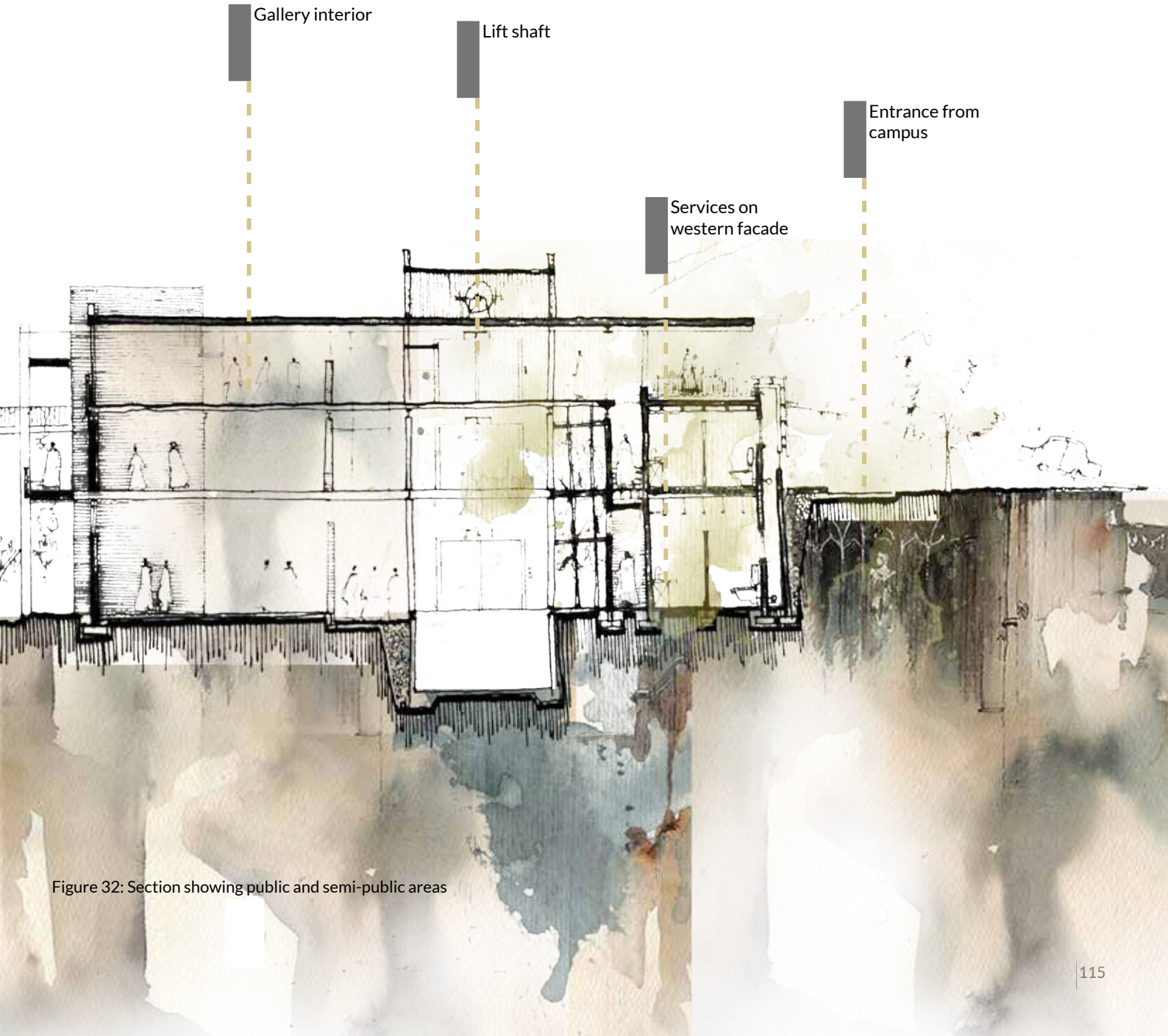


Figure 32: Section showing public and semi-public areas

“Vertical lines and forms express an active relationship to the sky and a wish for receiving light.” (Norberg-Schulz, 1980:66)

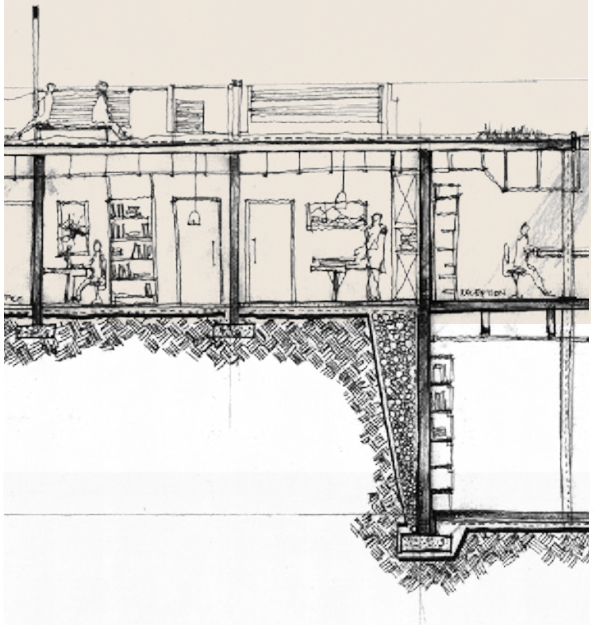
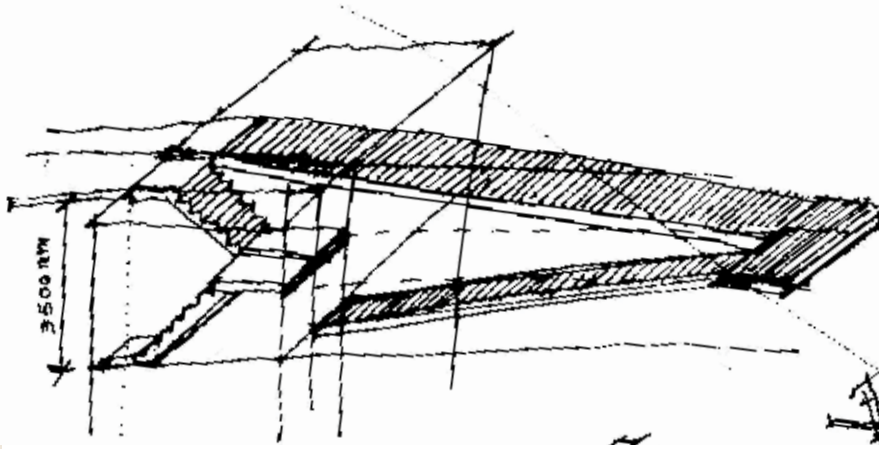


Figure 33: Sectional development showing sculpting of earth as applied at office space.



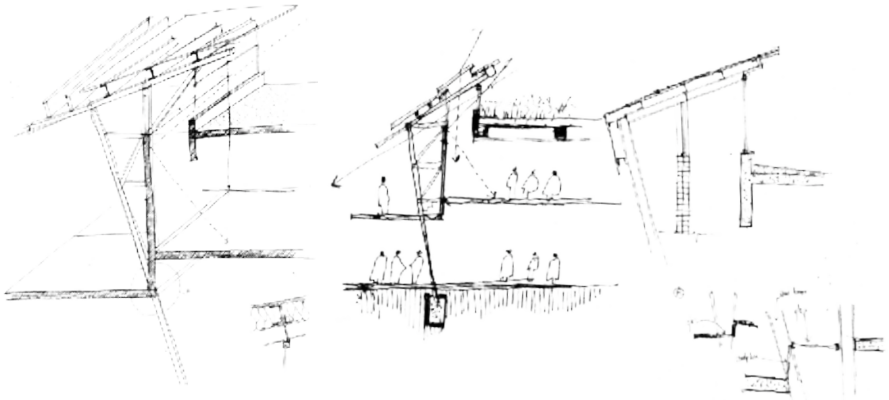


Figure 35: Roof construction concept

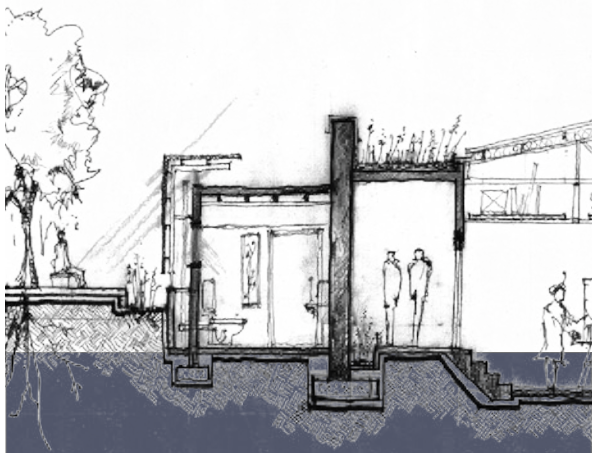
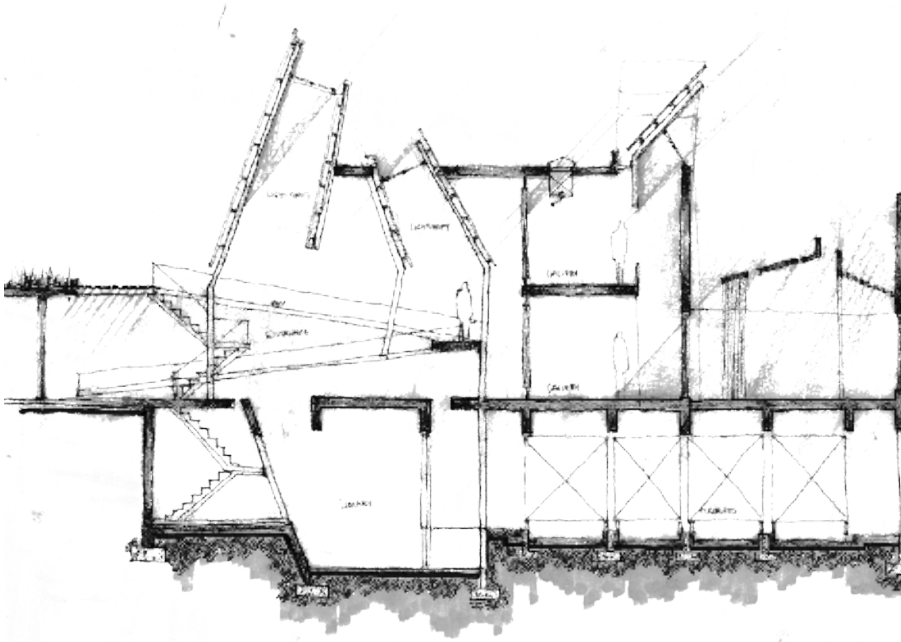
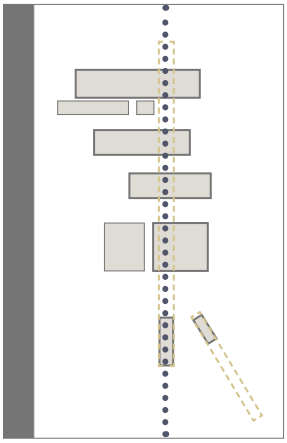


Figure 34: Section through workshops and toilets



DESIGN SYNTHESIS

Section development



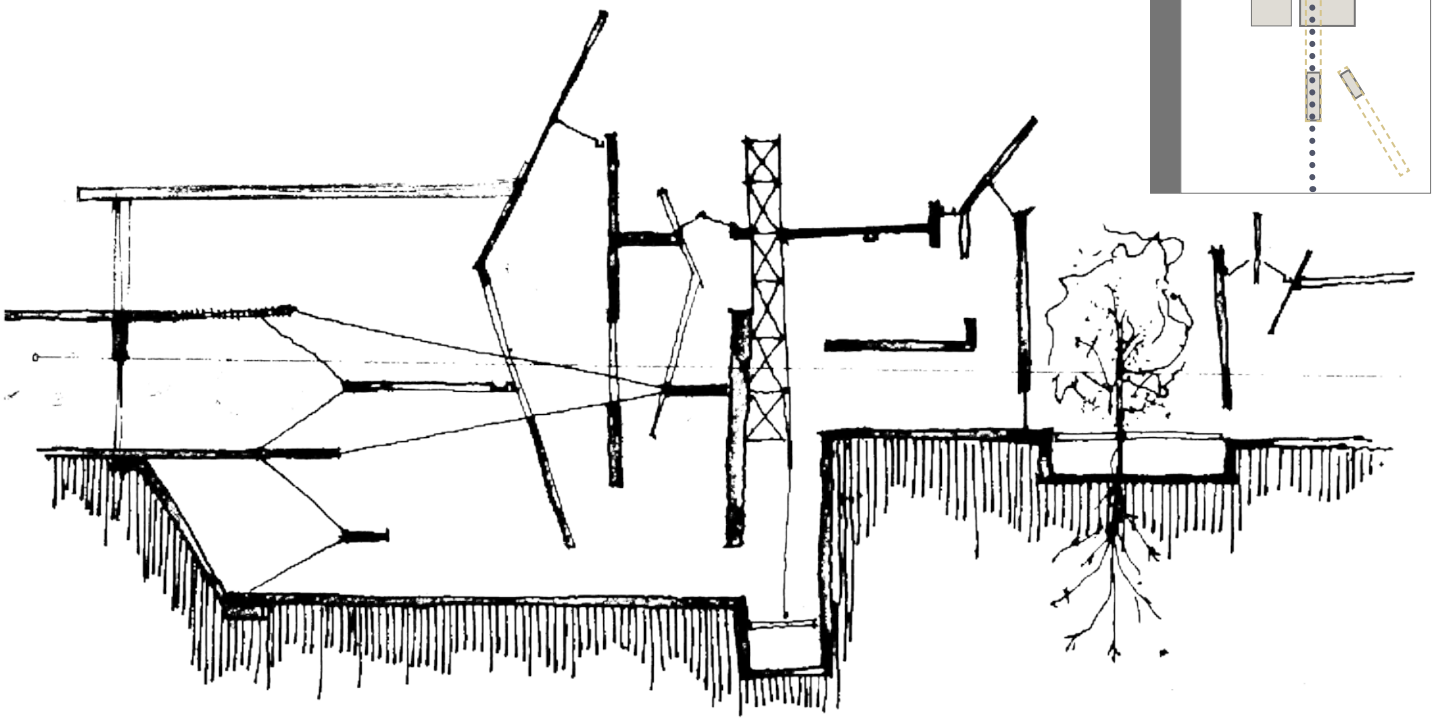


Figure 36: Ramps and stairs applied to lightboxes

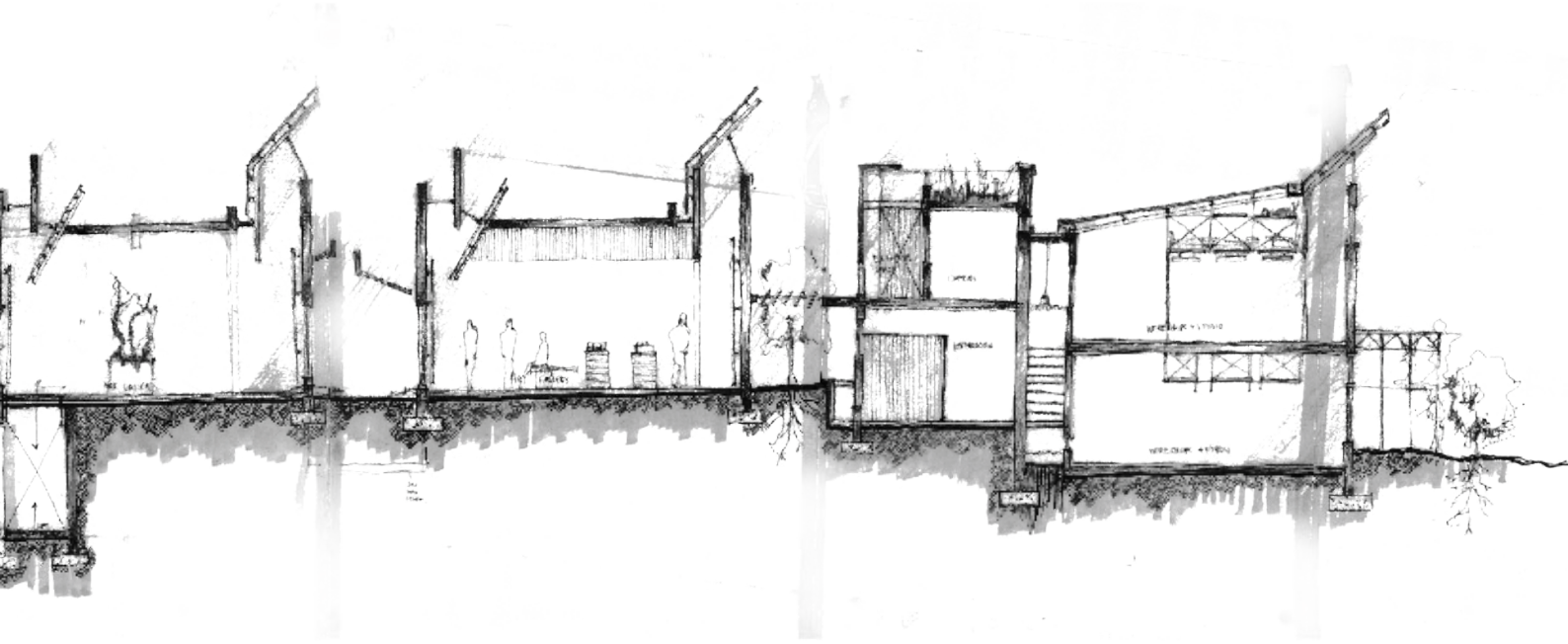


Figure 37: Longitudinal section

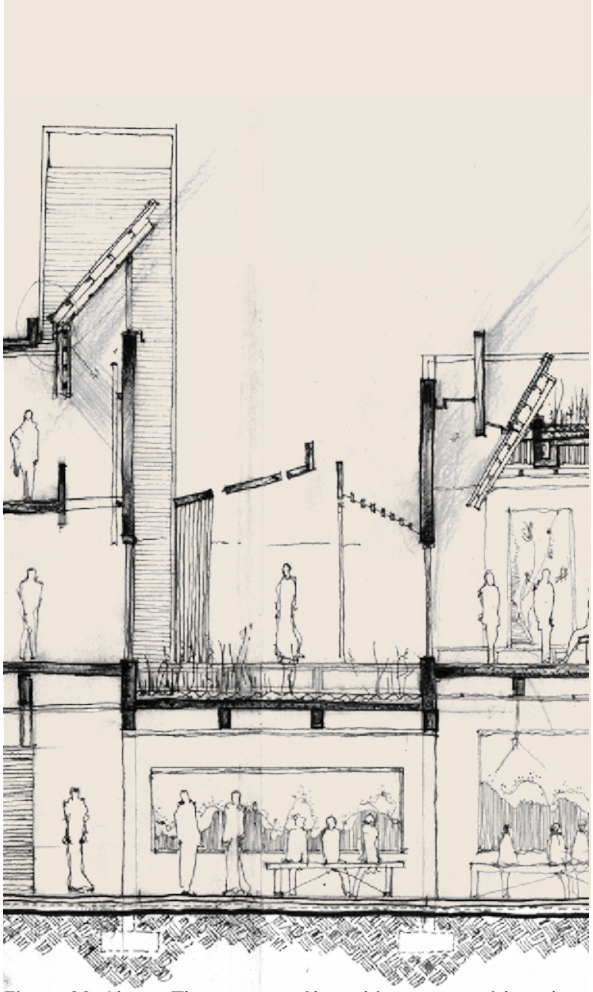


Figure 38: Above: The concept of breathing spaces with sculpting of sky applied.

Figure 39: Below: Structural beam for light shaft.

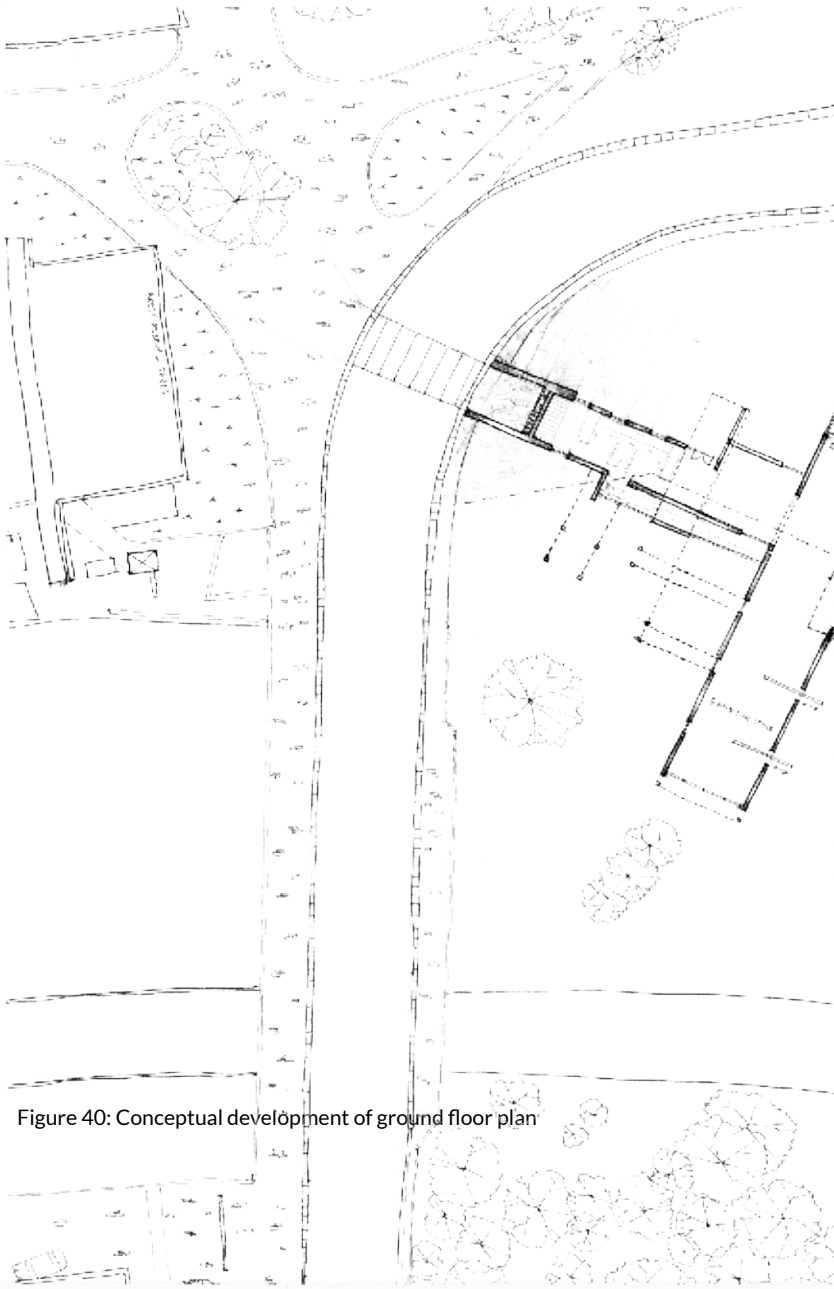


Figure 40: Conceptual development of ground floor plan

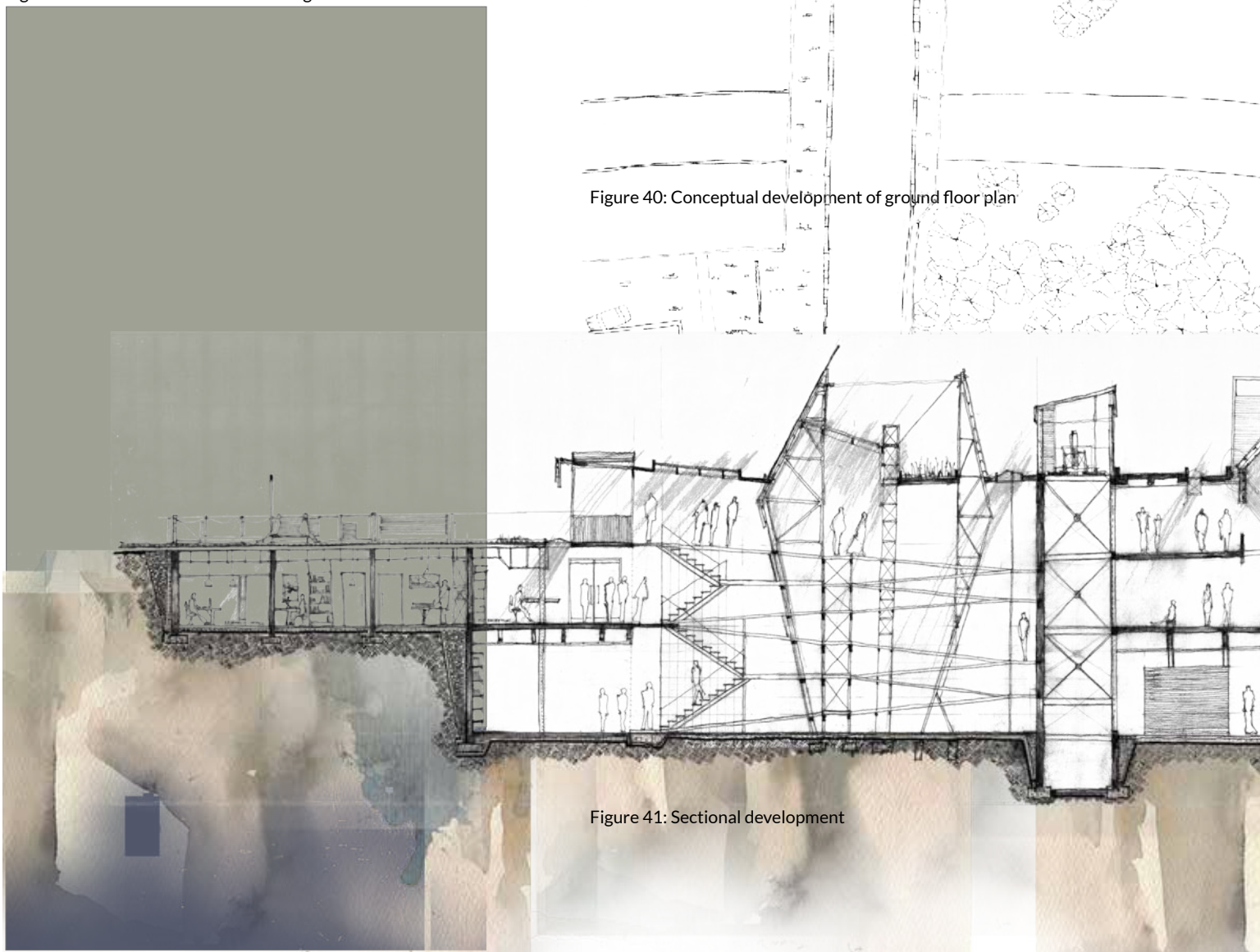
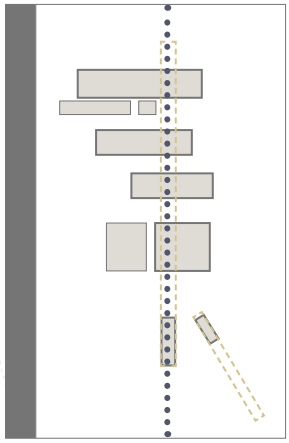


Figure 41: Sectional development

DESIGN SYNTHESIS

Preliminary longitudinal section



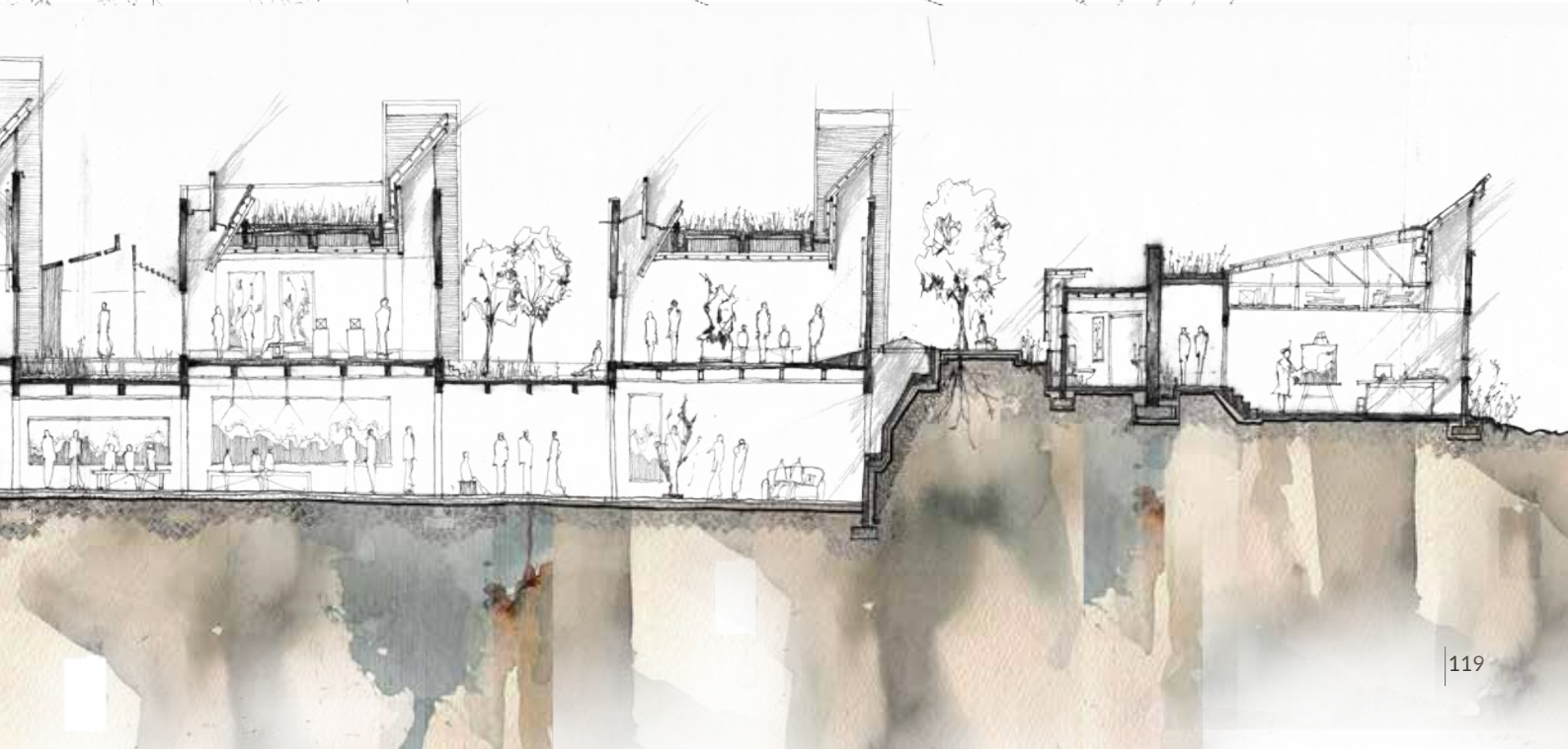


Figure 42: Development model

Figure 43: Development model

DESIGN SYNTHESIS

Model

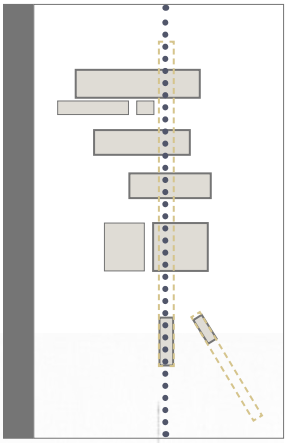


Figure 44: Section shows main circulation space with circulation ramps and light shafts allowing light into archives.

Figure 45: Ground floor plan with details

Figure 47: View approaching building from under bridge

Figure 48: View to entrance

DESIGN SYNTHESIS

Preliminary ground floor and basement floor plans

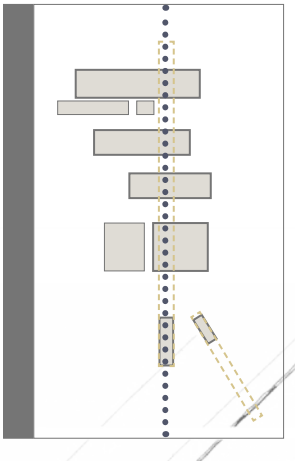


Figure 46: Basement plan

Figure 49: View to entrance from across street

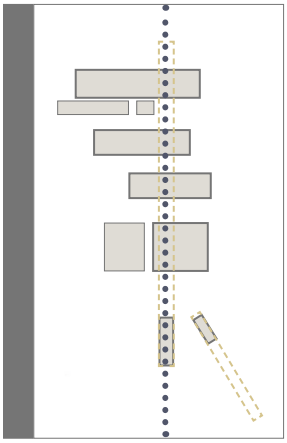
Figure 50: View from DF Malherbe Road

Figure 51: View of model from above

Figure 52: Sectional development

DESIGN SYNTHESIS

Section and perspective



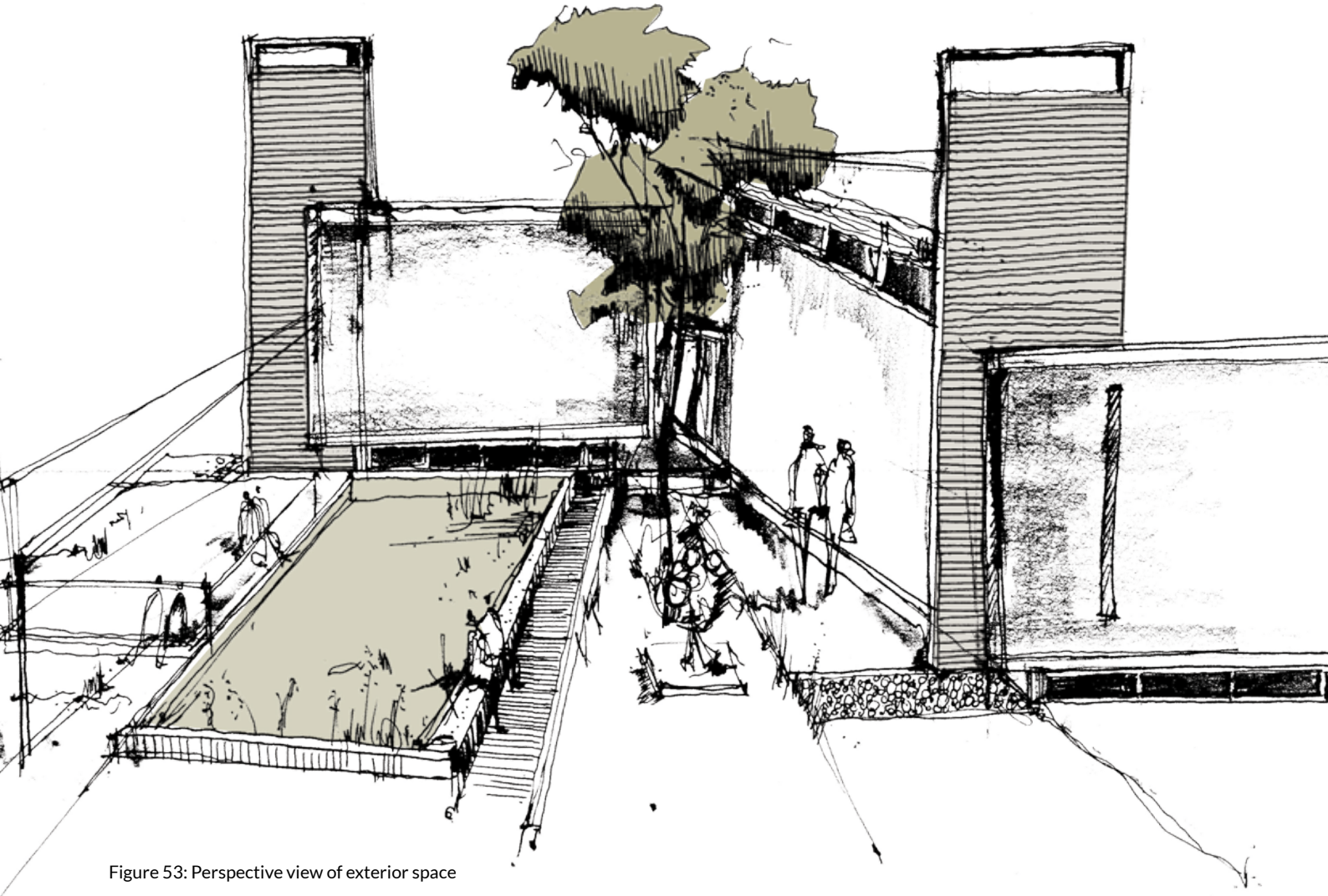
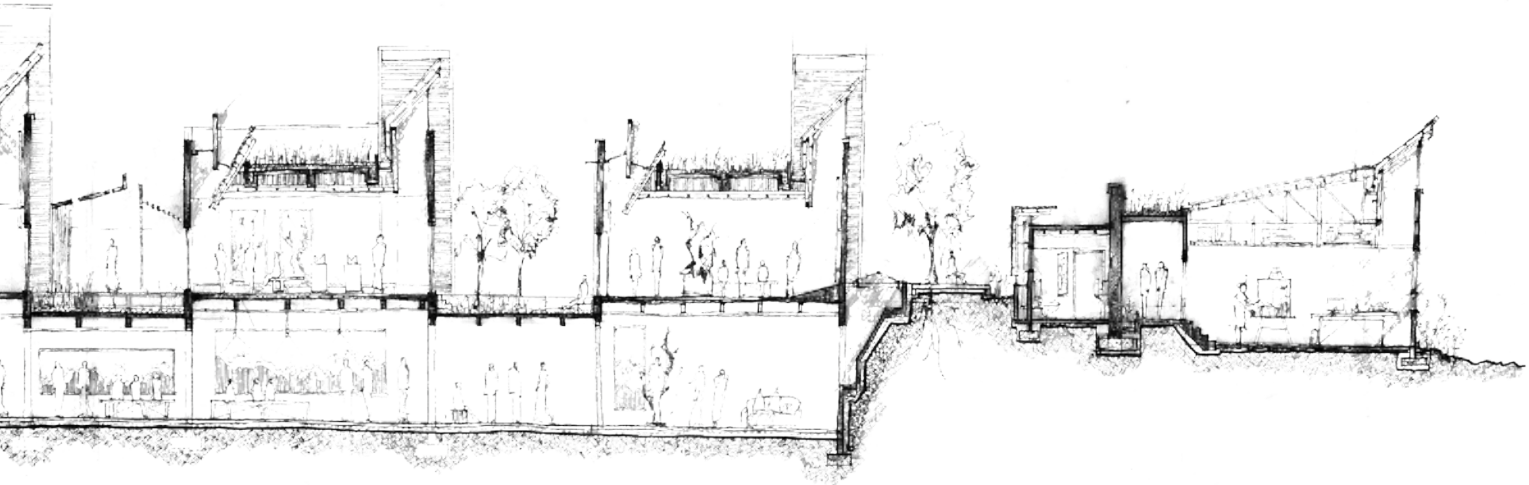


Figure 53: Perspective view of exterior space



Development of light shaft:
2 shafts incorporated.

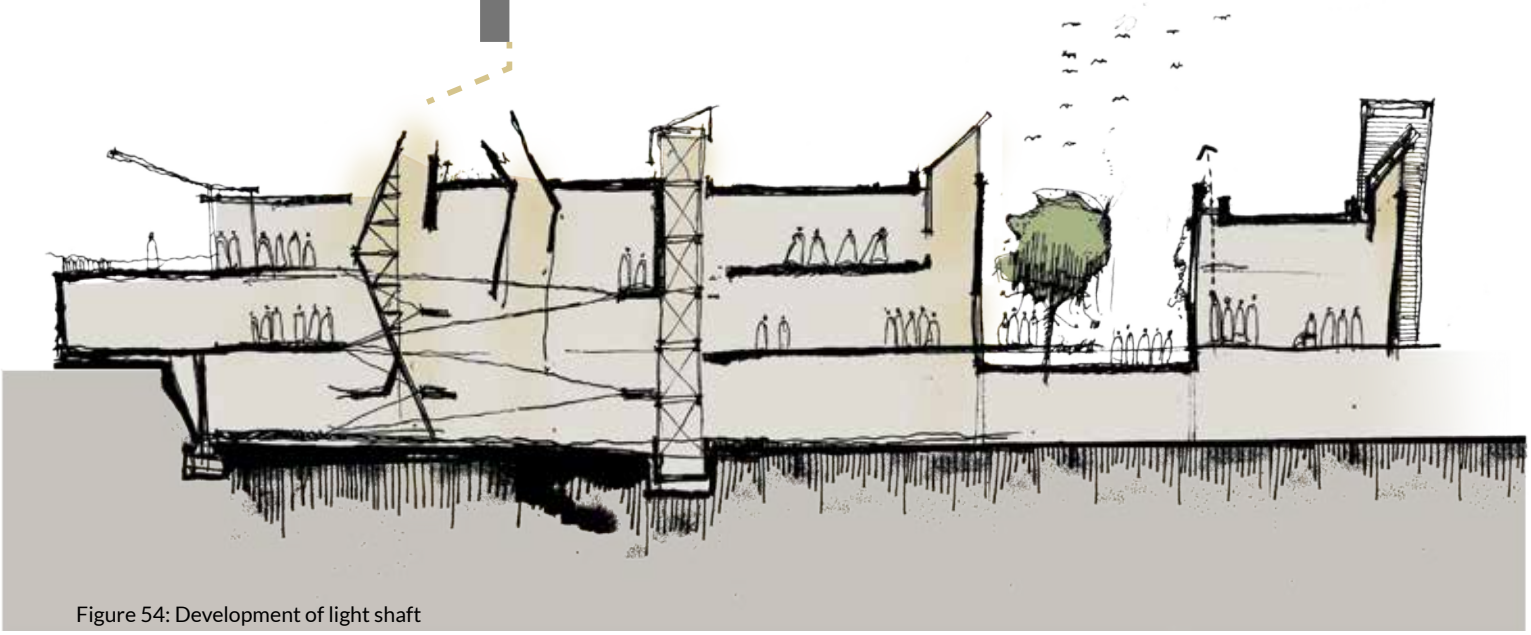


Figure 54: Development of light shaft

Weak point bending moment in structural beam.
Reinterpretation needed for steel beam.

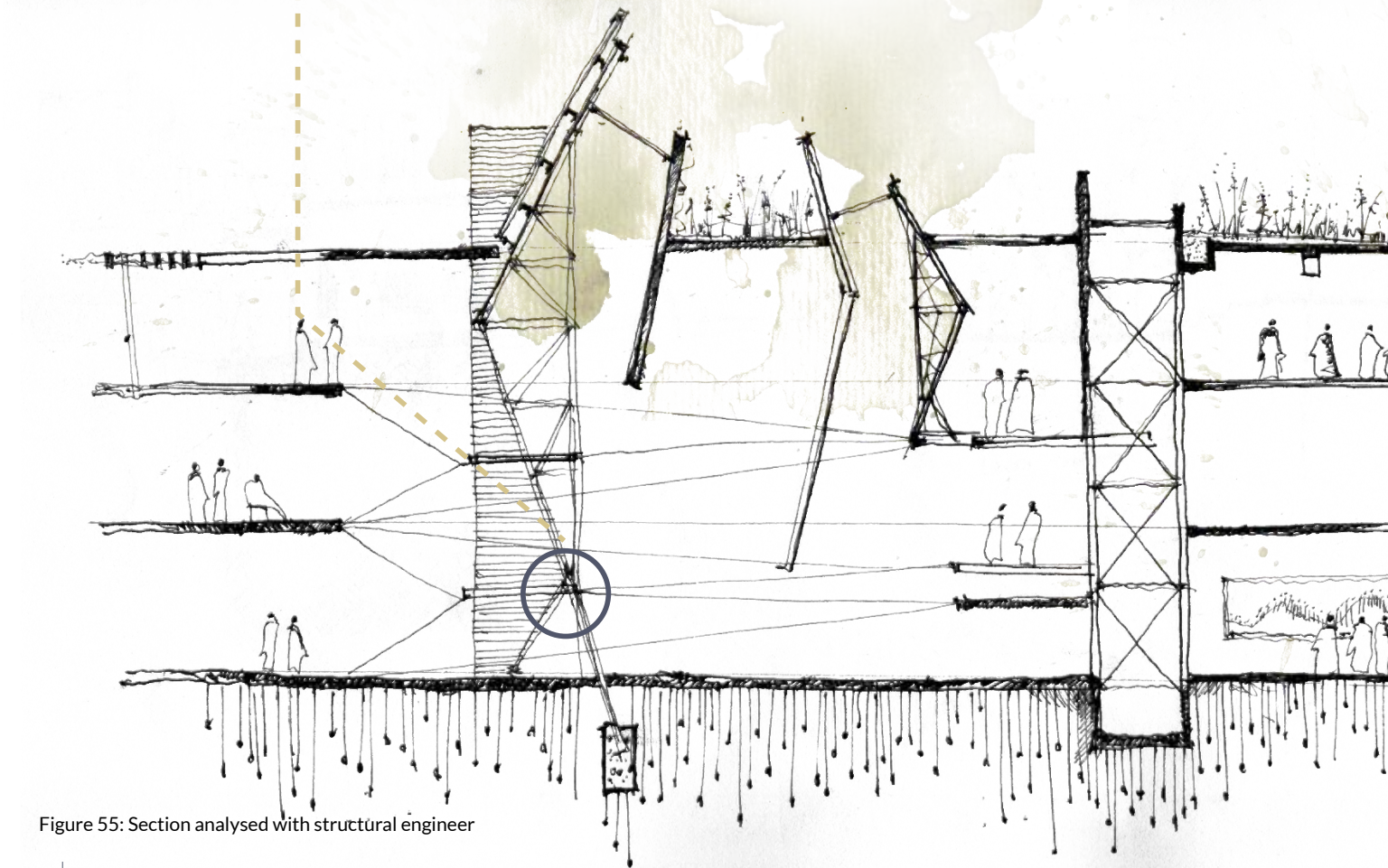
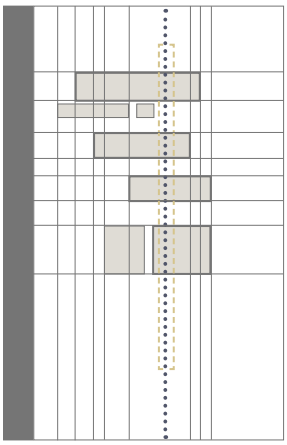


Figure 55: Section analysed with structural engineer

TECHNICAL APPLICATION

Structural engineer

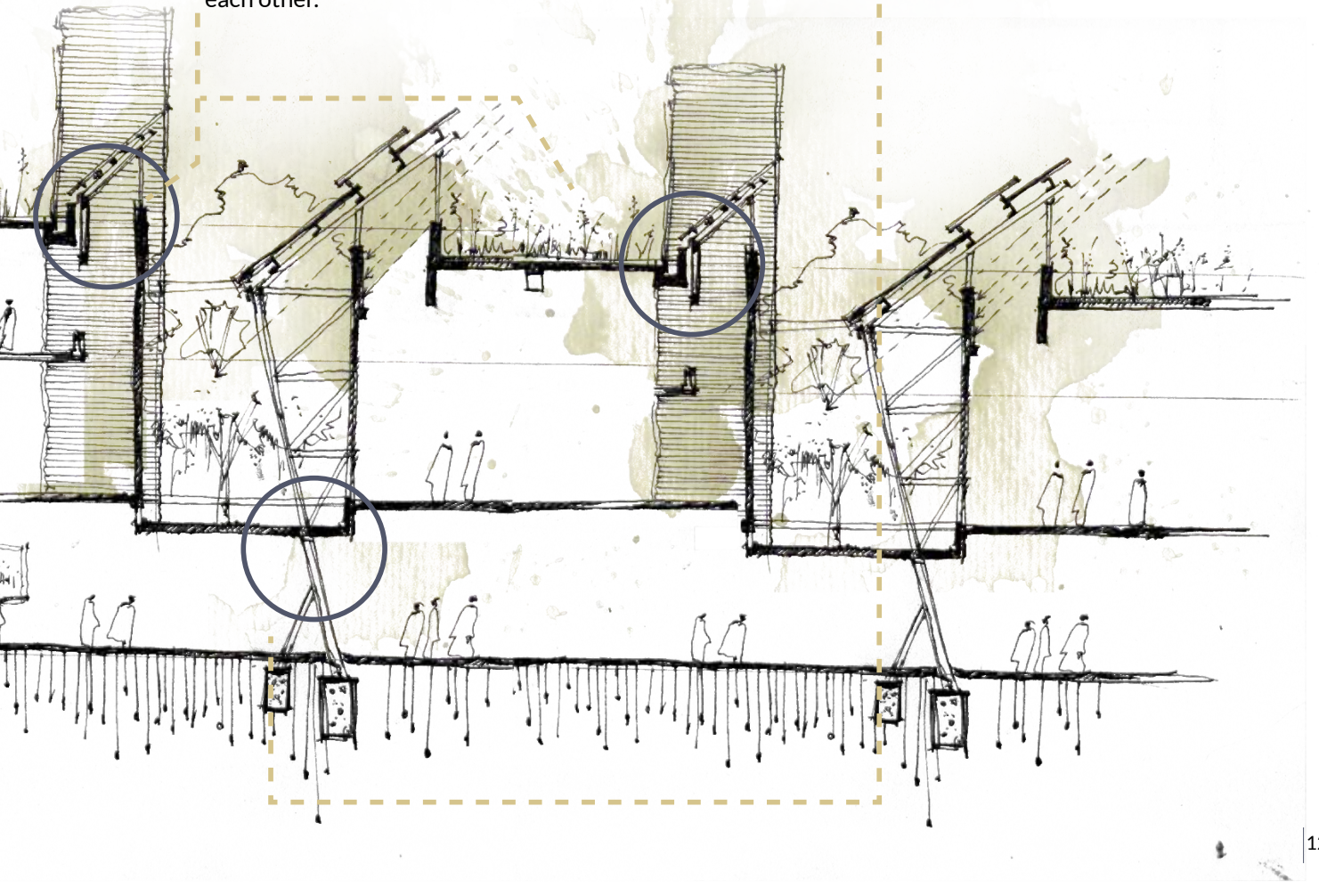


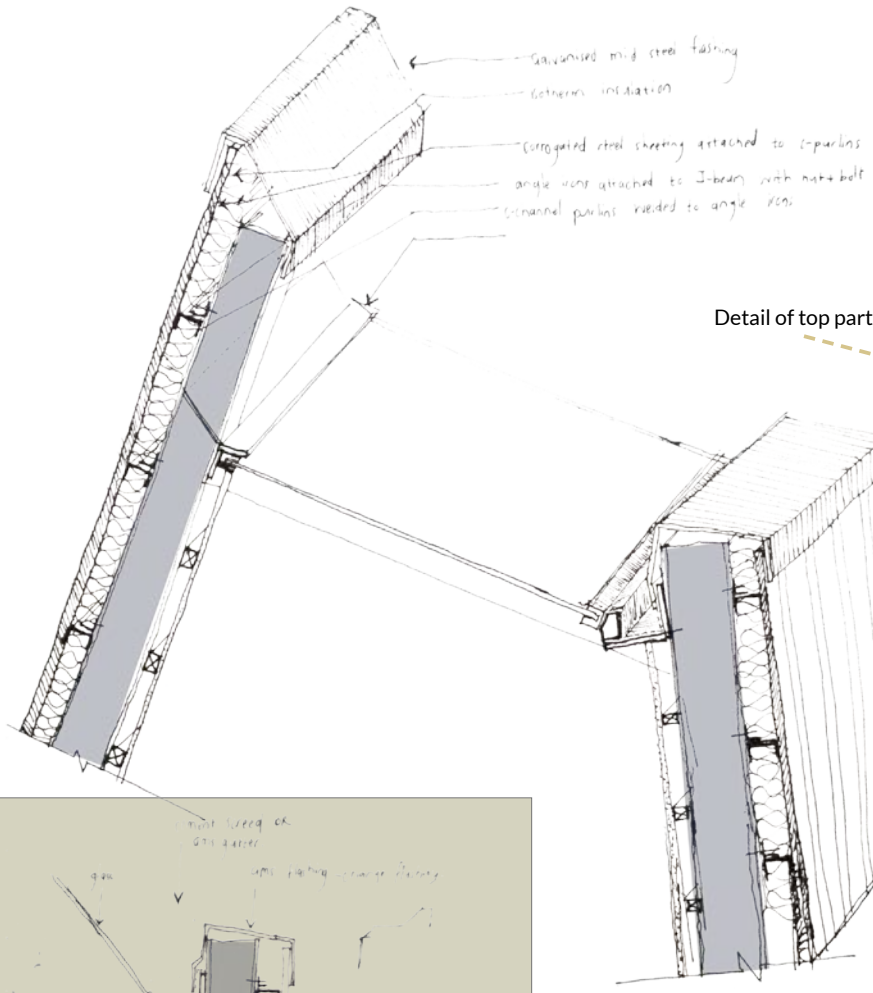
Discussion with Structural engineer:
Blue circles indicates structural problematic areas. Purpose made beams should be reinforced with support from both sides. Bracing of elements should support design of main frame.

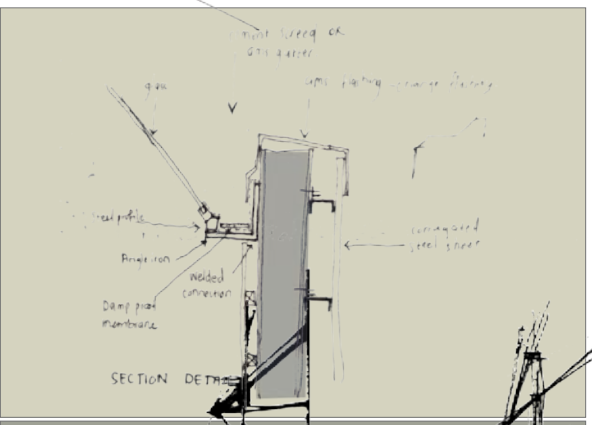
Gallery roof cover:
Green roofs should be kept to a minimum and should be accessible for visitors. The connection between the concrete roof shell and the structural steel light shaft should be waterproofed as one element. Changes are seen on following page.

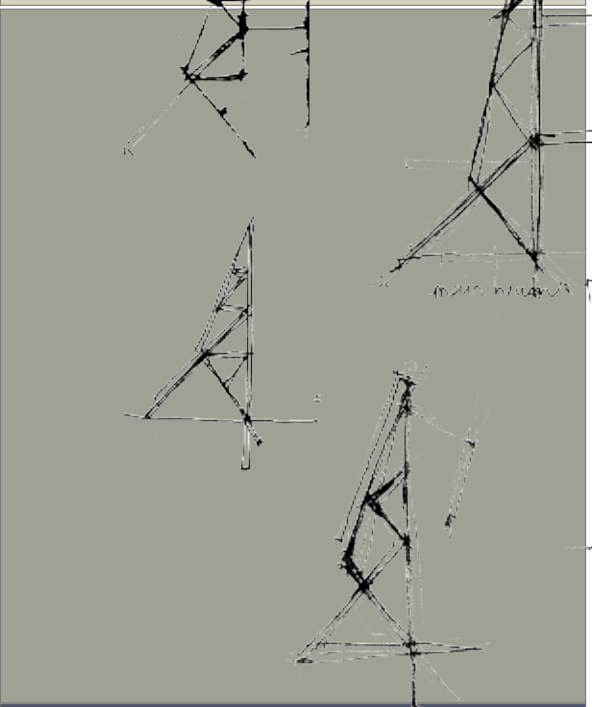
Waterproofing problem where steel and concrete connects. Should be designed as one element rather than two next to each other.

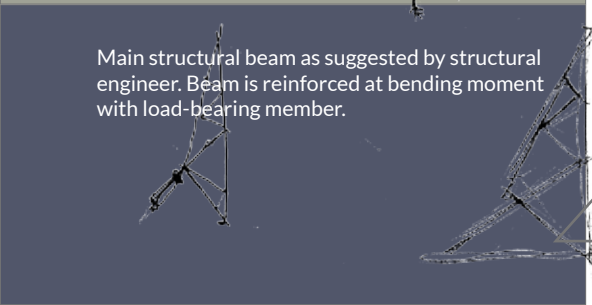
Weak point in bending moment in beam; to be reinterpreted with structural bracing.



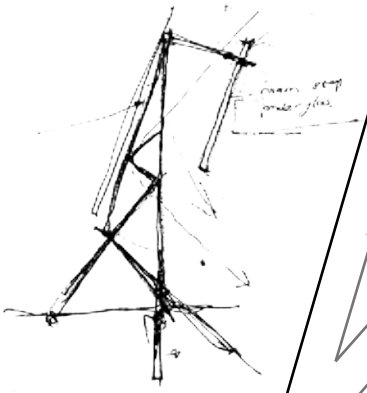








Main structural beam as suggested by structural engineer. Beam is reinforced at bending moment with load-bearing member.

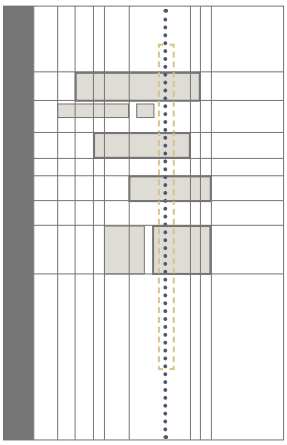


Reinforced connection

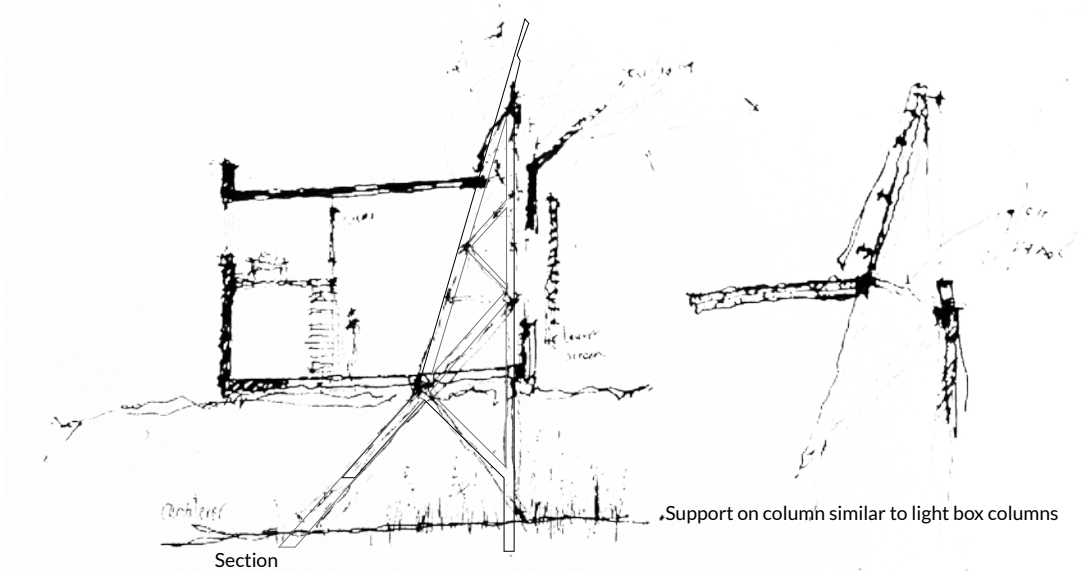
Figure 56: Development of structural column

TECHNICAL APPLICATION

Structural engineer

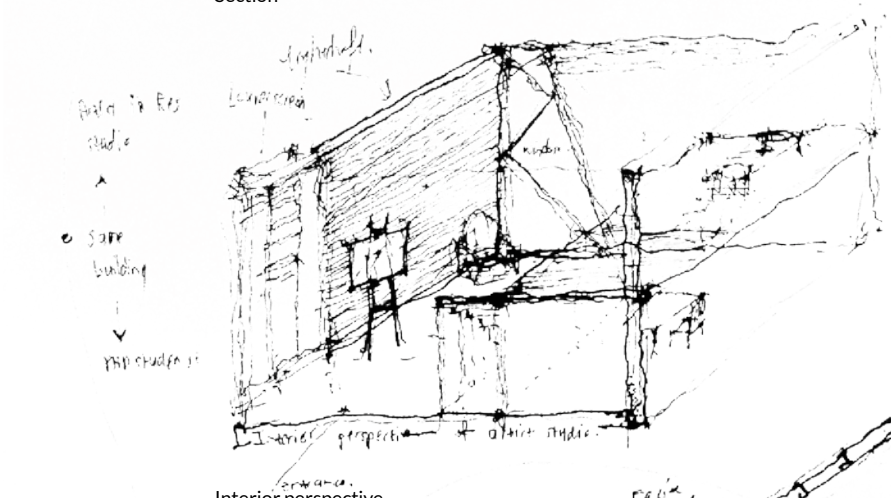


Similar column used in artist studio. Structural column visible from external facade and incorporated into design to allow light shaft into building.

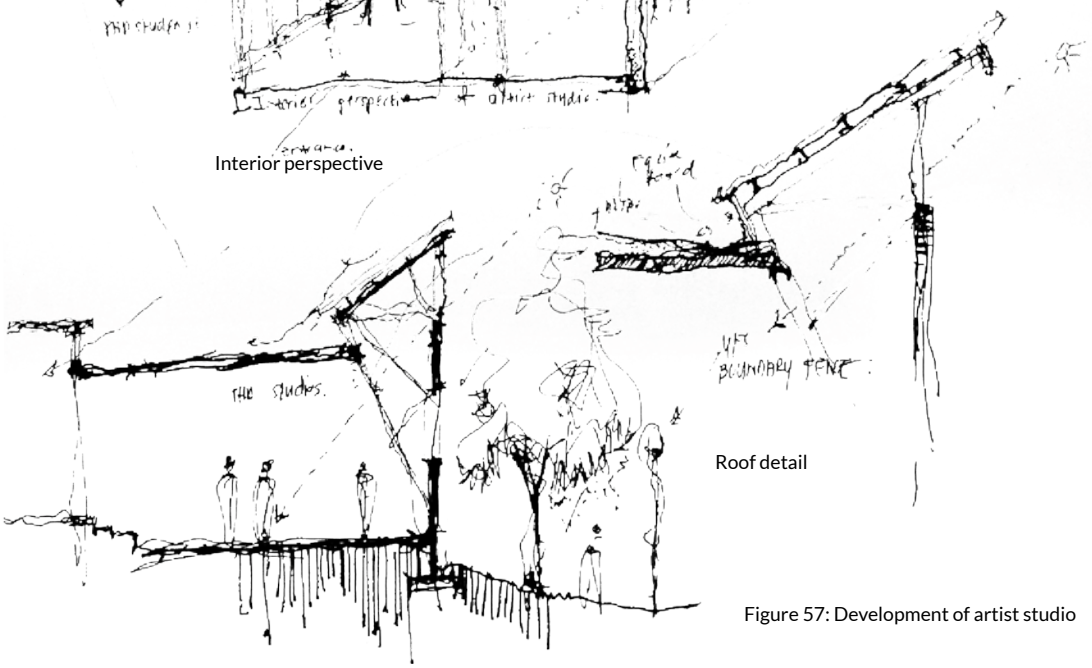


Section

Support on column similar to light box columns



Interior perspective



Roof detail

Figure 57: Development of artist studio

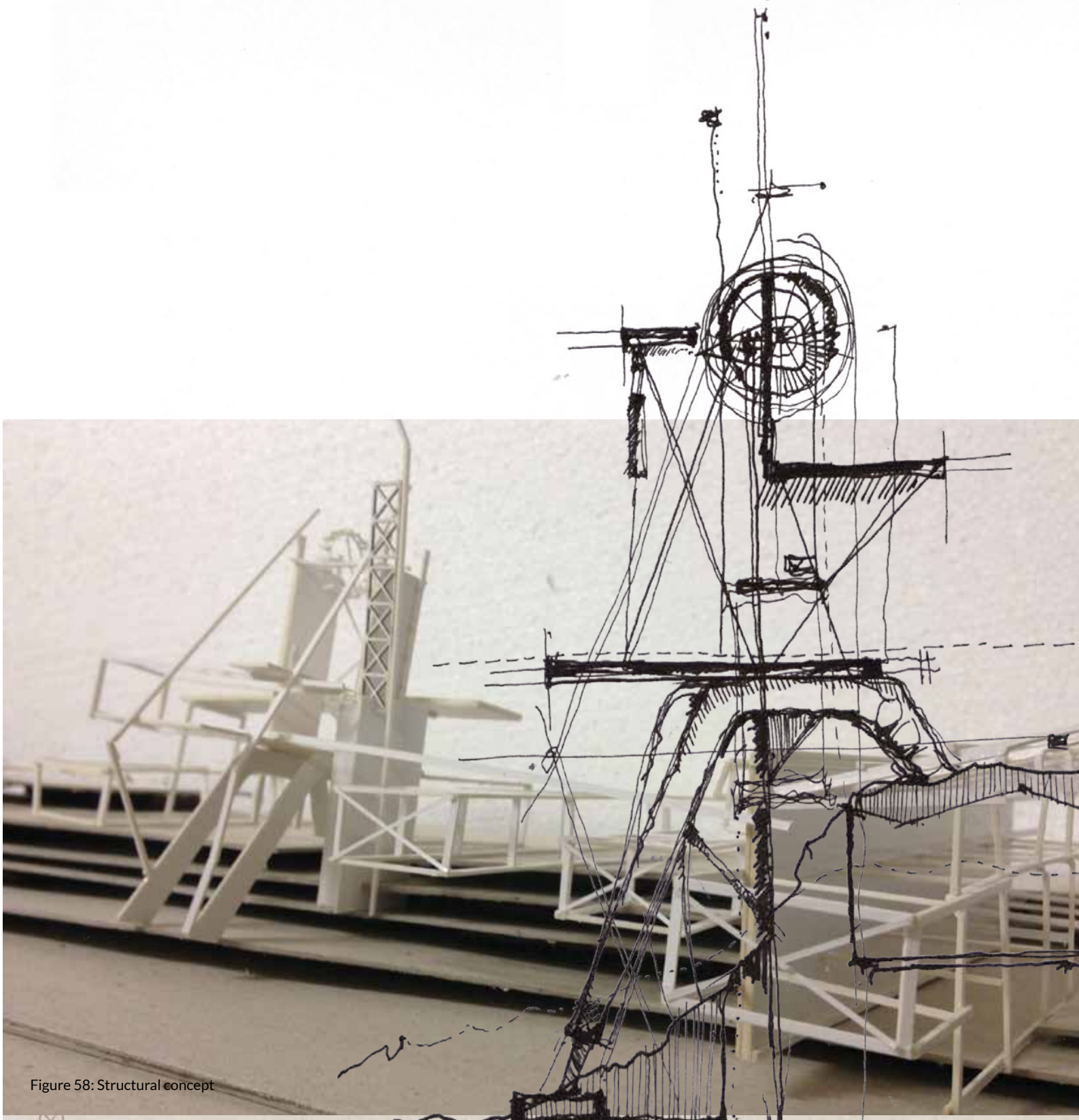


Figure 58: Structural concept

Figure 60: Structure idea

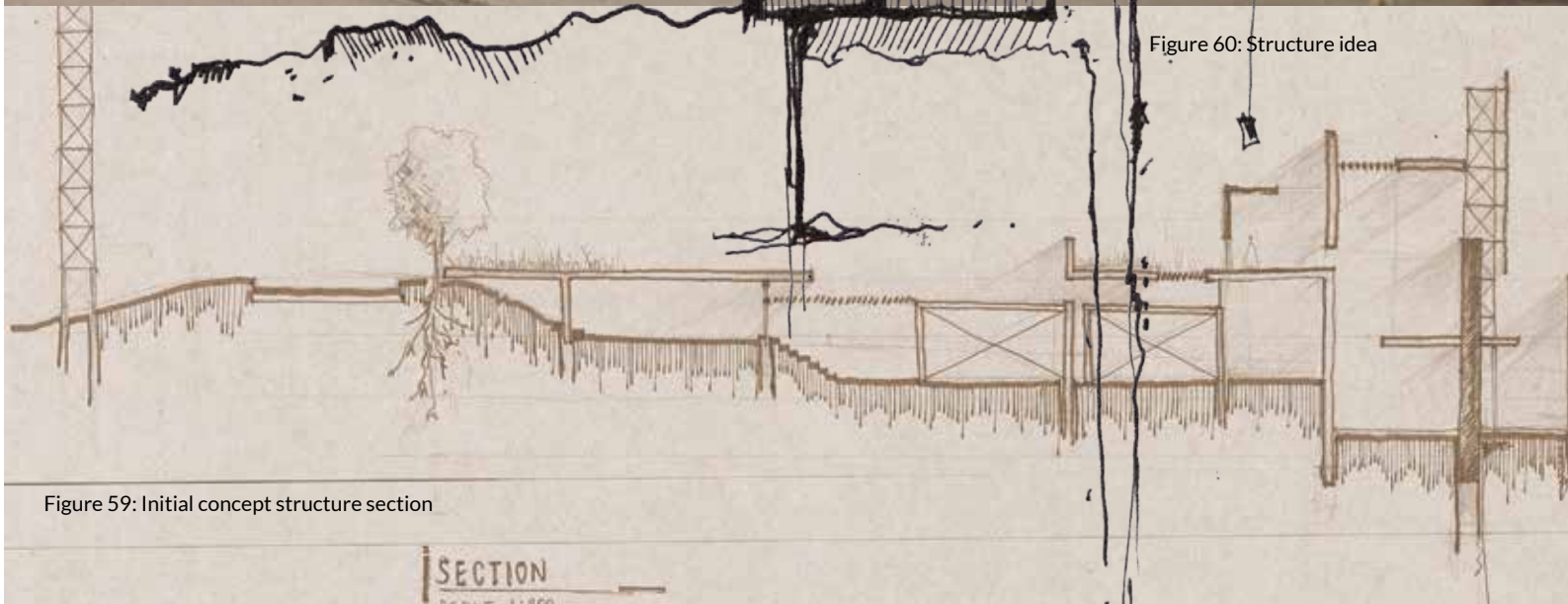
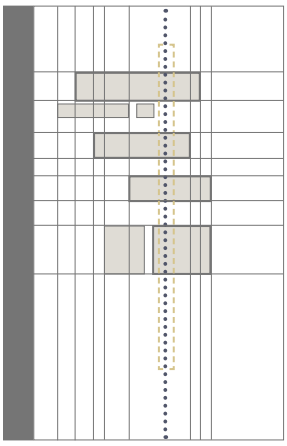


Figure 59: Initial concept structure section

TECTONICS

Structure concept development



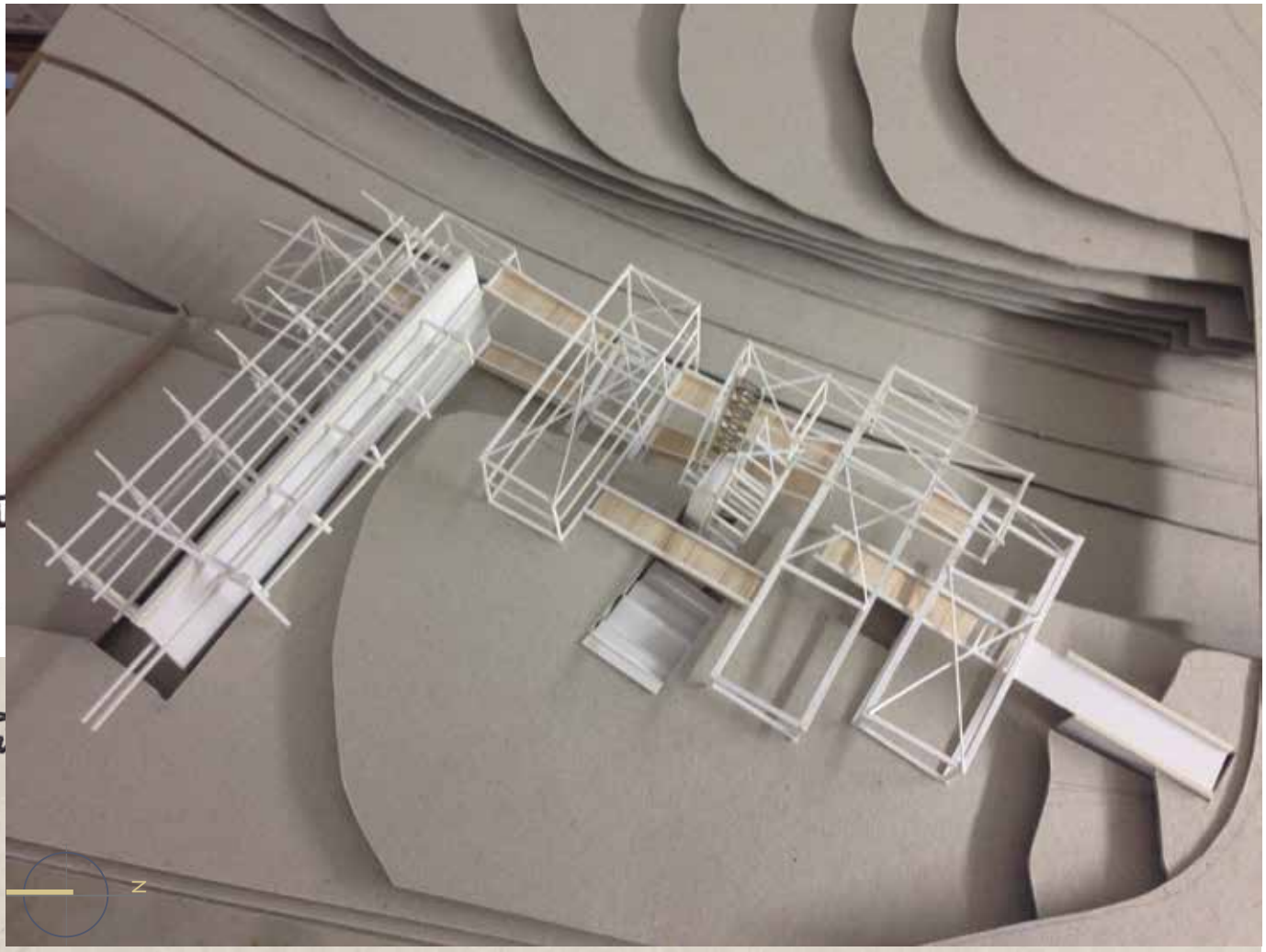
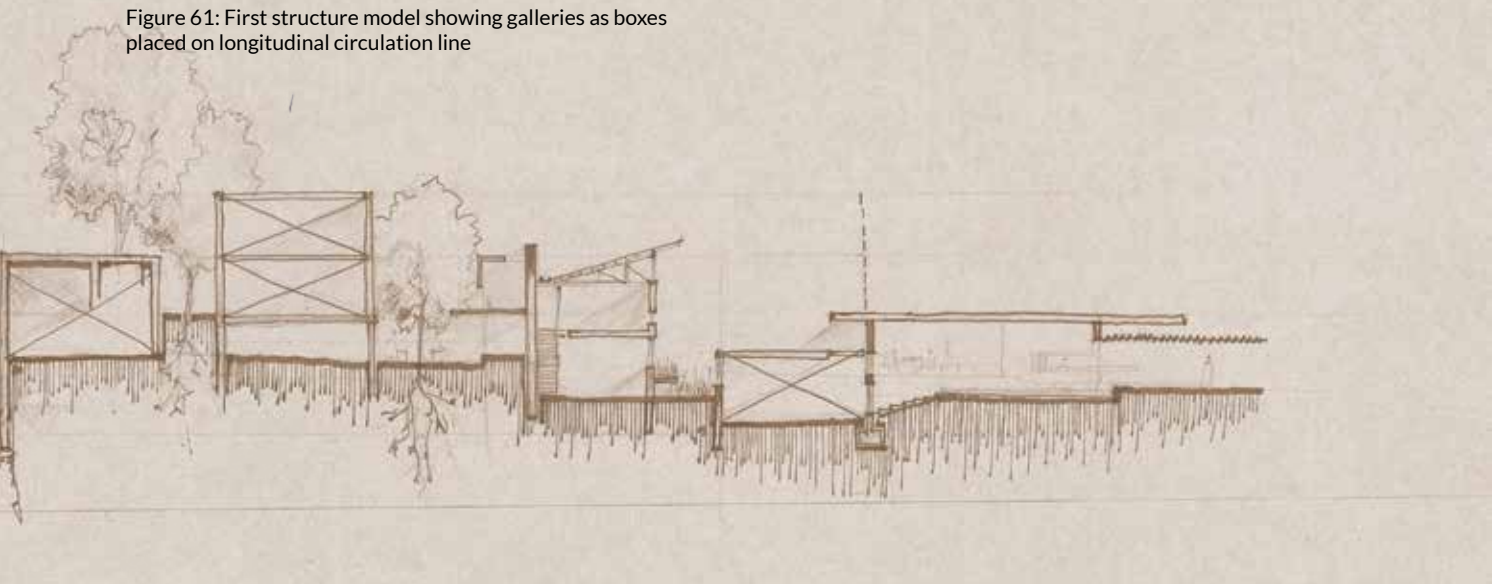
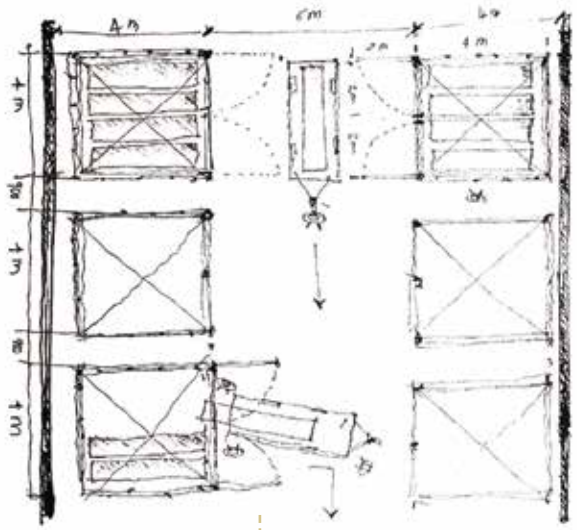


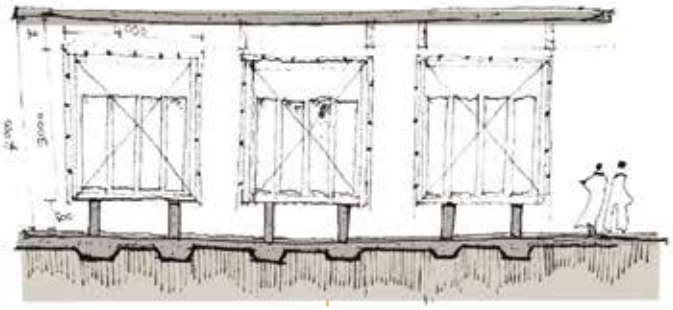
Figure 61: First structure model showing galleries as boxes placed on longitudinal circulation line



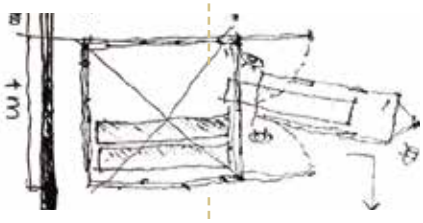
Process of deliveries of art
from archive



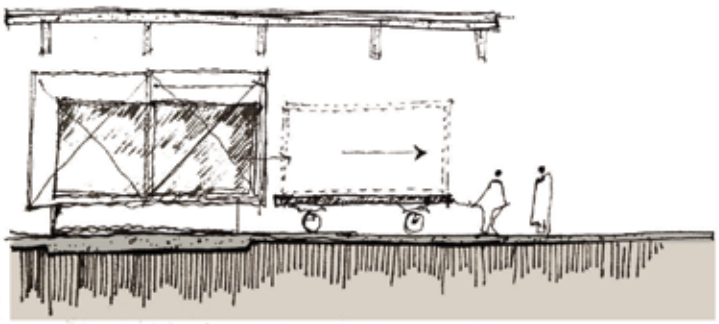
Plan: inside storage



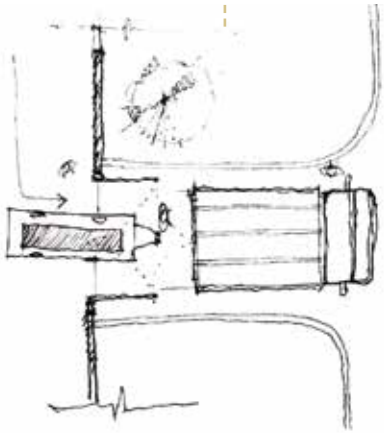
Section: inside storage



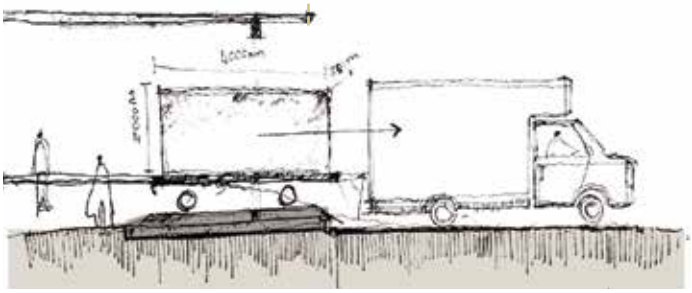
Plan: Loading



Section: Loading box unto trolley



Plan: deliveries

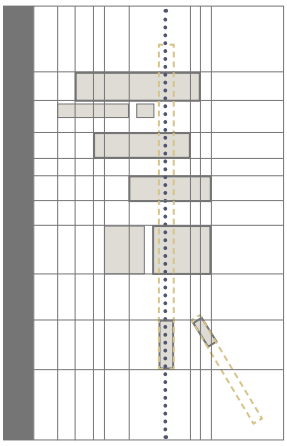


Section: deliveries

Figure 62: Process and functioning of basement storage space

TECTONICS

Archive functioning

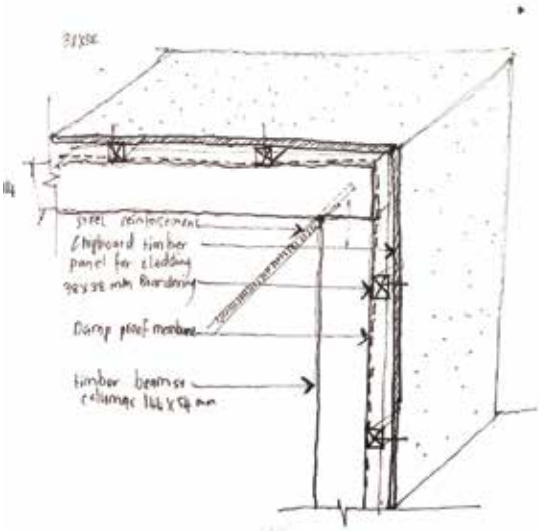


The archive storage is sized at a 1:1 ratio with the gallery space. The archives are located in the semi-basement underground. The archives can be accessed from the basement floor exterior on the north-eastern side of the site. Large doors are installed to allow the designed storage boxes to be delivered and collected.

Galleries may borrow artworks from one another in order to complete a certain exhibition (De Jesus, 2016). The storage units are designed in a way that 4 smaller units fit into one large timber box that is sealed and locked. The units are elevated from the ground floor and placed on concrete foundation walls to prevent water damage in case of leakage.

The units are grouped and separated with walls to prevent fire damage. The temperature is regulated with air-conditioning units and no direct light is allowed into the basement.

The image on the left shows the process where a box-unit can be collected with a trolley and transported to the delivery dock where a truck can park next to the building for collection. The unit can also be transported to the service lift which is large enough to allow the trolley inside. From this lift the art is distributed to the galleries on the ground floor.



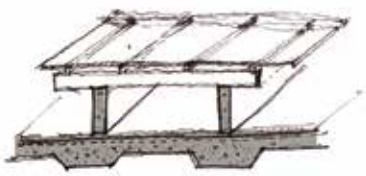
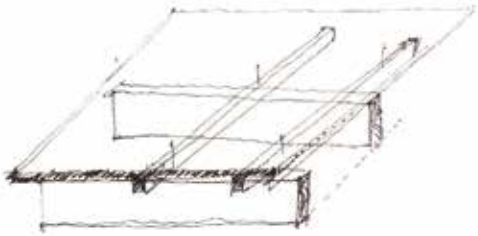


Figure 63: Details for archive storage box



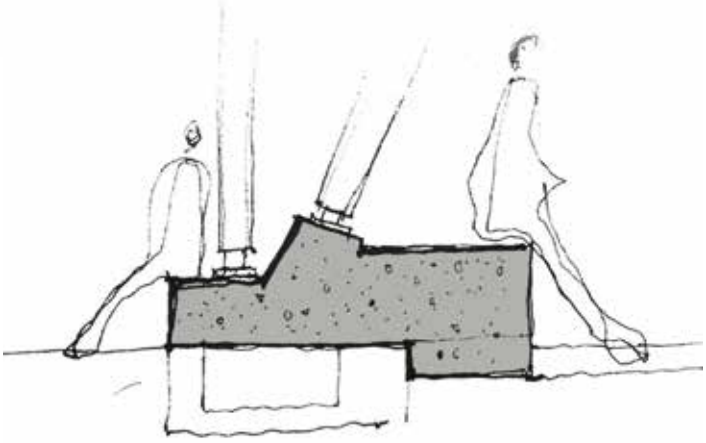


Figure 64: Detail: Seating in basement

Figure 65: Section model gallery interior and light patterns

TECTONICS

model light studies

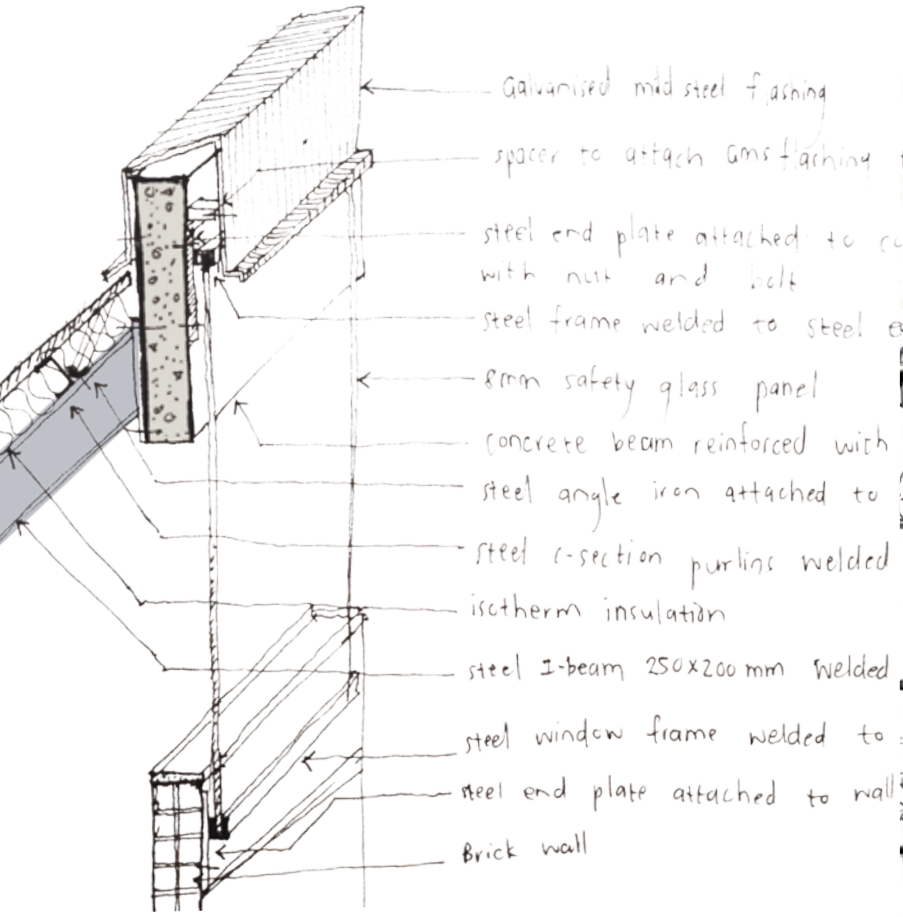


Figure 66: Structure detail

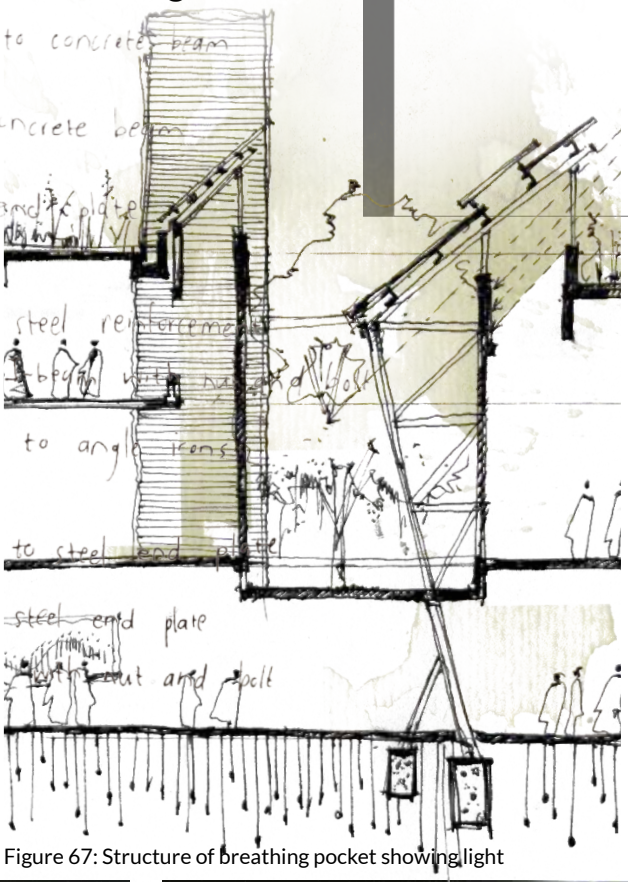


Figure 67: Structure of breathing pocket showing light

Figure 68, 69, 70: Light study inside gallery

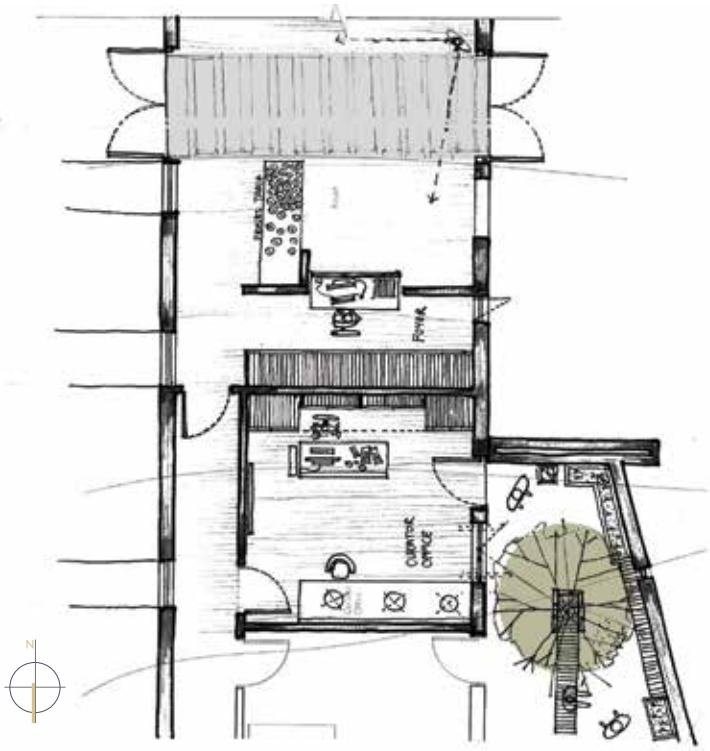
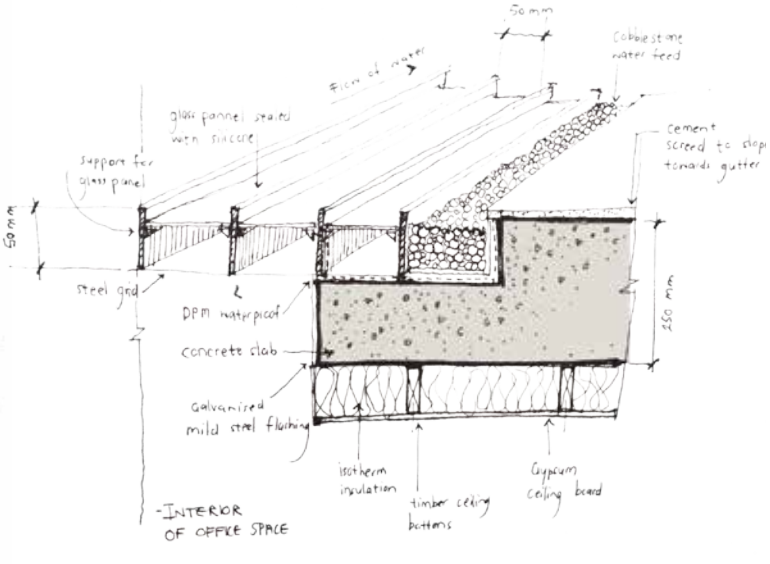


Figure 71: Detail plan of office, reception and exterior garden



Skylight detail

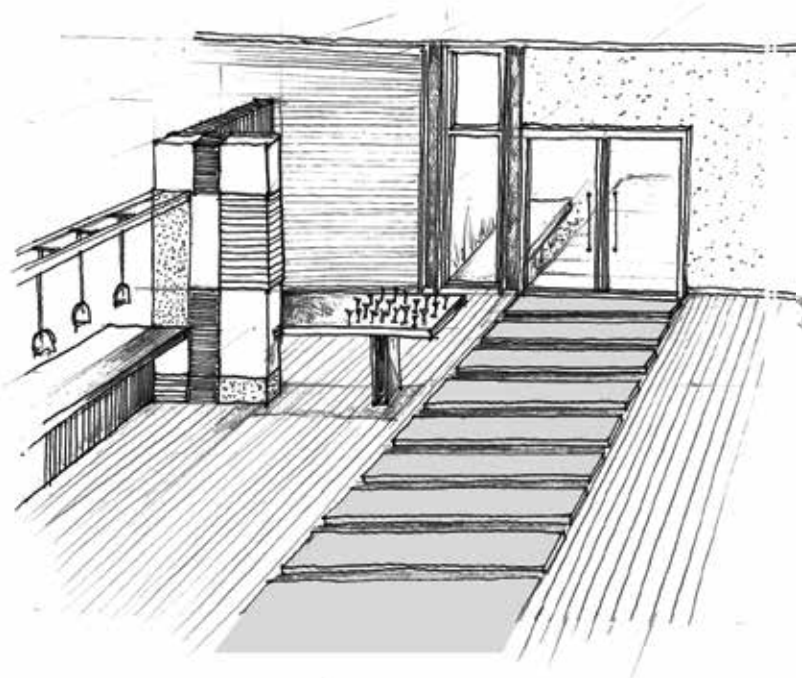


Figure 72: Detail 3D of reception

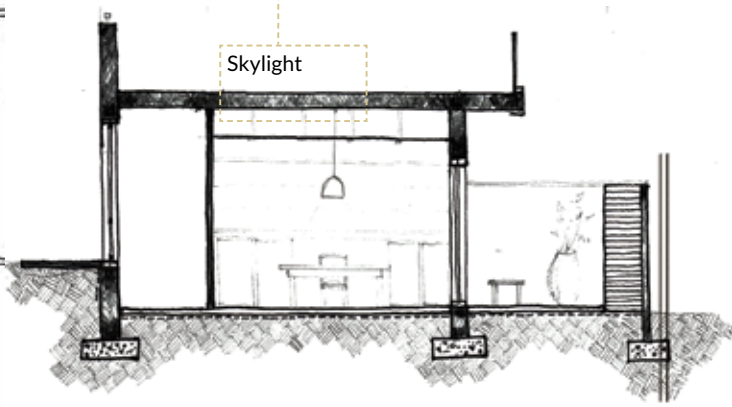


Figure 73: Detail section of office and exterior garden

Detailed drawings of entrance foyer. The foyer is accessed from the campus as well as from the outside of the university through a security entrance. The foyer is also where the circulation route and ramps start.

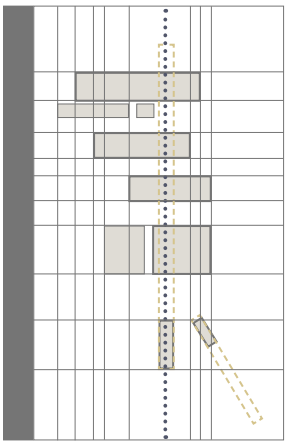
Visitors can gather in the foyer waiting for an exhibition. The administration and curator office is located on the southern side of the foyer.

The gallery reception is integrated with the foyer for information and inquiries.

Material use: Laminated timber floors are used throughout the gallery, as it is a neutral color and insulation material. The entrance is emphasized with a concrete panel walkway that extends to the exterior of the building. The concrete walkway establishes the dialogue between inside and outside and connects the gallery with its context.

TECTONICS

Detail design development



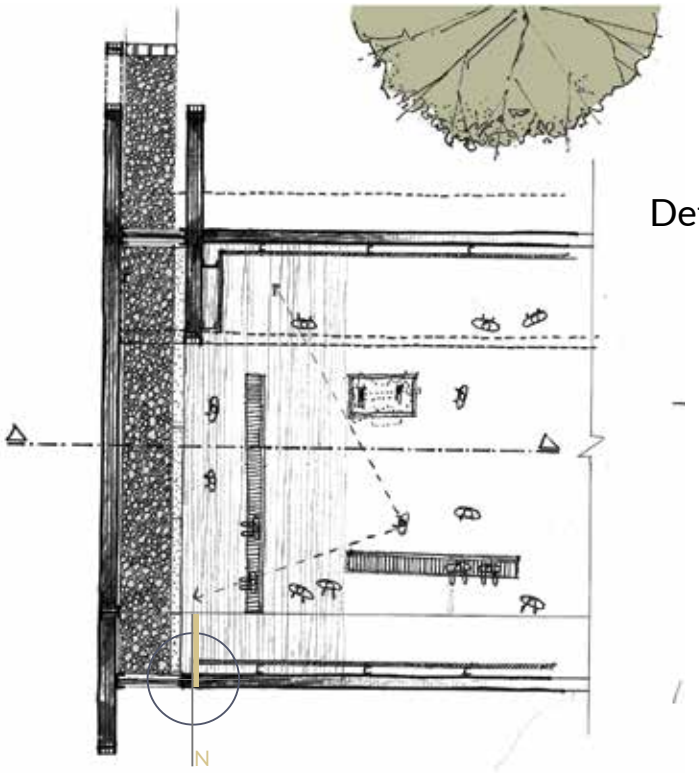


Figure 74: Detail plan of gallery

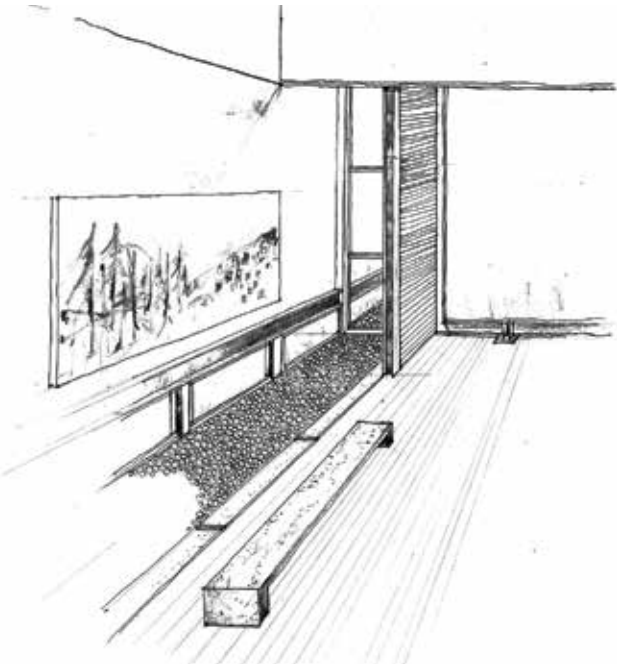


Figure 75: Detail 3D of gallery

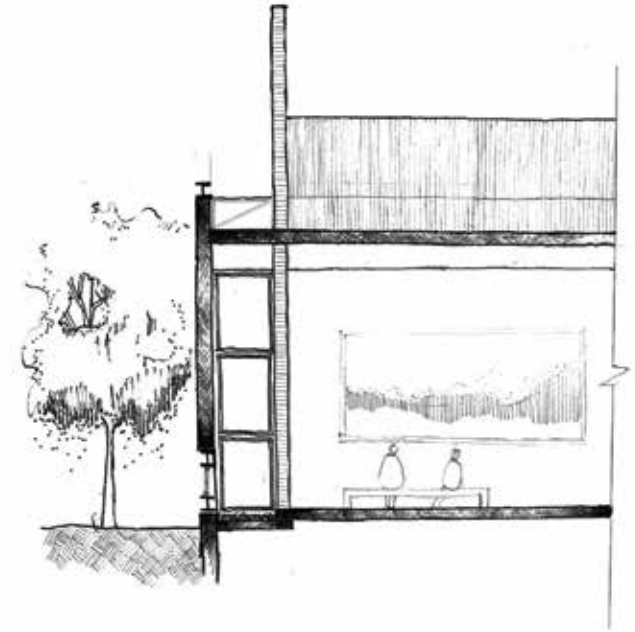


Figure 76: Detail section of gallery

Detailed drawings of the interior of the gallery shows the connection between the interior and exterior of the gallery through the cobble stone strip starting inside the gallery and continuing to the outside. This strip is further emphasized with the vertical window showing a clear dialogue between interior and exterior.

Material use: Floor finish of gallery consist of a polished concrete screed painted white. Walls are plastered and painted white.

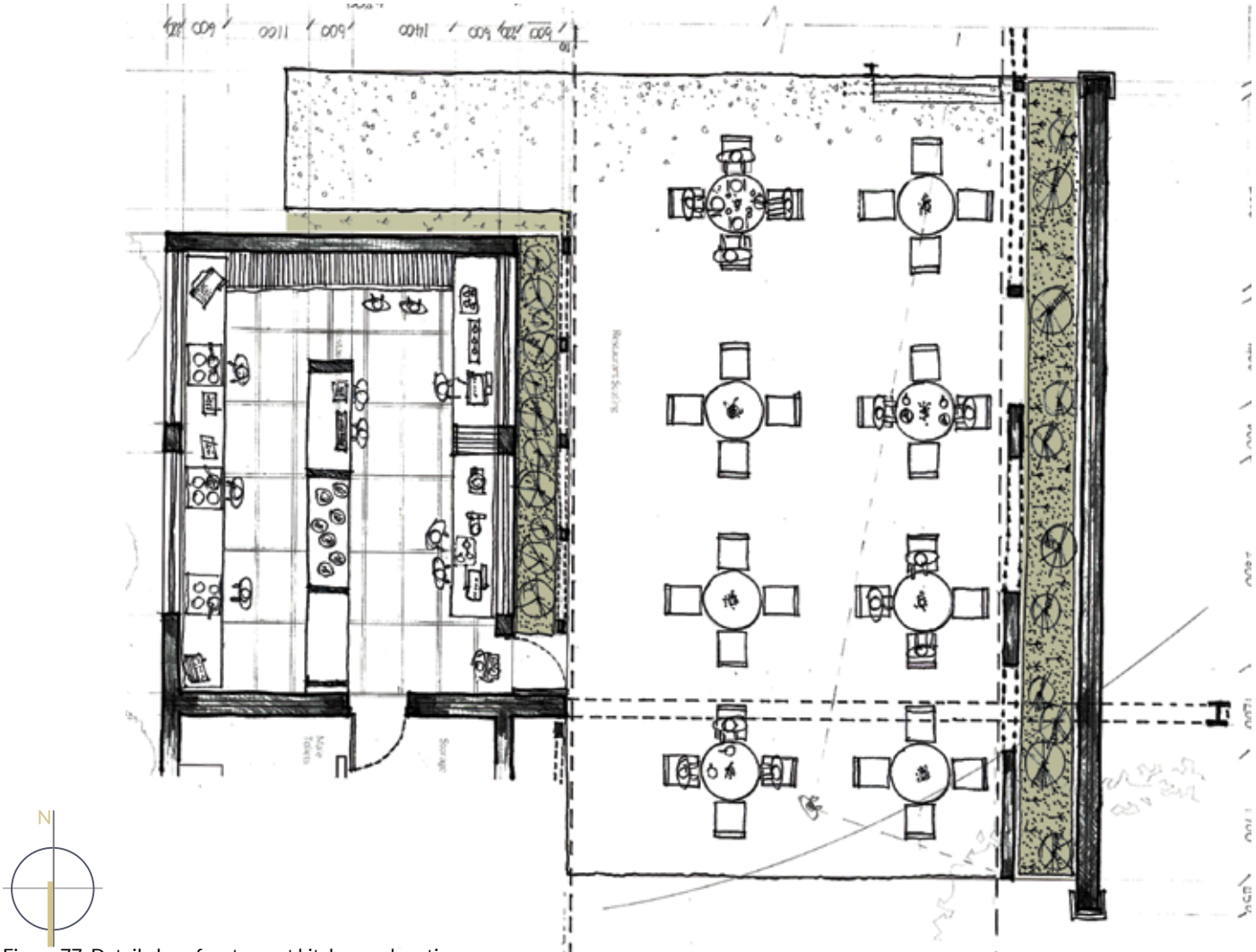


Figure 77: Detail plan of restaurant kitchen and seating

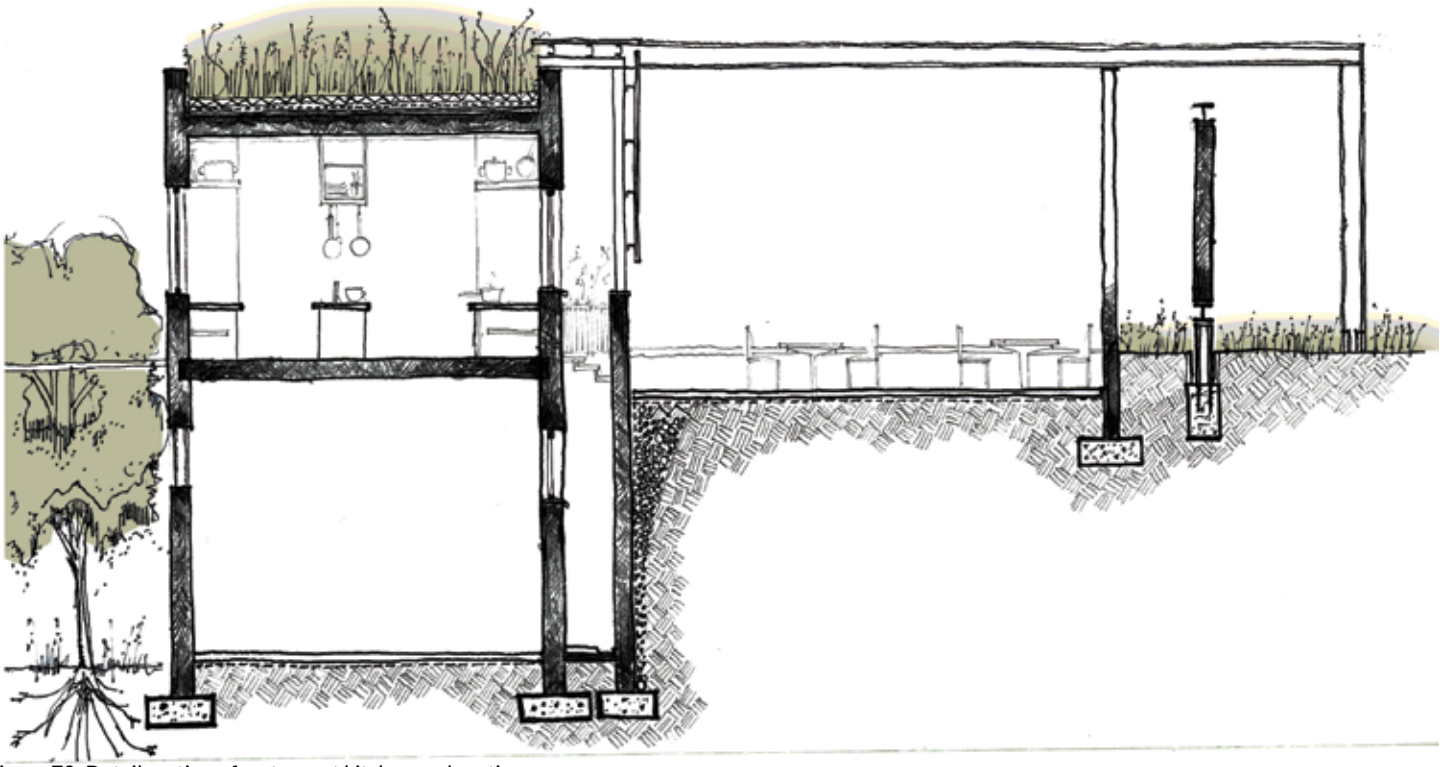
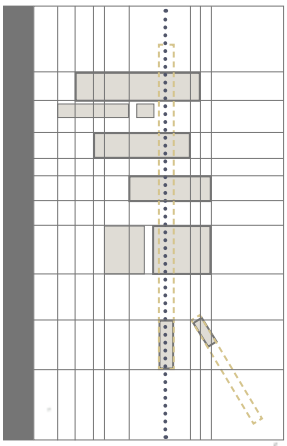


Figure 78: Detail section of restaurant kitchen and seating

TECTONICS

Detail design development



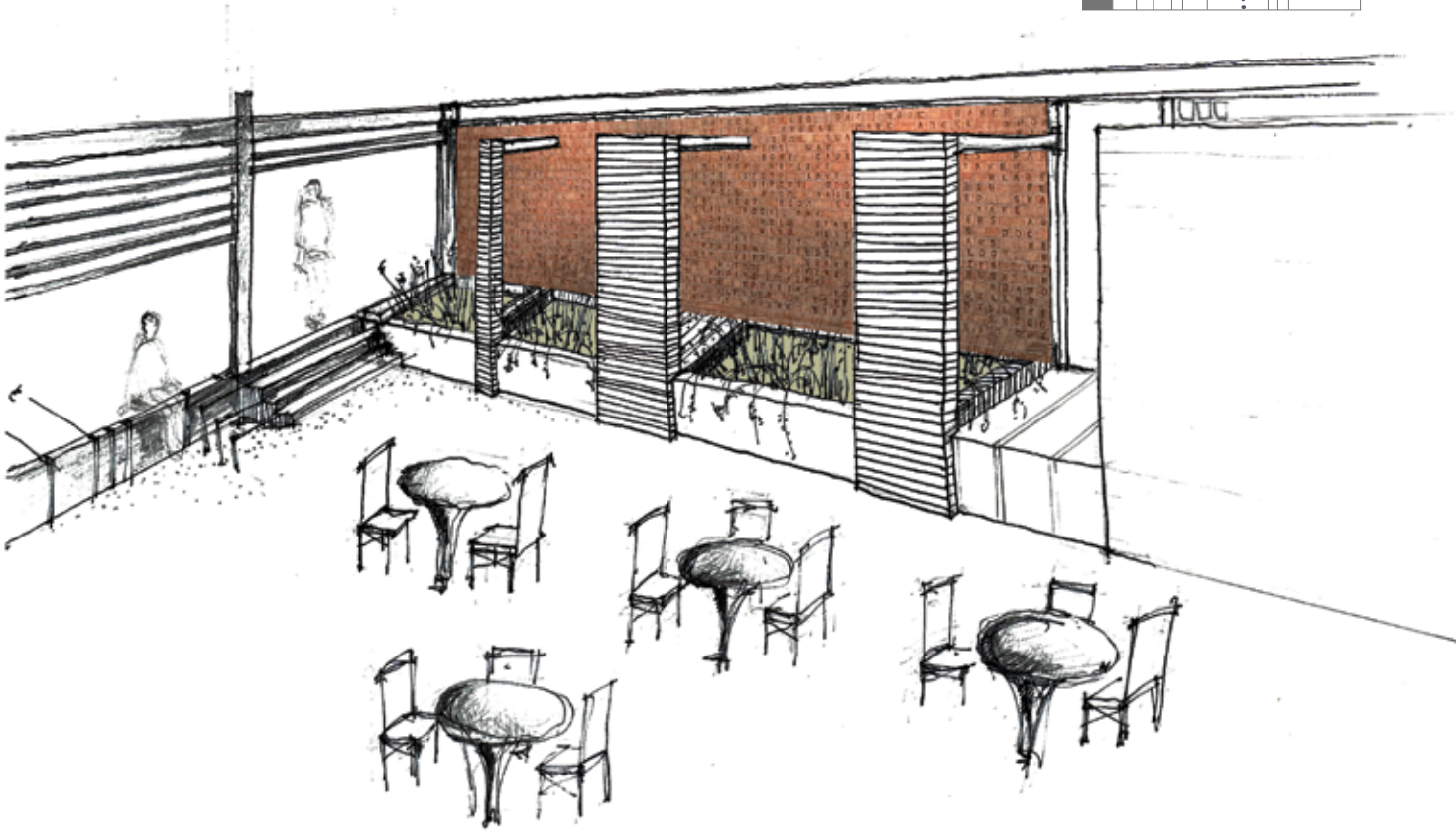


Figure 79: Detail 3D of restaurant kitchen and seating

The restaurant is an exterior space with a louvered roof covering. The restaurant serves as an extension of the Thakaneng student centre towards the art gallery. The Willem Boshoff Words Worth art piece is incorporated into the design of the restaurant. The hand-made clay brick wall is situated on the western side of the seating area to screen the seating from the western sun. The art-piece can be read from the seating space to act as a conversation starter.

Material use: Floor consist of concrete blocks cast in-situ, polished and varnished.

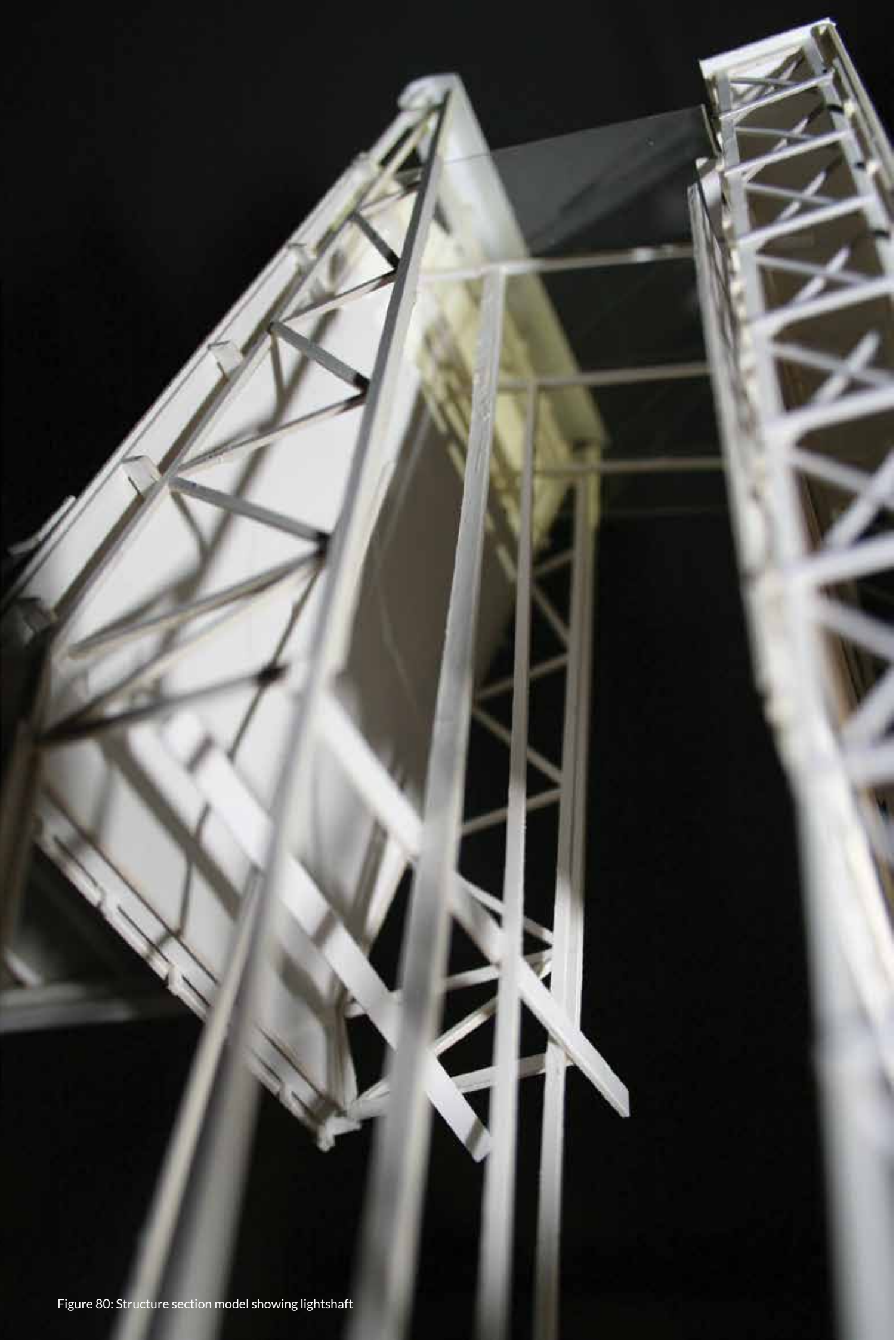
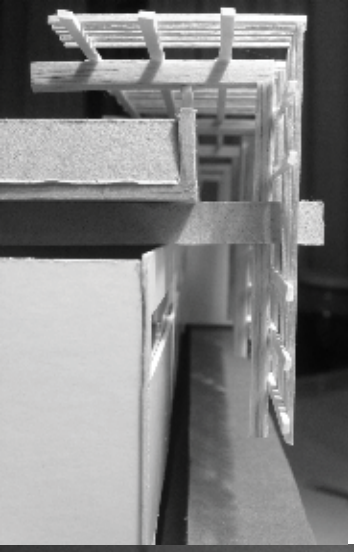


Figure 80: Structure section model showing lightshaft



TECTONICS

Structure concept development

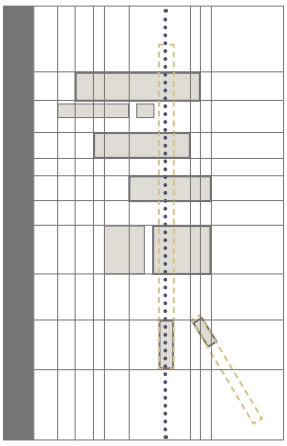


Figure 81: Structure section model

Figure 82: Sculptural shadows

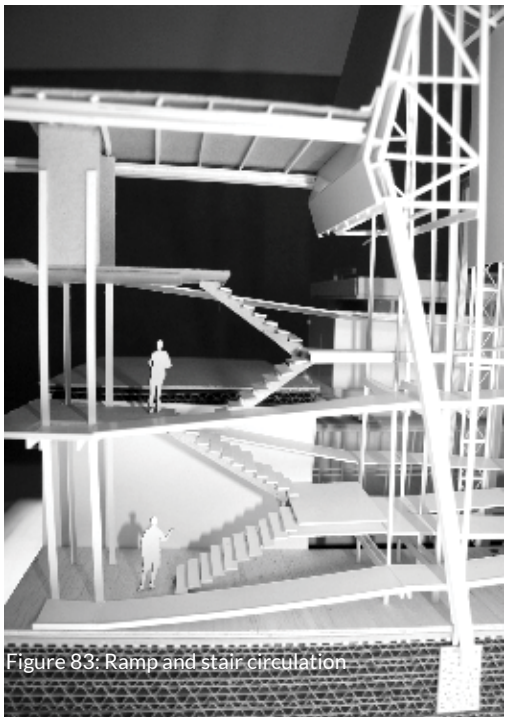


Figure 83: Ramp and stair circulation

Figure 84: Structure on western side

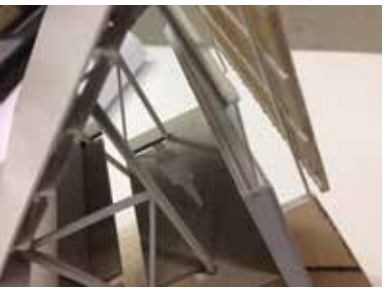


Figure 85: Artist studio structure model

Figure 86: Artist studio structure model-ground floor

Figure 87: Artist studio structure model-mezzanine

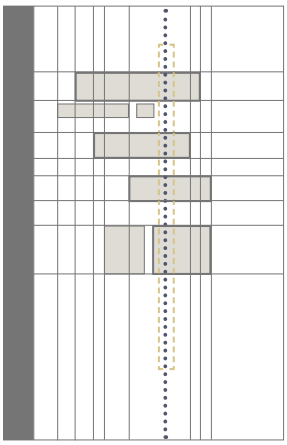
Figure 88: Artist studio structure model

Figure 89: Artist studio structure model as seen from northern elevation

Figure 90: Artist studio structure model

DESIGN SYNTHESIS

Final conceptual development



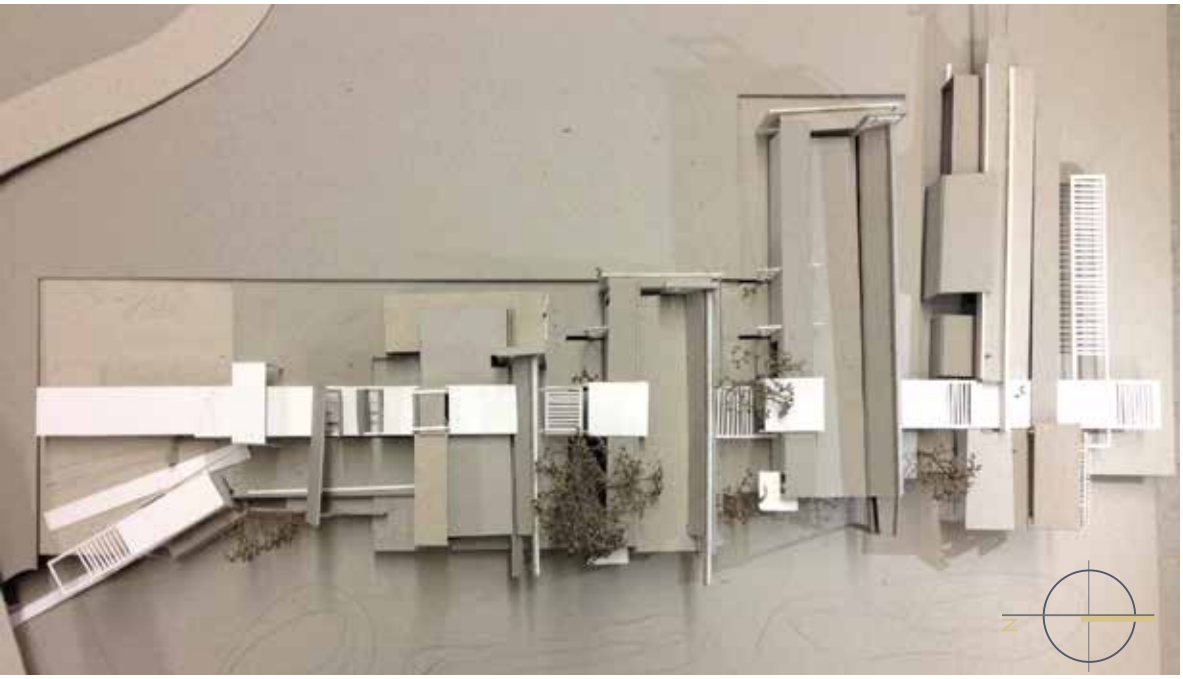


Figure 91: Final concept model as seen from above

Figure 93: Main gallery

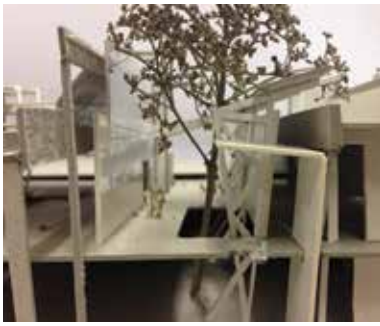


Figure 94: Breathing pocket

Figure 92: Final concept model

Figure 95: Gallery exterior

Figure 96: Artist studio exterior

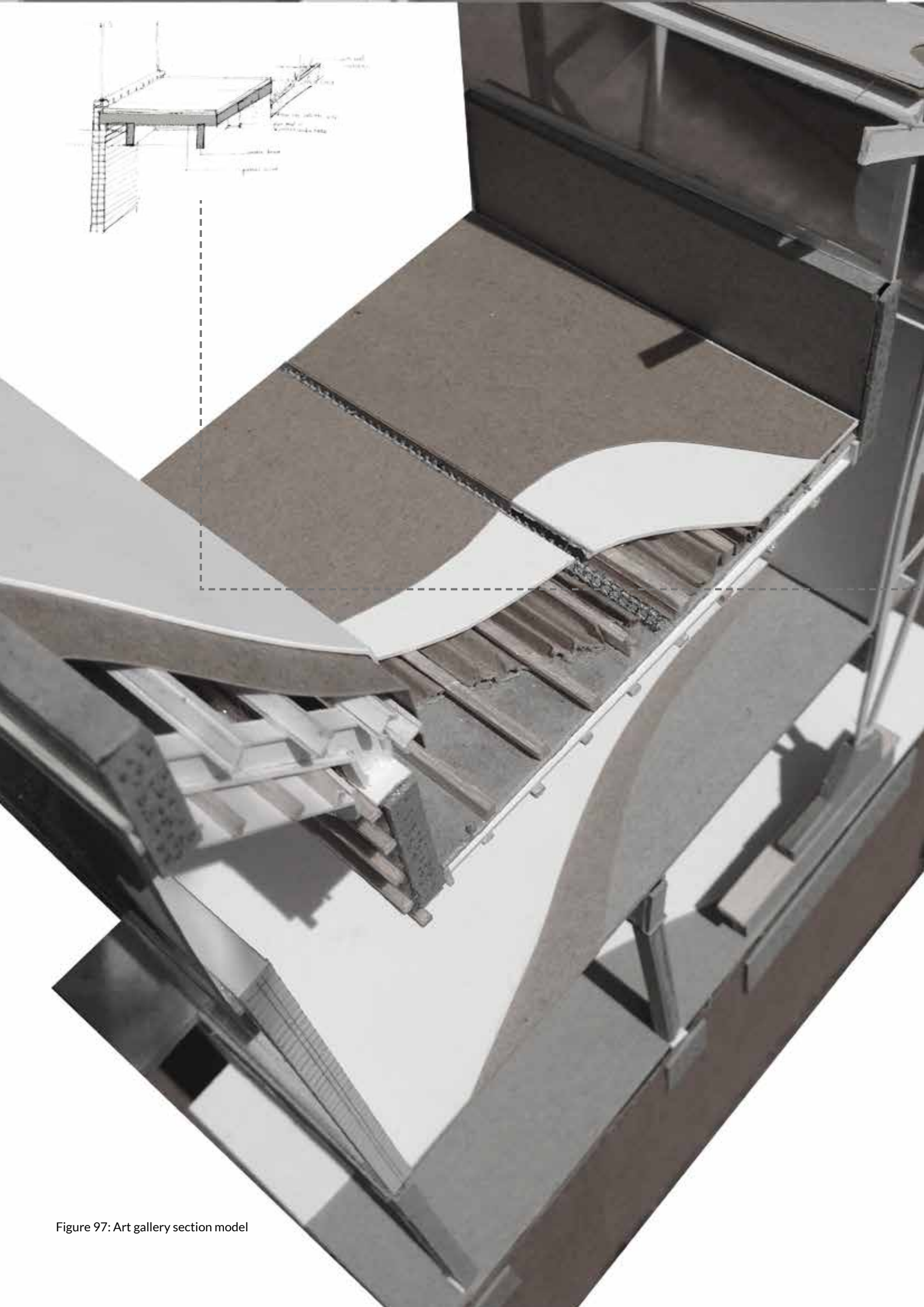


Figure 97: Art gallery section model

DESIGN SYNTHESIS

Final conceptual development

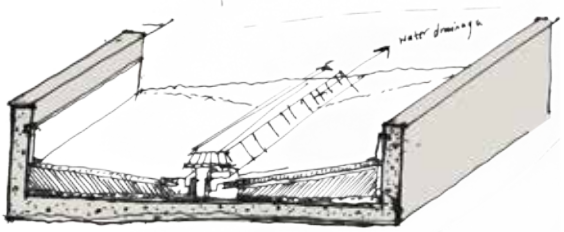
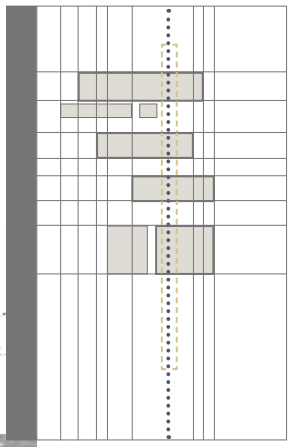


Figure 98: Gallery roof construction with SIKA roofing

Figure 99: Gallery roof construction with SIKA roofing



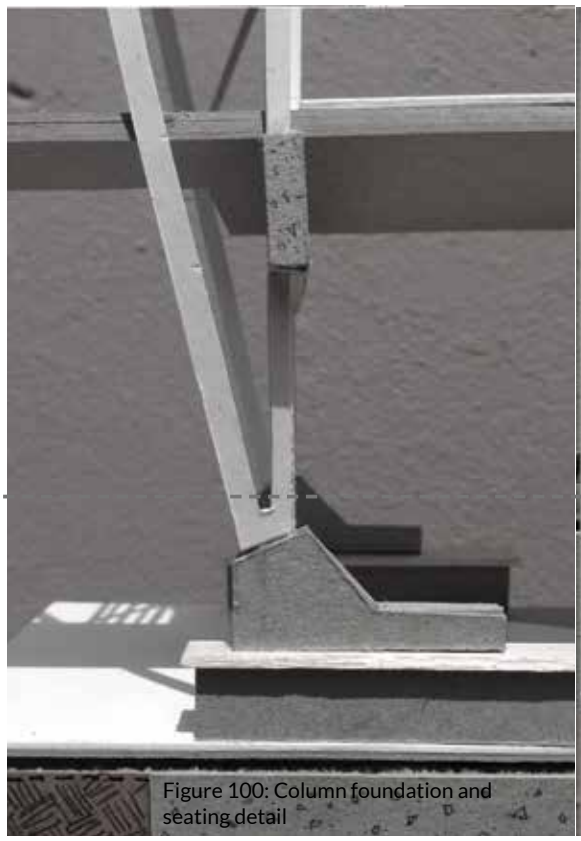


Figure 100: Column foundation and seating detail

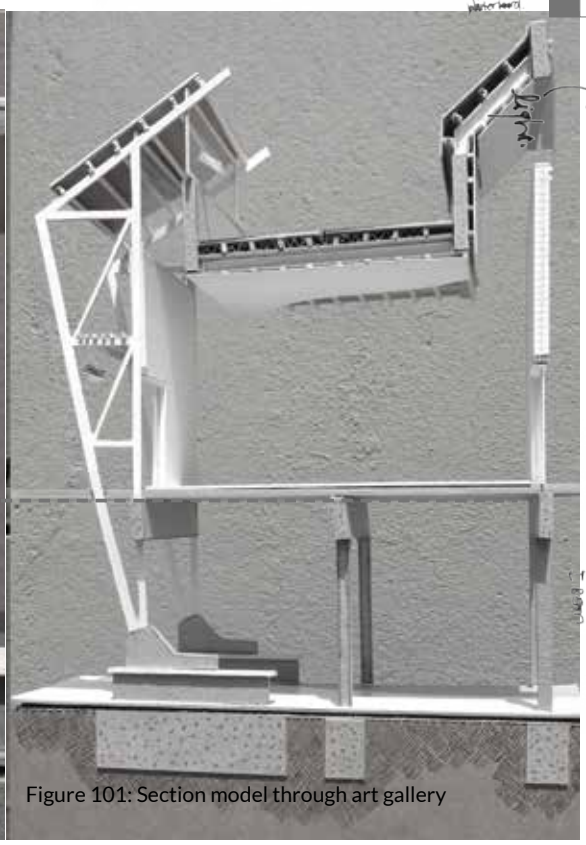


Figure 101: Section model through art gallery

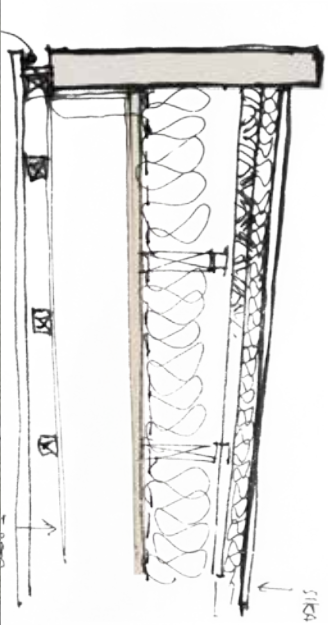


Figure 102: Detail of roof

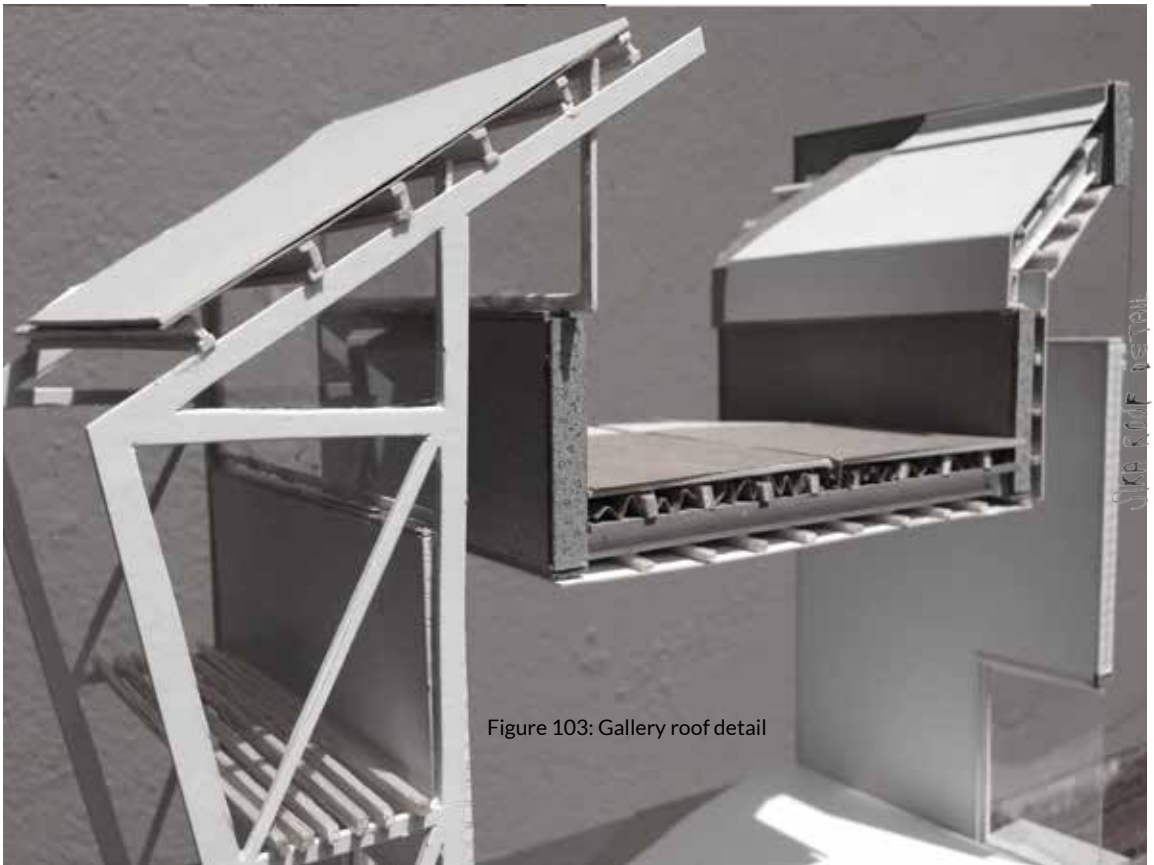


Figure 103: Gallery roof detail

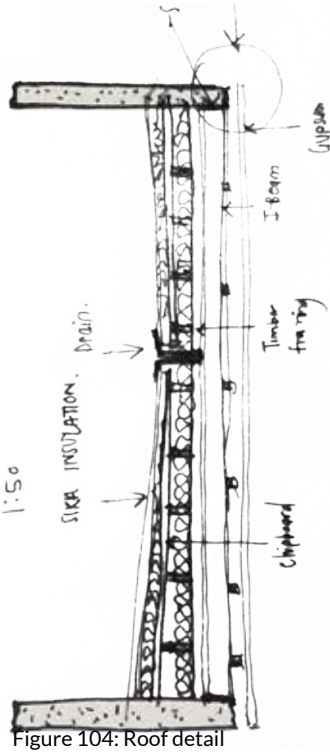


Figure 104: Roof detail

Figure 105: 3D view of art gallery

DESIGN FINALIZATION

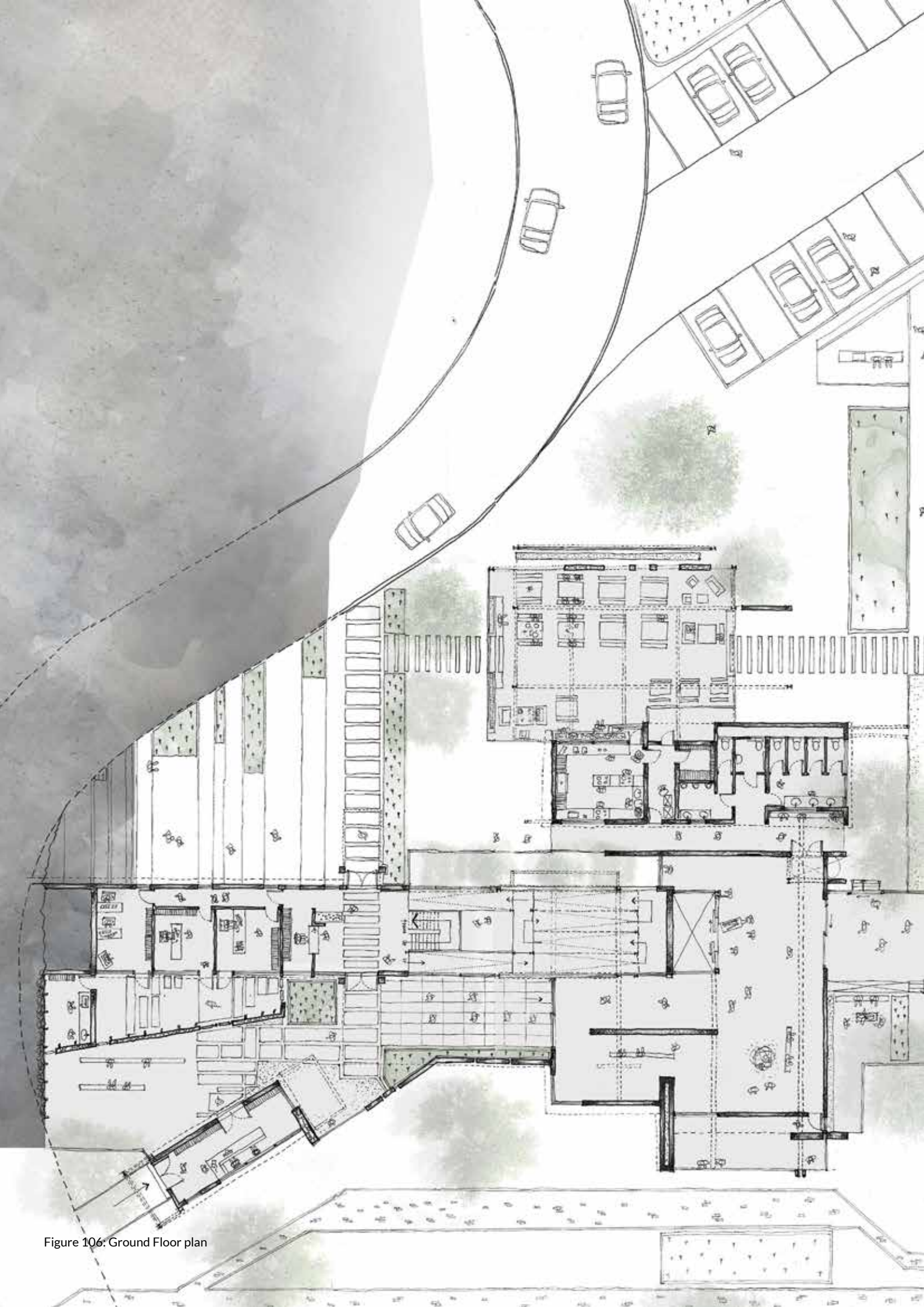
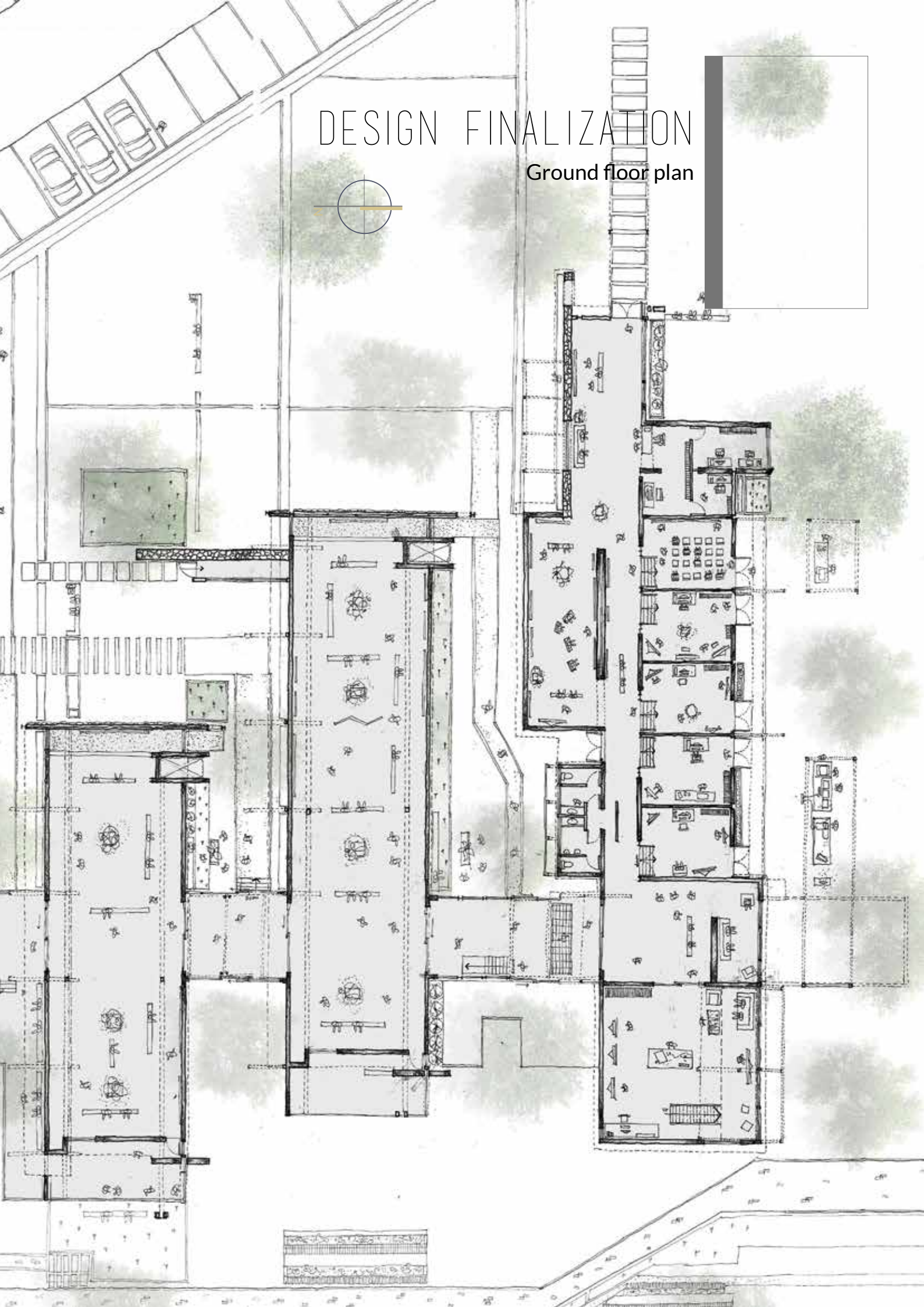


Figure 106: Ground Floor plan

DESIGN FINALIZATION

Ground floor plan



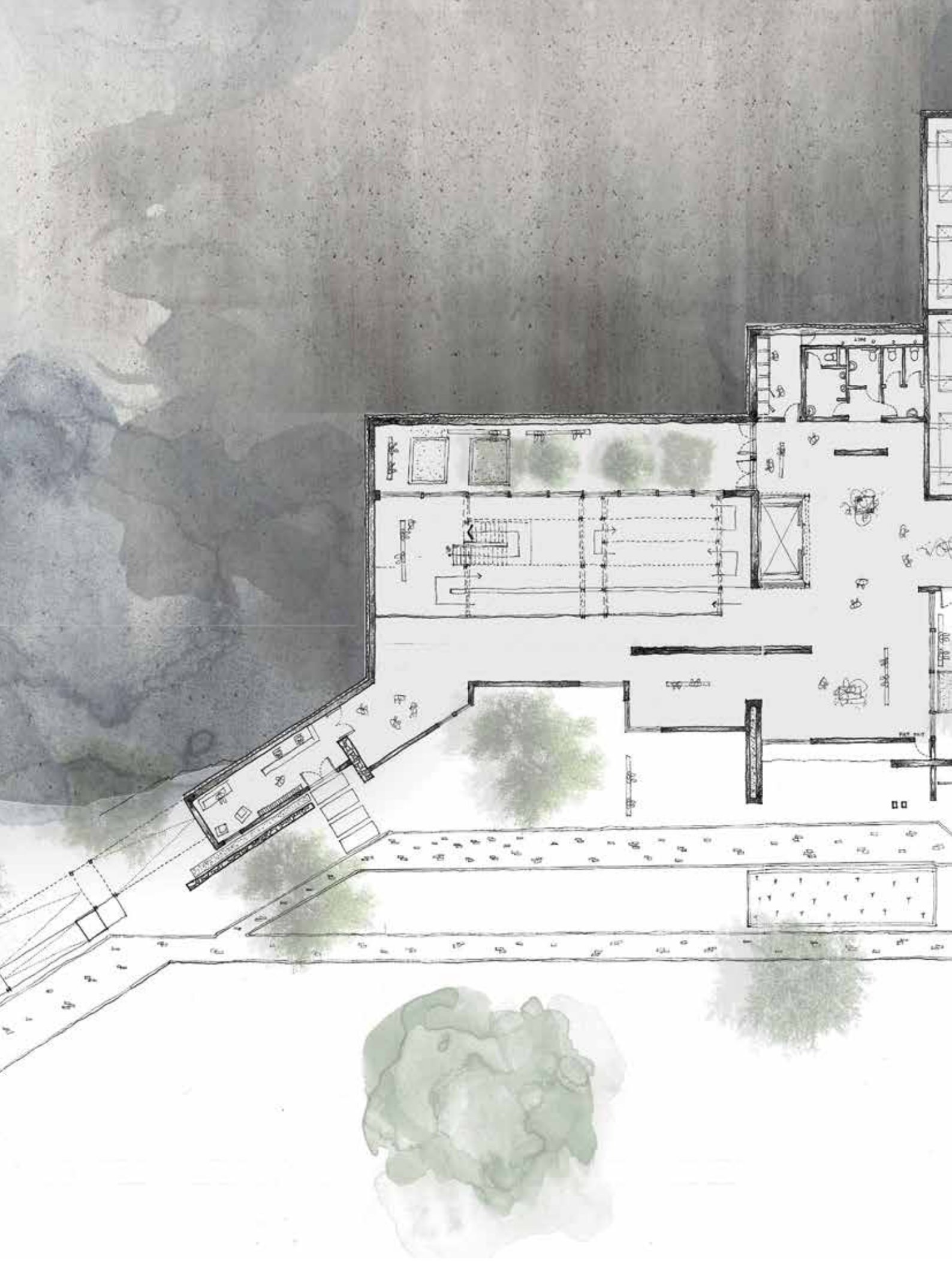


Figure 107: Basement plan

DESIGN FINALISATION

Basement plan

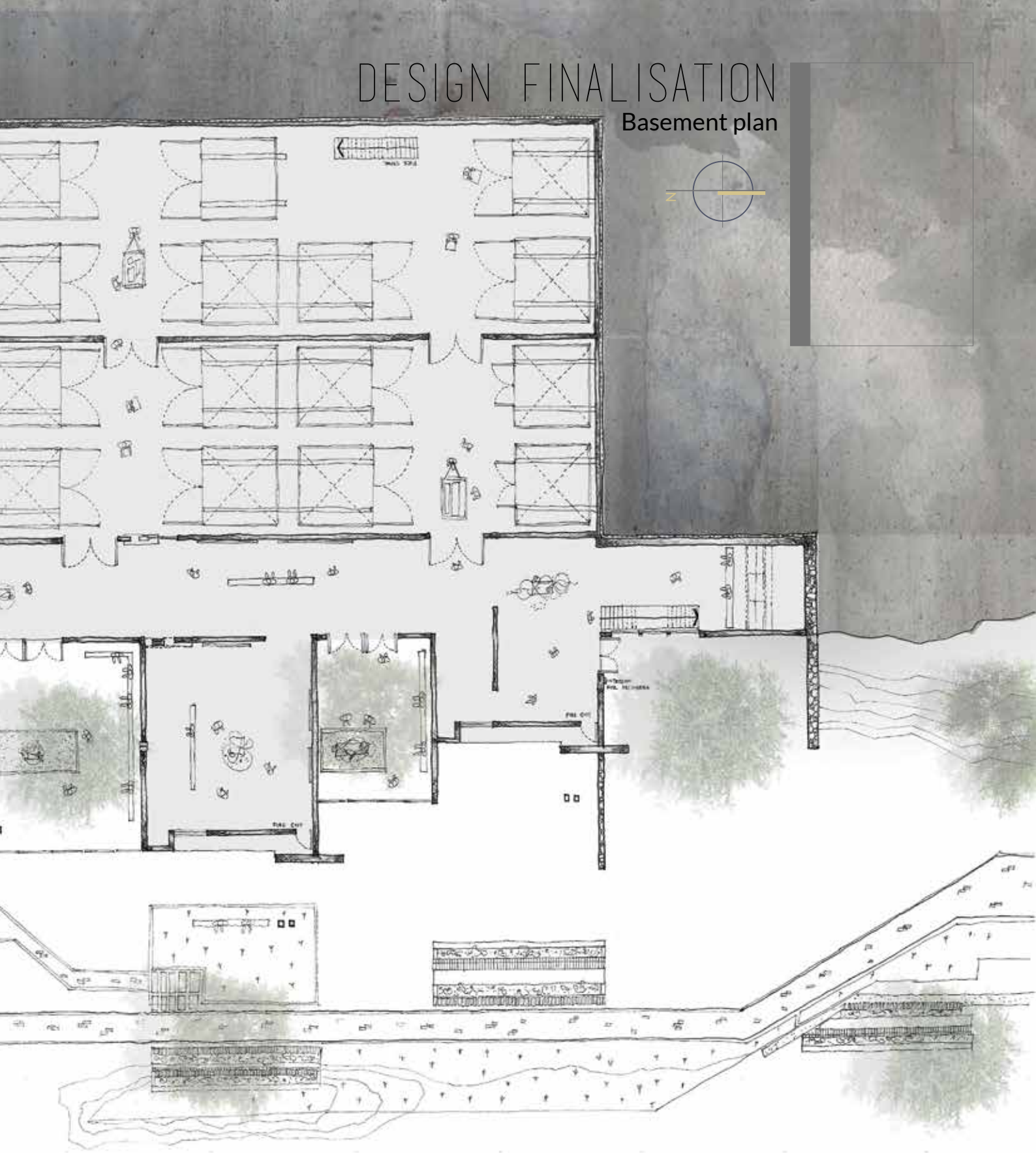


Figure 110: Streetview from DF Malherbe road

Figure 109: Restaurant and main entrance from campus

Figure 111: View from campus

Figure 112: Top view with gallery integrated with Thakaneng bridge development

Figure 113: Streetview from DF Malherbe road

Figure 114: Section through longitudinal

Figure 115: Underneath bridge crossing DF Malherbe drive

Figure 116: View from underneath bridge crossing DF Malherbe drive showing public entrance

Figure 118: View from campus, western facade

Figure 117: Restaurant seating

Figure 119: Pedestrian entrance from campus, south facade

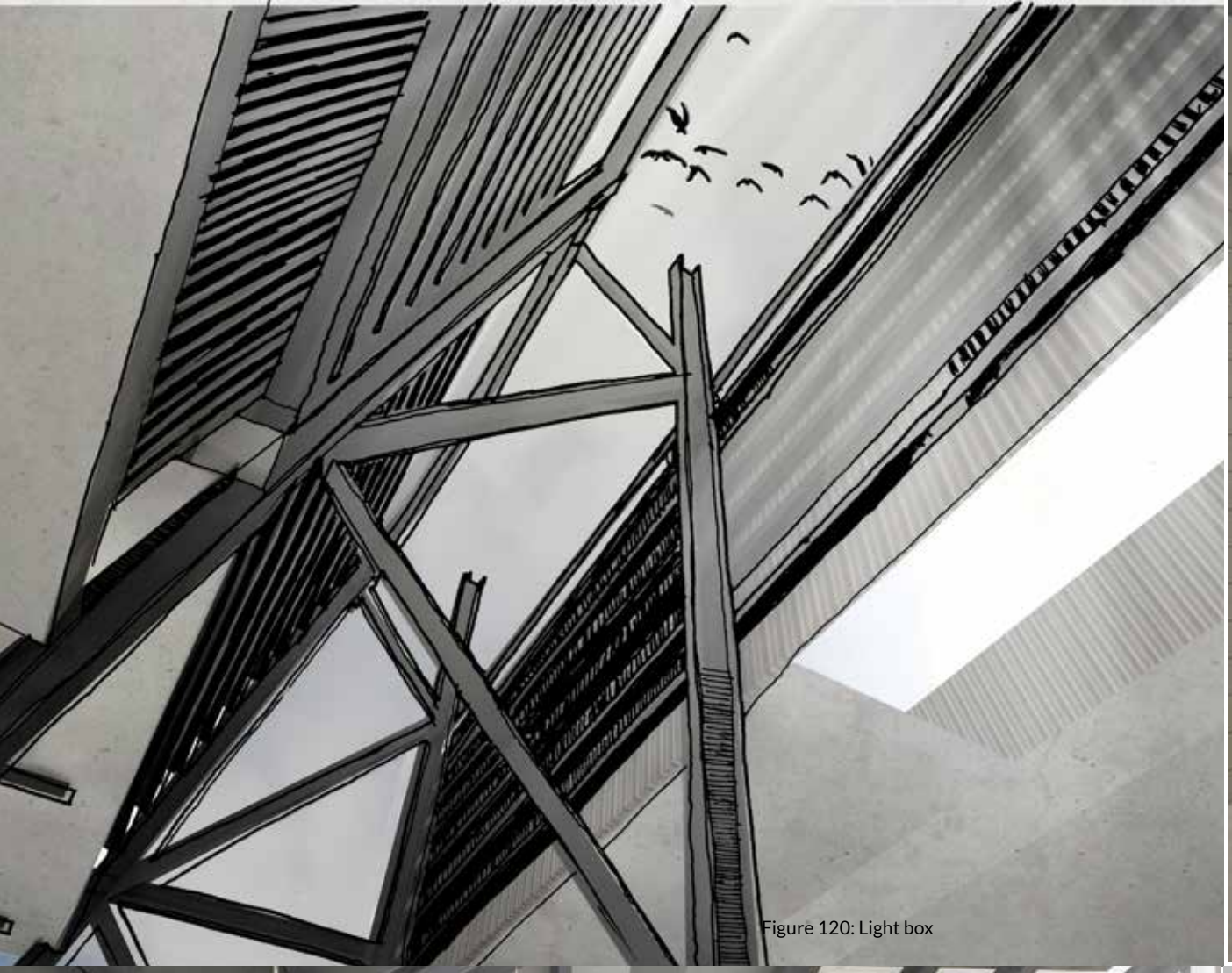


Figure 120: Light box

Figure 122: Artist studio interior

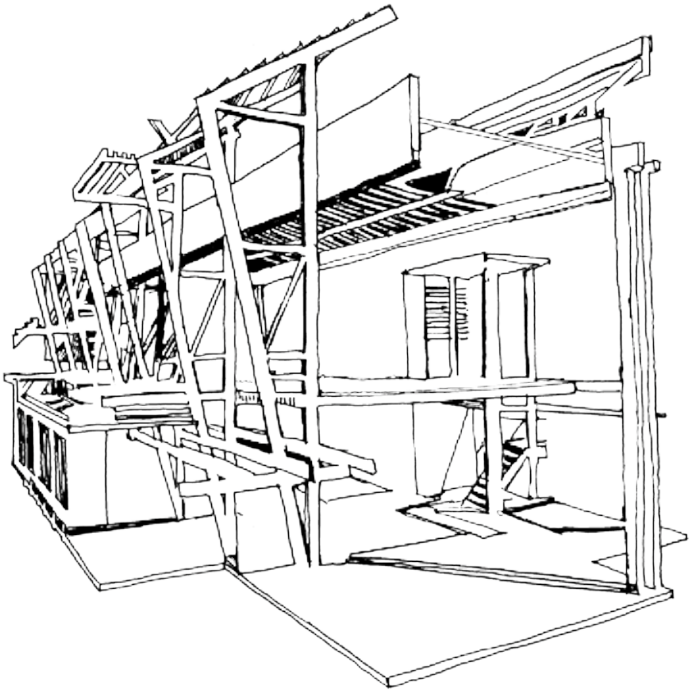
Figure 121: Basement gallery and archive

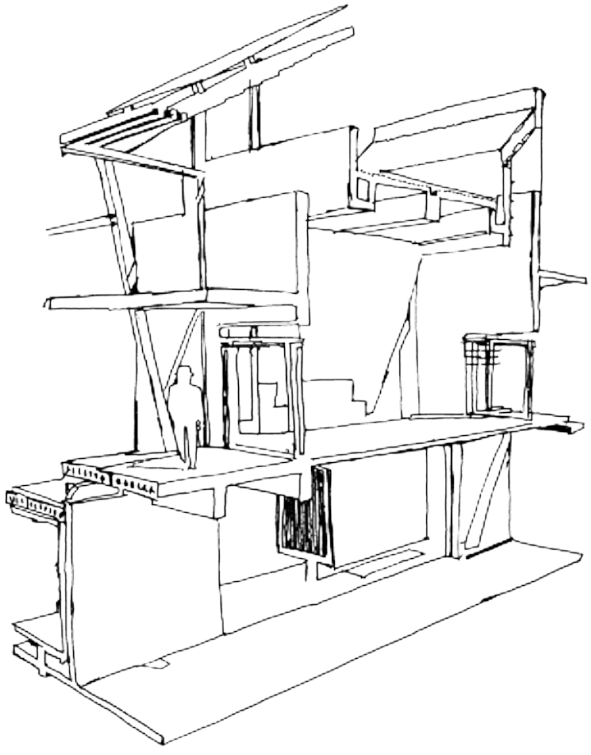
Figure 123: Art gallery interior

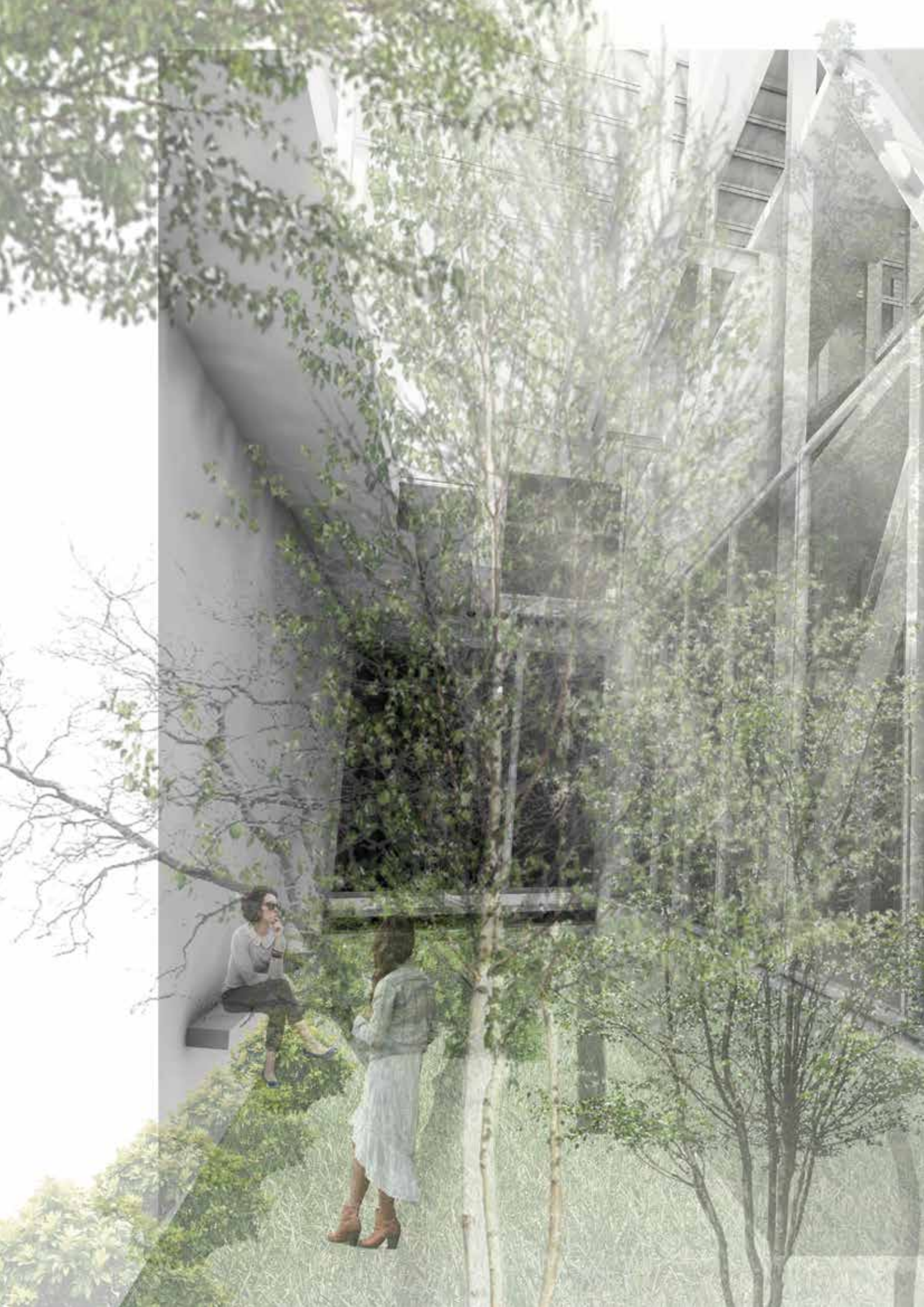
Figure 124: Art gallery interior connection to outside space

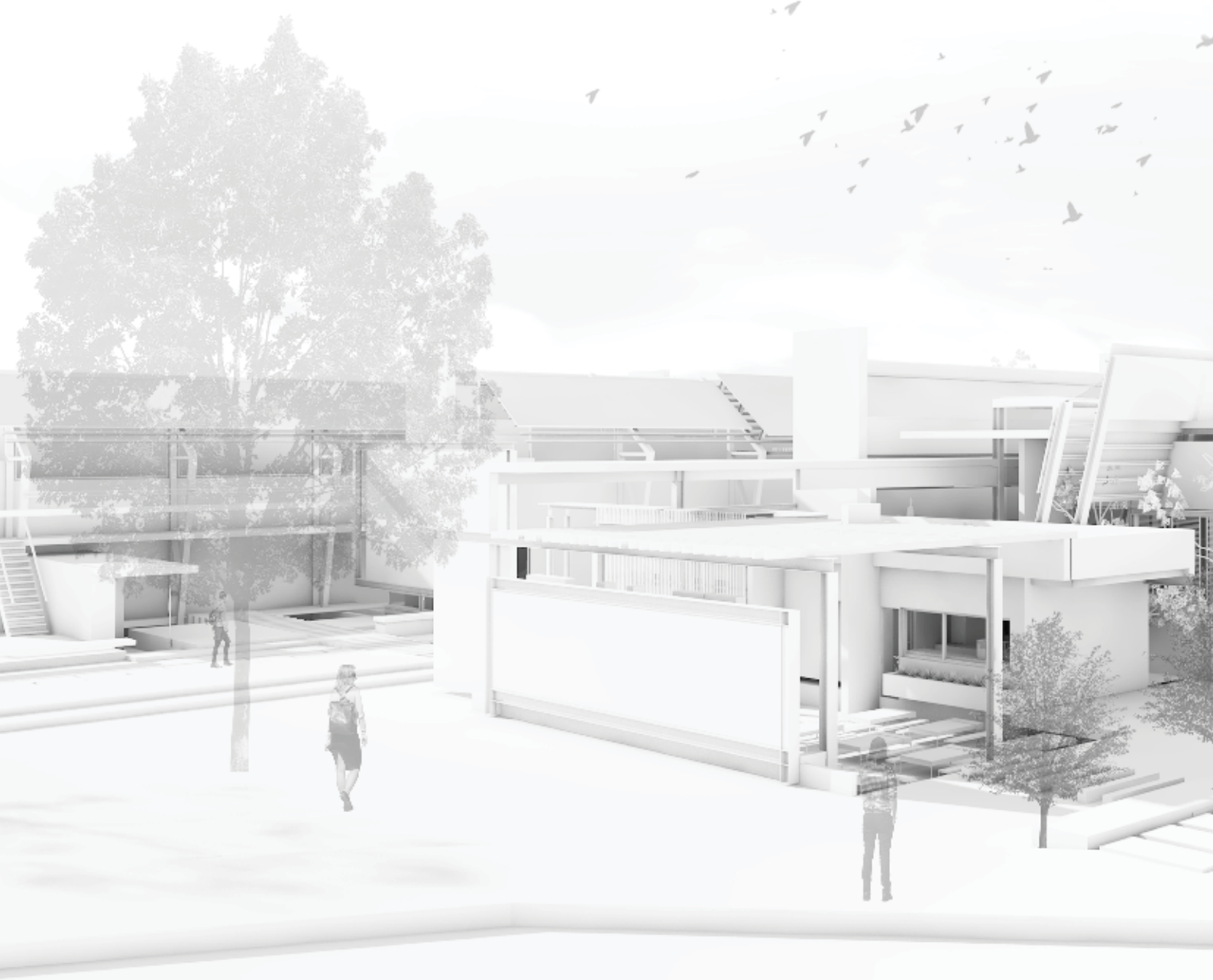
Figure 125: Breating pocket eastern view

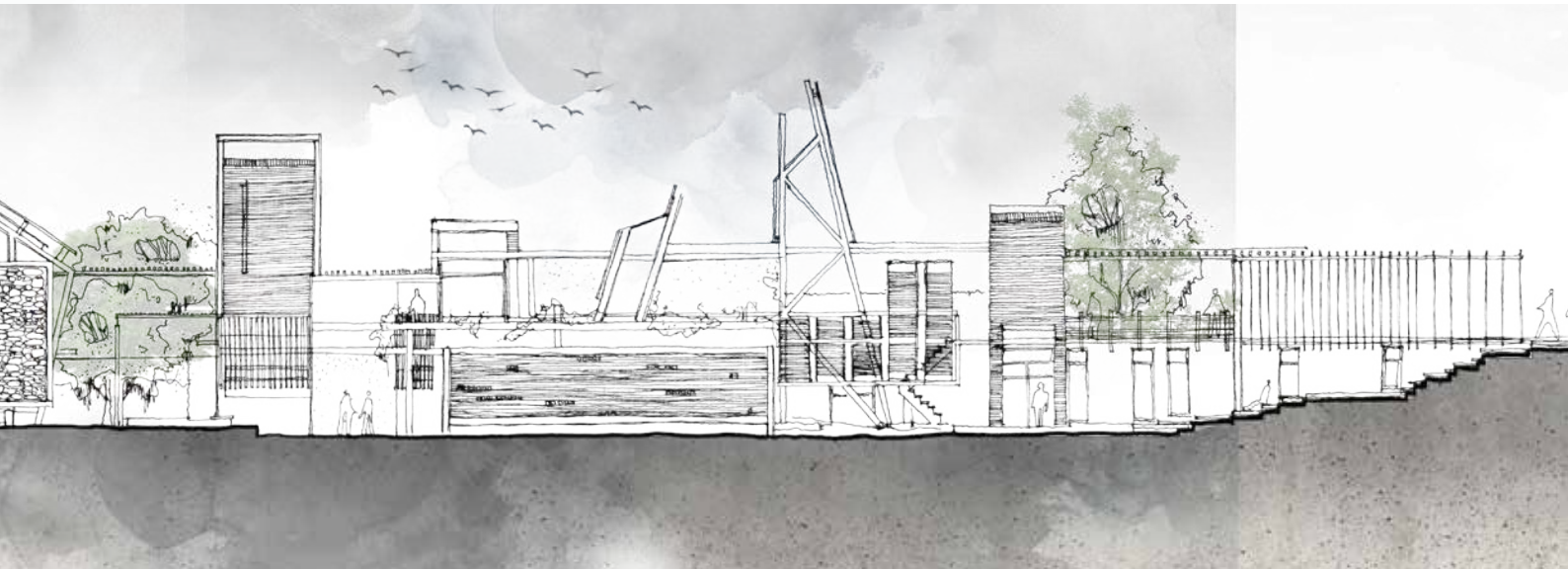

150mm concrete slab cast in-situ with steel reinforcement
Concrete slab cast into 254x146x31 mm Steel I-section parallel flange beam
8 mm laminated safety glass, installed in purpose-made aluminium window frame with charcoal powder colour finish
Cement cill
Cement screed sloped to gutter
Toilets
Corridor
artist workshop

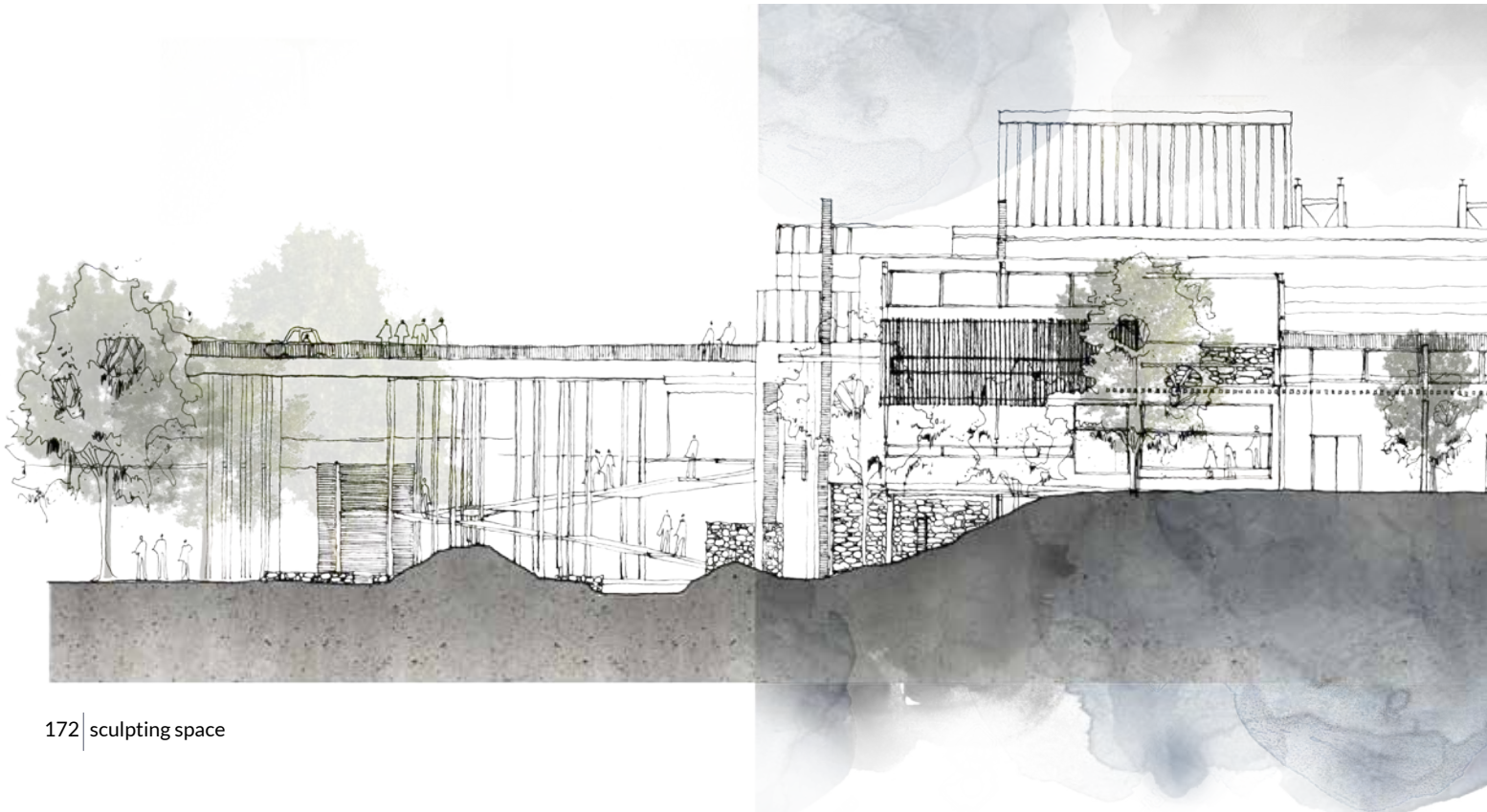


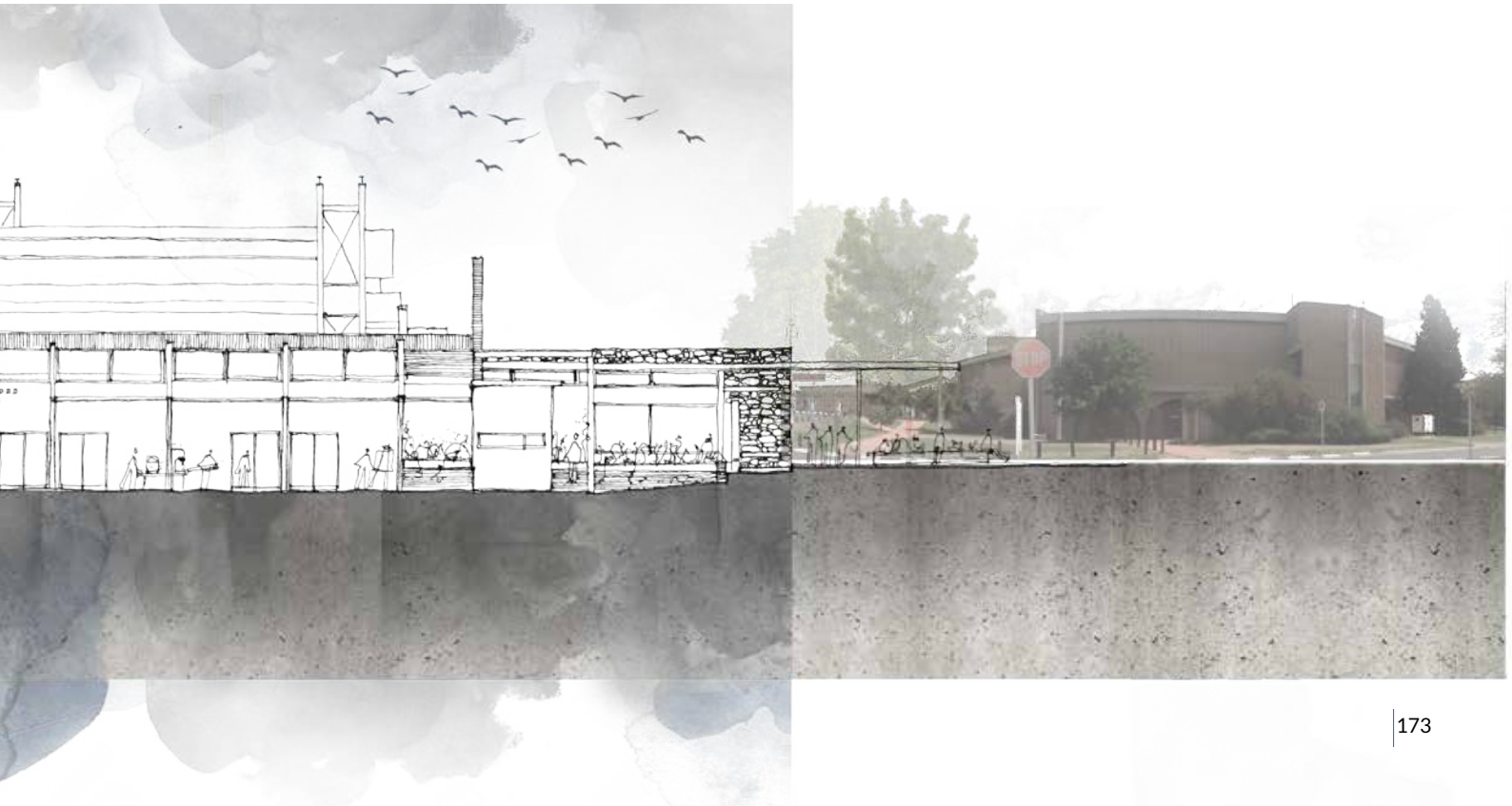












SCALE 1:100

Figure 126: Longitudinal section

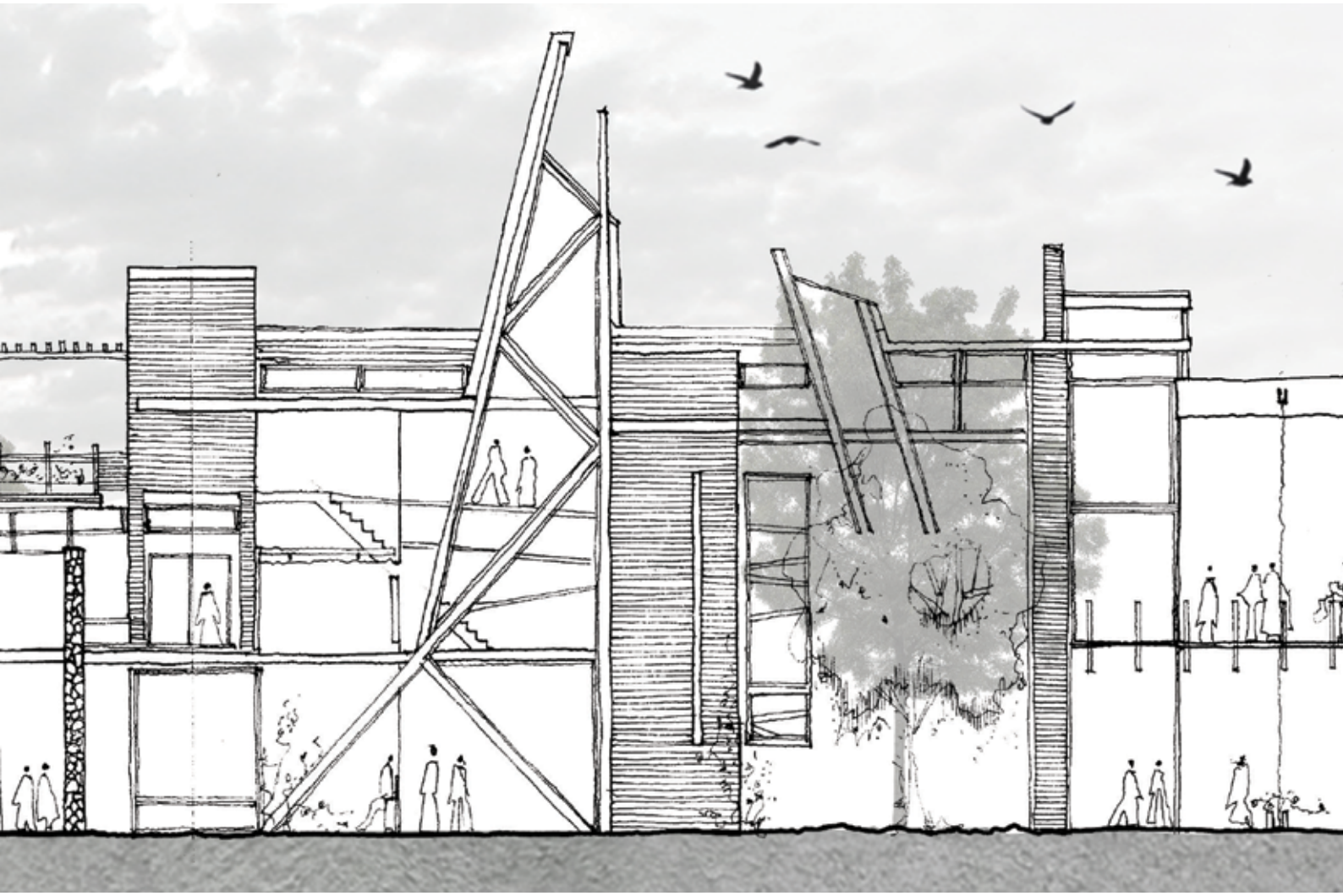


Figure 126 a: Elevation detail

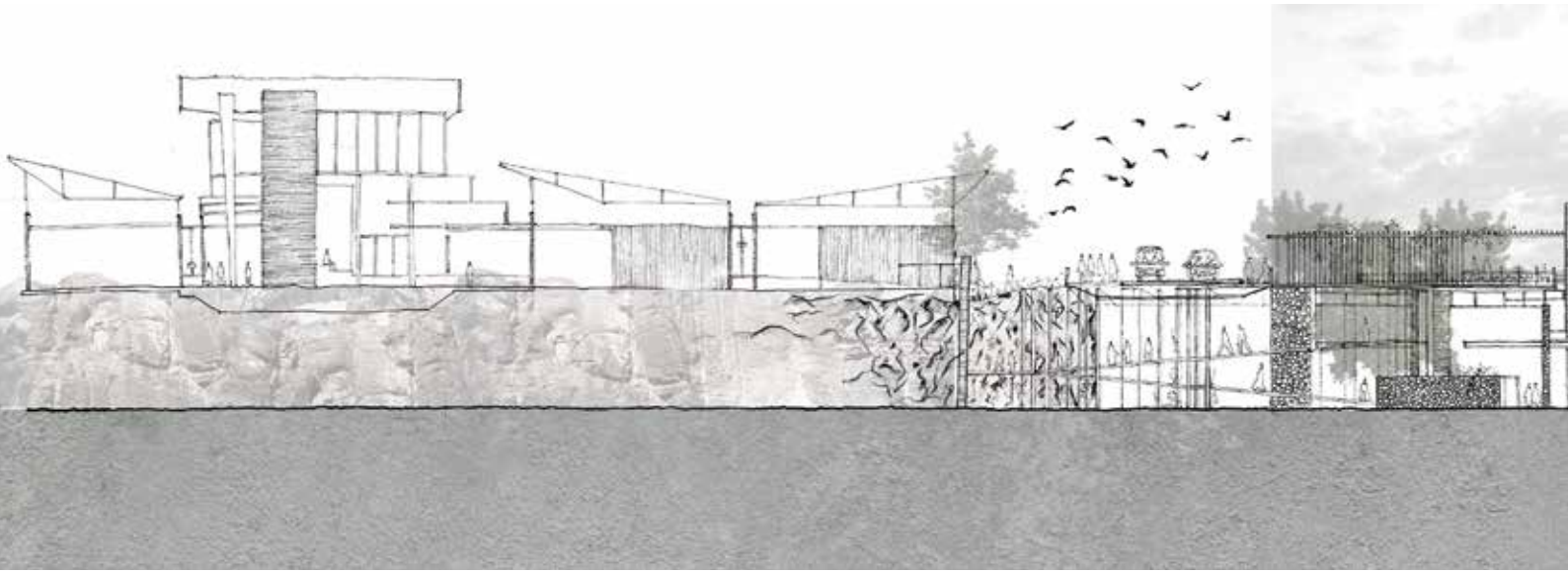
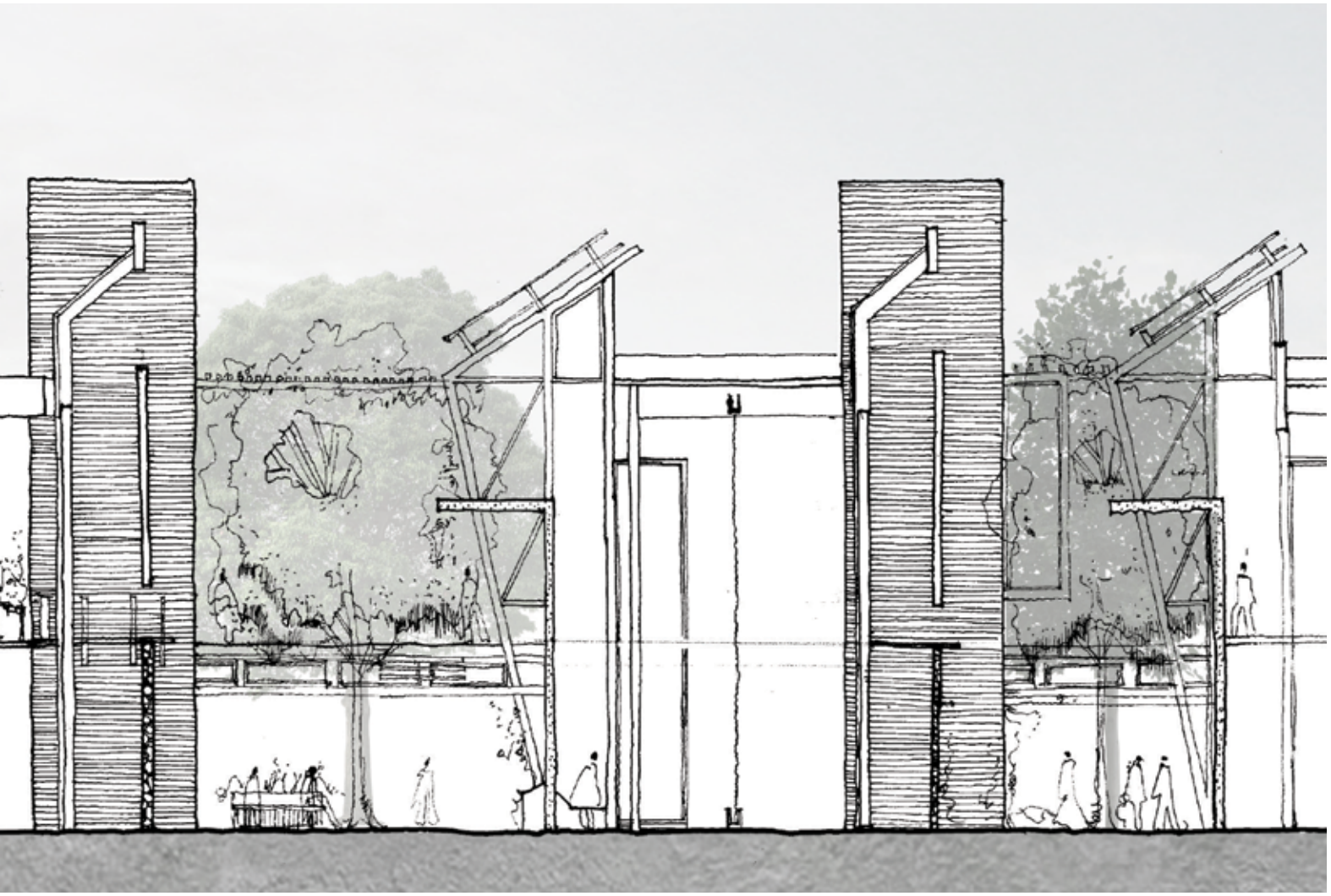
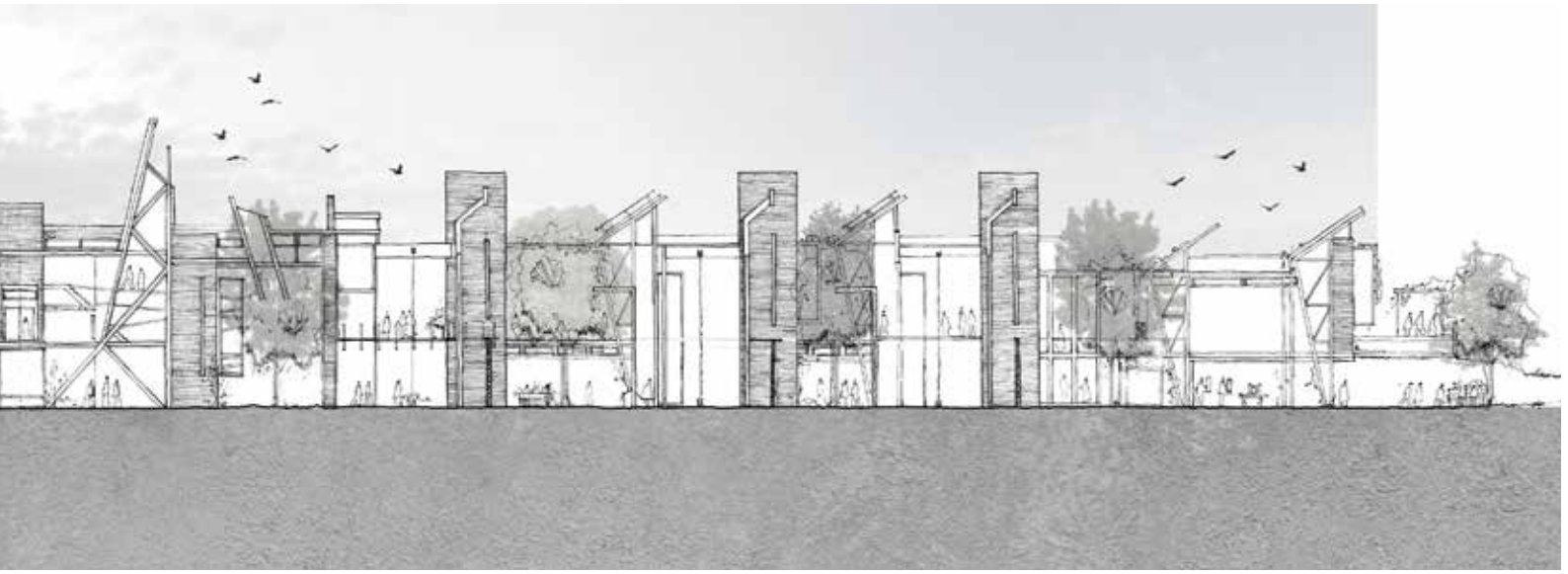


Figure 126 b: Elevation





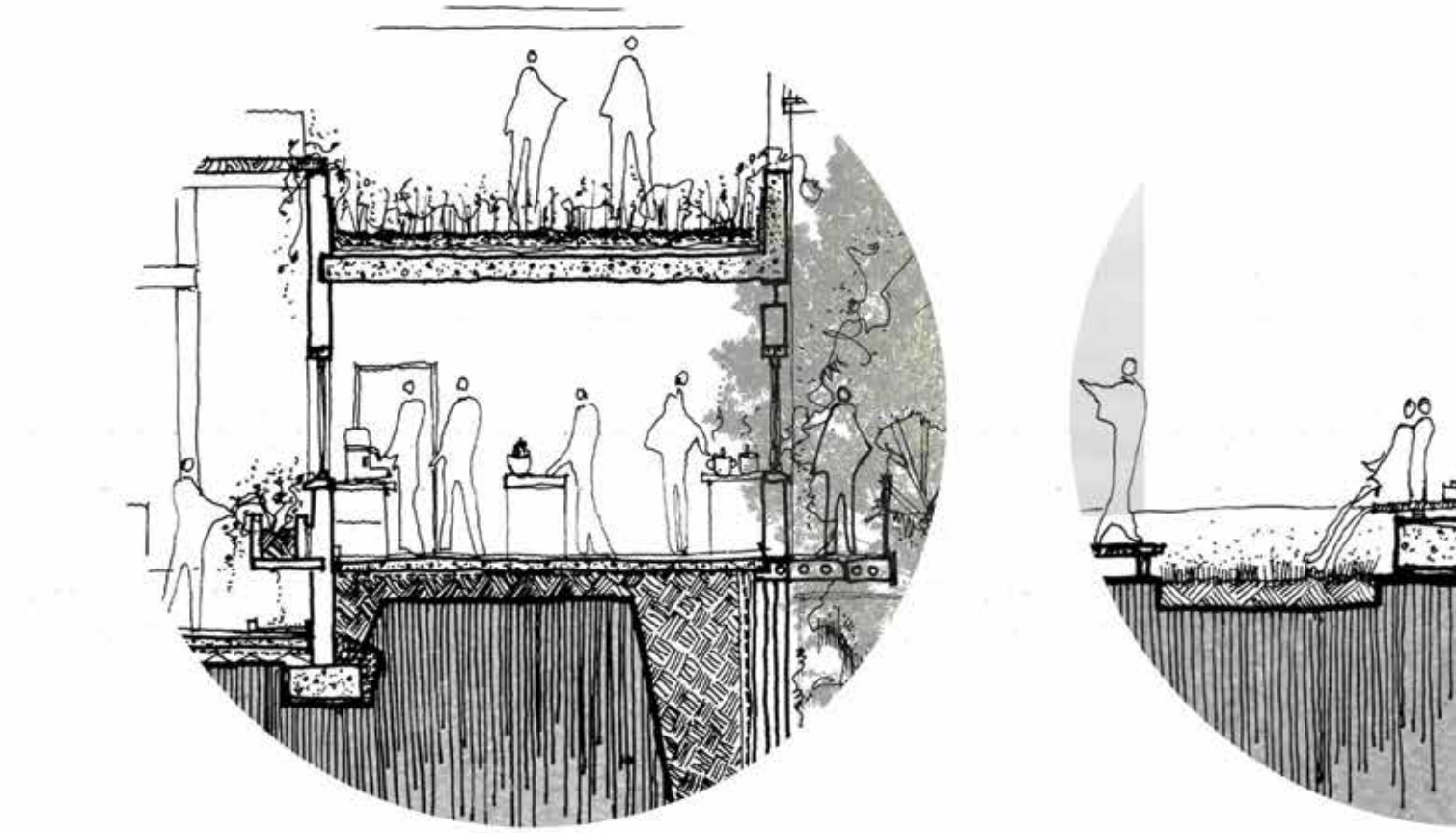


Figure 126 c: Short Section detail

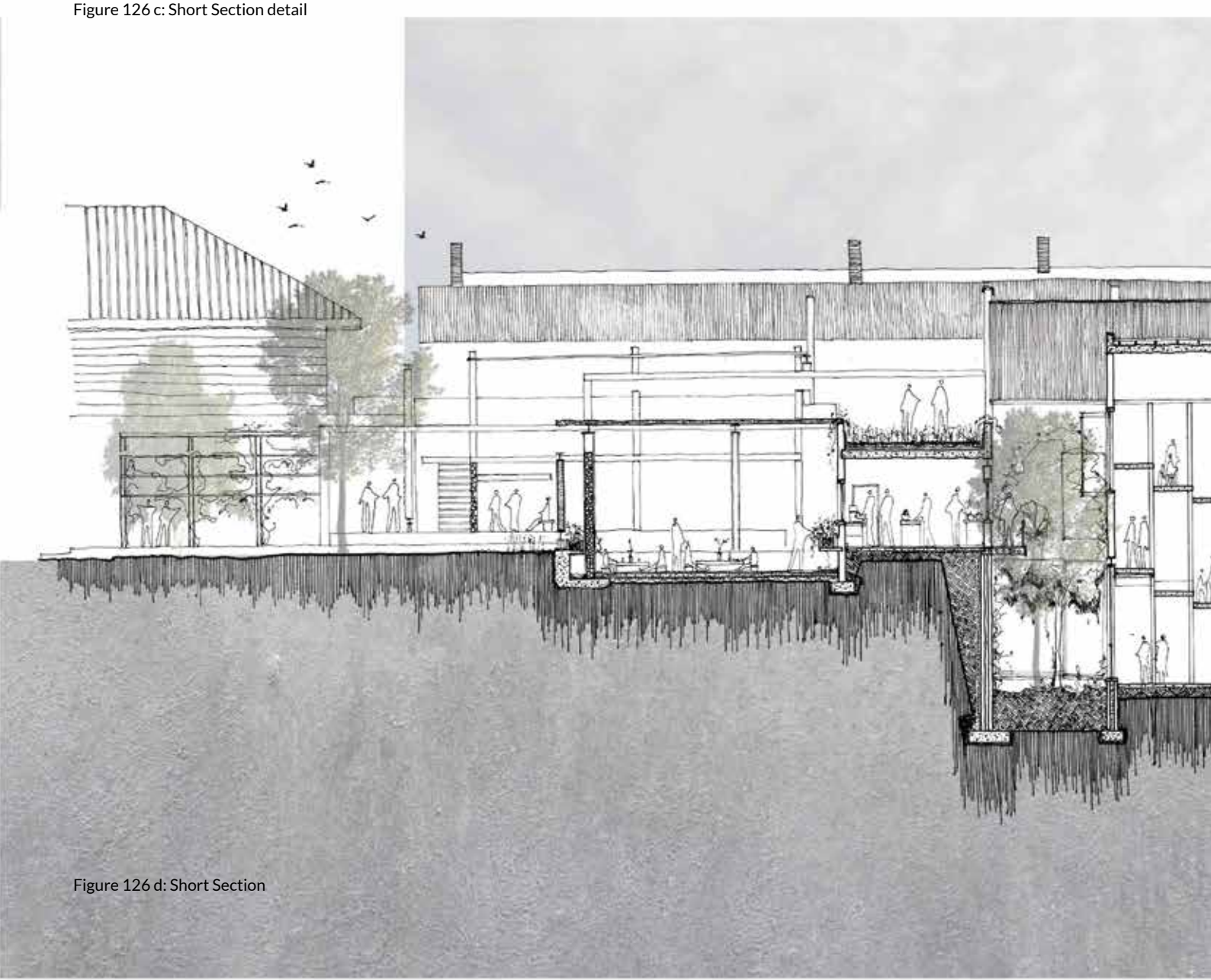
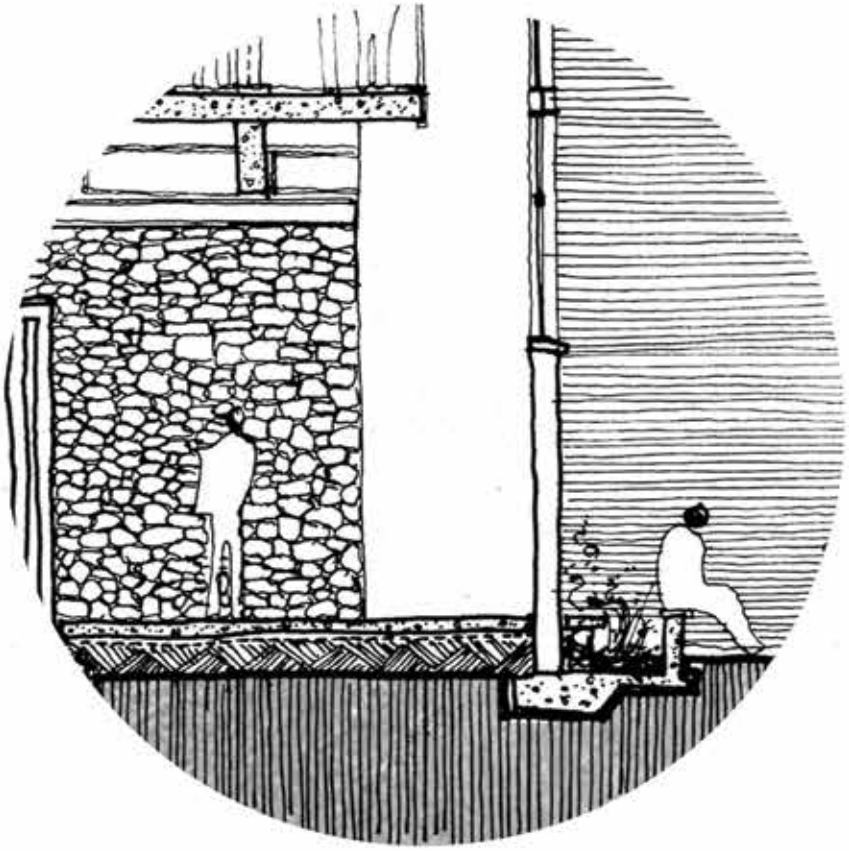


Figure 126 d: Short Section



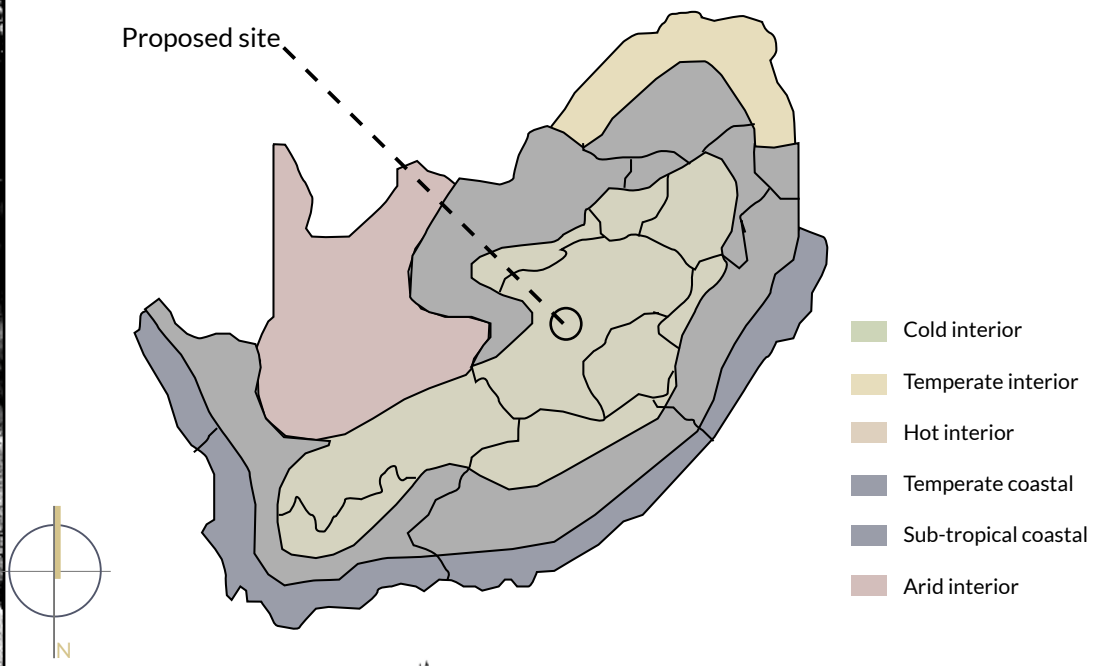


Figure 127: Climatic zone map

Figure 128: Vegetaion on site

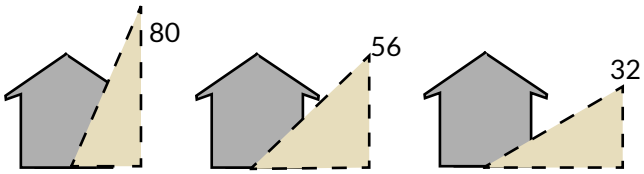


Figure 129: Sun angles in summer and winter:
Summer: 80 degrees
Winter: 32 degrees

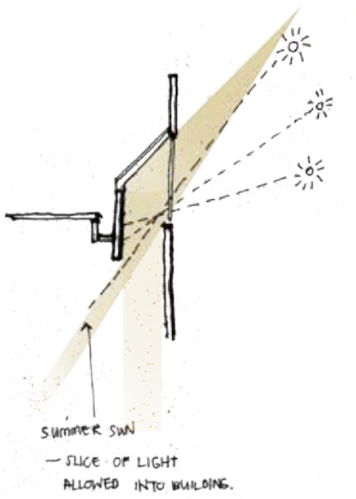


Figure 130: Sun angles applied to proposed design

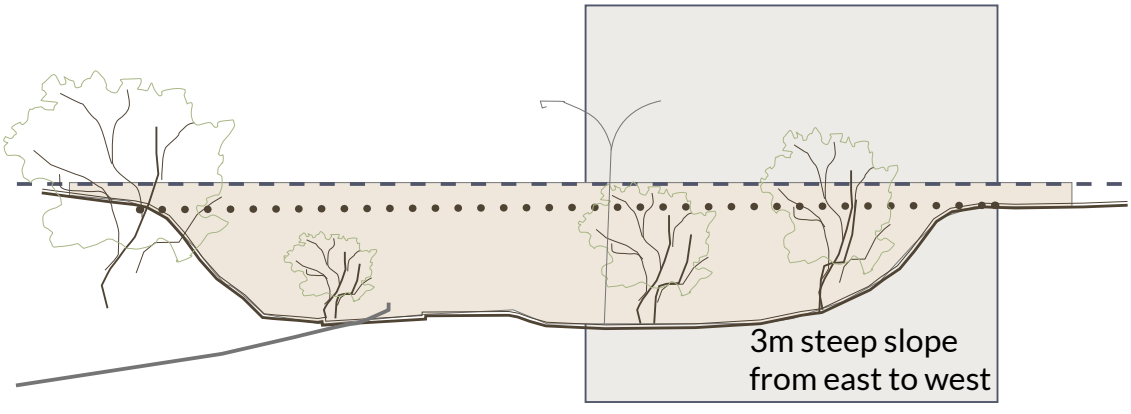
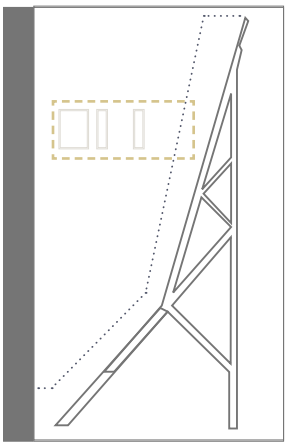


Figure 131: Slope on site, section viewing south

TECHNICAL REPORT

Tectonics investigation



SITE

The topography analysis of the site indicates the vegetation, physical barriers and climate.

VEGETATION:

The vegetation on the site mostly consists of Karee trees and smaller shrubs. The building was designed in a way where no large trees are removed and where the Karee trees form part of the natural gardens of the gallery's outside spaces.

PHYSICAL BARRIERS:

A physical barrier caused by rock formation is found on the southern edge of the site.

CLIMATE:

Bloemfontein is part of the cold interior climatic zone. The climate of the site affects the energy intervention measures. According to the National Building Regulations Part X, the building design and construction materials should be appropriate to the climate (Tiasa.org.za, 2016).

Bloemfontein is classified as part of the Semi-Arid Zone (Eldoradocounty, 2015). The climate in Bloemfontein is typical of the interior plateau with rainfall in the summer. During winter months (April to August), temperatures reach below zero degrees, but snow is seldom seen (Safarinow.com, 2015).

The design response to the cold interior climate zone, according to Schmidt and Pinheiro (Schmidt and Pinheiro, 2013), is to apply passive design strategies in order to contribute to comfort and reduce energy consumption through mechanical heating and cooling.

TOPOGRAPHY AND SOIL CLASSIFICATION

Bloemfontein contains a relatively flat topography. The natural slope on the site from north to south falls 3 meters within 100m. The man-made slope on the site was created when building the DF Malherbe Road. This slope falls 3m vertically within 2m horizontally.

The soil in Bloemfontein contains a relatively large amount of clay, but does not necessarily require float foundations.

Figure 132: Slope on site showing storm water run-off

Figure 133: Storage space indicated in yellow on basement plan.

Annex D
(informative)

Occupancy classification in accordance with SANS 10400

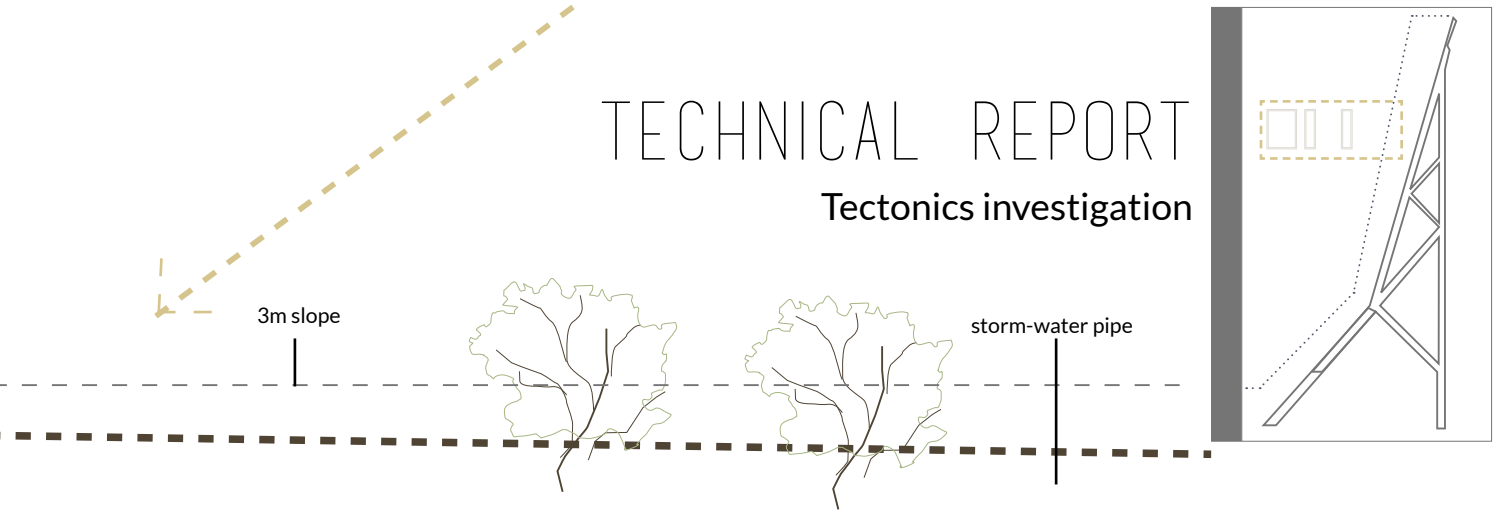
Table D.1 — Occupancy or building classifications in accordance with SANS 10400

1	2
Class of occupancy	**Occupancy**
A1	**Entertainment and public assembly** Occupancy where persons gather to eat, drink, dance or participate in other recreation.
A2	**Theatrical and indoor sport** Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographical or sport performances.
A3	**Places of instruction** Occupancy where school children, students or other persons assemble for the purpose of tuition or learning.
A4	**Worship** Occupancy where persons assemble for the purpose of worshipping.
A5	**Outdoor sport** Occupancy where persons view outdoor sports events.
B1	**High risk commercial service** Occupancy where a non-industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.
B2	**Moderate risk commercial service** Occupancy where a non-industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.
B3	**Low risk commercial service** Occupancy where a non-industrial process is carried out and where neither the material handled nor the process carried out falls into the high or moderate risk category.
C1	**Exhibition hall** Occupancy where goods are displayed primarily for viewing by the public.
C2	**Museum** Occupancy comprising a museum, art gallery or library.

Figure 134: Table with user requirements (SANS, online).

TECHNICAL REPORT

Tectonics investigation



STORM - WATER RUNOFF

The 3 meter slope on the site allows water run-off towards the northern edge of the site where a storm-water pipe servitude is located. This pipe discharges the water into the municipal storm-water system.

The drainage of the project consists of concrete box gutters that collects rain water from the pitched roofs as well as from the flat roofs into rain-water tanks. The overflow of these tanks are used to water the sculpture gardens. As the project contains a basement, the run-off of storm-water is of great importance.

USER BEHAVIOR AND REQUIREMENTS

Facilities required by an art gallery include collection facilities with sufficient storage space. The size of storage should be in ratio 1:1 to the exhibition space (De Jesus, 2016). The storage should include separate allocated areas for sculptures, paintings, etc., with protection against water leakage, fire, etc. The storage space should be well-ventilated to reduce dust gathering, and the paintings and sculptures should be covered to further reduce the gathering of dust.

Administrative facilities such as an office for the curator, research space and reception should be included. The exhibition space should be designed to allow the flow of circulation between people entering and exiting. The number of doors should be minimized for security and climatic purposes. The exhibition space should be wide enough to allow visitors to view the art from a decent distance without people moving between the visitor and the artwork.

Profile of users- user requirements:
A1 – Entertainment and public assembly Occupancy where persons gather to eat, drink, dance or participate in other recreation.
A2 – Theatrical and indoor sport Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographic or sport performances.
C1 – Exhibition hall Occupancy where goods are displayed primarily for viewing by the public.
C2 – Museum Occupancy comprising a museum, art gallery or library.

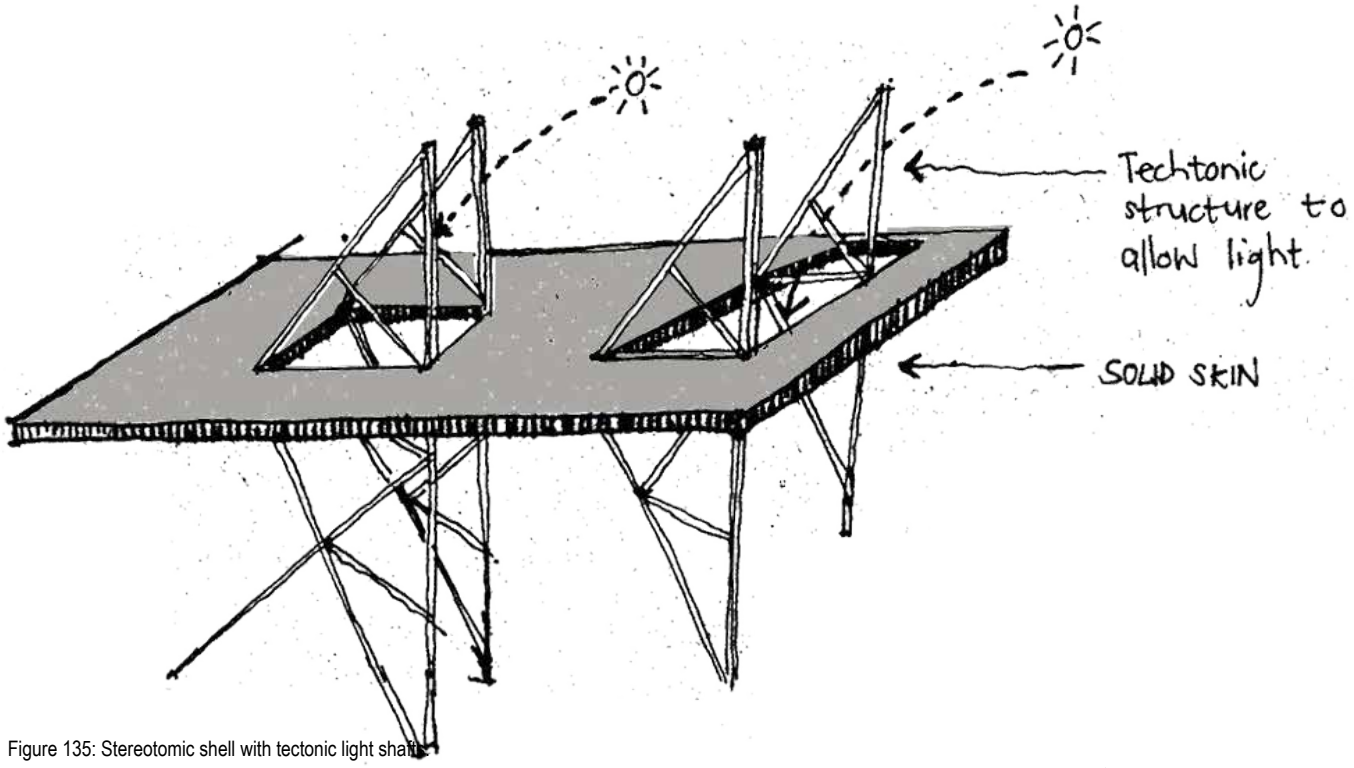


Figure 135: Stereotomic shell with tectonic light shaft

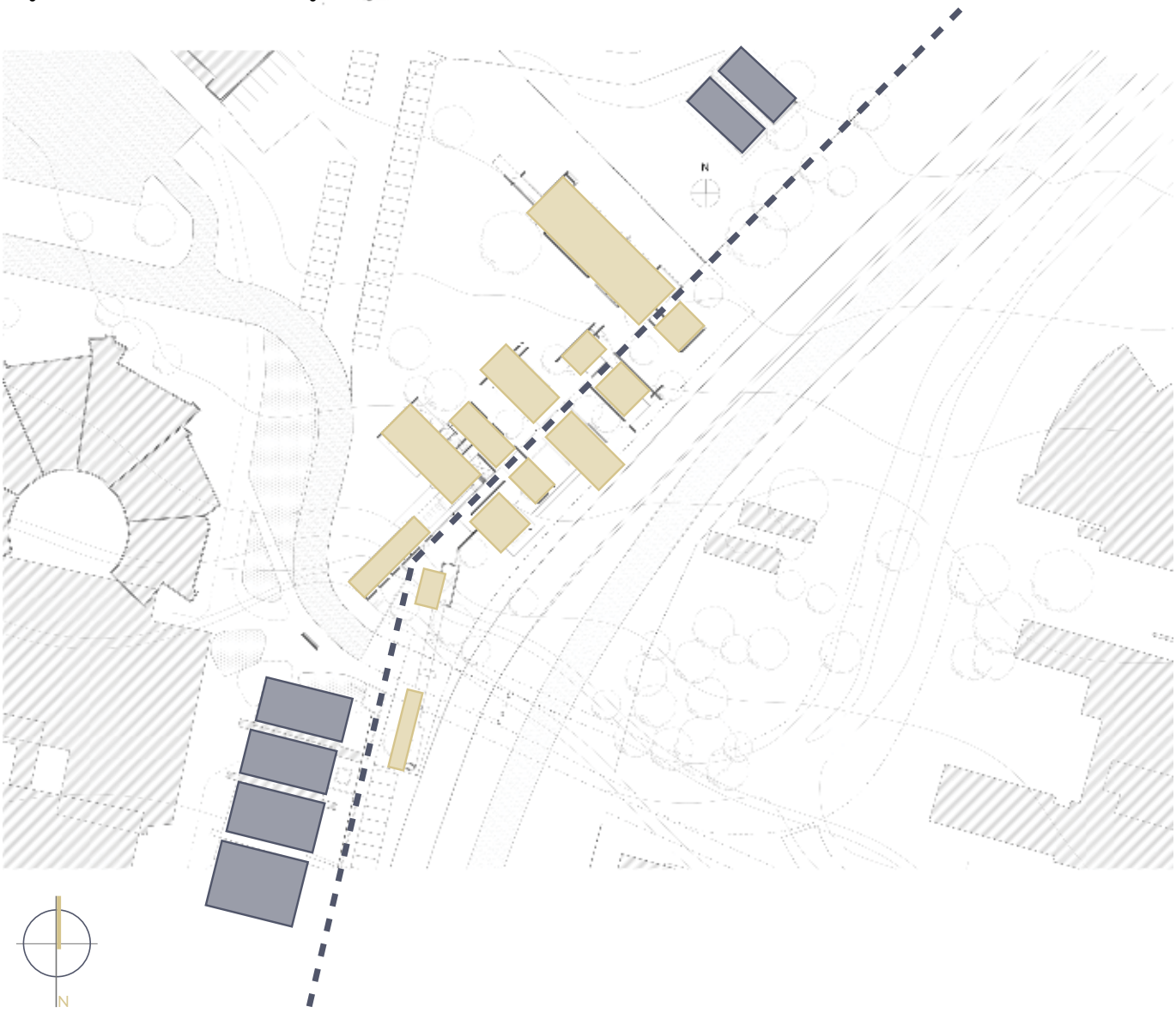
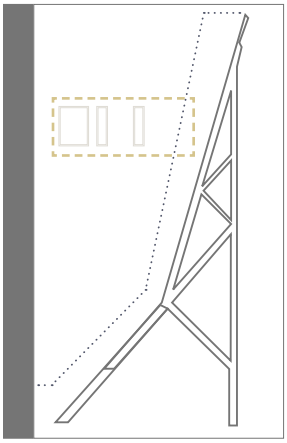


Figure 136:Floor plan showing rhythm of proposed design (yellow) according to existing context (blue) on site.

TECHNICAL REPORT

Tectonics investigation



STRUCTURE CONCEPT - STEREOTOMIC SHELL WITH TECTONIC LIGHT SHAFTS:

The architectural design of the project was mainly influenced by the way light enters the building. An art gallery requires natural indirect light to softly wash down the walls. The surrounding buildings influenced the use of material in the design.

The sport centre on the western side of the site suggests the deconstruction of tectonics as its support bracing is placed on the facade of the building.

The morphology and placement of the buildings on the southern side of the site is continued on the proposed design as seen in the image of the floor plan.

The tectonic concept for the art gallery was initiated by the structural concept of the suspension between stereotomic and tectonic masses.

This concept is refined to a structural system where the load-bearing masses and roof shell is constructed with concrete or masonry stereotomic units while the allowance of light into the building is constructed with light steel materials.

The aim of the tectonics of the project is to create uninterrupted longitudinal exhibition spaces which does not contain columns or shadow lines while illuminated with natural light.

The principle of 'ma' is applied throughout the detail design of the building. 'Ma' can be defined as the space of pause between two objects. The articulation of different elements allows for 'ma' to be present in the proposed design.

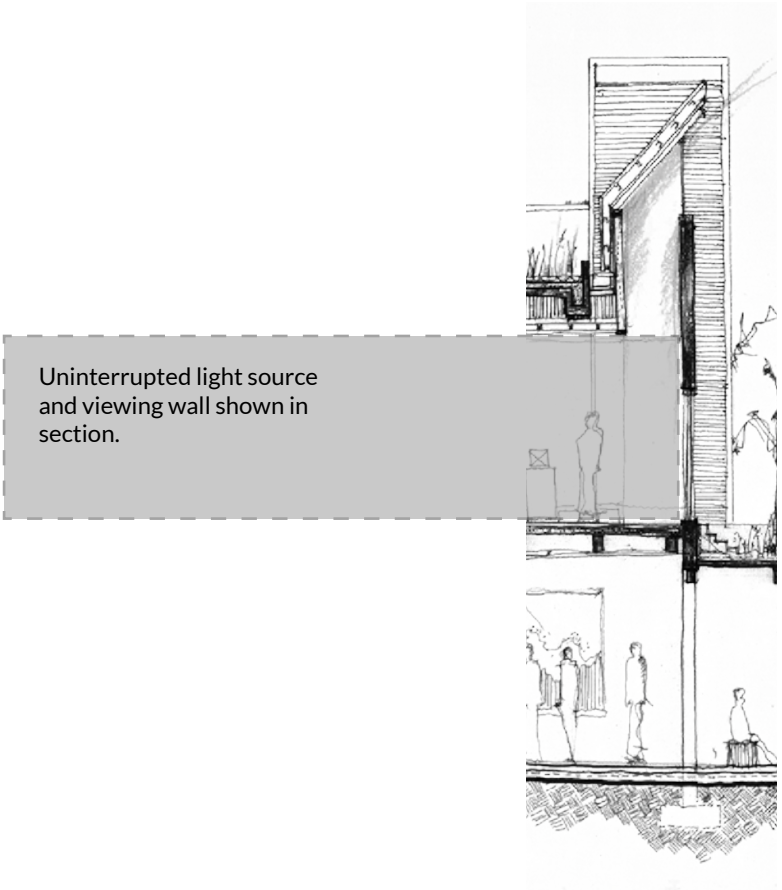


Figure 137: Uninterrupted gallery space.

ROAN - SATIN

SPECIFICATIONS	SPECIAL SHAPED BRICKS
Name	Roan
Brick Type	Face Brick
Texture	Satin
Base Colour	Red
Using	Masonry
Dimension	222 X 106 X 73 mm
Class	FBX
Format	Imperial
Area	National
Factory	Midrand Factory - Gauteng
SANS	227 :2007
ISO	9001:2008
Typical Comp Strength	30-40
Typical 24 Hr Water Absorption	8-10
Moisture Expansion Cat	II
Efflorescence Rating	Slight

FLAGSTONE CHARCOAL

SPECIFICATIONS	Variations
Name	Flagstone Charcoal
Brick Type	Concrete
Base Colour	Grey
Dimension	440 X 440 X 40mm
Factory	Avoca - KwaZulu-Natal
Classification	S-C: Allows No Interlock Between Vertical Faces Of Adjacent Blocks.
Range	Cobbles And Flagstones

Figure 139: Material use (Corobrik.co.za, 2016)

Figure 138: Material use (Corobrik.co.za, 2016)

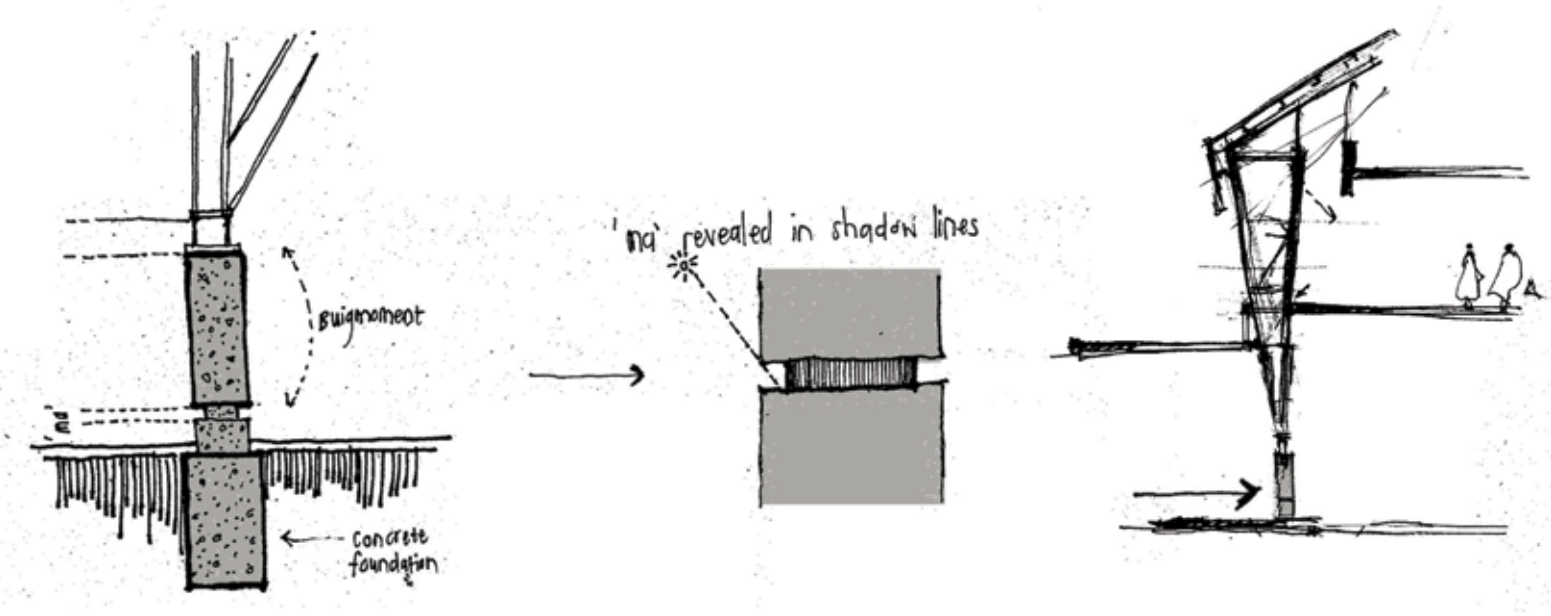
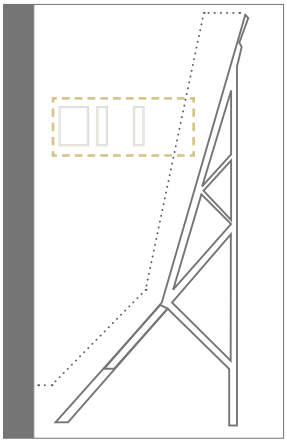


Figure 140: Details suggesting the use of the 'ma' principle.

TECHNICAL REPORT

Tectonics investigation



STEREOTOMIC:

The main structural system of the building consists of concrete beams and columns which forms the super structure of the construction. Load-bearing walls are used where no columns are required. Stereotomic concrete roofs are supported with concrete roof beams as seen in figure 140.

SUBSTRUCTURE

The foundations used are strip foundations for load-bearing walls. Concrete pad foundations for steel trusses are as prescribed by engineer specifications. The substructure of the building consist of the archive which is a semi basement. Engineer specified basement construction is used on the western facade of the building as the excavations are more than 3m deep. Concrete used for foundations must have a strength of at least 10mpa after 28 days.

SUPER STRUCTURE

The super structure of the building consist of clay-brick masonry construction. Red face-brick (Roan Satin by Corobrik) are used for feature panels in the design while non-facing plastered clay bricks are used for plastered areas such as inside the galleries. The bricks used in the building are of standard nominal brick size (222mm x 106mm x 73mm) (Schmidt, 2013: 207). Exterior walls are cavity walls to ensure effective temperature control.

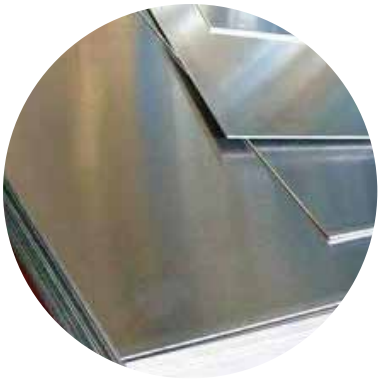
Paved walkways on site is constructed with Flagstone Charcoal paver by Corobrik.

The construction of the gallery spaces is done in a way that the external facade of the design shows the construction members while the inside hides all construction to ensure an uninterrupted view of the artworks.

Steel trusses located on the southern facade of each building assists in the support of the ground floor load. These trusses allow natural light into the building and support the steel roof structure. Masonry construction is done in-between the steel trusses which are spaced at 5000mm.

The steel trussed contains small glass panels to allow light into the basement. The trusses are welded to a steel base plate which is attached to concrete footings.

The concrete footings are designed to display a pause moment before touching the floor. This can be seen in the image.

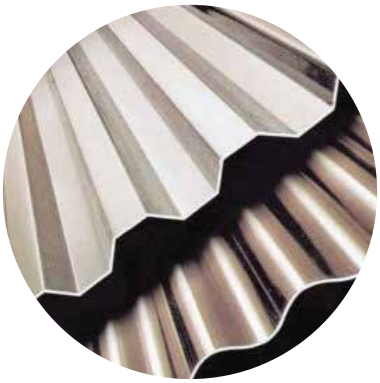


Aluminum plate
1. Alloy: 1100, 1145, 1050, 1060, 1070, 3003, 3105etc.
2. Temper: H12. H14. H16. H18. H22. etc.
3. Thickness: 0.2mm -- 8.0mm
4. Width: Under1600mm
5. Length: Under 6500mm

Application: Hot rolled thick plate, PS base plate, aluminum plastic base plate, aluminum curtain wall base plate, aluminum spacer, aluminum embossed sheet, aluminum tread plate, etc.

(Southafricab2b.co.za, 2016: online)

Figure 141: Aluminum plate (Southafricab2b.co.za, 2016: online)



IBR roof sheeting
1. Roof slope between 5 and 20 degrees.
2. Overall height not exceeding 15m
3. All sides equally permeable
4. Rectangular in plan (ratio long to short side not greater than 4:1
5. Ratio of height to least width not to exceed 4:1
6. Located in terrain with numerous closely spaced obstructions.

(Macsteel, 2016: online)

Figure 142: IBR roof sheeting (Macsteel, 2016: online)

Steel truss
purpose made according to engineer specifications.
Truss consist of
I-profile beam for structural system
Angle irons for bracing

Figure 143: Steel truss (Alibaba, 2016: online)

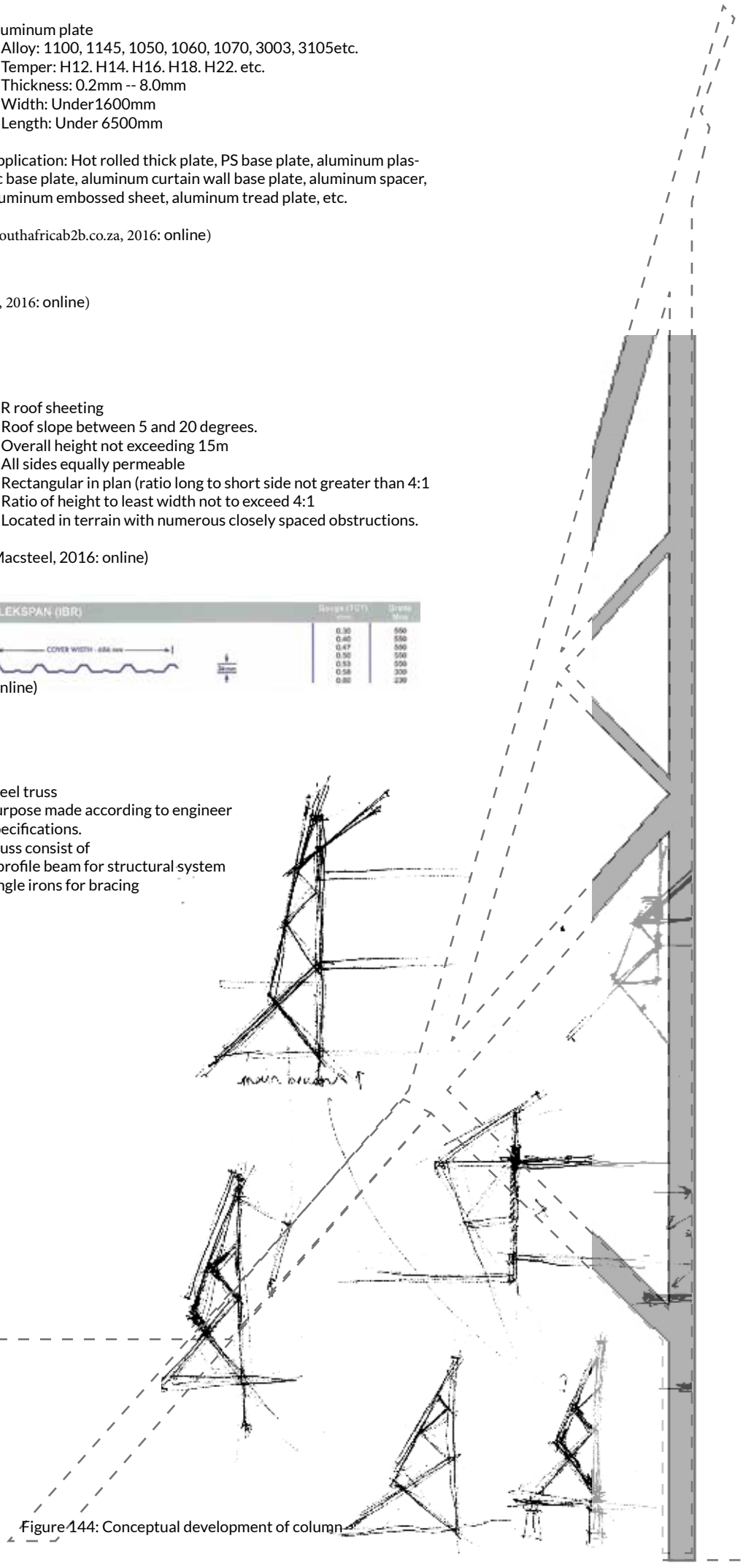
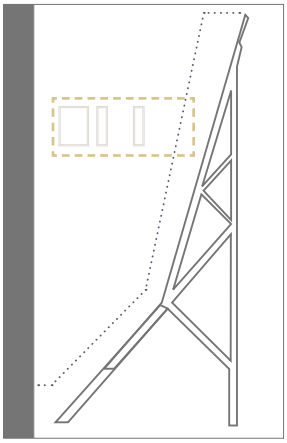


Figure 144: Conceptual development of column

TECHNICAL REPORT

Tectonics investigation



TECTONIC:

The function of the tectonic elements in the design is to allow light through the stereotomic shell. Light shafts are punched into the concrete slabs and supported with steel construction.

The light shafts are constructed with purpose made steel trusses as specified by an engineer. The steel trusses consist of I-beams as the main structure with steel angle irons as bracing. The trusses are cladded with IBR steel sheeting on the outside and reflective aluminum plates on the inside to reflect indirect light into the gallery spaces.

The light-weight steel elements extends towards the sky to represent the dematerialisation of mass from the heavy stereotomic sculpting of the ground to the deconstruction of sky.

SUPER STRUCTURE

Steel frame system:

A steel frame system is used for the support of mezzanine floors to reduce depth of mezzanine floors. Mezzanine floors are located in certain galleries and the artist studio. The cast-in-situ concrete floor is placed on top of the steel frame system.

Glass:

FG frame less glass panels are used in the gallery spaces. The glass panels contains a frame at the top and bottom of the panel. The top and bottom frames are attached to the side of the wall to allow a uniform facade. The glass panels are sealed with silicone at connection points. Connections are kept to a minimum in order to achieve an indirect uninterrupted light supply (Mccoysglass.co.za, 2016).

Glass used in the project is according to SANS 10400. Glass panels used in project: 8.38mm clear laminated Mc Coy glass panel sheet. The dimensions of the sheet is 3660mm x 1800mm. Panels are sealed with approved silicone (Mccoysglass.co.za, 2016).

The glass panel is secured by a steel clamp. The steel clamp is bolted to the masonry wall. Performance data of glass panels can be seen in the table below:

Performance data

Product	Visible Light		Solar Energy					Shading Coefficient	U Value	UV	Noise Control	Safety	Security
TABLE Clear Glazing	transmission	reflection	total elimination	reflectance	absorbtion	direct transmission	total transmission	ratio	(W/m²).K	elimination %	ISO rating/STC value	rating (see below)	rating (see below)
Clear laminated glass	82	15	34	11	35	54	66	0.75	3.2	99	34	1	2

Figure 145: Performance data for glass used (Mccoysglass.co.za, 2016)

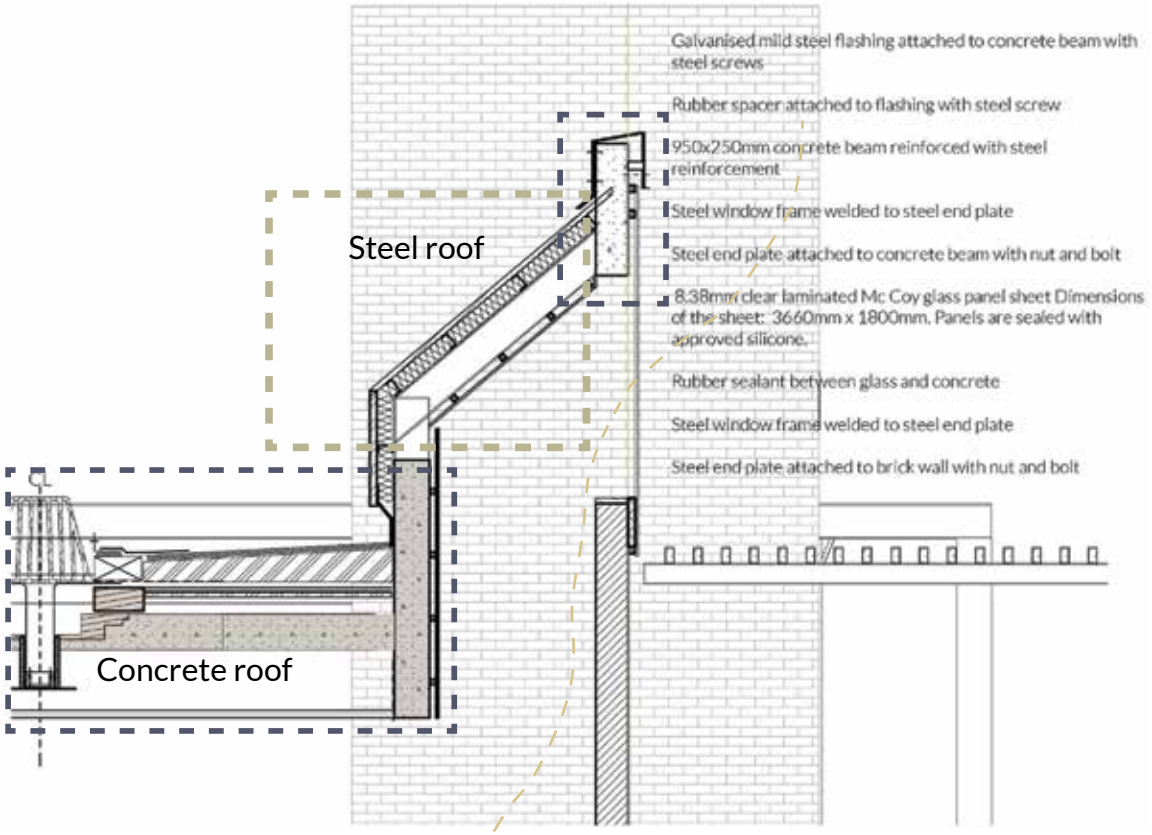


Figure 146: Gallery roof construction: SIKA roofing

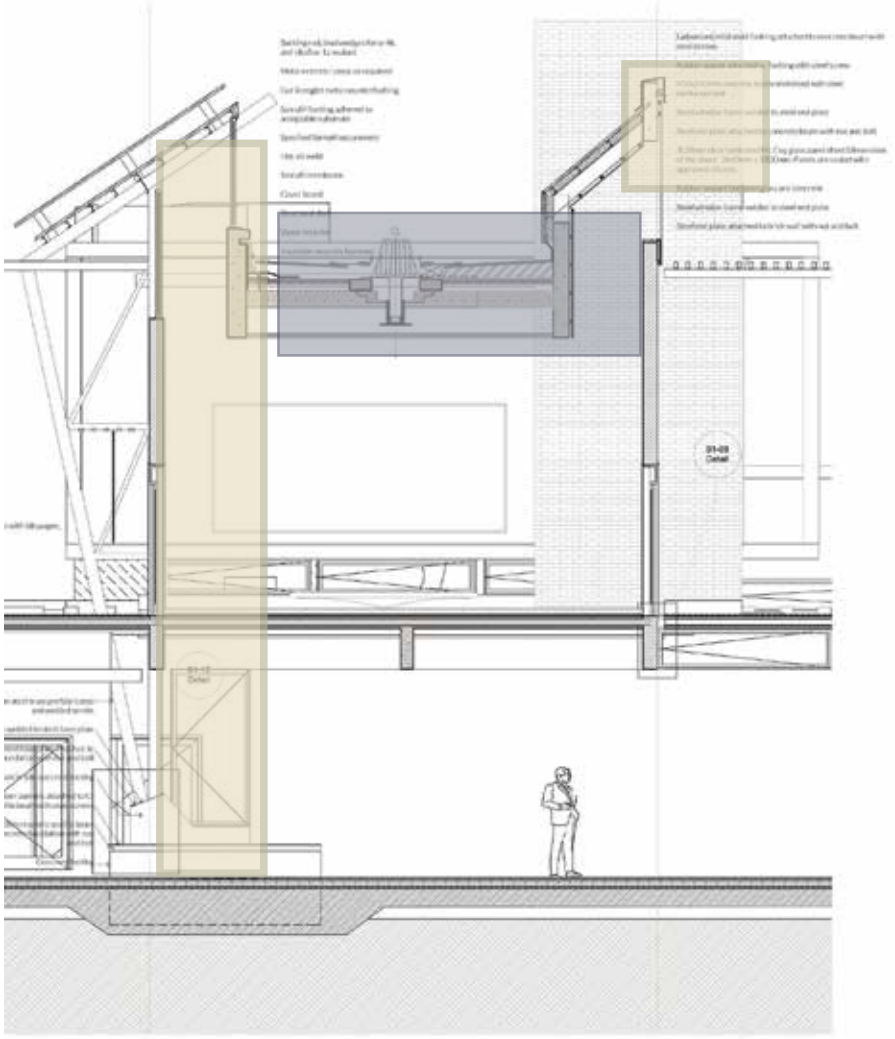


Figure 147: Gallery roof construction

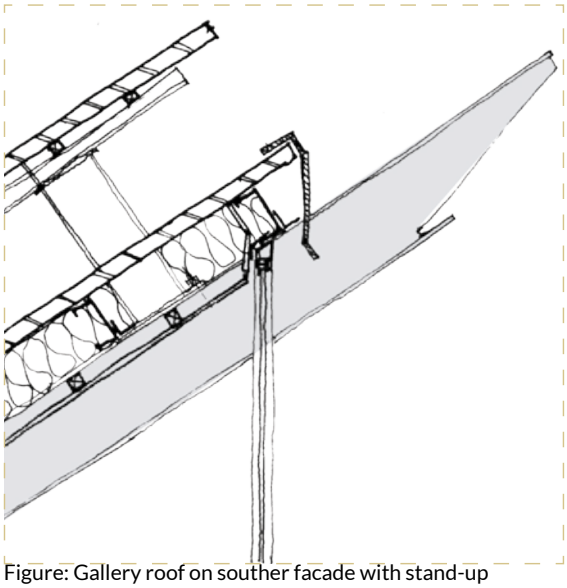


Figure: Gallery roof on souther facade with stand-up columns and extra roof layer to emphasize gallery entrance

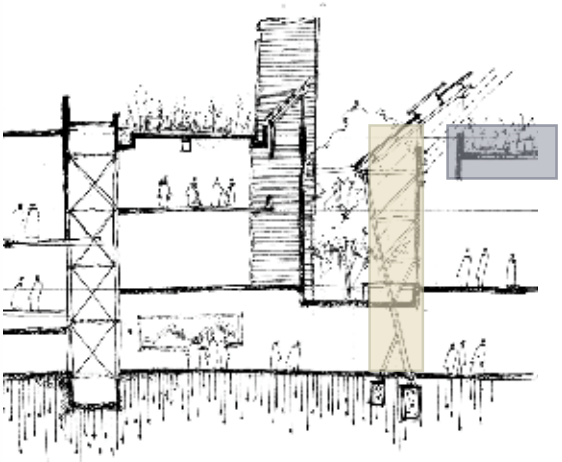
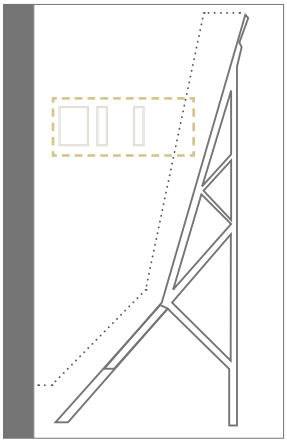


Figure 148: Conceptual development of roofs



Roofs

Two types of roof structures are used in the project. The first is a concrete cast in-situ flat roof with a SIKA roofing membrane and the second is a steel plate roof with steel construction.

Concrete roof with SIKA roofing membrane:
The concrete roof is supported by 1m thick concrete beams on either sides. The concrete columns are precast and delivered on site. The thickness of the beams is due to the 10m span without columns. 150x150mm steel I-beams are secured to the inside edges of the concrete beams. The SIKA roofing membrane construction is installed on the steel I-beams. This unit acts as a large box-gutter with a galvanized mild steel gutter that runs through the centre of the roof.

Sika-Trocal® S: mechanically fixed, UV stabilized, exposed waterproofing membrane.
The Sika roofing membrane consist of a homogeneous sheet without any polyester carriers. The sheet is designed to be used on an exposed roof for waterproofing and is attached to the roof with mechanical fasteners to resist wind uplift forces. The sheet contains ultra violet stabilizers and fire retardants. The sheet ages well and does not require any further treatment or maintenance. The sheets are flexible and can absorb movement. The flexibility of the sheet also ensures that a wind load is not directly absorbed by the fasteners, but spread through the roof membrane (Sika, 2016).

Steel roof:
The concrete roof beams serve as the structural support for the steel roof. Steel U-channels are attached to the top of the concrete beam with a steel base plate and nut and bolt connection. Steel channels are also attached to side of concrete beam at top of structure as seen in the image. C-channel purlins are attached to steel U-channels with angle irons and welded connections. The steel IBR sheeting is attached to purlins with specialized screws.

The construction system of steel roofs are also used to clad trusses. The studio and workshop spaces are covered with steel roofs.

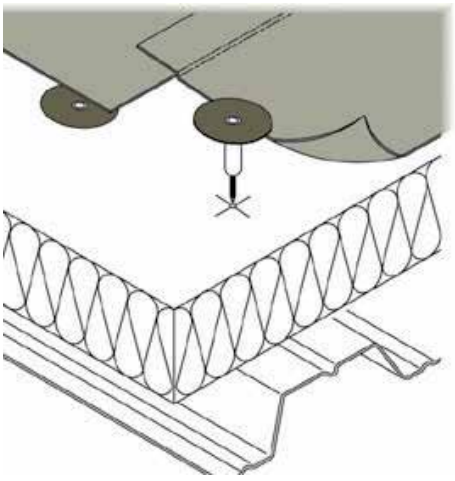


Figure 149: Sika roofing membrane attachment method (Sika, 2016).

Figure 150: Circulation route placed on existing boundary fence of UFS.

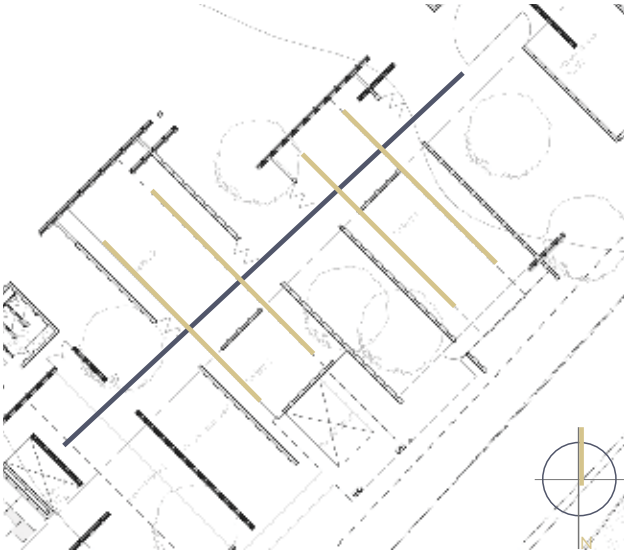


Figure 151: Circulation route interrupted by art gallery circulation.

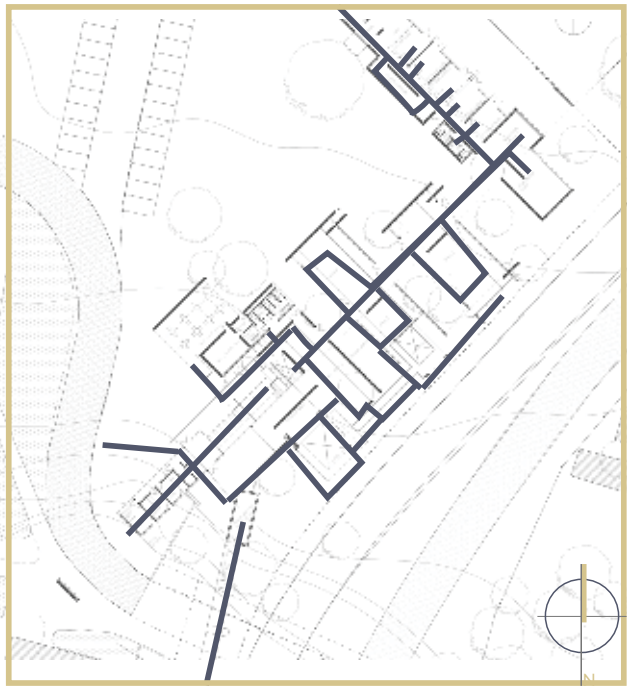


Figure 152: Vertical circulation

Figure 153:Horizontal circulation

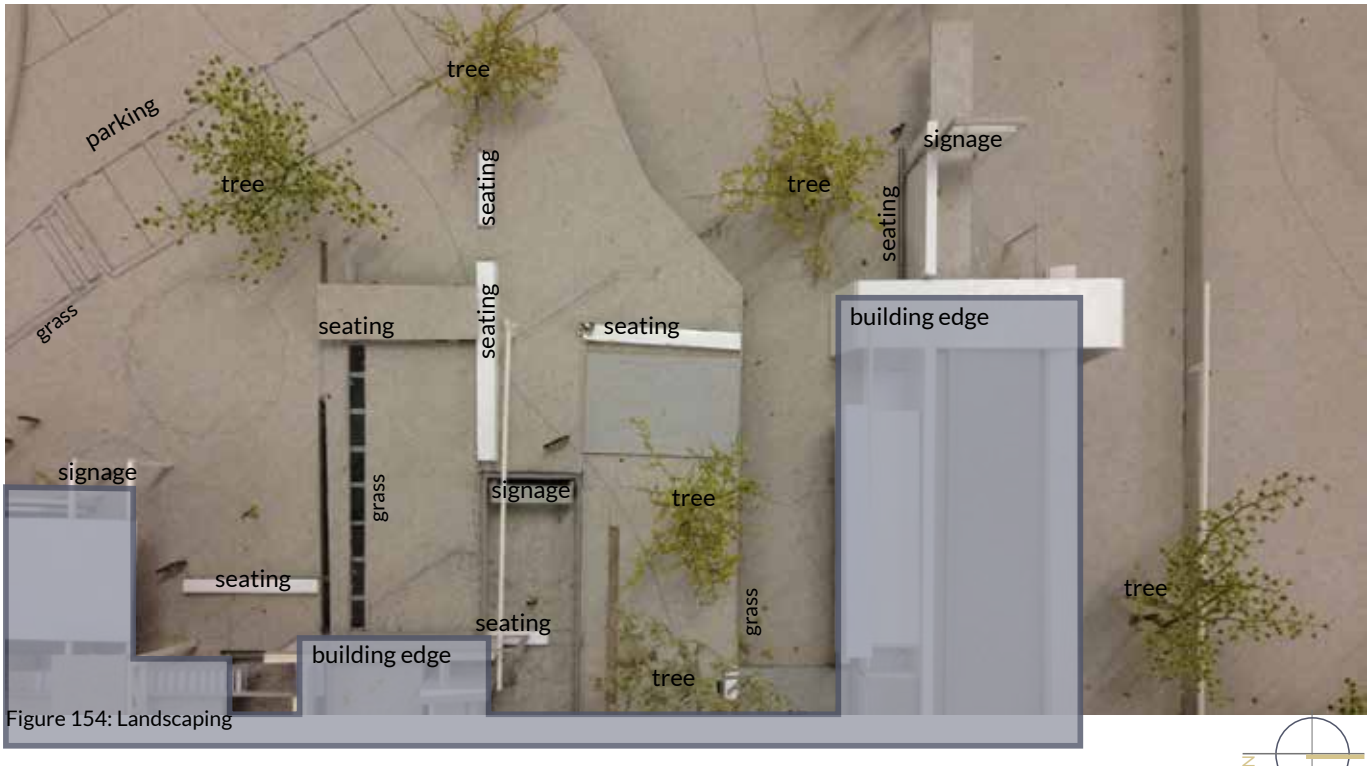
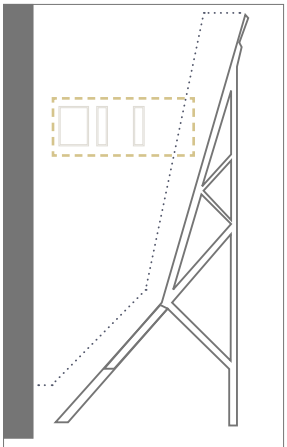


Figure 154: Landscaping

TECHNICAL REPORT

Tectonics investigation



CIRCULATION

The main circulation in the building is located where the existing fence of the university is placed. As the proposed design embodies the threshold, the circulation space allows the user to 'dwell the threshold'.

The horizontal circulation consist of a main longitudinal walkway from the one side of the building to the other. The walkway is interrupted by the art galleries. At these nodal points the circulation of the galleries are juxtaposed to the main circulation. This is explained in the image. The horizontal circulation is a combination of interior and exterior spaces.

The vertical circulation is also placed on the main horizontal circulation line in order to form one strip allocated to circulation. The vertical circulation consist of a lift which is used for people and services such as the transportation of sculptures. The ramps which stretches from the basement to the first floor are the second vertical circulation present in the building. The main entrance for the public is accessed by a ramp.

SITE PLANNING AND LANDSCAPE DETAILS

The site is next to a main pedestrian walkway on campus and also close to the Thakaneng Student Centre where people spend their lunch time. The location of the site requires the landscaping to focus on Lekgotla spaces (gathering areas). Seating areas are situated under trees and are incorporated with the sculpture gardens. The landscaping includes permanent work by Willem Boshoff like the Words Worth Wall which separates the restaurant seating area with informal seating.

The site is further developed with grass terraces forming a natural amphitheater that can be used in summer months for picnic space, etc. The path towards the entrance slopes down with the terraces.

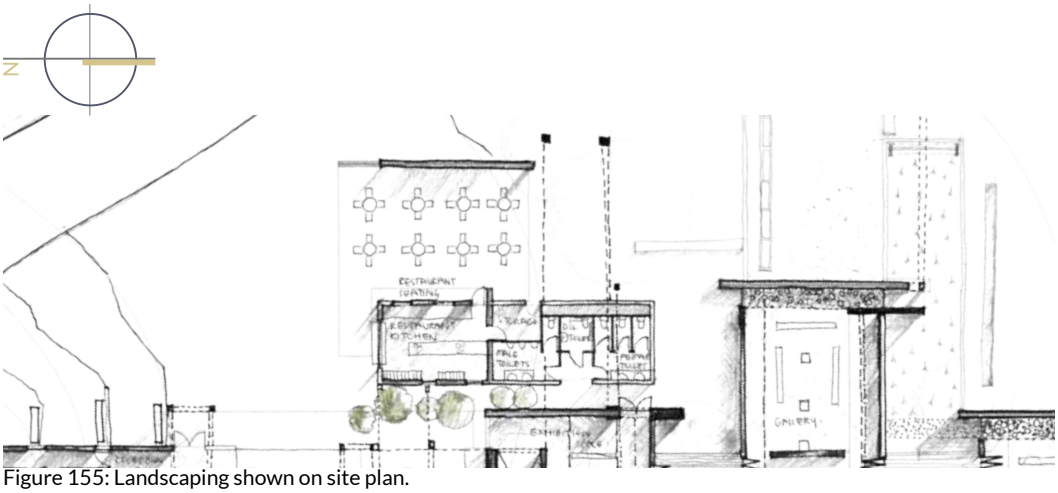


Figure 155: Landscaping shown on site plan.

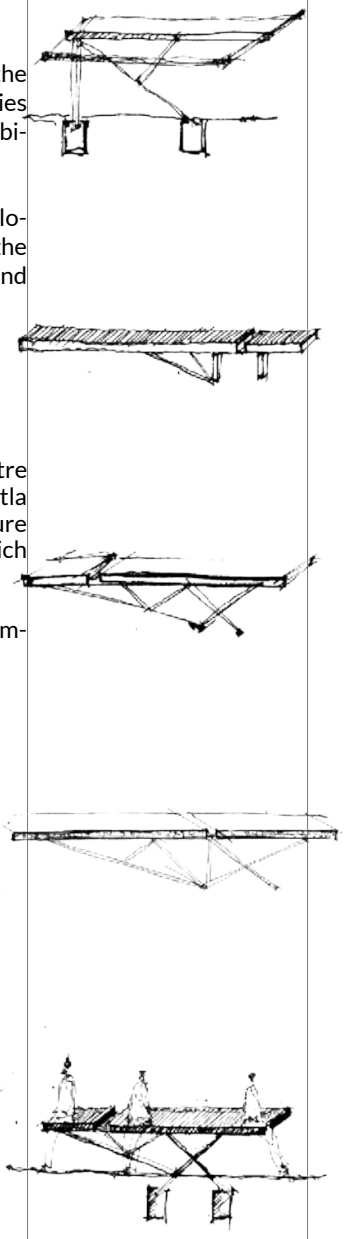


Figure 156: Development of seating space from concept of main design beams.

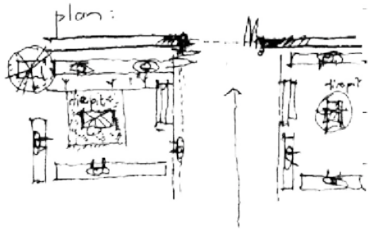


Figure 157: Conceptual planning of breating pockets

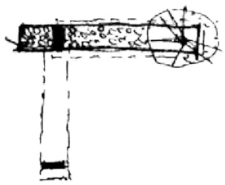
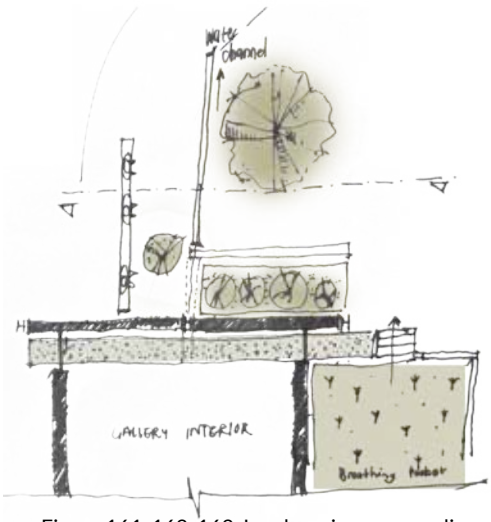
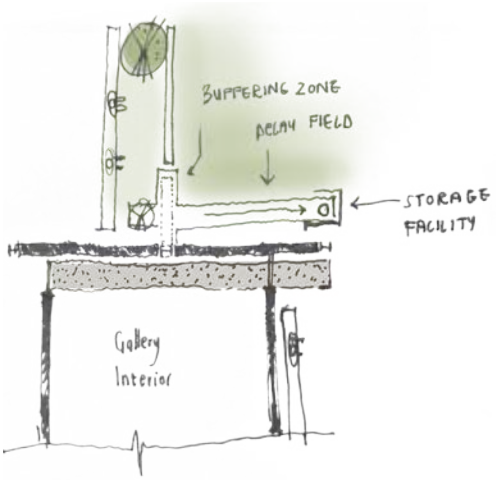


Figure 158: Seating plan

Figure 159: Seating as seen in 3D

Figure 160: Breating pockets on sides of walkway that connects art galleries.





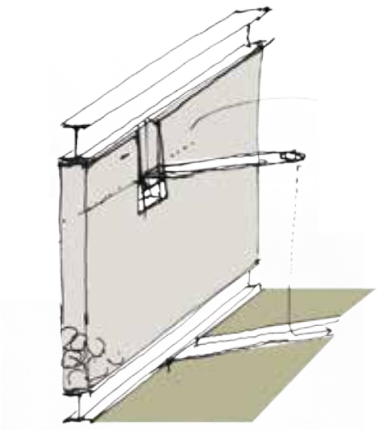
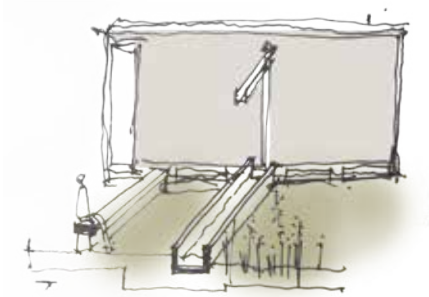


Figure 161, 162, 163: Landscaping surrounding gallery edge and gutter detail



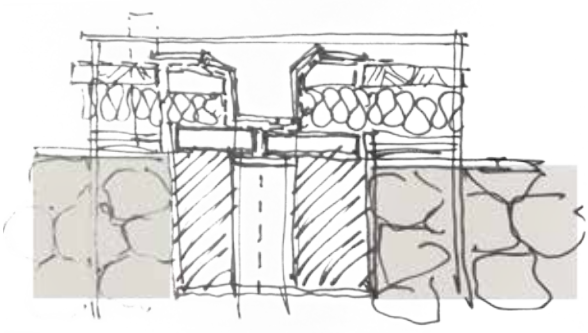


Figure 164, 165, 166: Landscaping surrounding gallery edge and gutter detail

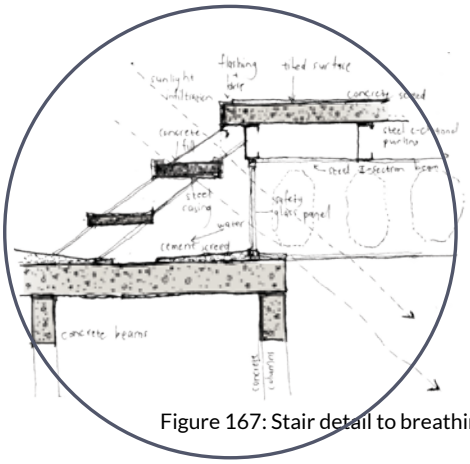
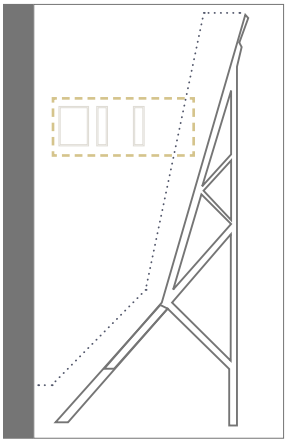


Figure 167: Stair detail to breathing pocket

TECHNICAL REPORT

Tectonics investigation



SITE PLANNING AND LANDSCAPE DETAILS:

Breathing pockets are designed in-between the galleries. These pockets contains sunken seating space with a fire-pit in the center. These can also be referred to as Lekgotla spaces as the gathering allows dialogue between different cultures attending an art opening.

The design of outside spaces with land and sculpture art together with the architecture creates a setting where the appreciation of the arts is enhanced.

Landscaping are extended into the gallery spaces through using the same material. A longitudinal strip of small stones are placed inside the gallery and extends beyond the strip window to the exterior, creating a strong dialogue between the interior and exterior. The window from the top floor to the ceiling dissolves the threshold between inside and outside.

The transforming relationship between the architecture and the landscape is explored through the Word's Worth Wall. The wall is constructed of handmade clay bricks. The artist, Willem Boshoff uses the landscape as material for his artworks. This artwork can be seen as an extension of the landscape into architecture, as the red ground of the Free State is visible in the wall.

The Word's Worth Wall serves as a screen wall for the restaurant seating area. Planter boxes are placed between the wall and the seating to encourage a natural environment. The restaurant seating is covered with louvers to allow filtrated light into the seating space.

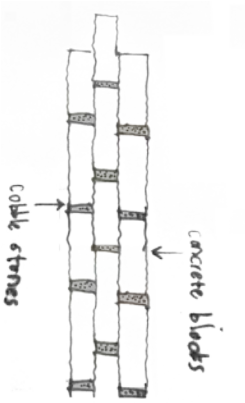


Figure 168: Paving detail

UTILITY AND SPACE ENHANCEMENT

Economic:
The restaurant is designed as an income generator for the gallery, as the gallery is for educational purposes and does not charge an entry fee. The art sales contribute to income of the gallery.

Enhancement:
The gallery space is enhanced for visitors to appreciate artworks on display. The tectonics of the project focuses on the display of the art and the lighting thereof. The project is build in a way that it is approachable from all sides. Each area is utilized for art viewing, including exterior sculpture gardens, resting pockets and landscaping.

Moral factors:
The design of the gallery is done as an extension of campus buildings and pedestrian walkways. The context was utilized as denominator in order to create a building that a pedestrian may interact with on his or her way to class.

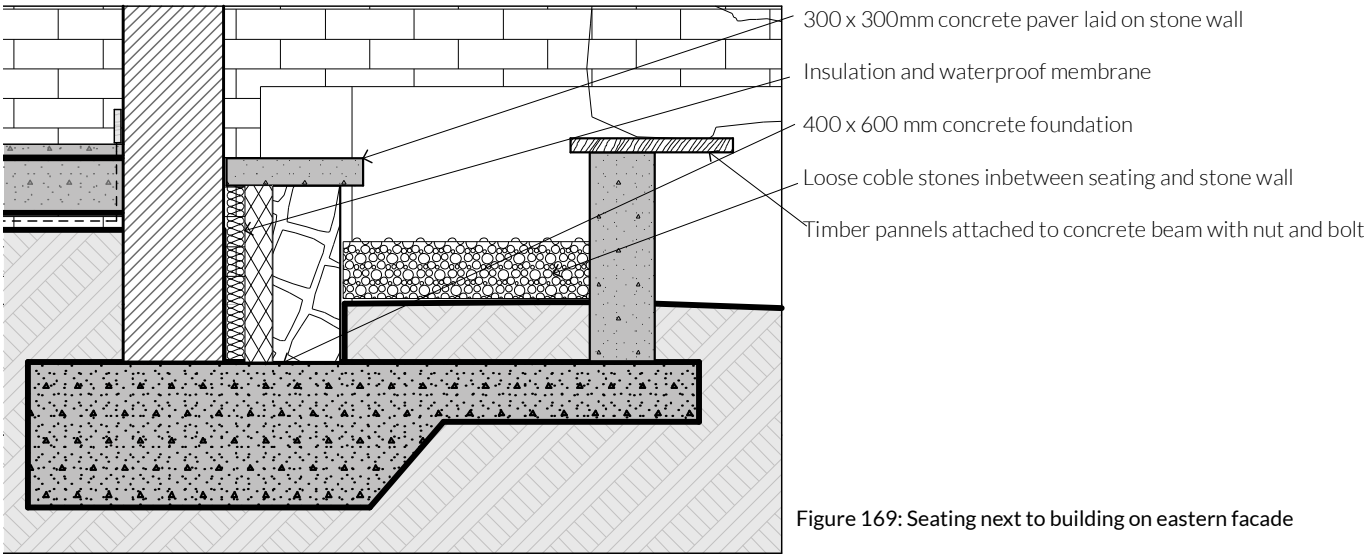


Figure 169: Seating next to building on eastern facade

Figure 170: Noise reducing landscaping section

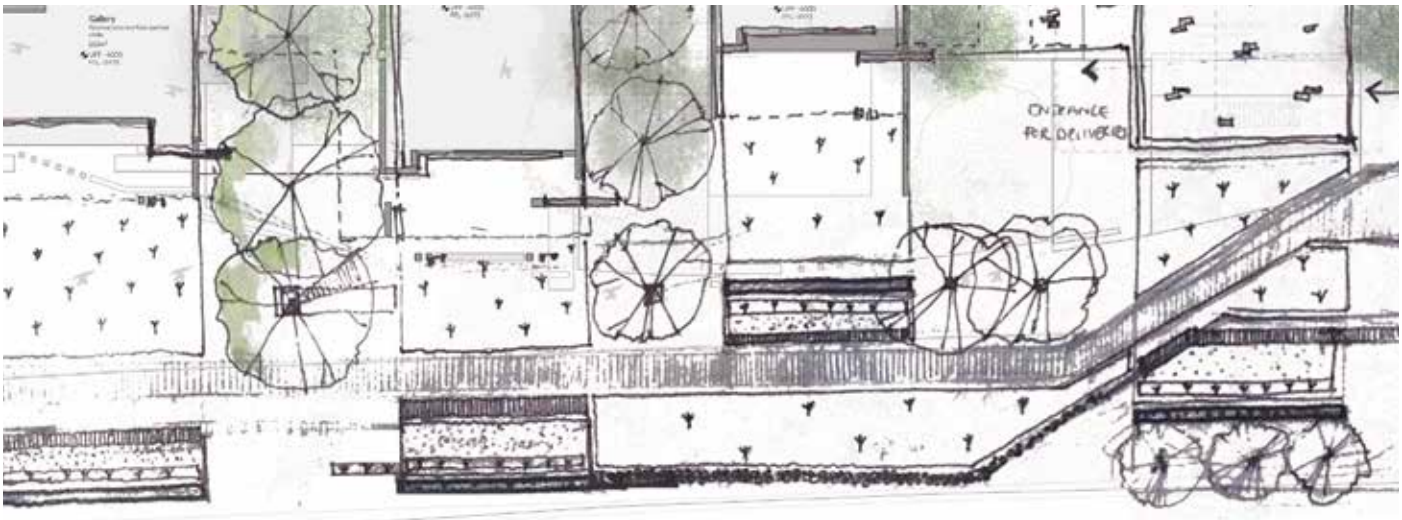


Figure 171: Noise reducing landscaping detail plan

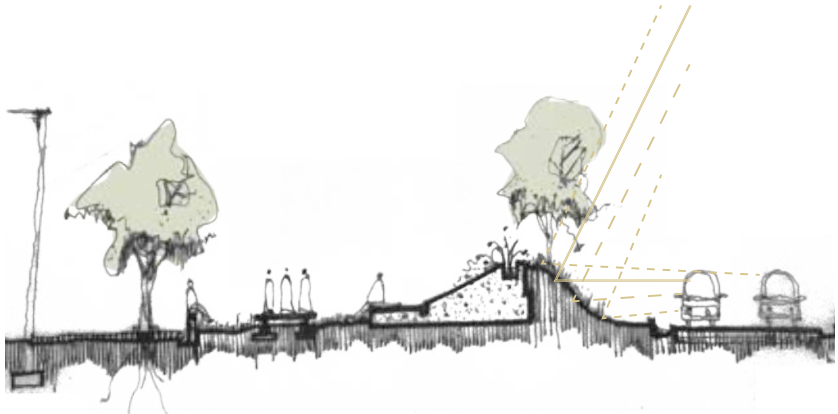


Figure 172: Noise reducing landscaping application

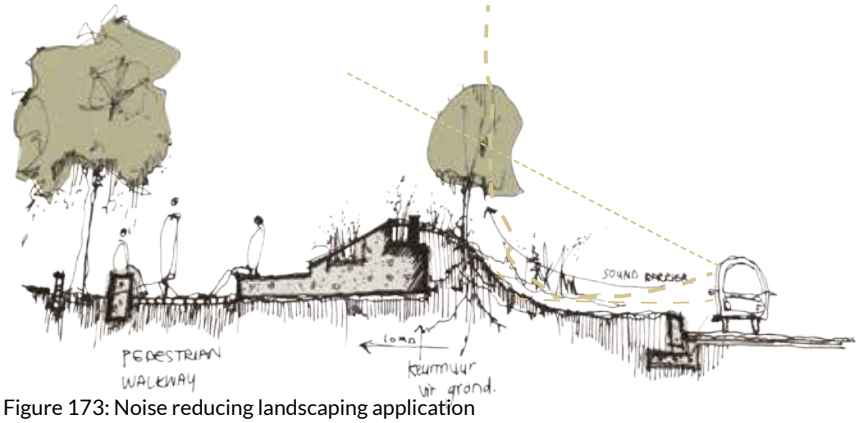
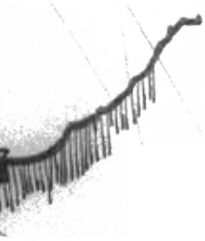
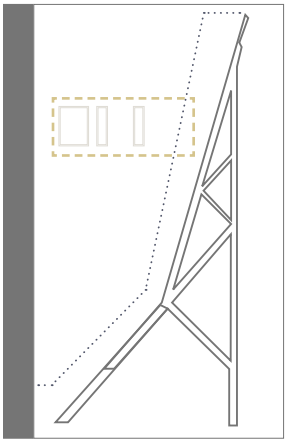


Figure 173: Noise reducing landscaping application

TECHNICAL REPORT

Tectonics investigation





LANDSCAPING AS SOUND BARRIER

The eastern facade of the building is next to the DF Malherbe road that generate noise pollution. Although this is not a very busy road, during peak times the vehicular noise may be a problem inside the art gallery. This problem is addressed with landscaping on the eastern facade.

Landscaping design for noise reduction is done through constructing a barrier which either absorbs or reflects the noise coming from the road.

This barrier is constructed with concrete and ground-fill and completed with trees and vegetation. The noise reduction landscaping include pedestrian walkways and seating between the road and the art gallery. Images shows how the noise is affected by the proposed noise barriers.

The concrete barrier walls are pre-cast and delivered and placed on site. After the concrete is placed, the ground is filled to the top of the wall to create a bank with vegetation to absorb the sound. The height of the wall is influenced by the height of the noise pollution, which is the height of a car.

The ground-fill is planted with vegetation to prevent ground erosion from storm-water.

The noise-reduction landscaping extends as a park beside the gallery, and artists may design landscape art installations in this park. The park can be seen as an extension of the sculpture gardens and breathing pockets in the art gallery proposal.

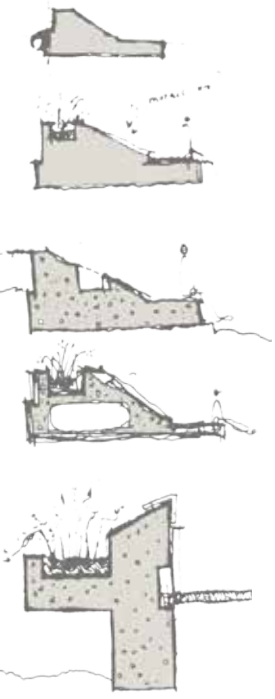


Figure 175: Concept development

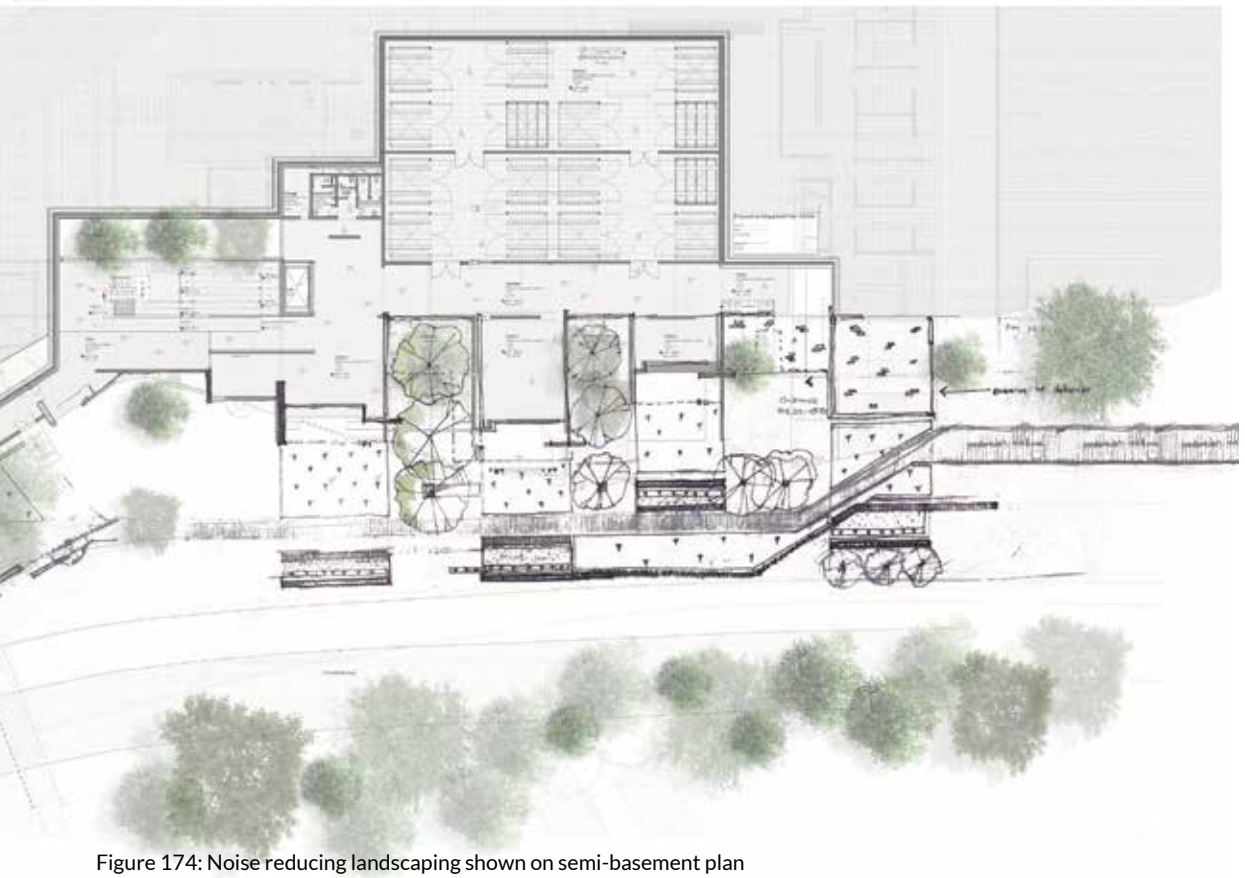


Figure 174: Noise reducing landscaping shown on semi-basement plan

Figure 175: Section through art gallery and basement corridor

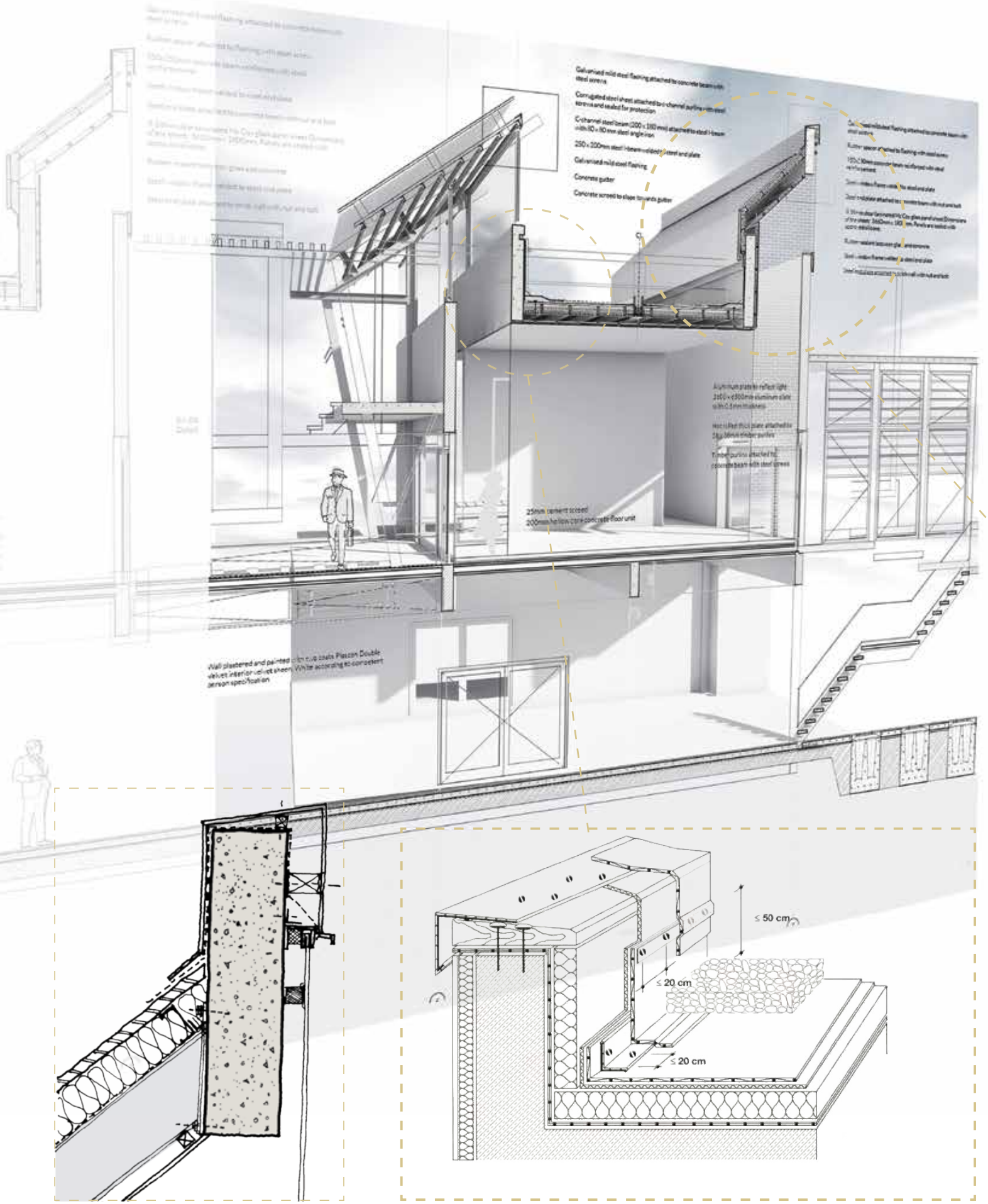
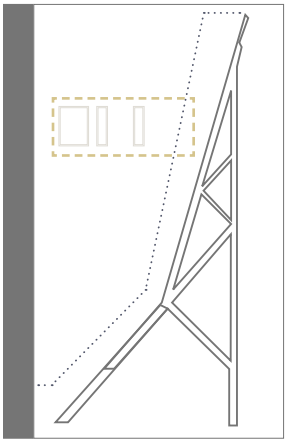


Figure176: Lightshaft in art gallery concrete beam and steel roof connection

Figure 177: Detail of upstand concrete beam with Sika roofing membrane (Sika, 2016:online)

TECHNICAL REPORT

Tectonics investigation



DESIGN DETAILS:

The structural detailing of the project is done by using the principle of 'ma', that can be defined as the space in-between or the embodiment of the threshold. Careful attention was given to the articulation between materials in order to achieve 'ma' in the details of the building.

The construction of the building is initiated with ground works for the archive. Foundations for the basement walls as well as steel columns are laid at this stage. The basement constructed consists of a concrete column and beam system with a concrete cast in-situ floor. The walkways on the ground floor is articulated to the basement through the infiltration of light. The floor is lifted underneath the walkway with steel construction to allow light into the basement. The detail shows the steel beam with glass panel

The second floor is constructed of a similar concrete and beam structure. Load-bearing walls are added for structural support. The galleries requires uninterrupted viewing space. To achieve this, concrete beams are used as the structural load-bearing element. A steel structure is connected to the beams as roof covering and light shaft to allow natural light into the gallery.

Glazing transcends beyond the usual purpose of a window opening. Glazing is fastened to the northern exterior facade to create a uniform view.

The light shafts in the main entrance consist of purpose made steel beams which contributes to the sculptural quality of the construction and is also a load-bearing element for the roof structure.

Figure 178: Gallery roof detail

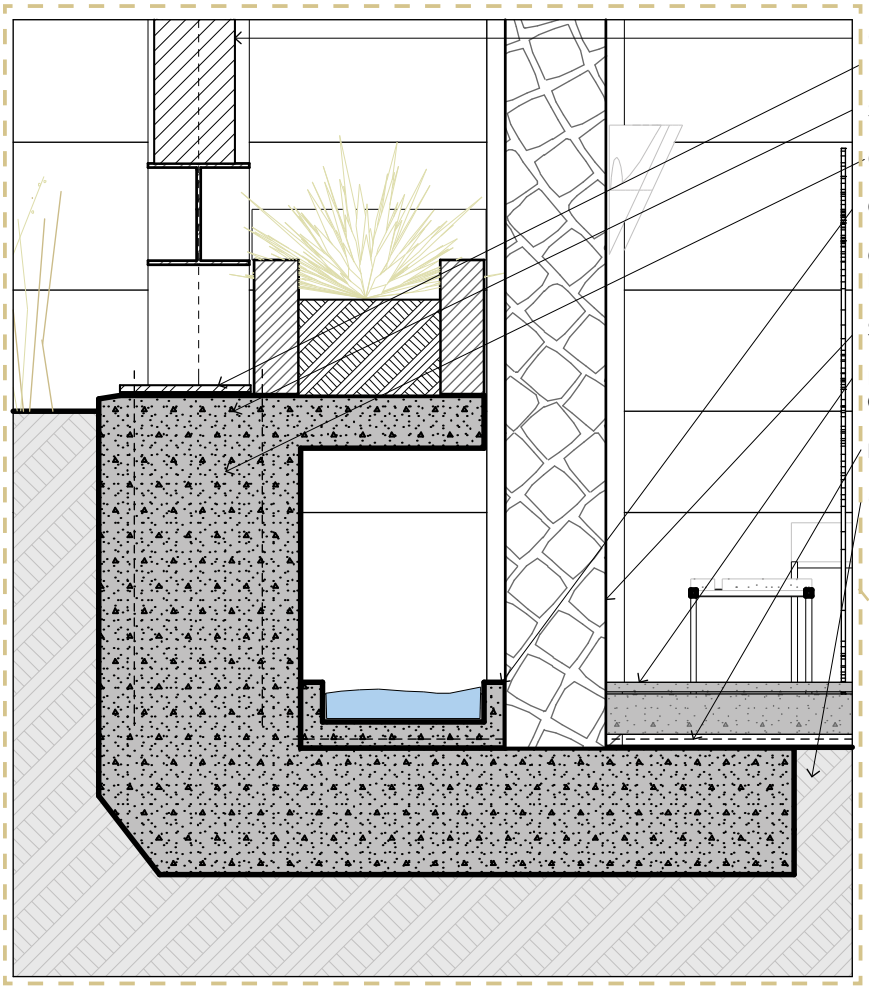


Figure 179: Detail showing storm-water management and planter box

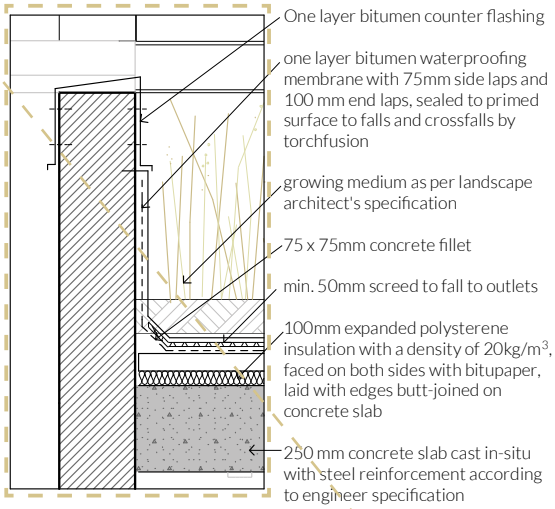


Figure 180: Detail showing green roof construction

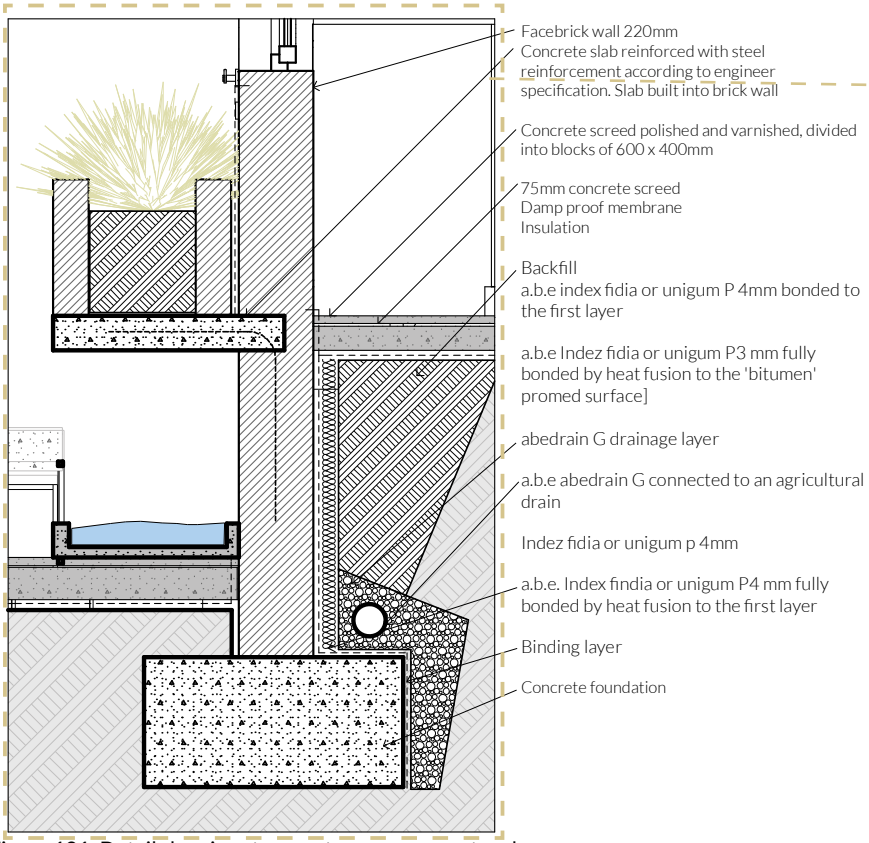


Figure 181: Detail showing stormwater management and planter-box

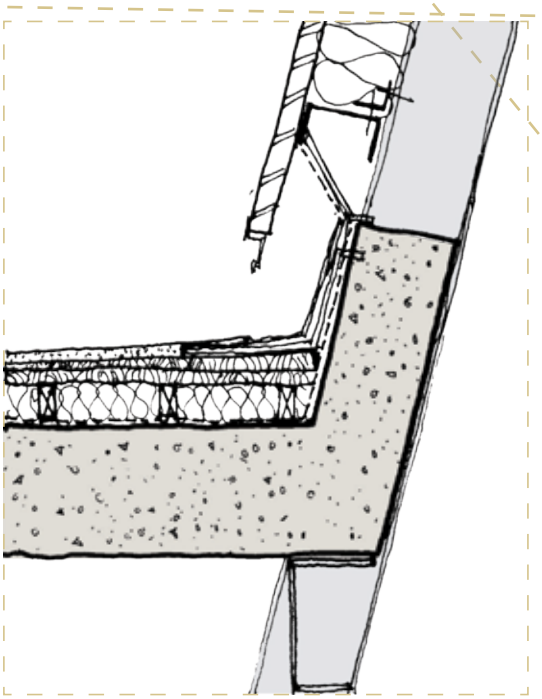
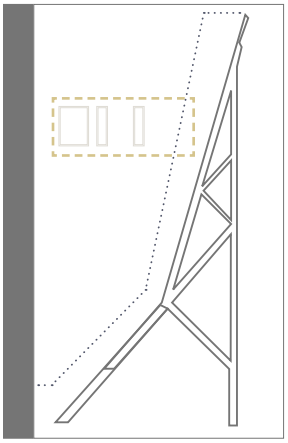


Figure 182: Flat concrete roof with SIKA insulation connection to light shaft column

TECHNICAL REPORT

Tectonics investigation



DESIGN DETAILS:

Details of the restaurant and ramps are shown in the short section at the bottom of the page. The restaurant is situated on a lower level than the natural ground line, the drainage of this level is therefore important. Cast-in-situ concrete gutters are placed underneath the plant boxes. The floor slopes towards the concrete gutter. On the northern side of the restaurant, the gutter flows into a pvc pipe that carries the water to the northern end of the side where the slope lowers to let the water out on the natural ground level. The green roof absorbs rainwater and overflow is allowed into the gardens.

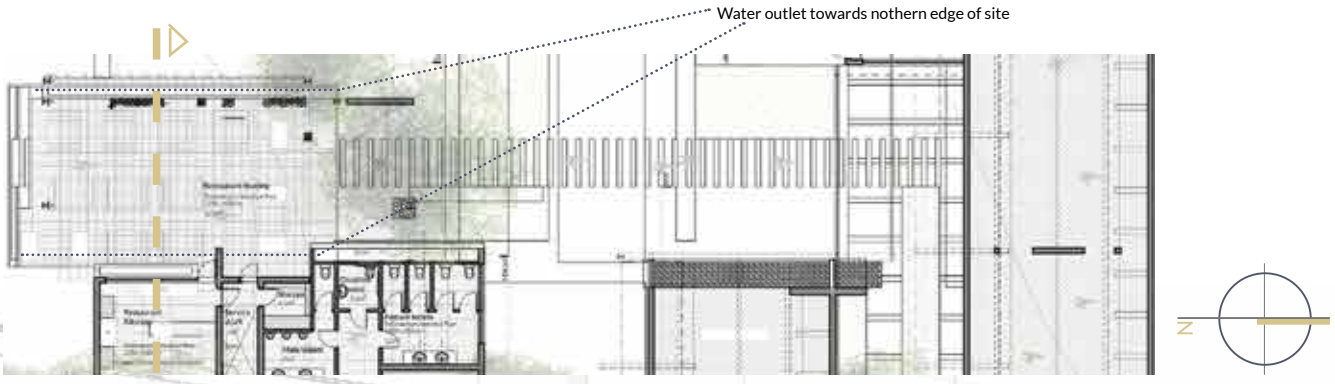


Figure 183: Floorplan indicating section and storm-water management

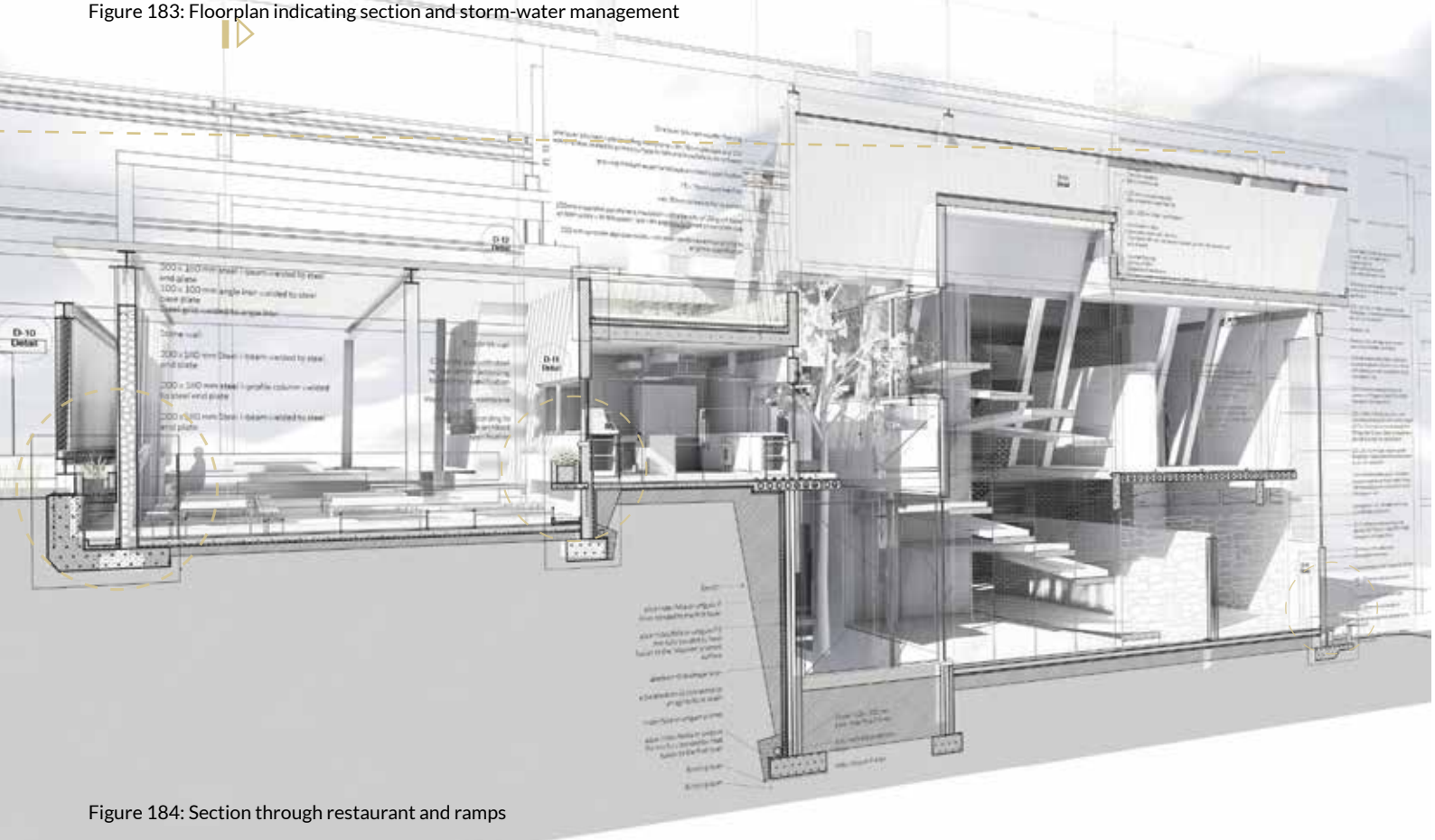
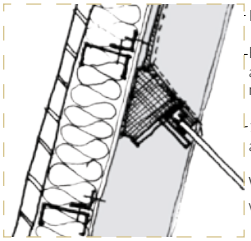


Figure 184: Section through restaurant and ramps



Klip-loc 700 Chromadek Z200 dove gray steel sheeting

Eco-Insulation heavy duty lightweight cellulose fibre insulation manufactured and certified in accordance with SANS 1381-6:2001, evenly pumped to a minimum R-value of 3,37 m2.K/W depth of 135m in roof space

100 x 50 mm Steel C-channel purlins welded to 500 x 500mm steel angle irons attached to steel I-beam with nut and bolt

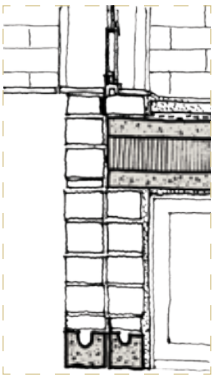
Waterproof membrane: abe Bitumen-Polymer reinforced prastomeric waterproofing membrane containing distilled bitumen and plastomers

8 mm laminated safety glass window, installed in purpose-made alluminium window frame with charcoal powder colour finish.

Aluminium window frame attached to steel angle iron with steel screws

Angle iron welded to steel end plate attached to steel I-beam with nut and bolt

Figure 185: Light shaft glass connection to column



Aluminium sliding door, see detail in door schedule

25mm cement screed polished
damp proof membrane

200mm thick hollow core concrete floor unit

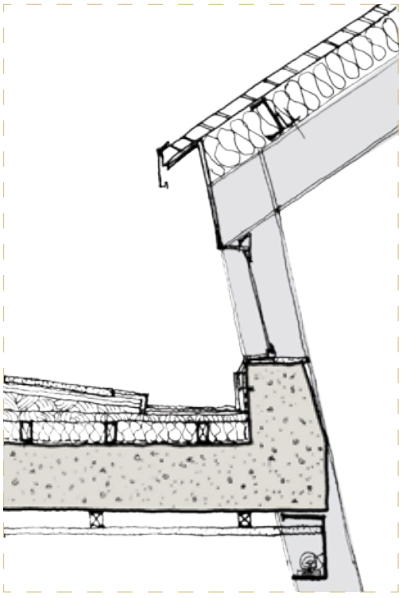
38x38mm timber battens

Gypsum ceiling board, skimmed and painted white

8mm safety glass installed in purpose made aluminium frame. Frame attached to concrete beam with steel screws

Concrete column

Figure 186: Hollow core concrete roof beam built into brick wall



Galvanised mild steel sheet flashing attached to I-beam and corrugated steel sheet

3mm glass installed in purpose-made aluminium window frame with charcoal powder colour finish

Window attached to purpose made steel I-beam with screws in pre-drilled holes. Sealed on sides with silicone sealant

Galvanised mild steel sheet flashing

Cement screed to slope towards cast in-situ cement box gutter

200mm concrete cast in-situ roof

38x38mm timber ceiling battens

9.5 mm gypsum ceiling board fixed to battens with steel screws. Plastered with gypsum plaster and painted white

Figure 187: Artist studio roof detail with SIKA insulation

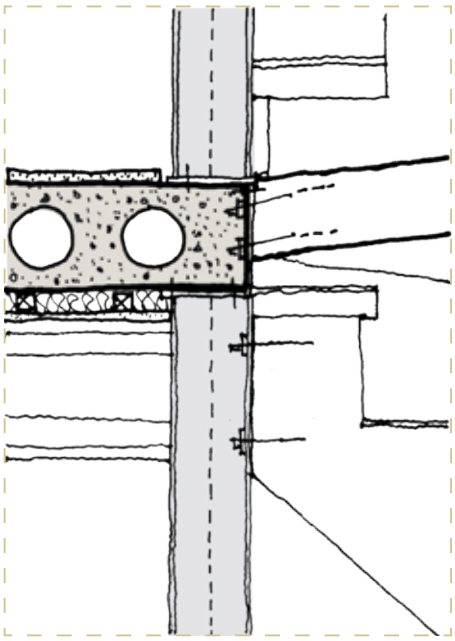


Figure 188: Connection between stairs, ramp and hollow core floor slab

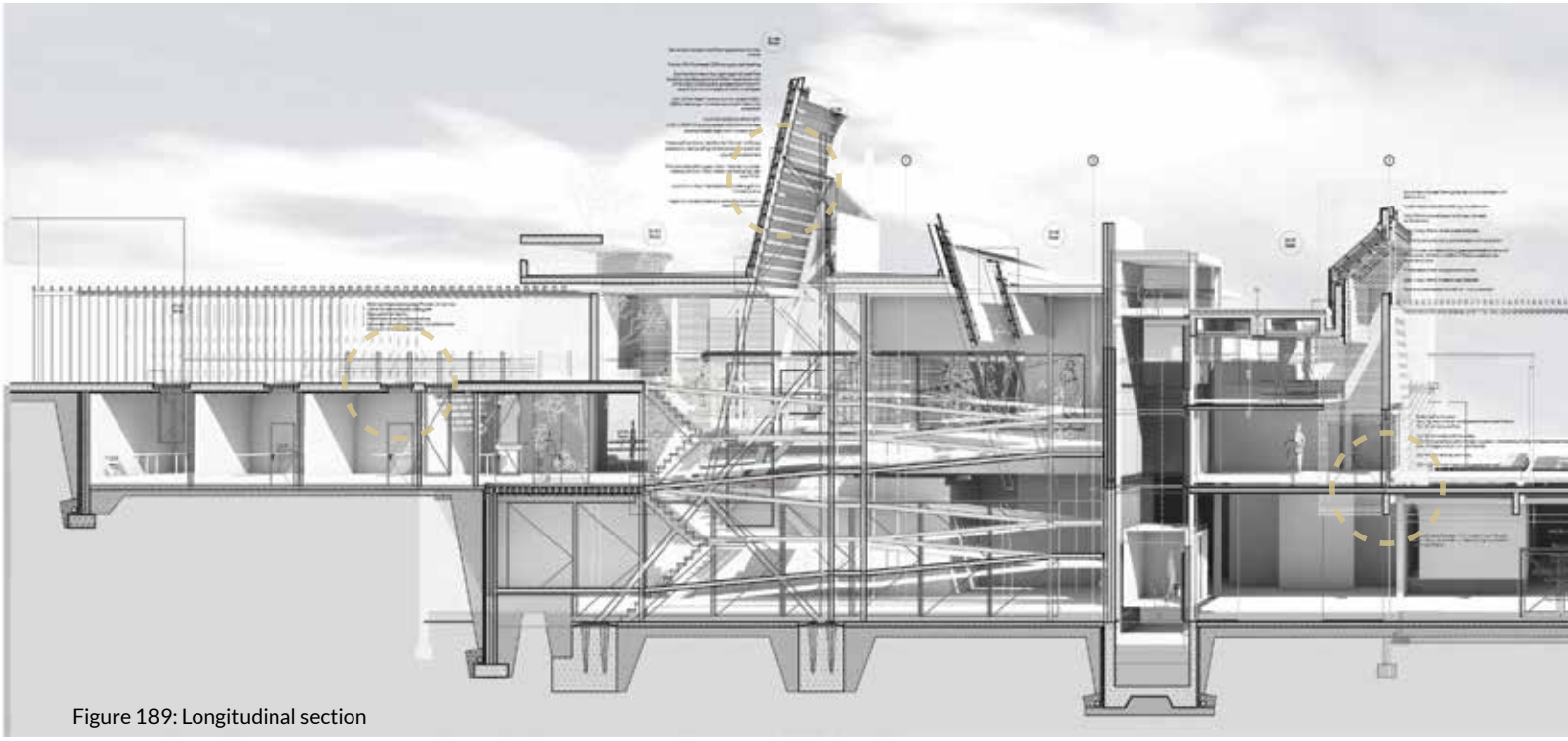
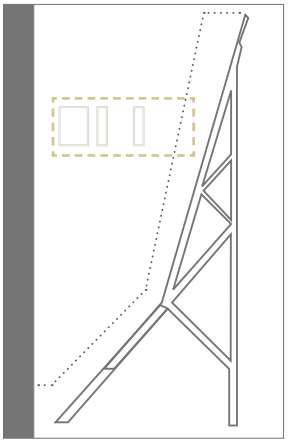


Figure 189: Longitudinal section

Tectonics investigation



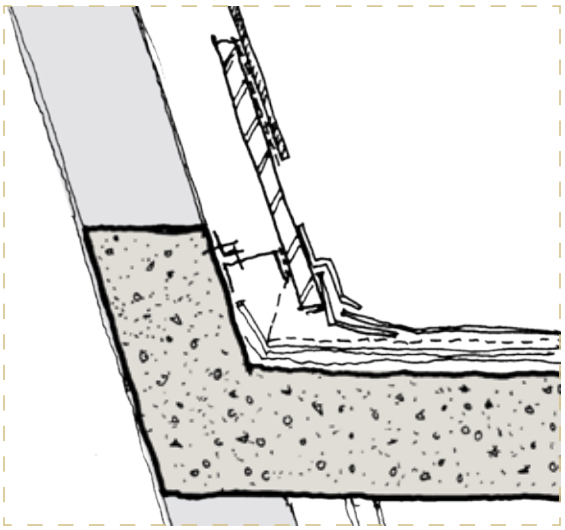


Figure 190: Light shaft column connection to concrete floor slab with SIKA flooring membrane

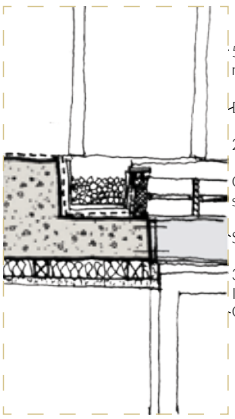


Figure 191: Light shaft in steel grid in floor allowing light into office spaces

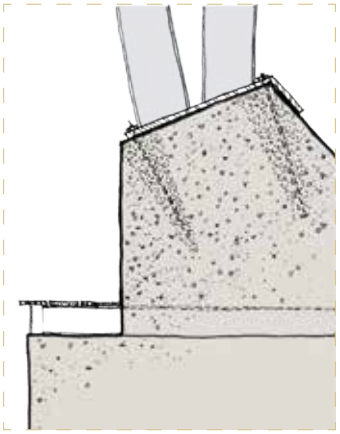


Figure 192: Concrete foundation and seating detail

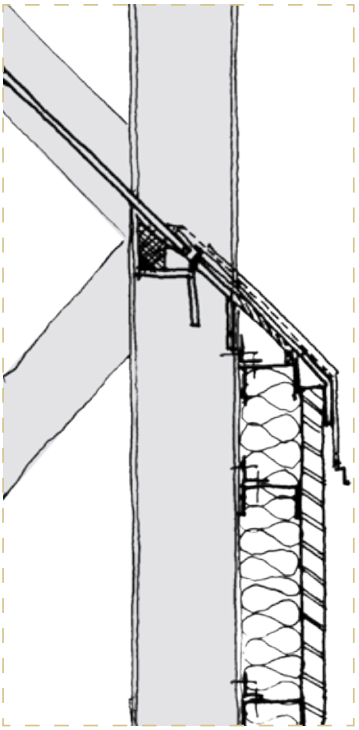


Figure 193: Light shaft column connection to cladding

Fire extinguisher

Fire exit

Rain water harvesting tank

HVAC outlet

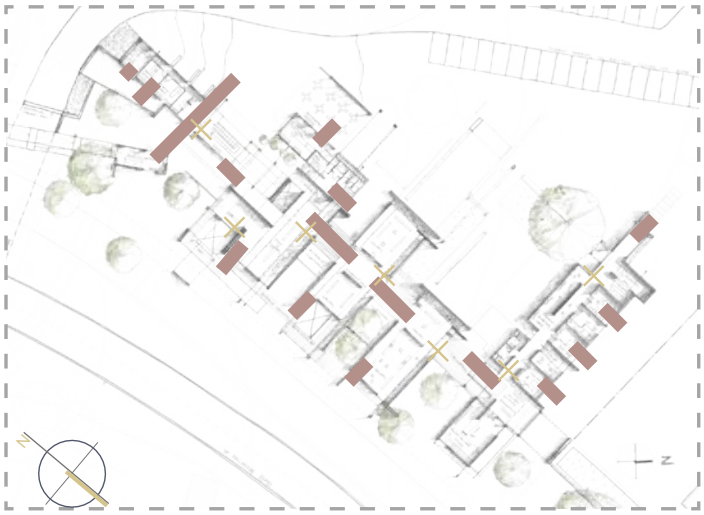


Figure 194: Fire escape routes on ground floor.

Figure 195: Placement of water tanks.

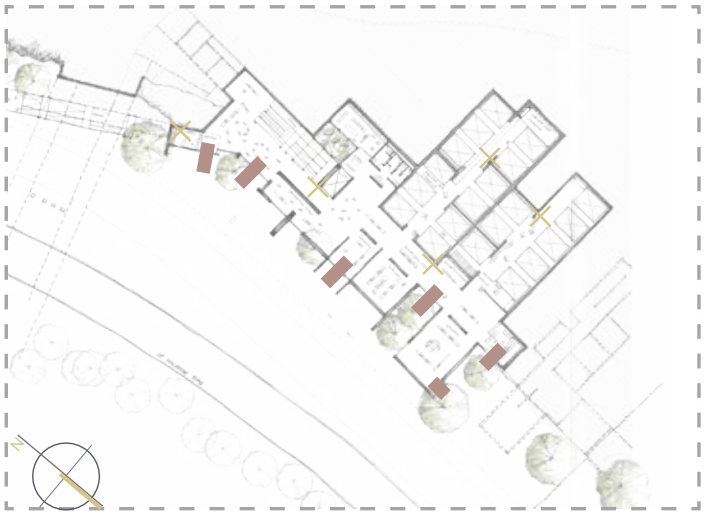


Figure 196: Fire escape routes on semi-basement.

Figure 197: Placement of hvac outlets.

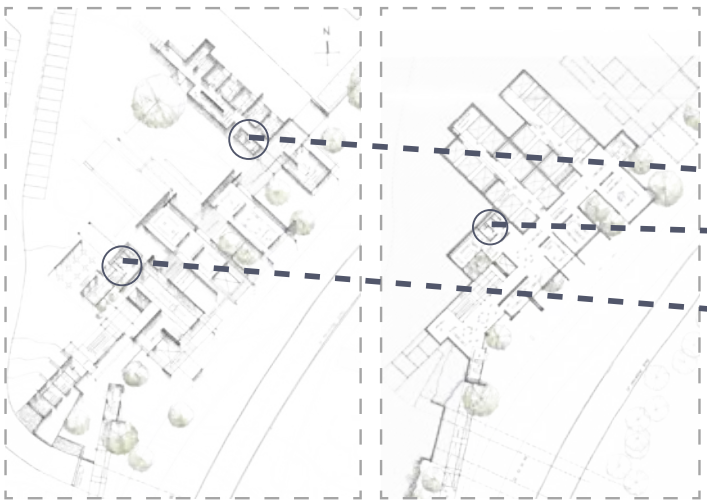


Figure 198: Placement of disabled toilets on ground floor and basement plans.

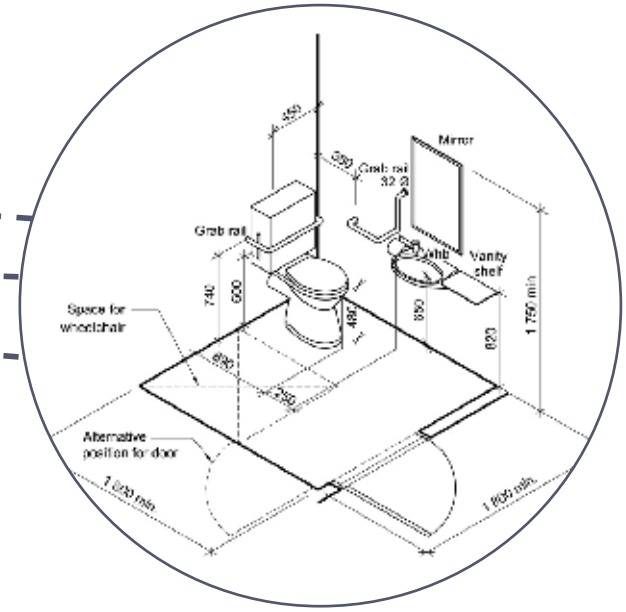
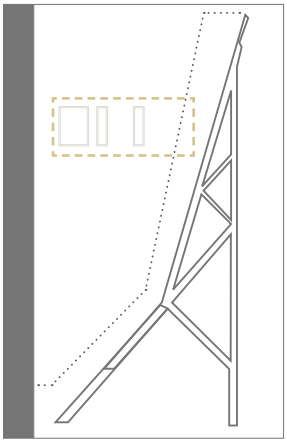


Figure 199: Layout of disabled toilet (Mowtrad.com, 2016).

TECHNICAL REPORT

Tectonics investigation



BUILDING SERVICES

// HVAC
The building contains a passive design system to optimize heating and cooling which will be described in the sustainability report. Mechanical ventilation is provided for the gallery spaces to control room temperatures adequate for art. The outlet pipes for the air-conditioning will be placed on the flat roofs of the gallery to hide it from sight on ground level.

//Water
Water is supplied by the municipality and rainwater is harvested for irrigation. Rainwater tanks is placed on the western facade of the building and is integrated with the design. Irrigation is kept to a minimum, for the landscaping is designed with succulent plants.

//Fire
The breathing pockets in the building ensures fire escapes. The half-basement has exits towards the eastern side of the site for fire escape. No fire stairs are necessary.

Fire hoses are installed at various points in the building. According to the South African National Regulations, two escape routes should be provided in a two story building. If the traveling distance is more than 4 meters to the nearest escape door, then not less than two escape routes are necessary. The total traveling distance from the furthest point in a room to an exit door should not be more than 15 meters. The total traveling distance from within the room to the access door shall not be more than 45 meters. Hose reels should be installed on every floor in a building and in every area for 500m². Any hose reel installed should be able to reach any point in the area as a form of protection (SANS, 2011: Part T-Fire Protection).

BARRIER FREE ENVIRONMENT

Access for Disabled Persons, NBR:
According to the National Building Regulations, walkways and ramps shall have a gradient, measured along the center-line, not steeper than 1 : 12, and where the difference in level of the ends of the ramp exceeds 400mm (SANS, 2011: Part S).

The foyer and main circulation space of the building contains ramps from the basement to the first floor. These ramps are used for exhibition space as well as wheel-chair access. The lift serves both visitors and building services and is situated in one of the main gallery spaces and is therefore easily accessible for disabled persons.

Disabled toilets are provided on the ground floor and first floor of the gallery, as well as in the workshop building. The door to the toilet is about 950mm wide with adequate space for turning. The door must open to the outside for safety precautions, in case the person should fall inside. The toilet seat must be 470mm high with hinged handles. A wheelchair friendly basin is also a crucial requirement, Thus, the mirror should be situated at an appropriate height.

The exterior of the art centre with the sculpture garden and land can be viewed by anyone at any time as it is not fenced in and extends to connect with the rest of the university. The exterior space can be used as a recreational area for informal gatherings which may be done free of charge at any given time. In this way the building creates a communal accessible green space.

Figure 200: The site before proposed intervention shows the site as an informal parking space. The boundary fence where the road were closed off is unused and will be developed as parking space for the proposed art gallery.

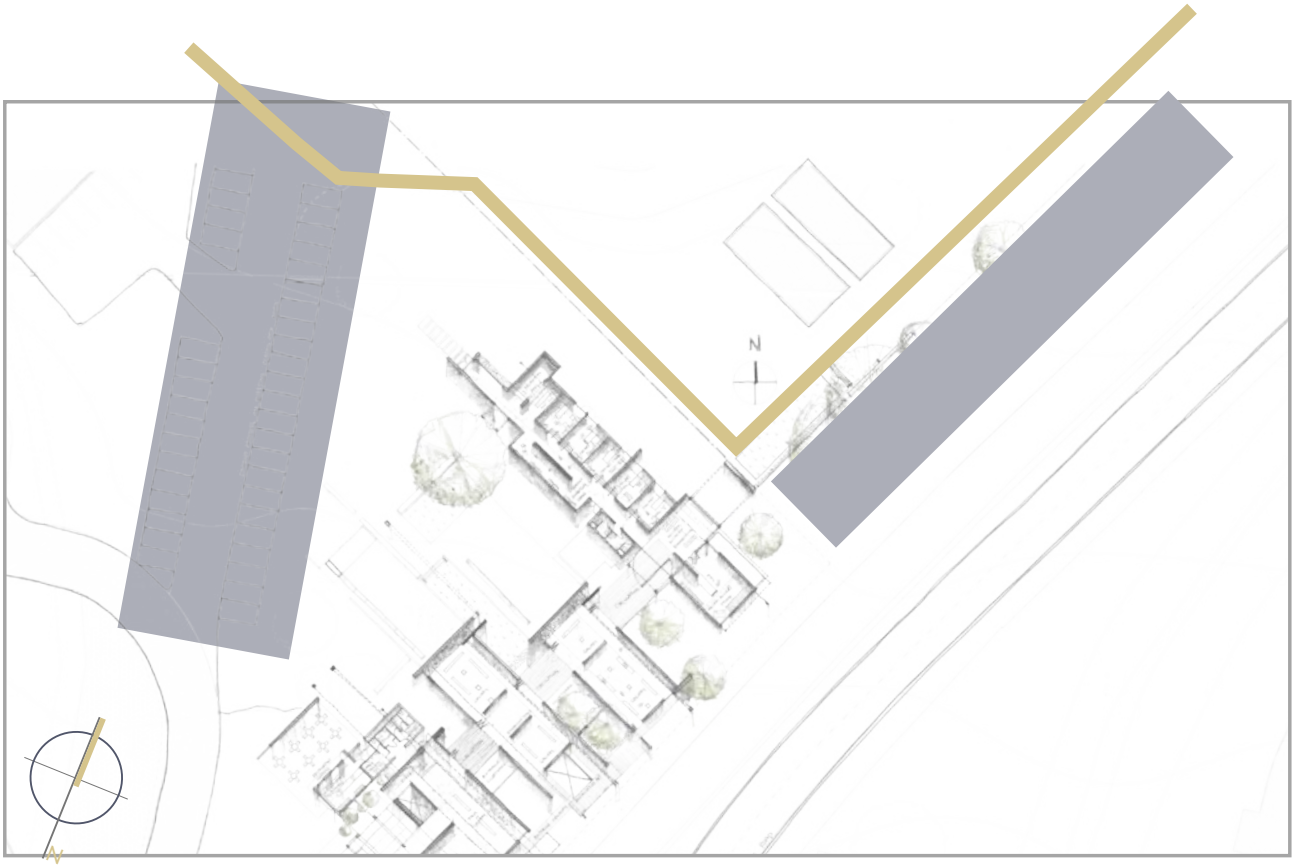
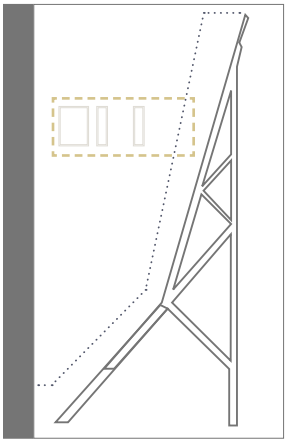


Figure 201: The site with developed parking space.



University boundary

Parking

PARKING REQUIREMENTS

The size of a standard parking space is 2.5m wide x 5m long with an aisle of 7.5m in-between rows of parking for vehicle access (Pinheiro, 2013: 537).

The average per head-on parking space required for a public building is 11,52m² (4.8m x 2.4m, with 6.1m clear zone).

Parking on site is provided on the road that was previously closed off by university boundary fence. As the road is already paved, a small paved area can be added to create a parking lot. This parking will be used for visitors to the gallery as well as student parking.

Parking for public visitors is located on the outside edge of the boundary fence between the two bridges.

Transport:
The taxi rank on campus is walking distance from the gallery, and therefore public transport is easily accessible from the gallery site.

Should the parking for the gallery be insufficient, then the visitors can make use of the Sasol Library parkade, as it is walking distance from the site. This parking area is also used for the Johannes Stegmann Art Gallery on campus..

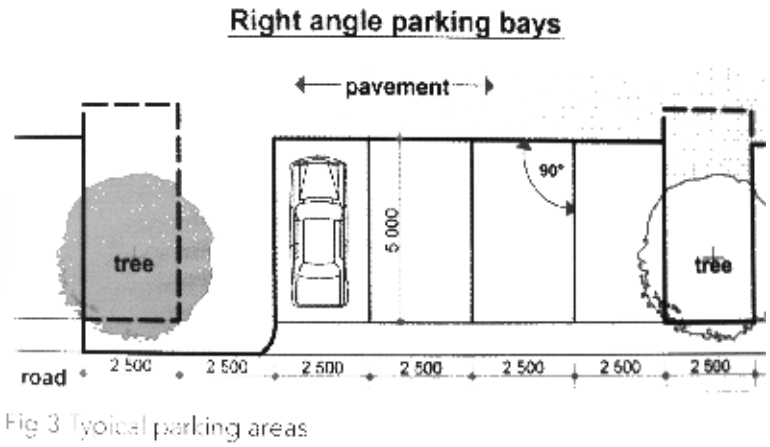


Fig 3 Typical parking areas

Figure 202: Right angle parking bays by regulation (Schmidt & Pinheiro, 2013)

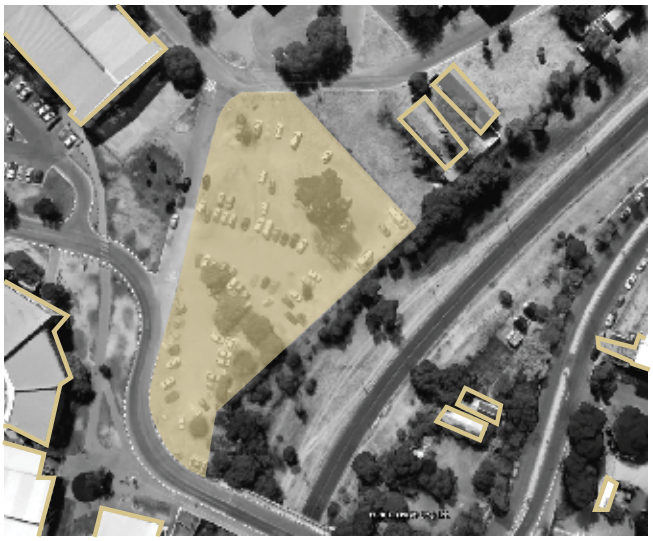


Figure 203, 204: showing open site and surrounding buildings.

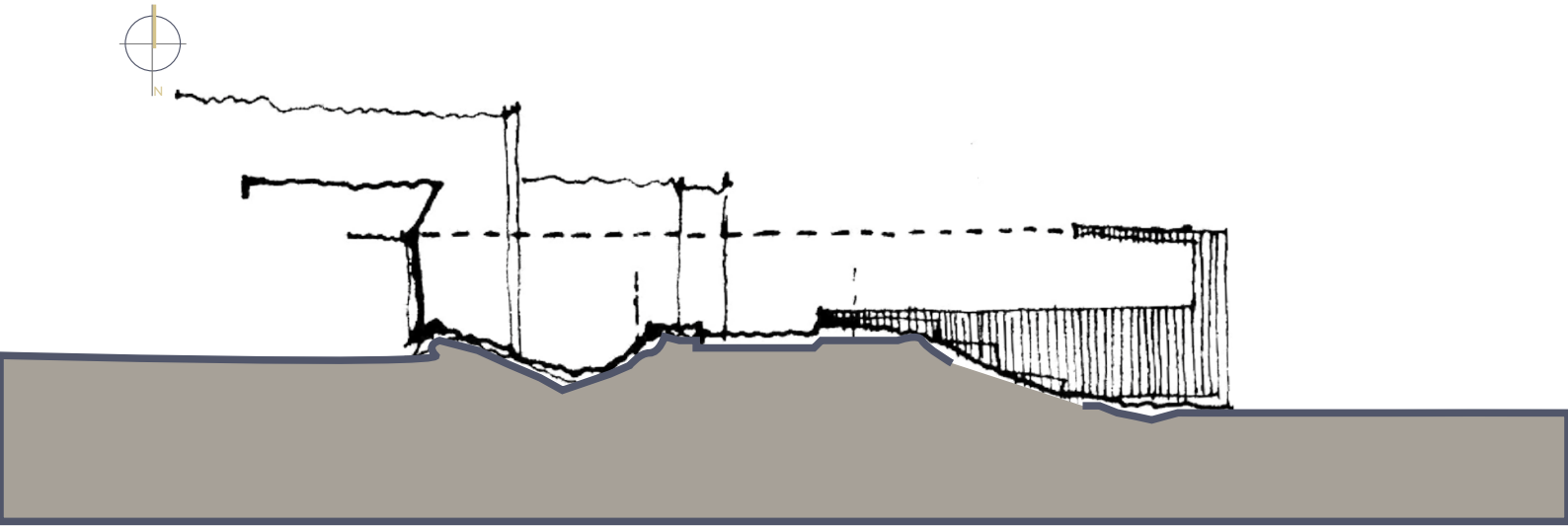


Figure 205 :showing connection to context in height.

Figure 206: LED artificial lighting used in galleries (Lumicrest High CRI LED Lighting, 2016: online).

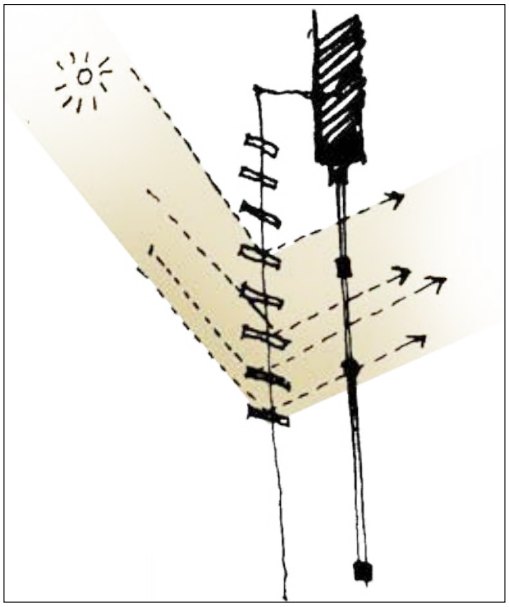
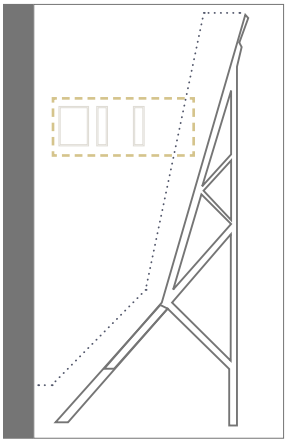


Figure 207: Louvers on western elevation.

TECHNICAL REPORT

Tectonics investigation



SUSTAINABILITY REPORT

Sustainable design is a method of designing buildings to comply with the principles of social, economic and ecological sustainability. The sustainability of a design can be measured in four aspects: conservation, environment, society and economic.

//Conservation

Conservation is done through the use of an open site. No buildings will be demolished or damaged during the construction of the gallery. The gallery continues beyond the university boundary and fills a non-place area in the city. Function is added to the unused space.

The proposed development does not overpower the existing context and continues with the architectural language of the campus.

//Energy and environmental sustainability

The proposed project uses passive design solutions to reduce the use of artificial heating, cooling and lighting for comfortable interior spaces.

Passive solar heating is achieved through creating a well-insulated building envelope. Materials with a good thermal mass will be used. These include clay bricks and concrete roofs.

Large windows are limited towards the southern elevation of the building. Fenestration on the northern side does not allow direct light into the galleries. Glazing on the western elevation is shaded with a louver system. The western facade of the building is further shaded with deciduous trees.

//Lighting
Indirect sunlight is utilized through clever design solutions. The building does not require any artificial lighting on the ground floor during daytime. Artificial lights are installed to illuminate artworks at night.

LED lights are used in the galleries in order to reduce the concern of deterioration of artworks through UV light emissions. LED lights have no emission in the UV spectrum and emit less heat than normal light bulbs. This reduce the risk of damage due to infrared heat. LED lights also saves a lot of energy costs (Lumicrest High CRI LED Lighting, 2016).

//Windows
The amount of light that a window admits into the interior has to do with the 'sky factor'. Windows at lower levels, where clear sky is only a minor proportion of the view they frame, admit less light than those higher up. Enlarging windows by raising their height will result in brighter conditions than widening will (Conran, 2010).

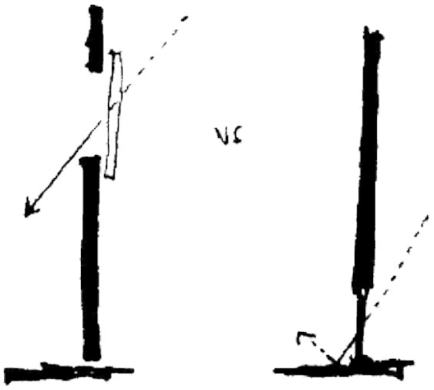


Figure 208: Sky factor emitted by window.

Figure 209: Spatial planning:
Services shown on ground floor plan.

Figure 210: Offices with courtyard on eastern side.

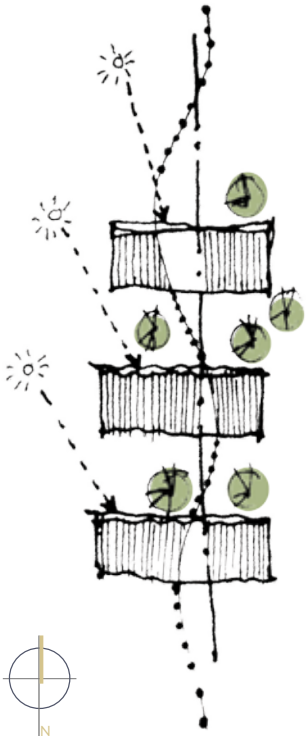


Figure 211: Orientation of building from north to south.

Figure 212: Green space and landscaping:
Plants in front of window.

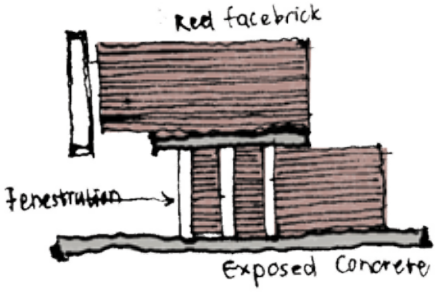


Figure 213: Green space and landscaping:
Planted surfaces to regulate storm-water.

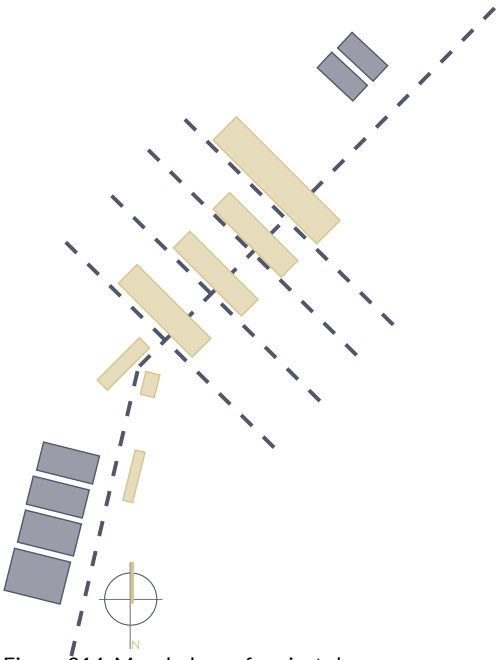


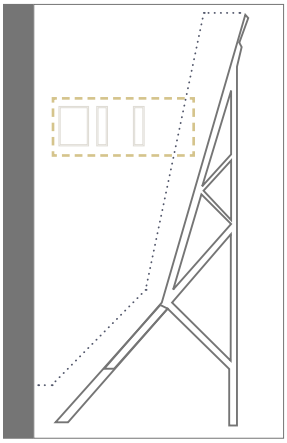
Figure 214: Morphology of project shown in parti diagram

Figure 215, 216: Facebrick use in surrounding buildings

Figure 217: External bracing seen in surrounding buildings

TECHNICAL REPORT

Tectonics investigation



//Spatial planning
Services are placed on the northern side of the workshop space. Services for the gallery (kitchen and toilets) are placed on the western side between the restaurant seating area and the gallery. It is easily accessible from the main circulation walkway. The habitable spaces includes the offices and studios. The offices have northern skylights and opens towards the east into a courtyard garden. The studios have north facing windows and also doors that open to the north. All rooms in the building are naturally cross-ventilated.

//Orientation
The building is placed longitudinal from north to south. Each separated part of the building receives northern light due to the courtyard breathing spaces between each gallery. The long narrow design of the building increases the effectivity of the passive design solutions.

//Materials
Materials known to local, unskilled builders will be used in order to be able to use local workforce in the construction of the building. Standardized materials will be used for the reason that it is readily available, economic, and local laborers know how it works.

//Green space and landscaping
Plants in front of windows can act as filter devices to reduce glare and allow cooled air into the building. To further reduce the urban heat island effect, large surfaces could be planted rather than paved. This will also help with regulating storm water.

//Social and economic sustainability
The project will include local laborers in the construction phase in order to involve the community. Thus, involving the community, a sense of ownership is created among the users of the building. The building has an economic responsibility towards the members of the community to ensure that they also benefit from the project.

The public gardens and recreational space is part of the building's return to the campus. Recreational space is located close to the Thakaneng Student Centre to allow interaction between students and art.

FORM AND FUNCTION

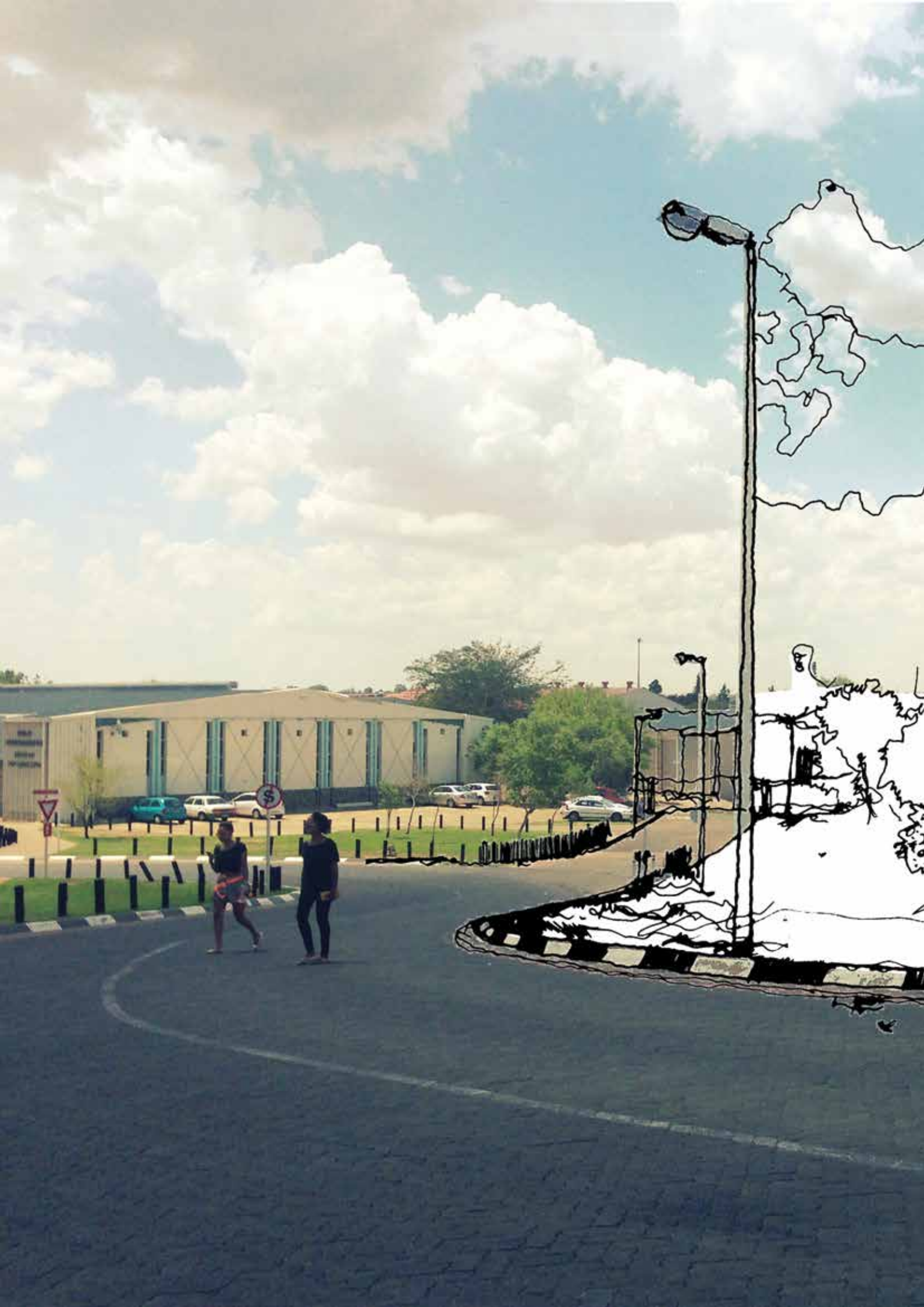
//Context
The project contributes to the existing architectural language of the campus. This is done through the use of red face-brick and exposed concrete as seen in the construction of the Thakaneng Student Centre. The exposed structural system on the eastern facade is repeated by the building on the southern side of the gallery as seen in the image. The business school building on the eastern side of the site contains a louver system on the north and western facade, which is echoed by the art gallery.

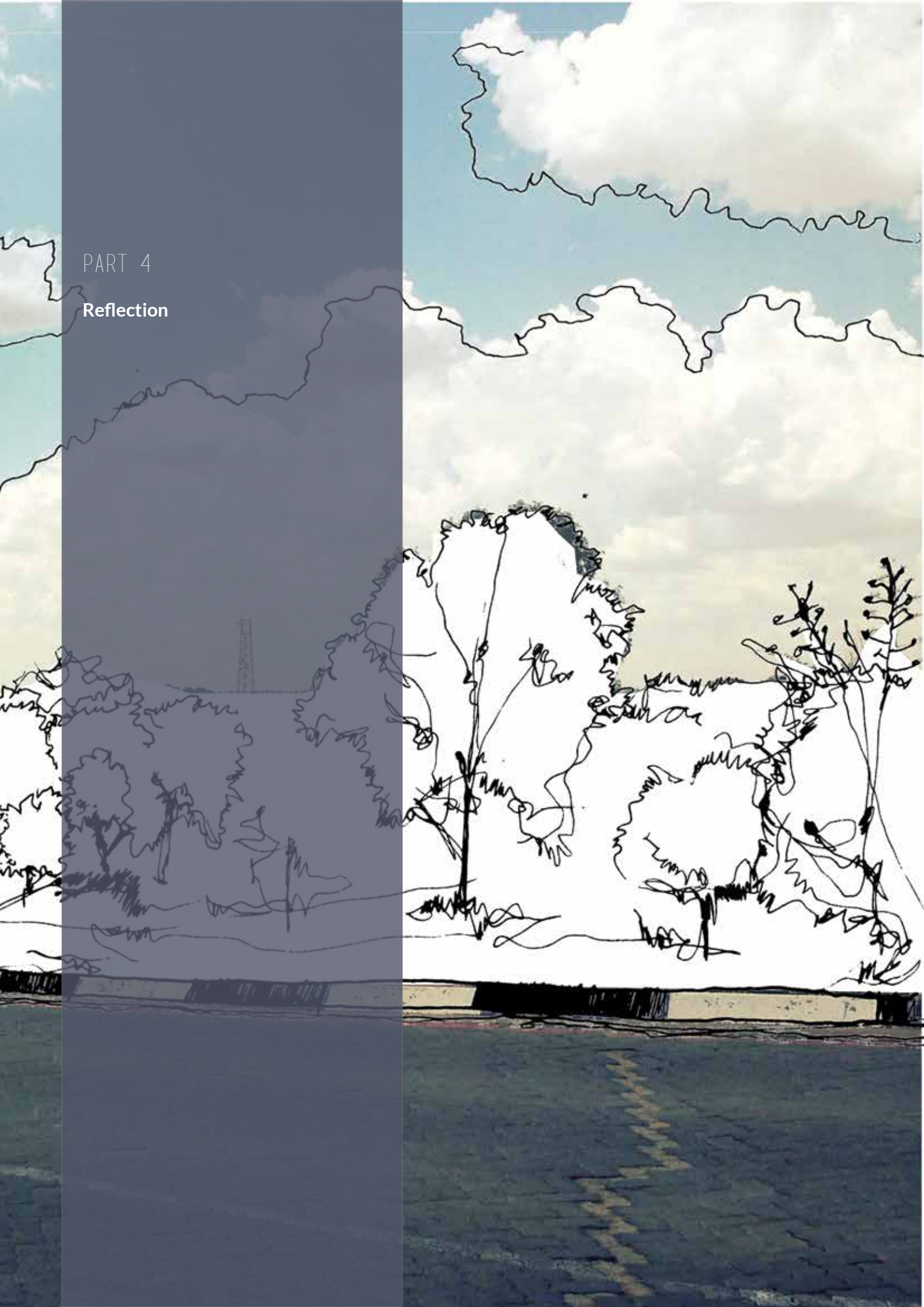
//Morphology
The form of the building was derived by the university's boundary fence that separate the site into two parts. This longitudinal spine is divided by the juxtaposing of the galleries perpendicular to the circulation spine.

CONCLUSION

In conclusion of the technical report of the design, the focus of the construction falls on the stereotomic and tectonic combination, which is derived from the surrounding context. Stereotomic elements are mainly used for structural load-bearing purposes while stereotomic elements allow light into the building.

The structure is applied in such a way that it influences the existing buildings, in the specific context, in a positive manner without changing its identity. The gallery does not superimpose on the site as institutional buildings usually do. Instead it is sculpted into the ground, allowing people to enter from a higher level into the gallery space.





PART 4

Reflection

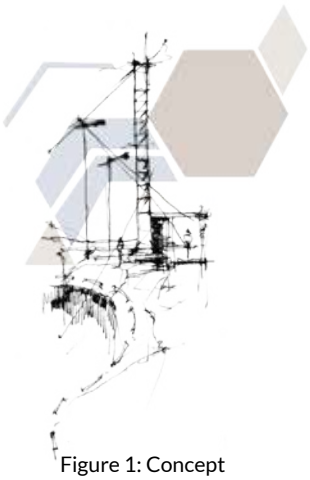


Figure 1: Concept

THE ART GALLERY

The initial idea for an art gallery came from my interest in art. I wanted to do something creative for my thesis. The beginning of the year which included the proposal and touchstone was difficult as I was unsure of the direction I was going with the design. I usually design from a practical side and allow the development of the theoretical approach to follow after.

PROPOSAL AND SITE ANALYSIS

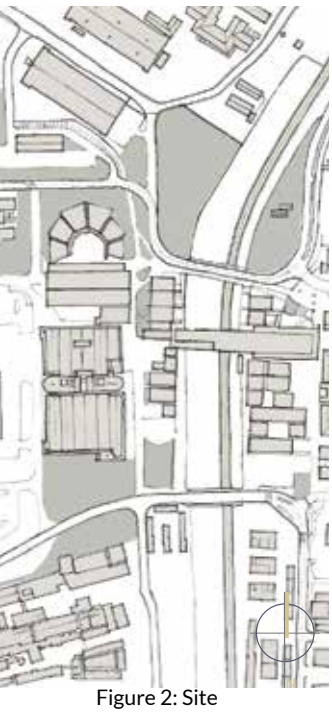


Figure 2: Site

I wanted to address the art faculty's presence on campus which is currently limited compared to the unknown importance of its integration with other faculties. The reason for the choice of project was to study how the typology of an art gallery can be challenged to provide integration spaces between art and the rest of campus. The topology was investigated beyond its boundaries to form a connection between the campus and the general public outside campus.

There were originally two options for the proposed site:

The first proposal is the current project site. This site was chosen because of the pedestrian movement along the site and also its integration with the general public from DF Malherbe. The second option was an open site next to the Sasol library. This is a quiet space with less pedestrian movement.

The first internal crit focused on the proposed design and the site analysis.

Feedback: Jan Smit, Henry Pretorius
Keep typology simple, do not complicate unnecessary.
Analyze the campus according to specifics such as public areas, easily accessible space and left over space.
Question the gallery space, the white-box theory.

Reaction on feedback:
I decided to focus on the design of an art gallery with archive storage space.
I researched the white box theory with the intention of generating a touchstone.

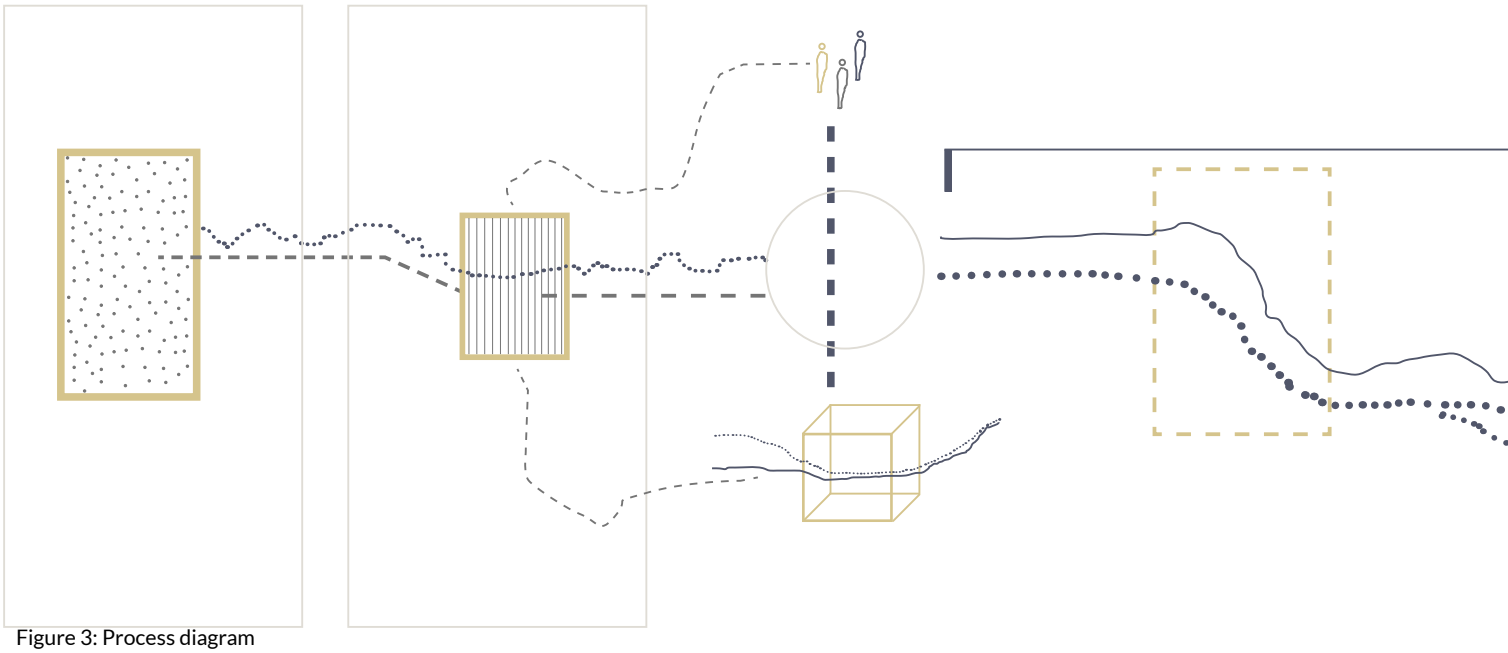
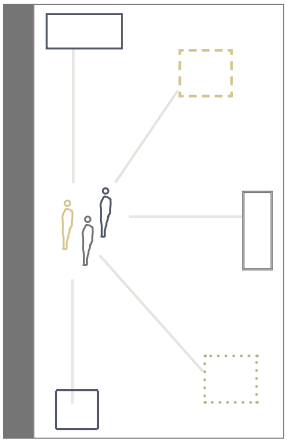


Figure 3: Process diagram

REFLECTION

Proposal and concepts



TOUCHSTONE

The idea that I portrayed with the touchstone was that art is created to influence the way people view society. The touchstone was build as a geometric box with open sides to portray the white-box with surrounding views.

Feedback:Jan Smit, Henry Pretorius
Distort the typical wall floor and roof of the white box. Include new forms of art. Temporary gallery. Safety, awareness, accommodate change.
Should artworks adapt to building, or should the building adapt to art?

Reaction on feedback:
The touchstone was not that successful as I did not yet have a strong main idea by which I could test my design decisions.

Figure 4: Touchstone

CONCEPTUAL DEVELOPMENT

I consider the concepts hand-in as the start of my design process. The concepts was done after a bit of research into art gallery architecture as well as conversations with lecturers and artists. I combined a theoretical approach with possible practical application to create the three concepts.

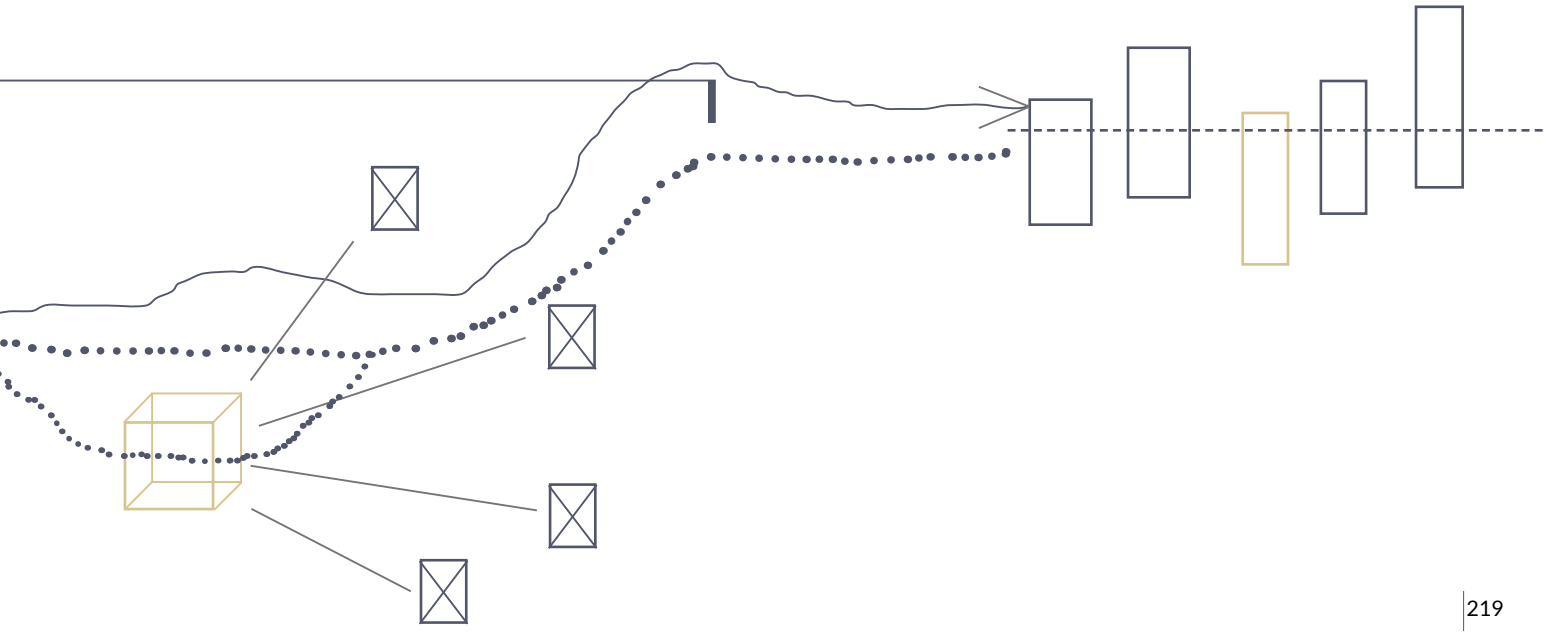
The three concepts; Redressing non-place, Framed movement and Sculpting space became the touchstone to my project. The conceptual phase was a crucial part of my project which strongly influenced my design.

Feedback:Jan Smit, Henry Pretorius
Combine the three concepts into one sentence: resculpting non-place with framed movement.

I applied the concepts to the proposed site. The theoretical approach of the threshold was included from the first concept model which consisted of a longitudinal design that stretches from north to south along the boundary line of the university.

I continued the site analysis with a focus on sculpting space. The conceptual floor-plan ideas was the result of this.

Figure 5: Concept model



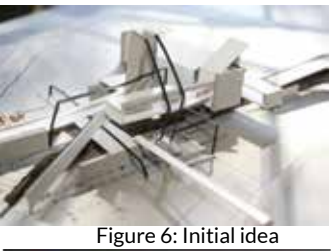


Figure 6: Initial idea

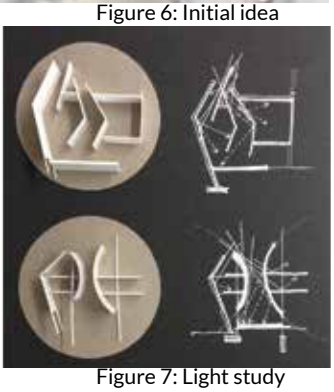


Figure 7: Light study

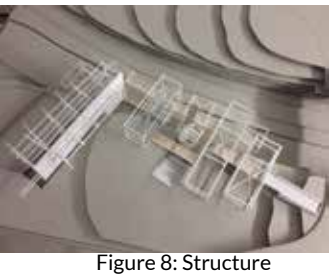


Figure 8: Structure model concept

INTERNAL REVIEW

The internal review was the first design crit with a concept that looked like architecture. My concept model explained my idea to use the boundary of the university as a strong axis line. It also suggested points of hierarchy and where the mass of the building would be placed.

Feedback: Jan Smit, Henry Pretorius
The building should meander around the boundary of the university. The study of light is a crucial part of the design of an art gallery.

Reaction on feedback:
I did a light study where I built small models with different shapes to see how light can infiltrate a building through light-shafts and reflection.

EXTERNAL REVIEW

A structure model formed part of this hand-in. The building of my structure model reduced my design to a few boxes placed along the axis line with one interesting hierarchy viewpoint.

Feedback: Ludwig Hansen
The sections through the design should be informed by light and not by basic structure. Address the influence of pedestrians on your building. The building should be generated from the inside out, although the viewer views it from the outside in. The building becomes an art project. Eg Circa gallery.
Factors to consider: What does the pedestrian see? What does the person in his car see? The building should be soft towards the interior of the university and hard towards the street.

Reaction on feedback:
I returned to the light studies and attempted to design a structure consisting of light-shafts. This changed the section view significantly.

THEORETICAL INVESTIGATION

The beginning of theoretical investigation generated interesting design considerations. Jaco Olivier suggested that I read the book *Deconstructing the Kimbell* by Michael Benedikt. The book explained the idea of 'ma' which I applied throughout the theoretical grounding as well as the design and technical resolution.

Feedback: Jako Olivier:
Use the sculptural qualities of the rock formations on your site.

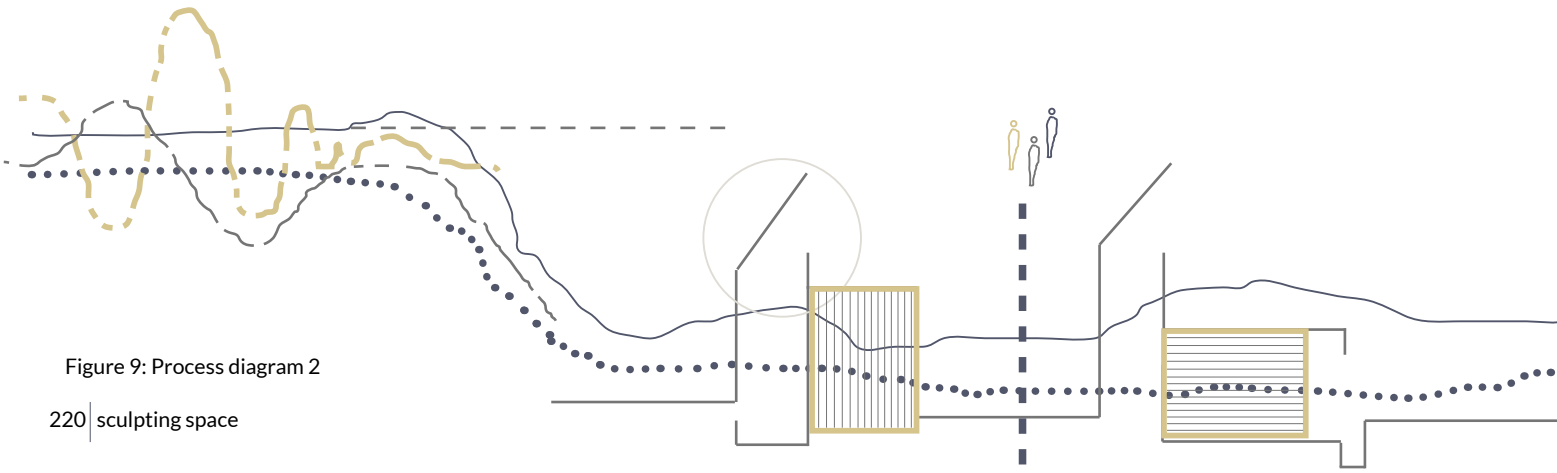
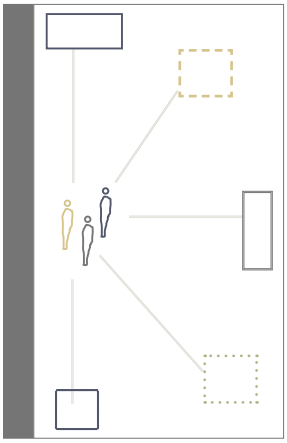


Figure 9: Process diagram 2

REFLECTION

Design development



INTERNAL REVIEW

The influence of light continued to form a morphological touchstone in the design of the architecture. The design continued to develop around the boundary line which became the main circulation way. I designed the meandering of a visitor through the gallery and formed the architecture around this path.

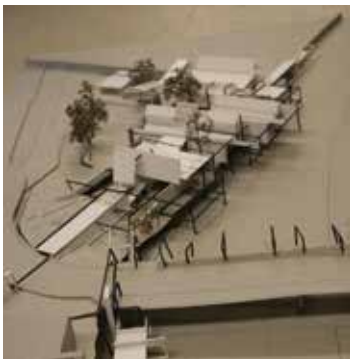


Figure 10: Internal review

EXTERNAL REVIEW

This was an important external review regarding our development so far. I built a final concept model in order to gain a better idea of what the design would look like at this stage. I realized that the design of the floorplan needed a lot of refining and landscaping as the exterior spaces with sculpture gardens are almost equally as important as the gallery inside.

Feedback: Ora Joubert and Marcio Miszewski
The general feedback during this stage was positive. Comments were made that the building is too busy, and that I must simplify the design. The technical design was exciting but also needed simplification.

Figure 11: External review

EXTERNAL REVIEW

This review included initial technical drawings and focus on planning. This was also the last crit before the final exam crit.

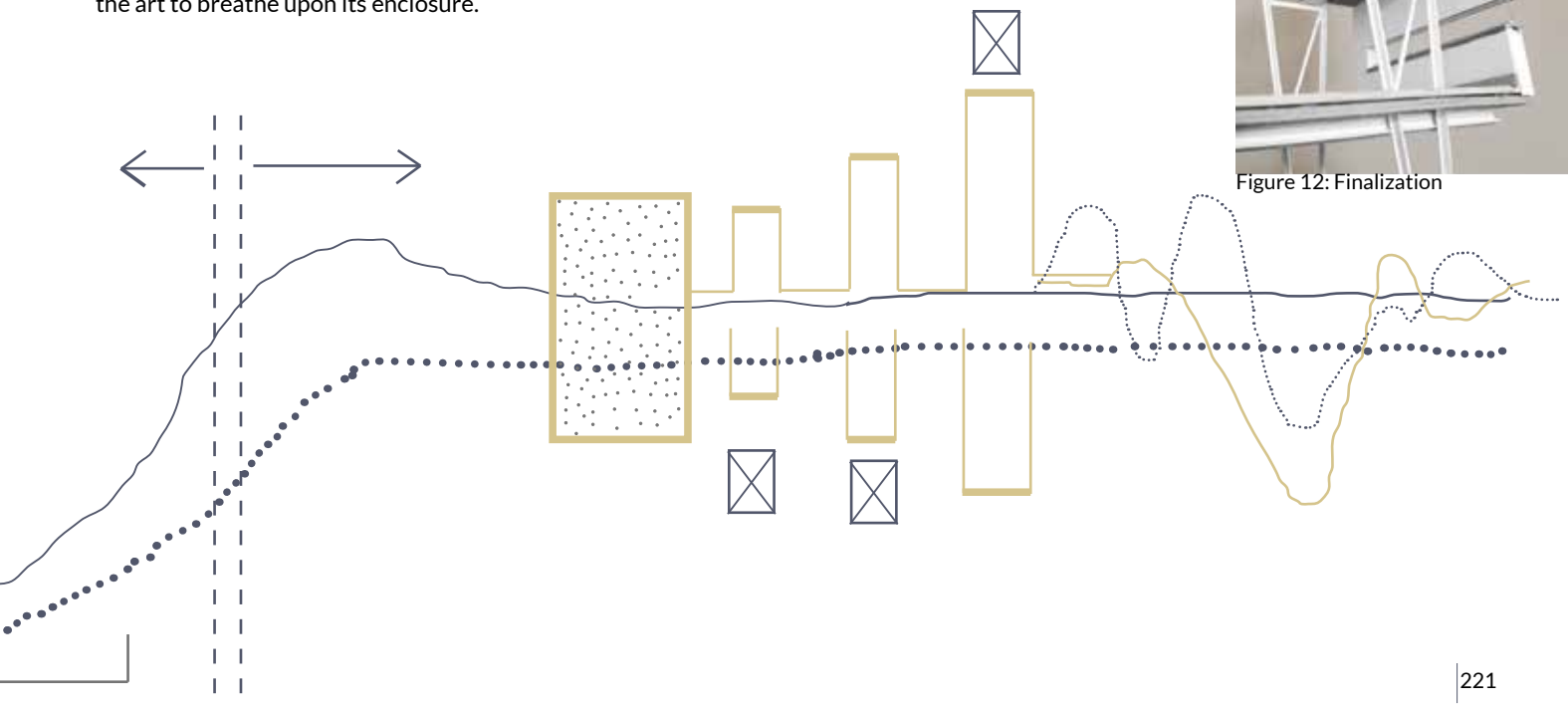
Feedback: Humphries Jooste
Be careful when finalizing the design that you do not just use the easiest technical solution and in that way loose the exciting feeling of the building

Figure 12: Finalization

IN CONCLUSION

Through the design process of the art gallery I realized that a large part of the design starts with the initial concept. If this concept is strong and well thought through, it eases the development thereafter. I really enjoyed this process because it kept posing interesting challenges. Frank Lloyd Wright said:

"Space is the breath of art". This captures the essence of a gallery space. A place that allows the art to breathe upon its enclosure.



BIBLIOGRAPHY

Alibaba. 2016. *Alibaba Manufacturer Directory - Suppliers, Manufacturers, Exporters & Importers.* [Online]. Available: https://www.alibaba.com/product-detail/Steel-Structure-Space-Frame-Workshop-Warehouse_542125833.html [2016, July 30].

Belvederecottages. 2014. *6 Beautiful Tourist Attractions in Port Elizabeth, South Africa*. [Online]. Available: http://www.belvederecottages.co.za/blog/post/6-beautiful-tourist-attractions-in-port-elizabeth/ [2016, January 18].

Benedikt, M. 1991. *Deconstructing the Kimbell*. New York: Sites Books.

Boshof, W. 2016. *Work by Willem Boshof.* University of the Free State

Byram, A. 2014. *Art Route 67 in Port Elizabeth. Guest House Four Star Luxury -The Admiralty Beach House, Port Elizabeth, South Africa.* [Online]. Available: http://www.theadmiralty.co.za/Guest-Information/entryid/45/art-route-67-in-port-elizabeth [2016, January 18].

Carrier, D. & Poussin, N. 1993. *Poussin's paintings.* University Park: Pennsylvania State University Press.

Casey, E. 2009. *Edges and the in-between*. 1st ed. Stony Brook.

Cashbuild. 2016. *Concrete calculator mix-on-site*. [Online]. Available: http://www.cashbuild.co.za/Concrete_Calculator_Mix_on_Site.php [2016, July 30].

Couture, S. 2013. *Architecture & Art : Light Articulations*. [Online]. Available: http://www.couturearchitecture.net/architecture-art-light-articulations/ [2016, August 8].

Corobrik.co.za. (2016). Corobrik - Clay brick and paving maufacturer and distributor. [online] Available at: http://www.corobrik.co.za/products/ [Accessed 19 Sep. 2016].

Craske, Matthew. 1997. *Art In Europe,* 1700-1830. Oxford: Oxford University Press.

De Jesus, A. 2016. *Art gallery specification*. University of the Free State.

Dti. 2015. *Business regulations.* [Online]. Available: https://www.thedti.gov.za/business_regulation/acts/building_standards_act.pdf [2016, June 26].

Fracalossi, I. 2011. *AD Classics: Kimbell Art Museum. Louis Kahn.* [Online]. Available: http://www.archdaily.com/123761/ad-classics-kimbell-art-museum-louis-kahn [2016, August 3].

Google earth, 2016. *University of Johannesburg.* [Online}. Available: https://www.google.co.za/maps/place/Kingsway+Campus+Auckland+Park/@-26.1835852,27.9954872,17z/data=!3m1!4b1!4m5!3m4!1s0x1e950b9514e0777d:0xff8d68c0a477737!8m2!3d-26.18359!4d27.9976812 [2016, September 19].

Heidegger, M. 1971. *Building Dwelling Thinking.* [Online]. Available: http://mysite.pratt.edu/~arch543p/readings/Heidegger.html [2016, August 18].

Joubert, O & Bakker, K. 2009. *10 years + 100 buildings*. Cape Town: Bell-Roberts.

Kasten, D. 2014. *The Great Wildebeest Migration: Gallery Row.* [Online]. Available: http://fanwood2joburg.blogspot.co.za/2014/08/gallery-row.html [2016, August 6].

Kznia. 2016. *KZNSA Gallery. The KwaZulu-Natal Institute for Architecture.* [Online]. Available: http://www.kznia.org.za/durban-city-guide/late-modern/kznsa-gallery [2016, August 3].

Lafarge.com. 2016. *Galerie d'art Circa, Afrique du Sud.* [Online]. Available: http://www.lafarge.com/sites/mediacenter/files/circa-south-africa.jpg?itok=Oa-JIbtbZ [2016, August 2].

Lareman, A. 2015. *To witness a word*. Bloemfontein: Department of Architecture, Faculty of Natural and Agricultural Sciences, University of the Free State.

Latest Home Decor Interior And Furniture. 2016. *Plain White Room Lovely With Photo Of Plain White Exterior New On Ideas*. [Online]. Available: http://botti.co/2526/plain-white-room/plain-white-room-lovely-with-photo-of-plain-white-exterior-new-on-ideas/ [2016, August 6].

Lawrence, J. 2016. *Digital camera --Kids Encyclopedia. Children's Homework Help. Kids Online Dictionary. Britannica*. [Online]. Available: http://kids.britannica.com/elementary/art-86867/Digital-cameras-are-easy-to-use-and-film-free [2016, August 6].

Lengkapku, L. 2015. *Johnson Wax Headquarters - Frank Lloyd Wright Office Building*. [Online]. Available: http://buildinformi.blogspot.co.za/2015/08/johnson-wax-headquarters-frank-lloyd.html [2016, July 20].

Lighting, F. 2010. *An Architect of Light: Louis Kahn.* [Online]. Available: https://fischerlighting.wordpress.com/2010/11/09/architecture-light-louis-kahn/ [2016, July 14].

Louis, M. (1960). Alpha-Pi | Morris Louis | 67.232 | Work of Art | Heilbrunn Timeline of Art History | The Metropolitan Museum of Art. [online] The Met's Heilbrunn Timeline of Art History. Available at: http://www.metmuseum.org/toah/works-of-art/67.232/ [Accessed 19 Sep. 2016].

Lumicrest High CRI LED Lighting. 2016. *Art Gallery LED Lighting - Lumicrest High CRI LED Lighting*. [Online]. Available: http://lumicrest.com/art-gallery-led-lighting/ [2016, August 2].

Lykantrop, 1937. *Khan Academy*. [Online]. Available: https://tr.khanacademy.org/humanities/art-1010/architecture-20c/a/frank-lloyd-wright-fallingwater [2016, August 7].

Lynton, N. 1980. *The New Barbarians. The Story of Modern Art.* New York: Cornell University Press.

Macsteel. 2016. *Macsteel Roofing. Macsteel: Africa's LEADING Steel Supplier.* [Online]. Available: http://www.macsteel.co.za/business-unit/macsteel-roofing [2016, July 30].

Matisse, H. 1952. *London – Henri Matisse: "The Cut-Outs" at The Tate Modern Through September 7th, 2014*. [Online]. Available: http://artobserved.com/2014/08/london-henri-matisse-the-cut-outs-at-the-tate-modern-through-september-7th-2014/ [2016, August 6].

Mccoysglass.co.za. (2016). McCoy's Glass: Leaders in Glass. [online] Available at: http://www.mccoysglass.co.za/ [Accessed 20 Sep. 2016].

McKeough, T. 2015. *Five Tips for Lighting Art*. Architectural Digest. Available: http://www.architecturaldigest.com/story/how-to-light-art [2016, March 17].

McLaren, T. 2014. *View toward Circa's east facade.* [Online] Available: http://www.e-architect.co.uk/images/jpgs/south_africa/circa_on_jellicoe_s090210_1.

jpg [2016, August 2].

Meier, R. (2016). *Richard Meier Quote*. [online] A-Z Quotes. Available at: http://www.azquotes.com/quote/830314 [Accessed 19 Sep. 2016].

Mical, T. 2005. *Surrealism and architecture*. London: Routledge.

Minh, T. (2015). B tranh bim ho v công ngh, cuc sng chúng ta ngày nay. [online] Thegioididong.com. Available at: https://www.thegioididong.com/tin-tuc/bo-tranh-biem-hoa-ve-cong-nghe-va-cuoc-song-cua-chung-ta-ngay-nay--761917 [Accessed 19 Sep. 2016].

Mondrian, P. 1929. *Piet Mondrian-paintings, biography, quotes of Piet Mondrian*. [Online]. Available: http://www.piet-mondrian.org/ [2016, August 6].

Mowtrad. 2016. *Handicap toilet layout*. [Online]. Available: http://mowtrad.com/wp-content/uploads/2016/07/bathroom-awesome-handicap-toilet-room-layout-handicap-accessible-with-regard-to-incredible-house-handicap-accessible-bathroom-floor-plans.jpg [2016, July 31].

Norberg-Schulz, C. (1980). *Genius loci*. London: Academy Editions.

Norberg-Schulz, C. (1985). *The concept of dwelling*. [Milan]: Electa.

O'Doherty, B. 1999. *Inside the white cube*. Berkeley: University of California Press.

Ohdesignblog.com. 2012. July. 2012. *OH!*. [Online]. Available: https://ohdesignblog.com/2012/07/ [2016, August 6].

Pathfinda. 2016. *Art Route 67, Popular Streets, Touristic Routes*. [Online]. Available: https://pathfinda.com/en/routes/touristic-routes/popular-streets/art-route-67/465 [2016, January 18].

Phaidon, A. 2006. *University of Johannesburg*. [Online]. Available: http://phaidonatlas.com/building/university-johannesburg-arts-centre/1447 [2016 , March 15].

Poussin, N. (1650). Self Portrait 2 - Nicolas Poussin - www.nicolaspoussin.org. [online] Nicolaspoussin.org. Available at: http://www.nicolaspoussin.org/Self-Portrait-2.html [Accessed 19 Sep. 2016].

Quiles, L. (2011). These Are The Most Controversial Illustrations You Will See This Year. [online] A Plus. Available at: http://aplus.com/a/luis-quiles-controversial-art?no_monetization=true [Accessed 19 Sep. 2016].

Richards, K. 2006. *UJ Art Centre*. [Online]. Available: http://www.gerbera.org/landscaping-magazine/landscape-sa-index/september-october-2006/uj-art-centre/ [2016, March 16].

Rutherford, J. 1998. *The Third Space*. Interview with Homi Bhabha. Identity: Community, Culture, Difference. London: Lawrence & Wishart.

Safarinow. 2015. *Bloemfontein and Free State Weather and Climate*. [Online]. Available: https://www.safarinow.com/cms/bloemfontein-and-free-state/irie.aspx [2015, August 18].

Schmidt, S. & Pinheiro, D. 2013. *Architective*. Johannesburg: Architective Publications.

Sener, S. (2016). *Modern Resim Sanatı - MiM 85*. [online] MiM 85. Available at: http://www.mim85kultursanat.com/modern-resim-sanati/ [Accessed 19 Sep. 2016].

Sika, (2016). *Single Ply Roofing Membranes*. [online] Sika Roofing. Available at: https://www.sika.com/dms/getdocument.get/13a170fc-25d8-3ff5-a127-ae85265c06b4/roofing_technology_concepts.pdf [Accessed 29 Sep. 2016].

South African Bureau of Standards. 2011. *SANS10400: Part T- Fire Protection*. 3rdedn. Pretoria: SABS.

Southafricab2b. 2016. *Aluminium sheet*. [Online]. Available: http://www.southafricab2b.co.za/default.cgi/action/viewproducts/productid/140298/productname/Aluminium_sheet/ [2016, July 13].

Suzi-K. 2013. *Port Elizabeth Route 67 the voting line*. [Online]. Available: https://commons.wikimedia.org/wiki/File:Port_Elizabeth_Route_67_the_voting_line.JPG [2016, January 18].

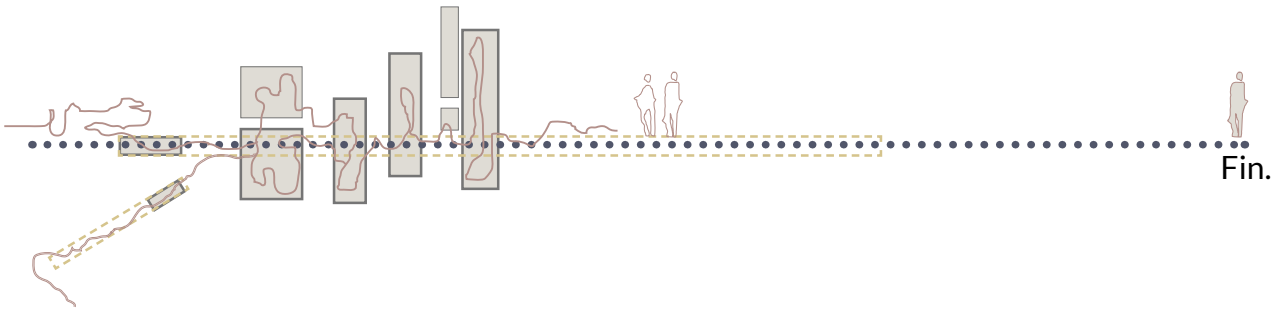
The Journalist. (2016). *Angela de Jesus*. [online] Available at: http://www.thejournalist.org.za/contributors/angela-de-jesus [Accessed 19 Sep. 2016].

Tiasa. 2016. *Map of Climatic Zones*. [Online]. Available: http://www.tiasa.org.za/Map.htm [2016, June 26].

Turner, V. 1969. *The Ritual Process: Structure and Anti-Structure*. Penguin.

Wawaza. 2016. *When Less is More: Japanese "MA" concept, minimalism & beyond*. Available: https://wawaza.com/pages/when-less-is-more-the-concept-of-japanese-ma.html [2016, April 23].

Watkykjy.co.za. (2015). Bokkies, bloeisels en 'n bier saam met Willem Boshoff. [online] Available at: http://www.watkykjy.co.za/2015/09/bokkies-bloeisels-en-n-biere-saam-met-willem-boshoff/ [Accessed 19 Sep. 2016].



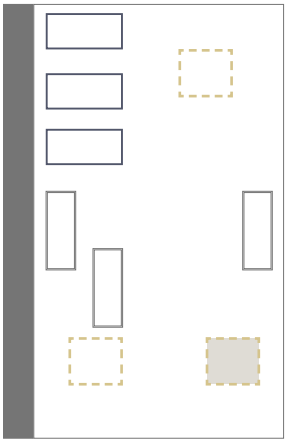
Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Lana Bramley
Assignment title:	DDIS final draft
Submission title:	Art gallery
File name:	Lana_Bramley_2011017882.pdf
File size:	781.18K
Page count:	200
Word count:	43,448
Character count:	229,434
Submission date:	09-Oct-2016 08:18AM
Submission ID:	717747534

ADDENDUM



ADDENDUM 1

The plagiarism report shows a 2% similarity. The project may contain 25% similarity before it is classified as plagiarism.

ADDENDUM 2

The construction drawings will be added to the back of the document for appropriate persons