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• an exploration of the threshold in the public realm as an interactive space •

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• HM Oosthuizen, s26082340

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Acknowledgements

All thanks to God, without whom I would not have been able to complete this project. Thanks also to my family and friends who supported me through the year.

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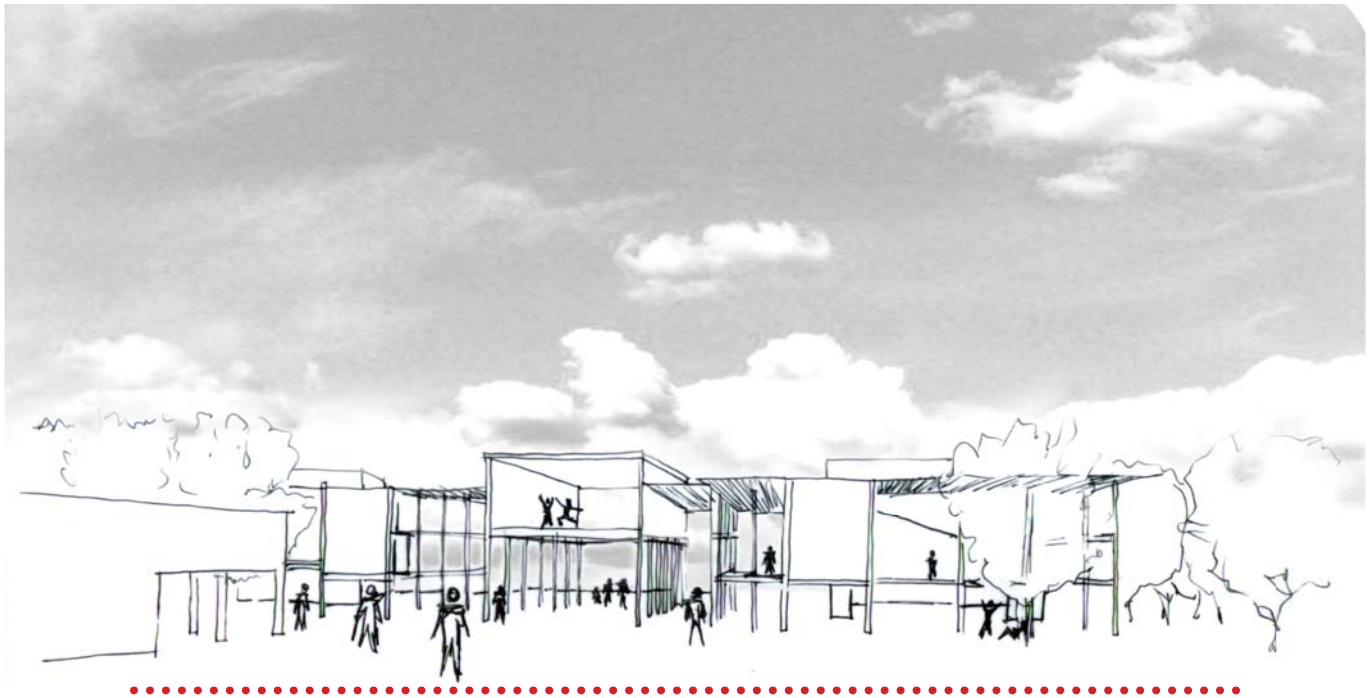

HM Oosthuizen

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Course Co-ordinators: Jacques Laubscher , Arthur Barker

Submitted in fulfillment of part of the requirements for the degree of Masters in Architecture (Professional) in the Faculty of Engineering, Built Environment and Information Technology, the University of Pretoria.

Pretoria, South Africa
2012

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1. Introduction

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1.01_Project Overview

This project is situated in Olievenhoutbosch - a still-developing community - within a new urban design framework called the Olievenhoutbosch Osmosis Framework, which is a student project criticizing the original Olievenhoutbosch Ministerial Housing Estate Framework of July 2005. The framework addresses the issues related to connectivity in the area, and the design intervention attempts to address this issue on a human scale, on various experiential levels. The dissertation explores the use of multi-functional theatre spaces with varying degrees of interaction and levels of activity. The primary generators for this design intervention has been its urban connectivity, location, the specific site, human movement, and human activities related to the site and the programme of the intervention. In view of the context, the programme, the design intent of the framework, and the location in the framework, the design intervention will create spaces both in and around the structure in which various activities can take place, through the interplay between different tectonic elements.

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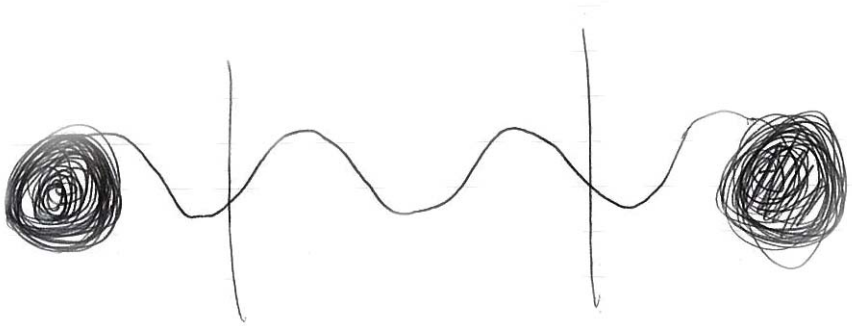

Figure 1.1: Parti diagram.

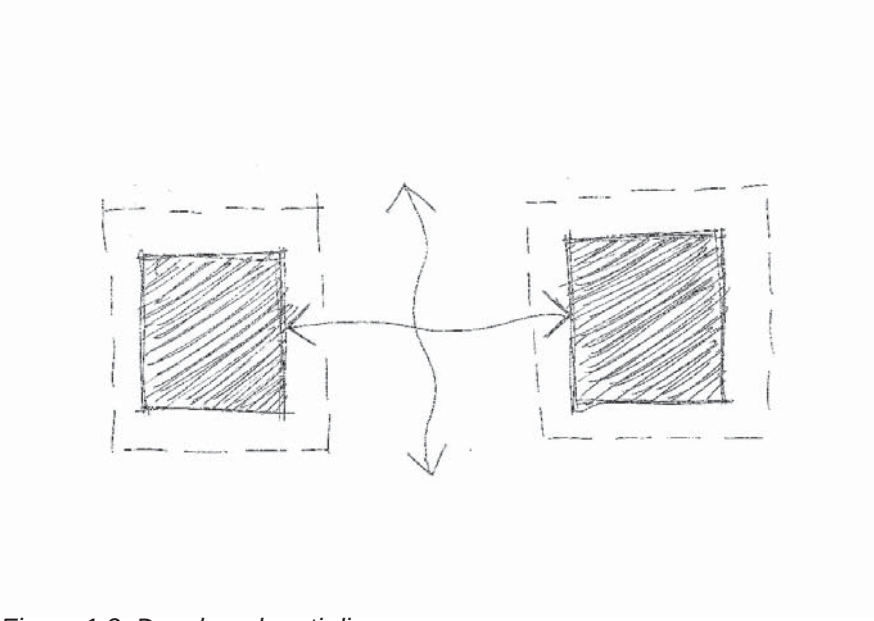

Figure 1.2: Developed parti diagram.

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1.02_Primary Objective

The primary objective of this proposal is to develop a design intervention that will focus on creating public spaces in which varied, vibrant and ever-present interactions take place between inhabitants. These interactions occur through the interface created by the interaction between different tectonic elements. These spaces will become platforms on which various components of the community, such as schoolchildren and shop owners, can interact with one another to varying degrees, further strengthening existing connections in the area of study. To achieve this, the proposed design will promote interactivity within the community, as well as a clear distinction between public and private space and the connections between them (Figure 1.3).

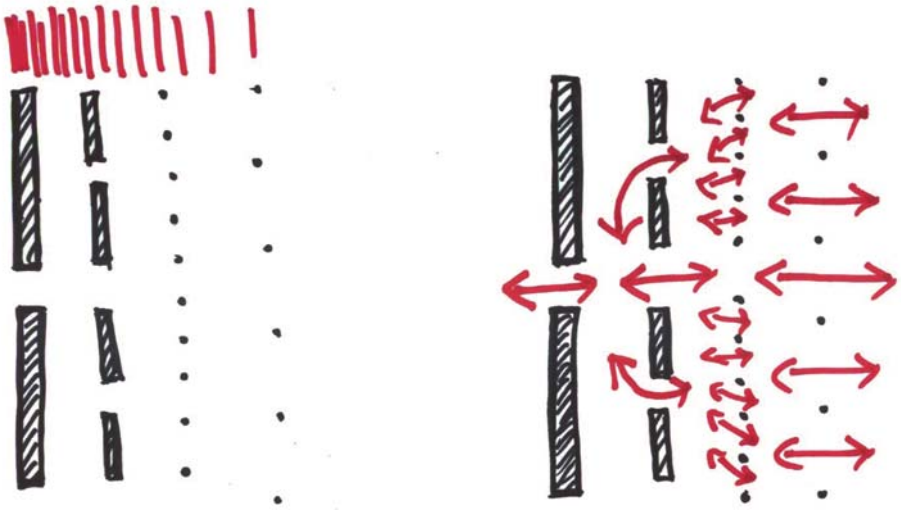

Figure 1.3: Levels of activity and degrees of interaction between public and private spaces.

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1.03_Clients

The following parties should benefit from the proposal due to the fact that some of these parties have already started similar programs in other areas such as Mamelodi.

These entities are CAFCA (Commited Artists for Cultural Advancement), the Delft School for Music, the UNISA Music Foundation and the City of Tshwane Municipality. CAFCA and the Delft School previously collaborated to create a music school in Mamelodi. UNISA (University of South Africa) later added their support by providing accredited exams and sponsoring aspiring musicians (www.cafca.co.za. 2008). The City of Tshwane is not involved, but has a stated interest in creating a richer environment in Olievenhoutbosch as per the Urban Design Framework (Olievenhoutbosch Ministerial Housing Estate) of July 2005.

Although the clients may be sponsoring the intervention, they will not be the daily users of the design intervention. These users will be the residents of Olievenhoutbosch who will visit the theatres, make use of those spaces as gathering spaces, and as recreational areas. The intervention will also be available to those who want to learn more about various performance arts such as music and dance. These are the requirements of the users.

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1.04_Design Approach

The investigation encompasses various spheres of knowledge and practice. An approach integrating theoretical research relating to urban design, precedent studies and practical technologies relating to construction and acoustics of theatre spaces was adopted to ensure a design intervention that functions on the urban scale down to the human scale as a connecting element in the relevant context. The premise of the project is that as a mobile being, man uses streets and pathways to move around, and that these streets and pathways become spines of activity with varying degrees of activity and levels of interaction because of this movement (Figure 1.4). Design decisions were informed by this premise pertaining to human movement.

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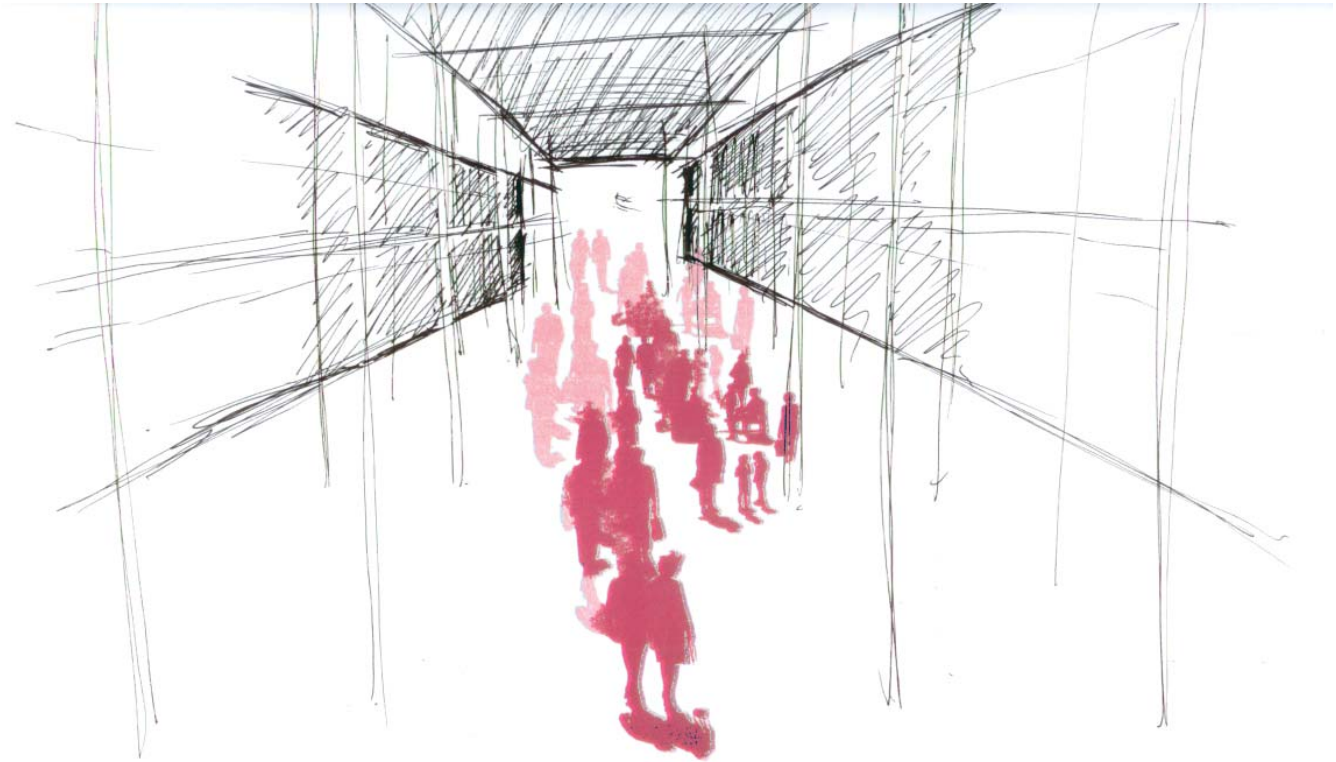

Figure 1.4: Drawing indicating the premise of the project.

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1.05_Research Methodology

This dissertation is a culmination of the research and the investigation of the current situation on site and proposed solutions. Current conditions in the study area are mapped and investigated, while existing frameworks are critically analysed. The project attempts to address problems found in both existing, and proposed conditions relating to the public realm. This will be recorded and studied through the use of mixed media such as video-recordings, sketches and photographs. The project proposes a hierarchical, multi-functional public edge set against the backdrop of multiple degrees of interaction between the public spaces and the program. The chapters in this dissertation will explain the relevant contextual informants, and then provide a theoretical base from which an answer to the problem may be introduced as an architectural intervention.

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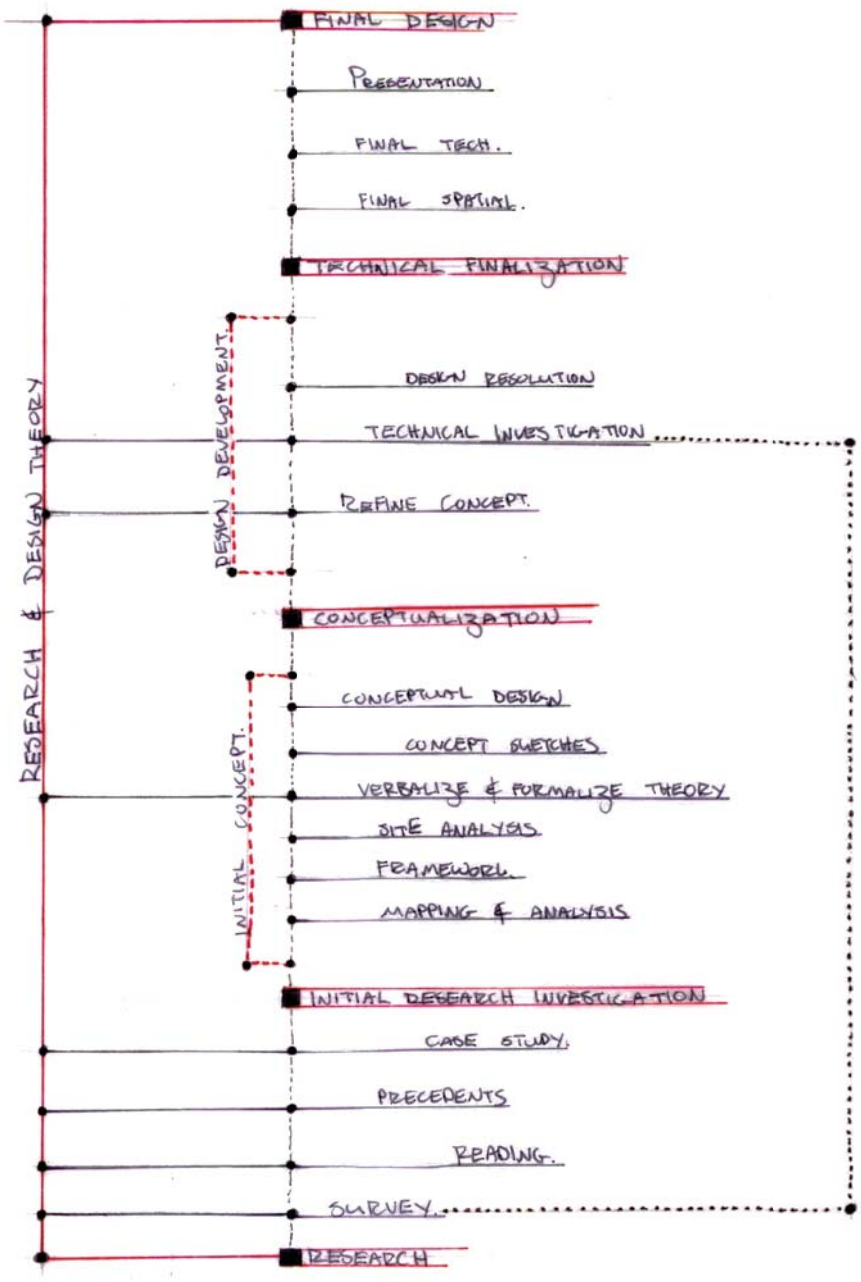

Figure 1.5: Diagram illustrating initial research methodology.

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2. Current Condition

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This chapter deals with the area of Olievenhoutbosch, which lies between Johannesburg and Pretoria - two of South Africa's most dominant cities, and contains an in-depth study of the existing conditions and components related to the proposed area of study. This investigation of the physical built and natural environments, institutional elements, economic factors and social needs and influences, and their relations towards each other has to be done to understand the context as an inter-connected system that influences design decisions. This investigation will allow the author to complete a S.W.O.T. analysis (Strenghts, Weaknesses, Opportunities, and Threats), in order to facilitate an informed design approach and design proposal.

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“Any city, however small, is in fact divided into two, one the city of the poor, the other of the rich. These are at war with each other.”

- Plato, Greek Philosopher.

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2.02_Location

Figure 2.1: Map locating proposed study area from a global context down to regional context.

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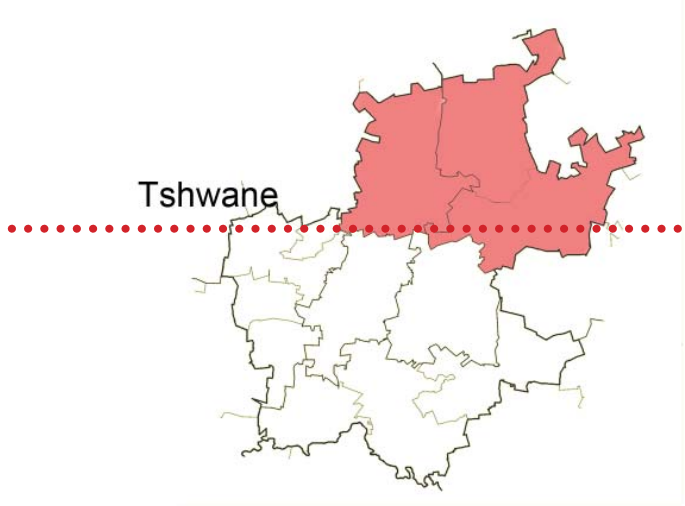
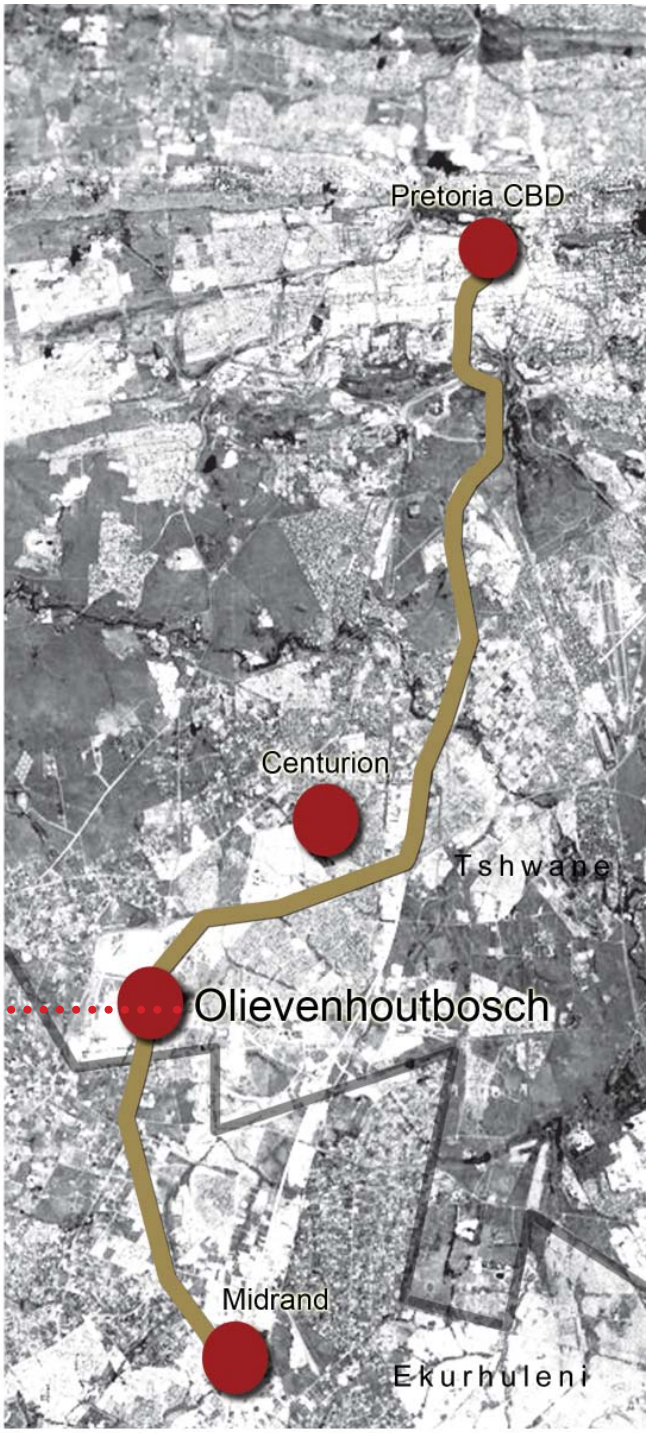
The proposed study area, Olievenhoutbosch, falls into the larger Southern Region of the Tshwane Municipal Area. It lies on the edge between the municipalities of Tshwane in the north and Ekurhuleni in the south. North-east of Olievenhoutbosch is Centurion, a suburb and partial business district of Pretoria, and to the south lies Midrand, a similar area but belonging to Johannesburg (Figure 2.1).





Lat. - 25°54'6.19"S
Long. - 28° 5'38.96"E

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2.02_Historical Context

1980 — Farm Olievenhoutbosch 389-JR.

1989 — First squatters arrive on the farm.

1994 — After the first democratic elections a number of transit camps are created. All squatters are moved to these camps.

1996 — Formalisation of the area started.

1998 — Approximately 1 665 households with 8 605 individual residents.

2000 — Olievenhoutbosch falls under the new Tshwane Metropolitan Municipality

Figure 2.2: Timeline indicating the growth of Olievenhoutbosch over a short period of time.

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2001

Approximately 22 500 residents

2006

25 December 2005 - 4 January 2006: Groups of South Africans chase foreign Africans from their homes, shops and businesses.

February 2006: Olievenhoutbosch receives R400 million housing project

2010

Residents clash violently with police about poor service delivery.

2011

People die in violence resulting from a dispute between rival taxi operators.

2012

Taxi operators protest against the use of busses in Olievenhoutbosch.

2009

2011

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2.03_Settlement Edges

The edges of Olievenhoutbosch are strongly defined by elements that do not promote expansion. To the north lies the N4 highway to Krugersdorp, and to the east lies the R55 road which is one of the primary connections between Midrand and Centurion and by extension between Johannesburg and Pretoria. This road also serves as the only connection between Olievenhoutbosch and the larger metropolitan area, as the two entrances to Olievenhoutbosch both connect to the R55. The southern edge of Olievenhoutbosch lies on the border with the Ekurhuleni Municipality and therefore expansion is restricted due to the problematic nature of cross-municipal management. To the south-west lies an electrical sub-station, with an electrical servitude running from the sub-station northwards to the N14 highway. While this servitude is permeable to pedestrians, very few formal connections exist between Olievenhoutbosch and the area to the west of the servitude. This lack of access, as well as the distance from the main entrances of Olievenhoutbosch, and the activity found there, to the servitude, discourages expansion to the west.

- Northern Boundary - N14 highway
- Eastern Boundary - R55 road
- Southern Boundary - Municipal border
- Western Boundary - Electrical servitude
- Entrances to Olievenhoutbosch

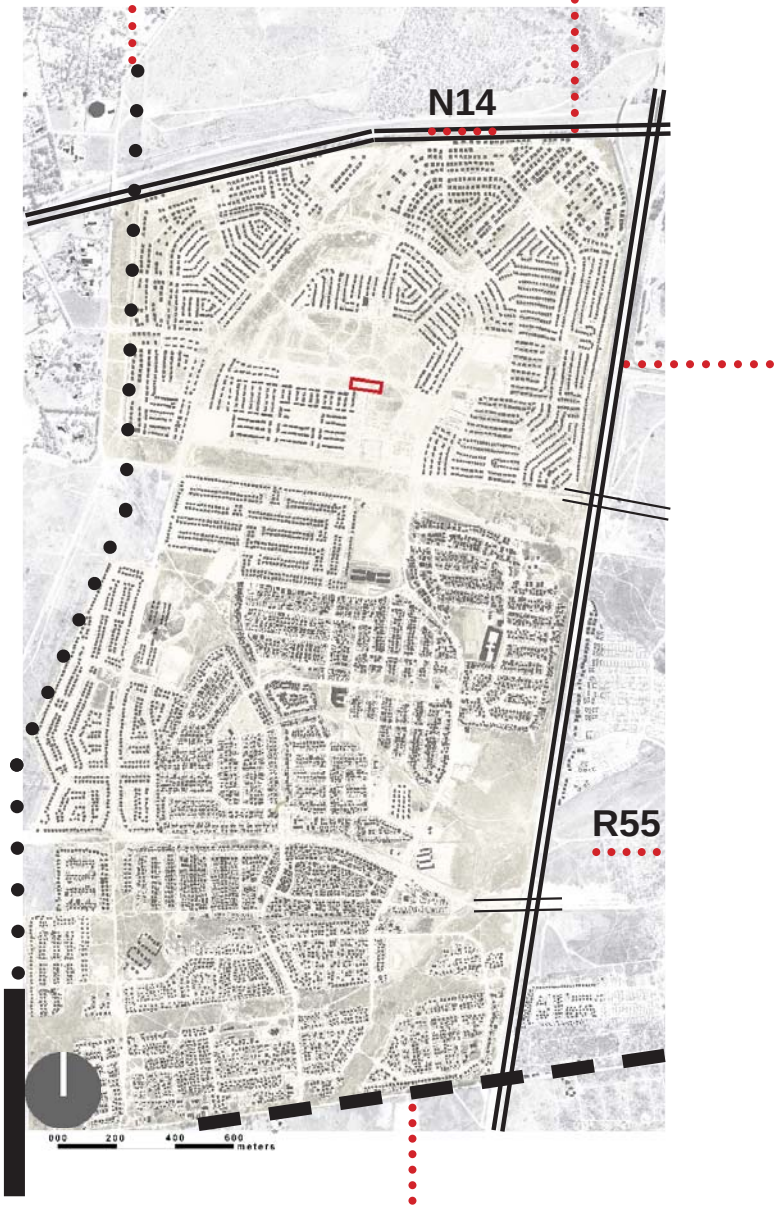

Figure 2.3: Map depicting settlement edges.

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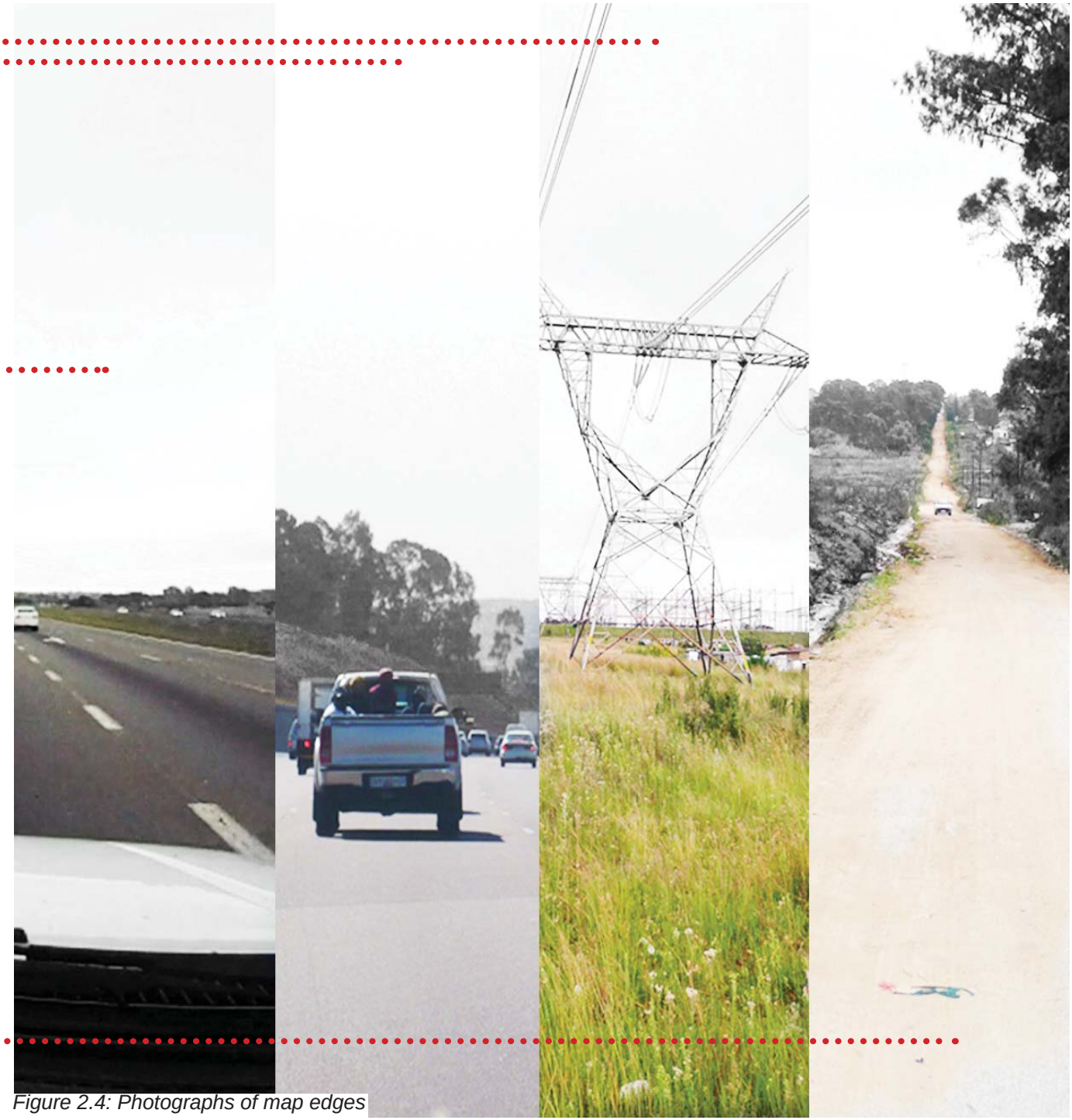

Figure 2.4: Photographs of map edges

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2.04_Access

The study area of Olievenhoutbosch is primarily connected to the larger metropolitan area via two entrances along the R55 road running from Centurion in the north to Midrand in the south. There are primarily two modes of transport available to the residents who need to travel to either of these two areas, as well as other areas. These modes of transport are a bus-system, and a taxi service, and are situated in the northern district close to the northern entrance, and the southern district near the southern entrance respectively. While the departure points for these two services are relatively close to the main artery of Olievenhoutbosch, the ease of access for the residents is lacking. A ten minute walk to or from any of these points will leave the majority of residents still far from his or her destination.

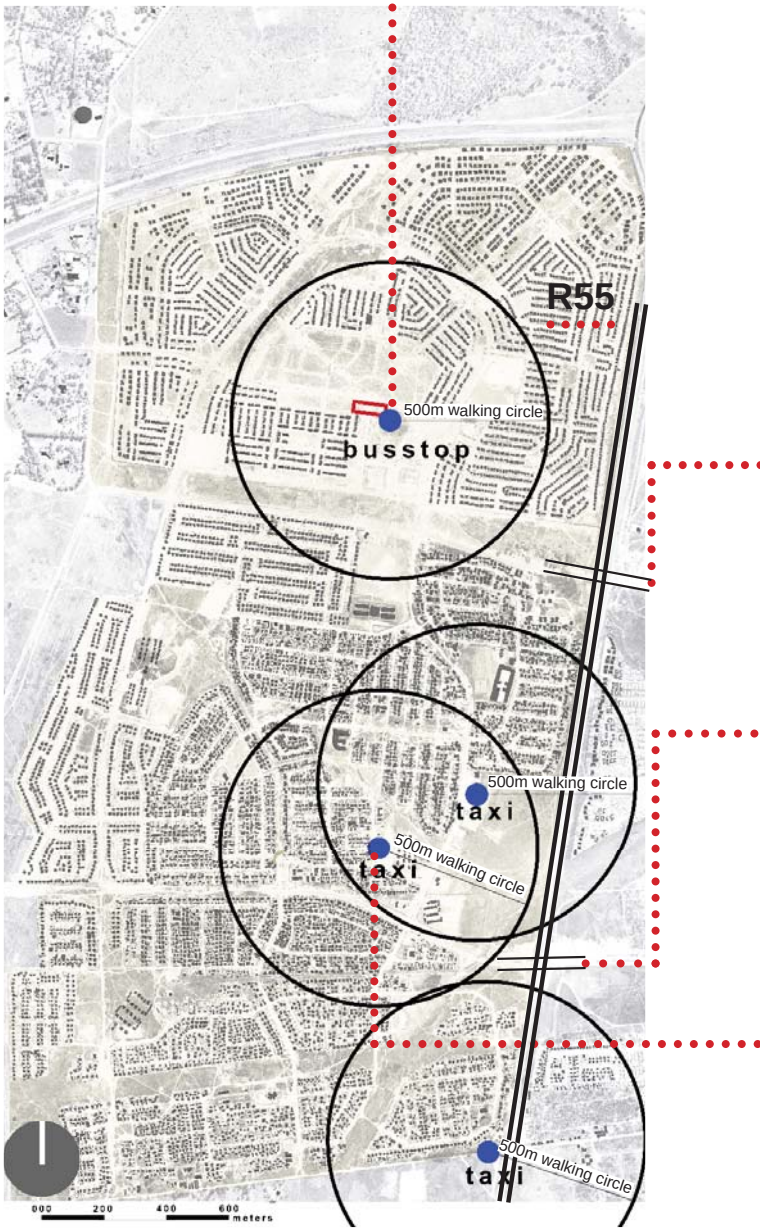

Figure 2.5: Map showing location and access to transportation.

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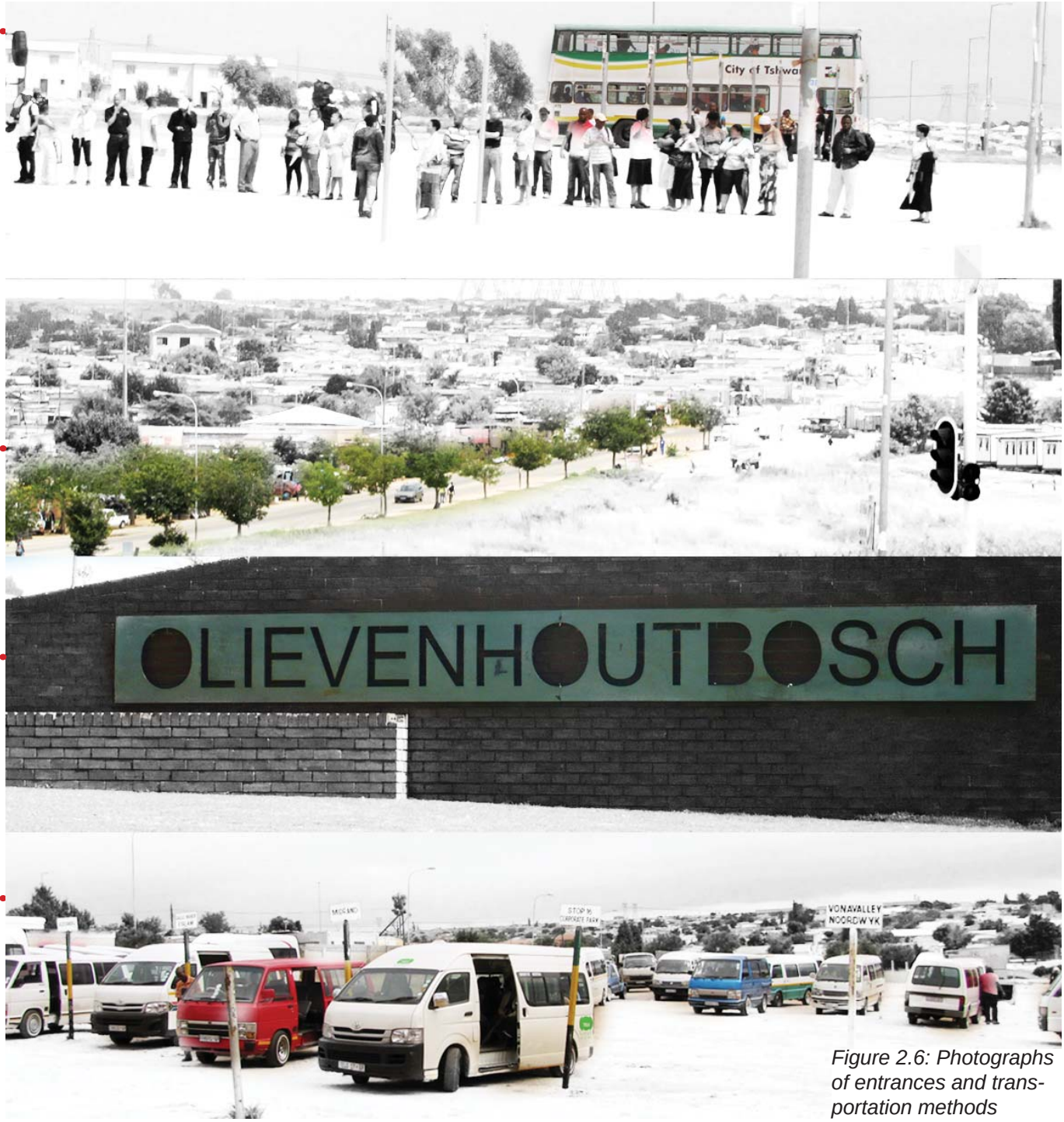

Figure 2.6: Photographs of entrances and transportation methods

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2.05_Activity & Primary Route

Areas of activity in Olievenhoutbosch are connected along the primary movement route, running north-south, or connect almost directly with this route. These areas consist of social, civil, educational and economic activities such as parks and churches, a community centre, schools and both formal and informal trade. At the ends of this route lies a bus stop in the north, and two areas that serve as departure points for taxis in the south. It is not clear whether the transport system was in place before or after the activity started to grow along the route, but it is certain that once either of these two elements were in place, the other would naturally evolve from the resultant energy created by the increased movement along the route. While this increase in energy along the street is in itself sought after, the focus of the street design, the function of the destinations on the ends of the route, and the placement of the route in urban fabric are three factors that negatively impact this primary route. It does so for the following reasons:

- The vehicular nature of the destinations in the north and the south perpetuates vehicular-focussed design and also enforces the idea of a transitory settlement.

- The route does not connect the centres of the northern and southern areas in Olievenhoutbosch, nor does it provide easy access between these areas. This creates a settlement with no easily identifiable or discernable centre.

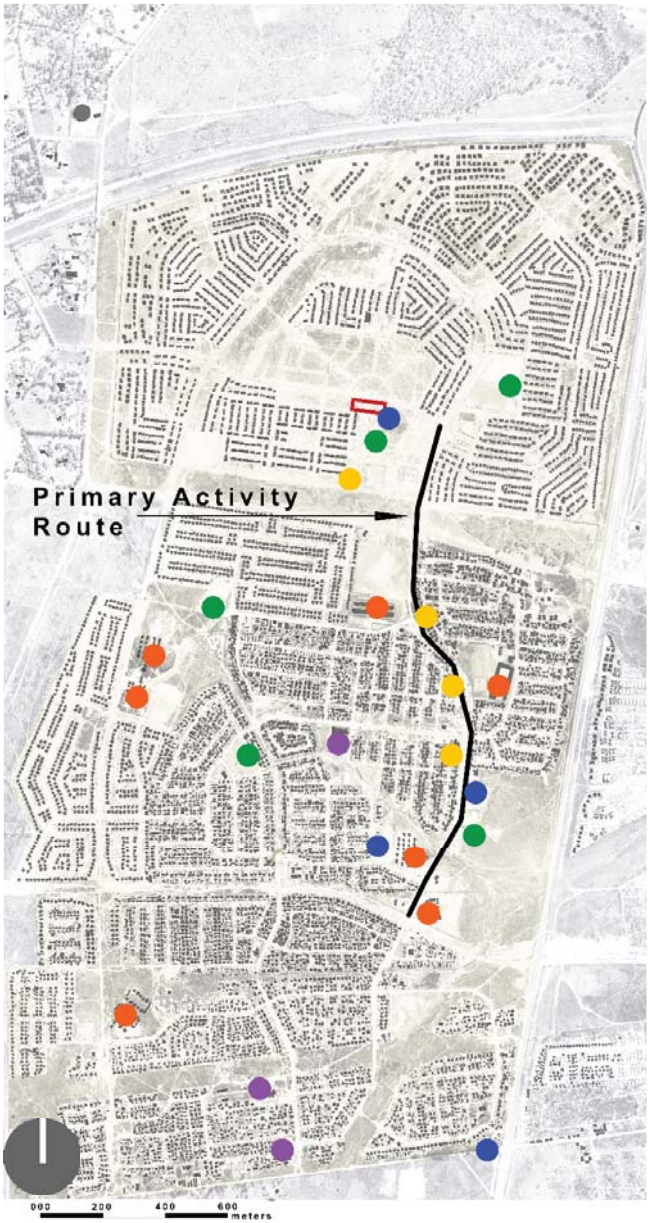

Figure 2.7: Map identifying key activities in study area.

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Figure 2.8: Photographs of typical activities.

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2.06_Fragmentation

The current situation in Olievenhoutbosch is fragmented by different barriers, such as the existence of electrical servitudes (figure 2.10), a history of xenophobia, different urban fabrics in the same settlements (figure 2.9), and very little community pride. All of this is perpetuated by an existing town-planning framework by Bigen Africa and ADA Urban design for the Department of Housing, ABSA, and the City of Tshwane. The Urban Design framework: Olievenhoutbosch Ministerial Estate of July 2005 does not encourage any kind of connections to be made, and is designed to emulate a typical Pretoria suburb where the houses mostly have fences and are set back from the road. This creates a closed community with no interaction with neighbours, as well as a lack of clearly defined public spaces. This dissertation will promote openness and interconnectivity via an understanding of public activities and interactions in opposition to current social and planning tendencies.

Figure 2.9: Map illustrating barriers and fragmentation of urban density.

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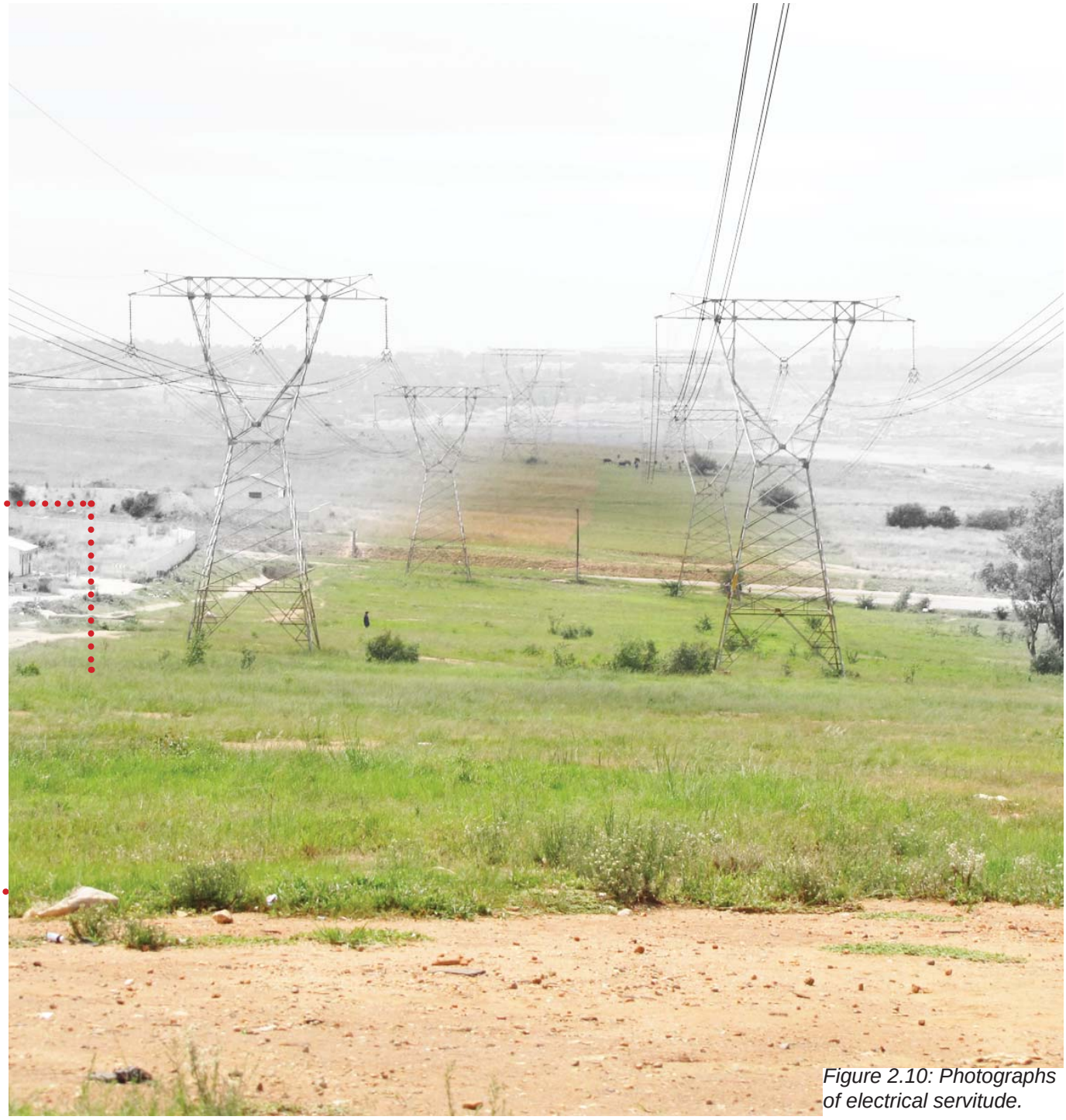

Figure 2.10: Photographs of electrical servitude.

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2.07_Existing Frameworks

During the investigation of the proposed study area, three municipal documents were examined. They are the following:

- Urban Design Framework: Olievenhoutbosch Ministerial Housing Estate of July 2005 prepared by Bigen Africa and ADA Urban Design for the City of Tshwane Metropolitan Municipality, ABSA, and the Gauteng Department of Housing.

- Integrated Development Plan 2011-2016 of April 2011 by the City of Tshwane Metropolitan Municipality.

- Spatial Development Framework 2012: Region 4 of March 2012 by the City of Tshwane Metropolitan Municipality.

Key Intentions

- Upgrade, extension and addition of clinics.

- R6 million for multi-purpose sport & recreation centres.

- Prominent land use of strategic significance to local and urban environment, such as the Olievenhoutbosch ABSA Housing development.

- Introduction of modal interchange facilities at the Olievenhoutbosch and Main Road intersection with the railway line.

- A new east-west link between Olievenhoutbosch and Rooihuiskraal.

- Future plans for an extension of the Gautrain, contributing greatly to the creation of an integrated transport system.

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The third document, the Urban Design Framework: Olievenhoutbosch Ministerial Housing Estate, focuses on the northern section of Olievenhoutbosch, where the proposed site is located. When the framework was created, certain principles were followed:

- Making connections.

- Balanced movement network.

- Local district network.

- Invest in public realm.

- A broad mix of uses and amenities.

These guidelines and intentions are not directly applicable to the proposed site, but serve the larger settlement. It is important to note that a large part of the intentions and guidelines are focussed on increasing activity in Olievenhoutbosch, as this will affect existing economic and civil systems in the settlement.

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2.08_Olievenhoutbosch Ministerial Housing Estate Framework

The location of Olievenhoutbosch, lying between two large business centres, makes it ideally suited for people who are looking for work in the economic hub of South Africa. Thus, the people in Olievenhoutbosch are generally transient in nature, not looking for a home, but for a place from which they can move on. These two factors - the transient nature of Olievenhoutbosch and the comfortable location for work-seekers - influence the identity of Olievenhoutbosch in many ways, of which a multi-cultural and multi-national community is but one.

However, multi-cultural and multi-national communities in South Africa are fragile, as evidenced by the string of xenophobic attacks which had its flashpoint in Olievenhoutbosch near the end of the year 2006. Reasons for attacks like these are intricate and complex, according to Tseliso Thipanyane (Chief Executive Officer of the Human Rights Commission), with some of the primary concerns being competition for work and housing, which are limited (McKenzie, 2008). This history of xenophobic attacks, coupled with the transient nature of the area creates a community almost devoid of cohesion.

According to the Urban Framework: Olievenhoutbosch Ministerial Housing Estate of July 2005 there are a broad range of amenities planned to create a pedestrian-oriented development, but the placement of these in the urban fabric does not enhance a sense of place and identity, but rather the activity along the route which runs from the landmark tower in the centre of the framework, to the southern edge which is the road (Figure 2.11).

This route and its focus is especially problematic for two reasons. Firstly, the route does not connect to the larger settlement, but to another transit system, which enhances the idea of a transitory settlement. Secondly, the functions of the majority of the buildings next to this route are not public-oriented, so there will not be a constant flow of pedestrians in the area as the existing framework intends. Therefore, a redesign of the framework is needed to better integrate the northern area of Olievenhoutbosch with the larger, to promote a vested, cohesive community, and to create a movement network that is designed with the pedestrian in mind.

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Figure 2.11: Image of the Urban Design Framework: Olievenhoutbosch Ministerial Housing Estate.

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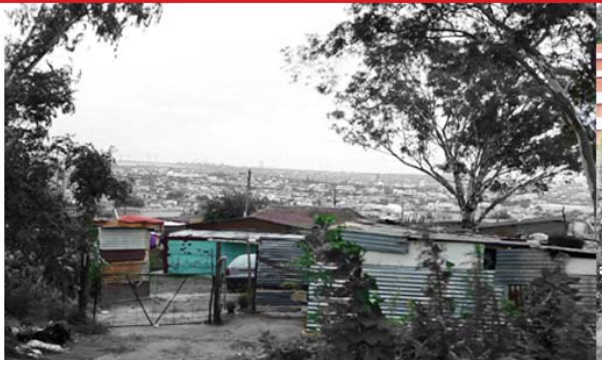

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2.09_Current Situation

Religious Facilities

Street Conditions

Sport & Recreation

Civil Services

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2.10_S.W.O.T. Analysis

Strengths:

- Location halfway between Pretoria and Johannesburg creates ideal place for residential community.
- Incentives to instill a sense of community pride in their home.
- The area is relatively young and as such has no preconceptions pertaining to the future.

Weaknesses:

- Limited access.
- Limited facilities.
- Segregated precinct.
- Electrical servitudes.
- Highway.
- Sensorial blandness.
- Limited activities.
- Not easily navigated.

Opportunities:

- Dense residential area provides enough people to allow for development.
- No facilities beyond basic services allows for developing opportunities.
- Cross-cultural experiences provide the groundwork to create a true integrated community in the spirit of the new South Africa.

Threats:

- Developers who develop without taking context into account.
- Xenophobic attacks prevent integration of the community.
- Limited space for expansion available.

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2.11_Conclusion

The investigation of the current condition of Olievenhoutbosch, and the subsequent S.W.O.T. analysis indicates what the approach must be towards the urban framework and the design intervention. Some of the elements identified in the S.W.O.T. analysis cannot be addressed by a design intervention or a framework because of the factual and permanent nature of these elements. The remaining elements will be addressed through the design of an urban framework and a design intervention.

The new urban framework will focus on creating and strengthening connections within the precinct and encouraging a human approach to urban design. It will also allow for extended development of the public facilities needed in the community. The design intervention will have a similiar role in the urban framework, where it will provide publicly accessible facilities and an interface for activity on a connecting route through Olievenhoutbosch. The intervention will be a central element in the precinct and as such will have to be a place which strengthens existing community conditions that were identified as strengths through the S.W.O.T. analysis. Because of its public nature, a theatre is able to address most of the elements in the analysis, but is still one-dimensional. It needs degrees of activity which will be provided by educational and commercial layers, and create the Olievenhoutbosch Performance Arts Centre.

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3. Framework

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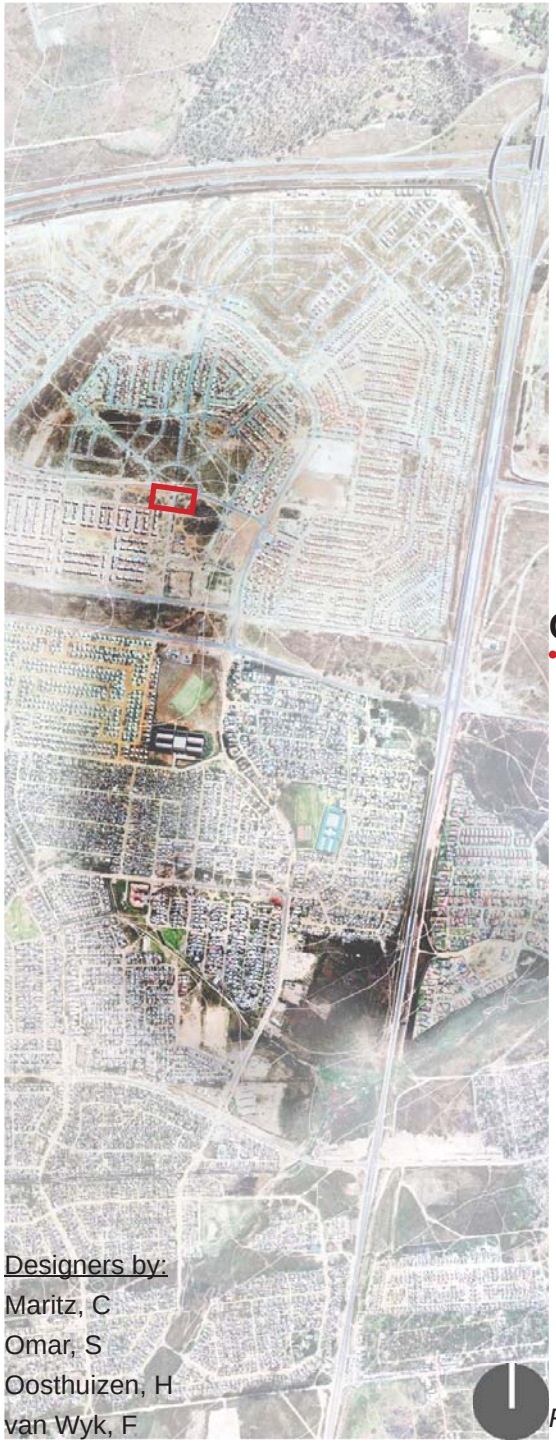

Olievenhoutbosch Osmosis Framework

- a gradual, often unconscious process of assimilation or absorption.

Designers by:
Maritz, C
Omar, S
Oosthuizen, H
van Wyk, F

Figure 3.1: Map indicating proposed site.

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The proposed framework, the Olievenhoutbosch Osmosis Framework, takes the principles as laid out in the Charter of New Urbanism and the four key objectives for cities defined by Jan Gehl (Gehl, 2012), and applies these principles to an existing framework - the Urban Design Framework: Olievenhoutbosch Ministerial Estate. This new framework will propose a new spatial structure that will strive to improve and strengthen the pedestrian scale of movement and life in Olievenhoutbosch.

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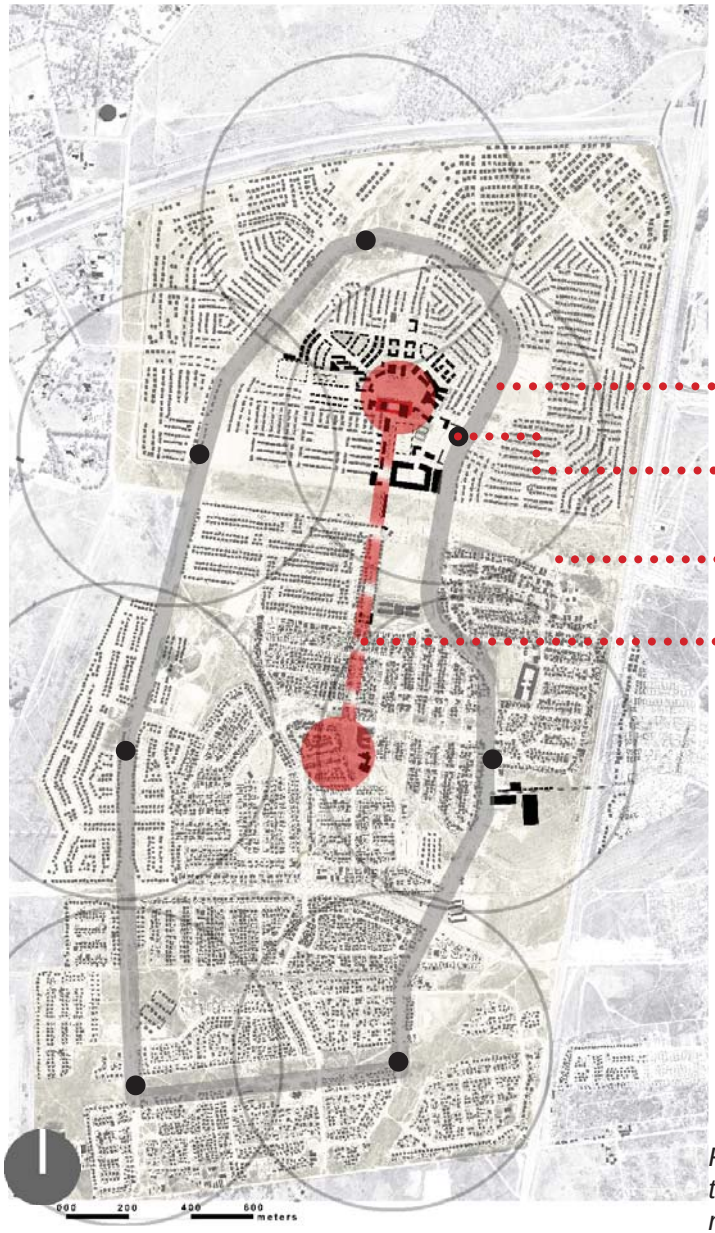
3.01_Precinct Intervention



- Bus route
- Bus stop
- 500m walking circle
- Pedestrian connection between two community centres.

Figure 3.2: Map showing the proposed bus route and north-south connection.

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“ Four key objectives for cities:

• Lively cities are accentuated through the natural movement of pedestrians and cyclists.

• The desire for a healthy city is heightened if more people walk and cycle.

• A sustainable city is achievable if a large part of the transportation in the city consists of “green mobility”.

• A safe city comes into being when people move in it and through it and stay in the city space.“

- Jan Gehl, *Cities for People*, 2010

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3.02_Framework Intent

"The Congress for the New Urbanism views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building challenge.

We stand for the restoration of existing urban centres and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighbourhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy.

We advocate the restructuring of public policy and development practices to support the following principles: neighbourhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.

We recognize that physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent and supportive physical framework.
We represent a broad-based citizenry, composed of public and private sector leaders, community activists, and multidisciplinary professionals. We are committed to re-establishing the relationship between the art of building and the making of community, through citizen-based participatory planning and design.

We dedicate ourselves to reclaiming our homes, blocks, streets, parks, neighbourhoods, districts, towns, cities, regions, and environment."

- The Congress for New Urbanism, 1996

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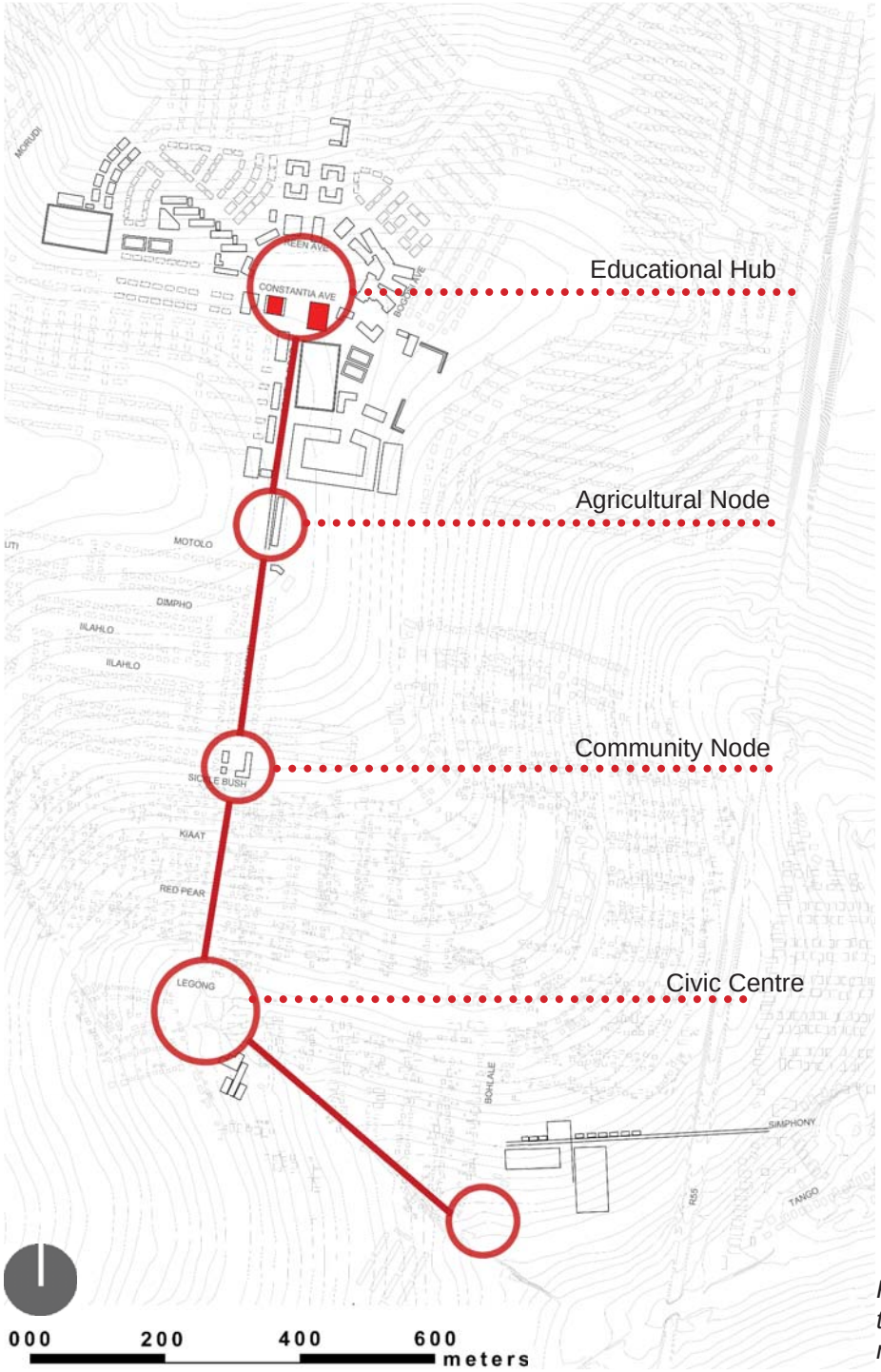

The key intentions driving the development of the Osmosis Framework for Olievenhoutbosch are as follows:

- To create a pedestrian-oriented layout supported by the existing transport system, instead of being subservient to it.

- To define a space that acts a legible community centre that is defined by community facilities and services.

- To connect the new central community space with the existing community centre in the southern area of Olievenhoutbosch via the strengthening of pedestrian-oriented movement network that is already developing naturally.

- To provide various necessary activities within walking distance of each other.

- To create a central community gathering space intended for intimate interaction between diverse age groups.

Figure 3.3: Map showing the connections created between the various nodes.

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3.03_Framework Layout

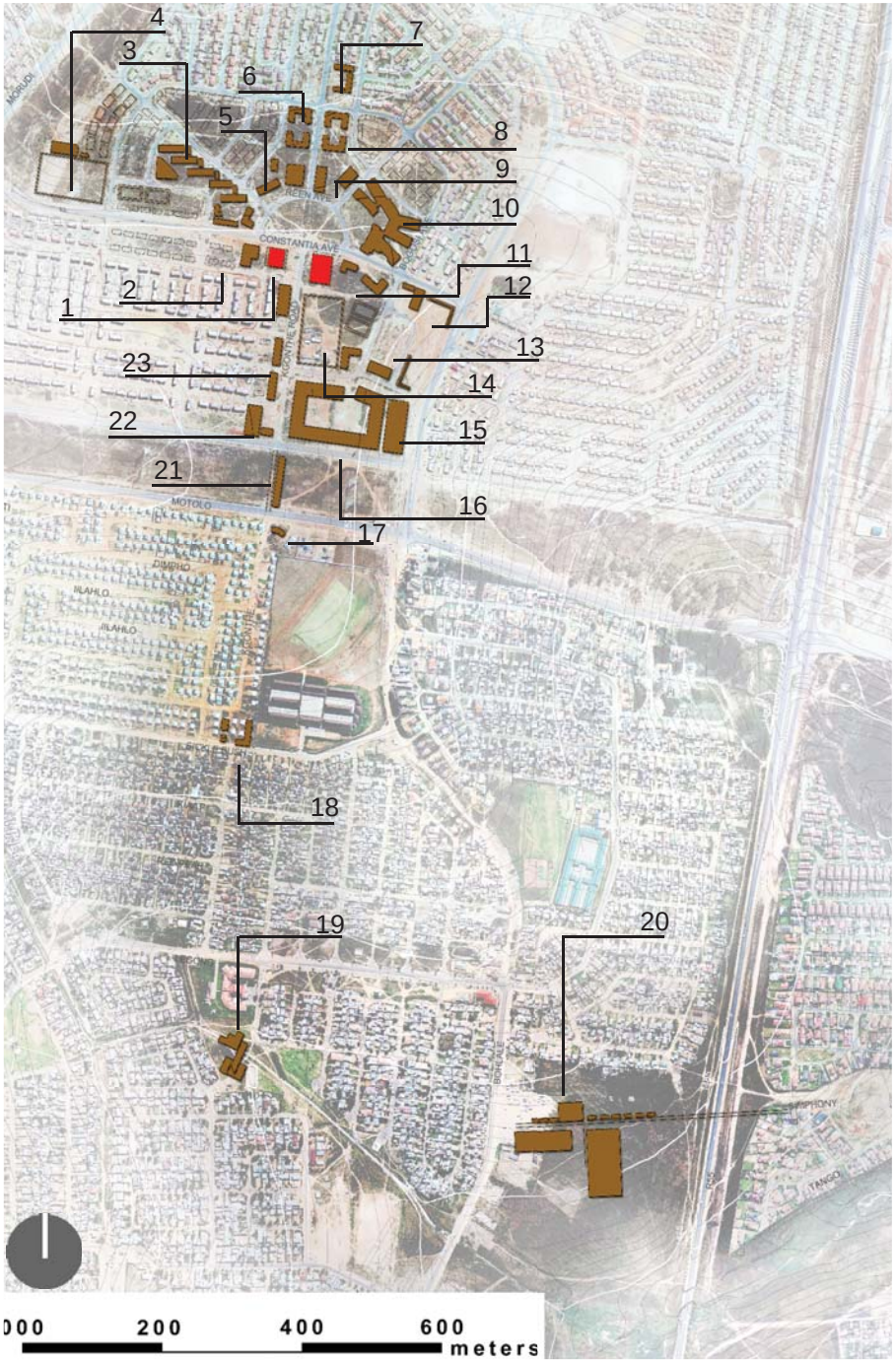

Figure 3.4: Map indicating the proposed layout of the new framework.

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The framework layout concentrates on the northern precinct of Olievenhoutbosch, with key interventions along the pedestrian-oriented route to strengthen and support the route (figure 3.4). These interventions are designed by Mr. Francois van Wyk (20), Mr. Saadiq Omar (19), Ms. Colette Maritz (10), and the author (1). The layout also focuses on creating a tangible and intangible connection between the northern and southern precincts through the placement of activities along the route.

1. Performance Arts Centre
2. Student Housing
3. High School
4. Sports Facilities & Fields
5. Community Centre
6. Multi-storey Housing
7. Creche
8. Multi-storey Housing
9. Clinic
10. Primary School
11. Sports Facilities & Restaurant
12. Bus Depot
13. Parking
14. Sports Fields
15. Business
16. Social Housing
17. Church
18. Library & Community Hall
19. Recreational Facilities
20. Sports Facilities & Fields
21. Taxi drop-off & Carwash
22. Market
23. Mixed-use & Businesses

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3.04_Spatial Framework

Existing Condition

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3.05_Spatial Framework

Proposed Condition

Figure 3.5: Mapping of spatial structure.

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3.06_Land Use Framework

Existing Condition

© University of Pretoria

3.07_Land Use Framework

Proposed Condition

Figure 3.6: Mapping of land usage.

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3.08_Master Plan

Existing Condition

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3.09_Master Plan

Proposed Condition

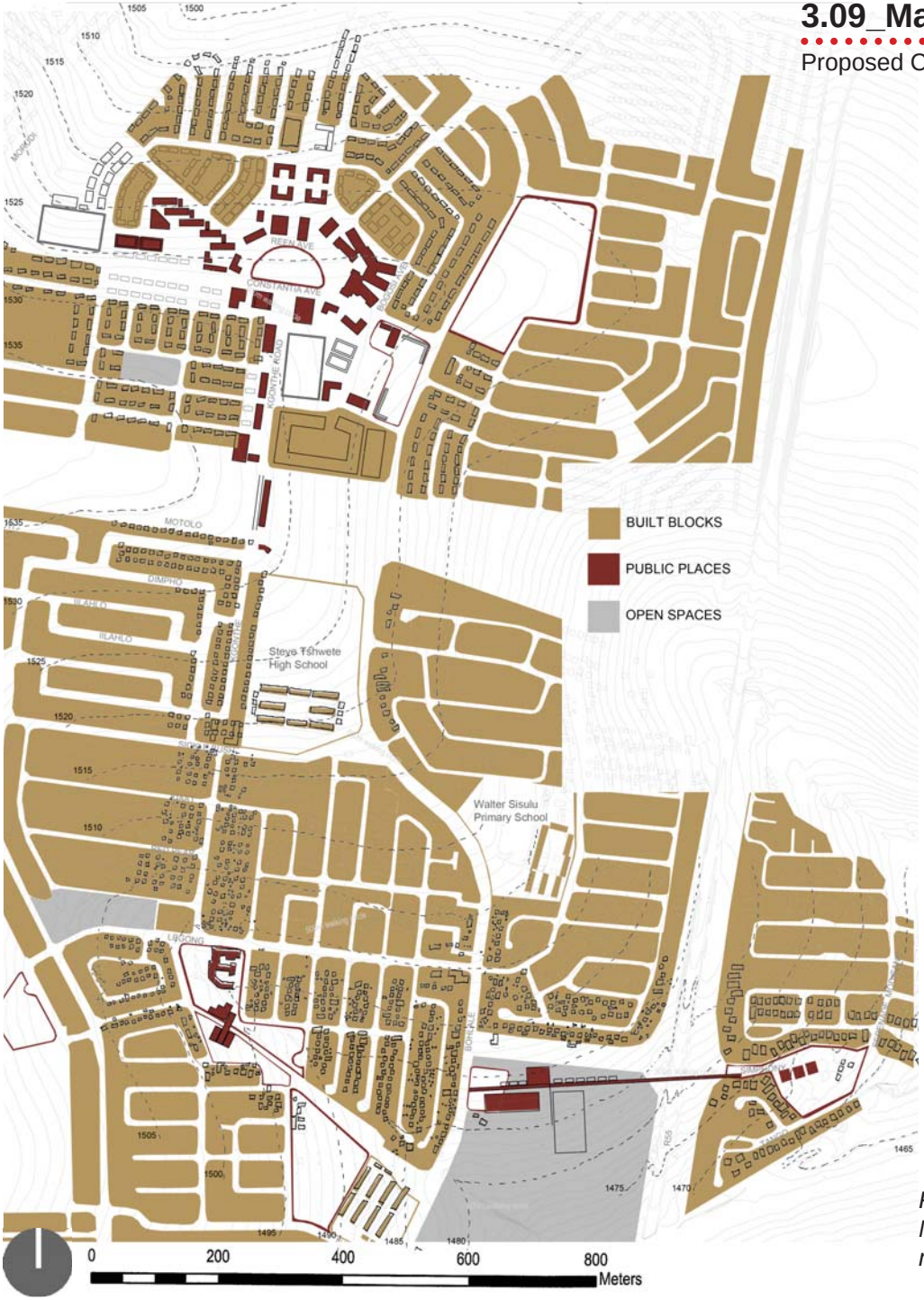

Figure 3.7: Mapping of master plan.

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- 4.02_The Site Identified_p60
- 4.03_Site Activity and Movement_p62
- 4.04_Climatic Data_p64

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4. Site Analysis

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4.01_Site Location

This chapter offers a graphic analysis of the influences different factors have on the proposed site, which lies in the northern section of Olievenhoutbosch. This northern section is the result of an Urban Design Framework prepared in July 2005 by Bigen Africa and ADA Urban Design, called the Olievenhoutbosch Ministerial Housing Estate, and has not yet been fully developed. A large section of the central area of this development lies vacant, and the proposed site falls within this area. However, this area, along with a connection to the southern section of Olievenhoutbosch has been redesigned to accommodate a more socially-and-economically integrated approach to development and this redesigned framework, called the Osmosis Framework, attempts to correct certain lacking features in the existing framework. In this new framework the proposed site lies on the southern edge of the northernmost public space connected to a pedestrian-oriented route which directly connects the centres of the northern and southern sections of Olievenhoutbosch, and also bridges this route to form a gateway between two disconnected sections of the area (figure 4.1 & 4.2).

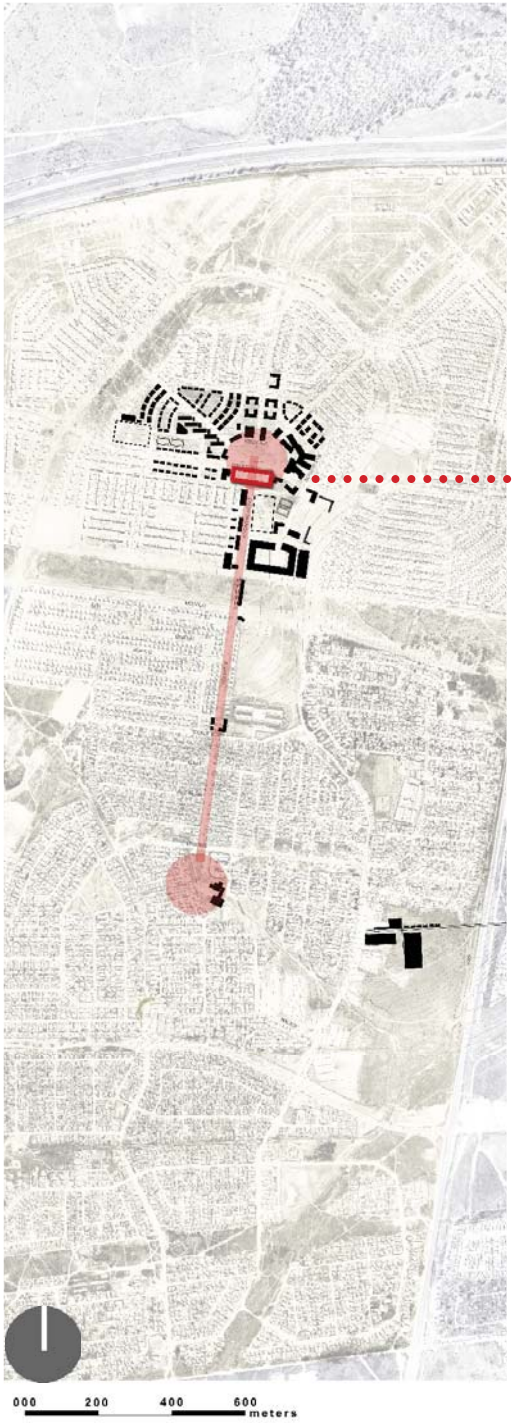

Figure 4.1: Map showing the location of the proposed site with regards to the connection with the southern section of Olievenhoutbosch.

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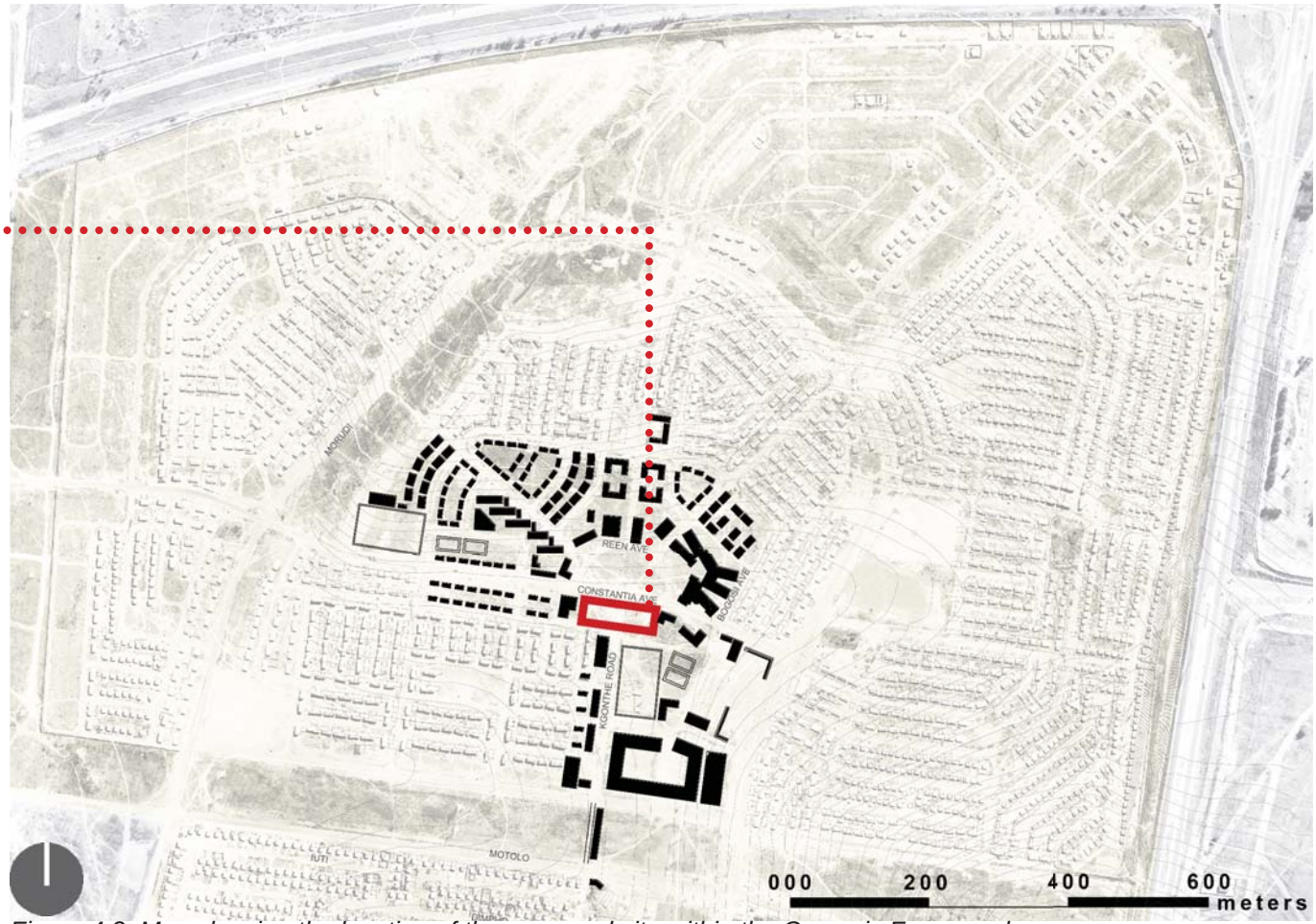

Figure 4.2: Map showing the location of the proposed site within the Osmosis Framework.

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4.02_The Site Identified

The new framework, the Osmosis framework, proposes 4 nodes that are connected via a pedestrian-oriented route. These nodes are the Civic, Community, Agricultural and Educational nodes. The Educational node in the northern section of Olievenhoutbosch has the added function of acting as a destination or a departure point in the northern section, and as such it can rather be called an Educational Hub. As a hub that acts as a destination / departure point, it needs to be defined by a gateway, that both connects the hub with the rest of Olievenhoutbosch and can act as a landmark.

"Any part of a town - large or small - which is to be identified by its inhabitants as a precinct of some kind, will be reinforced, helped in its distinctness, marked, and made more vivid, if the paths which enter it are marked by gateways where they cross the boundary."

- Christopher Alexander, A Pattern Language, 1977

A gateway that is part of this educational hub must lie on the southern edge of the public space, where the pedestrian-oriented route enters the educational hub, because the educational hub is the focal point for activity in the northern section of Olievenhoutbosch, and this edge is the connecting element between the hub and the pedestrian-oriented route which connects to the rest of Olievenhoutbosch. The gateway becomes a portal of access between the two areas. According to Christopher Alexander, gateways area always solid entities, not just gaps or openings, and regardless of what each entity is, they all have one thing in common - they create a feeling of transition.

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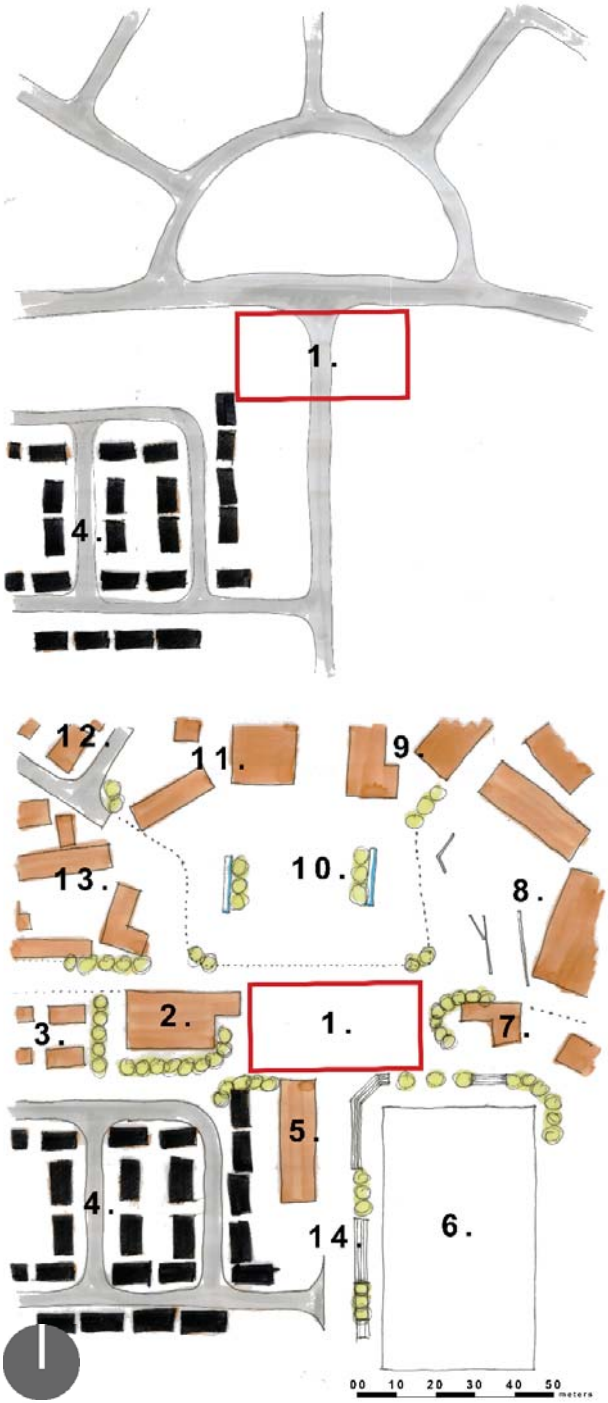

1. Proposed Site
2. Student Housing
3. Proposed Double-storey Housing
4. Existing Double-storey Housing
5. Mixed use and Business
6. Sports Fields
7. Sports Facilities & Restaurant.
8. Primary School
9. Clinic
10. Public Square
11. Community Centre
12. Proposed Double-storey Housing
13. Secondary School
14. Proposed Pedestrian-oriented Route

Figure 4.3: Diagrams indicating the proposed site in both the current and proposed contexts.

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4.03_Site Activity and Movement

Figure 4.4: Photographs of daily activities at the proposed site

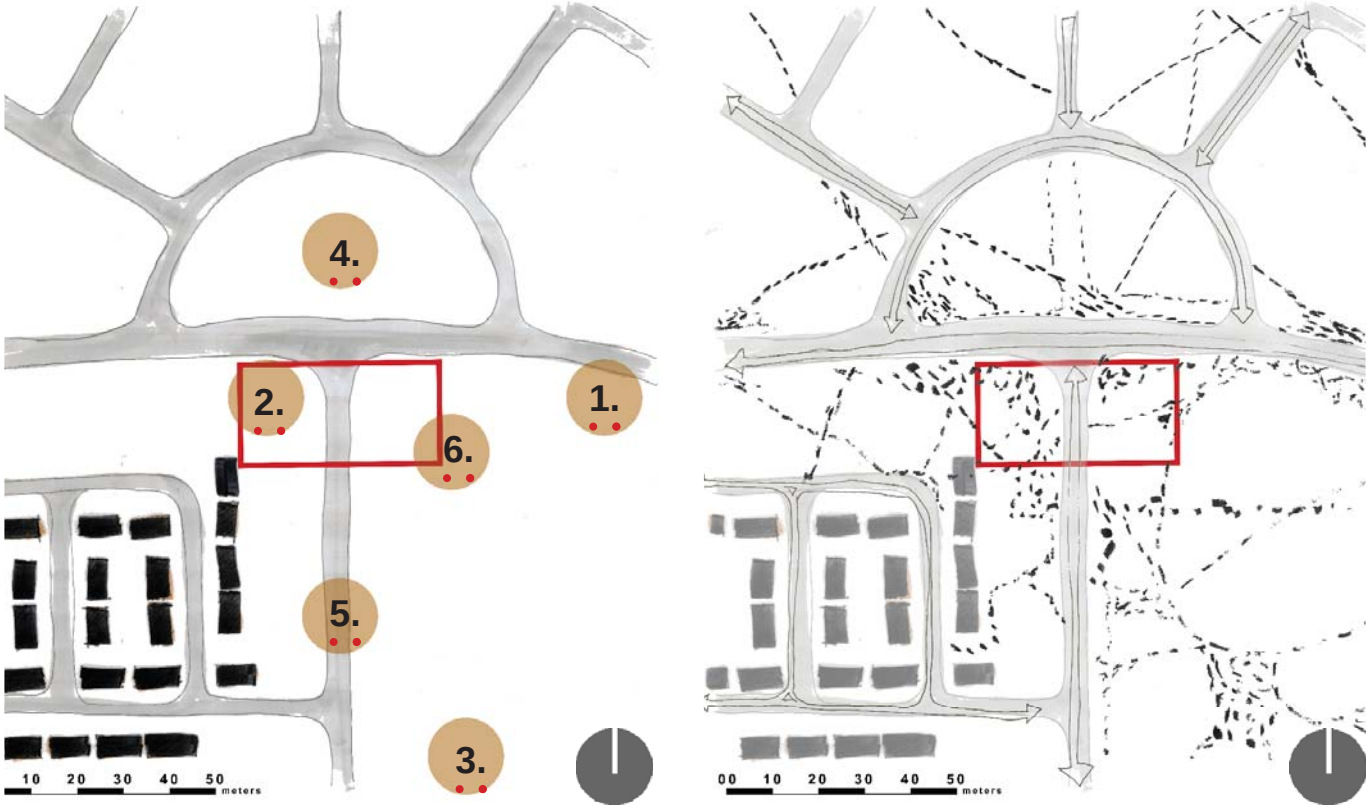

Figure 4.5: Diagrams indicating activity and movement in both the exisiting and proposed conditions.

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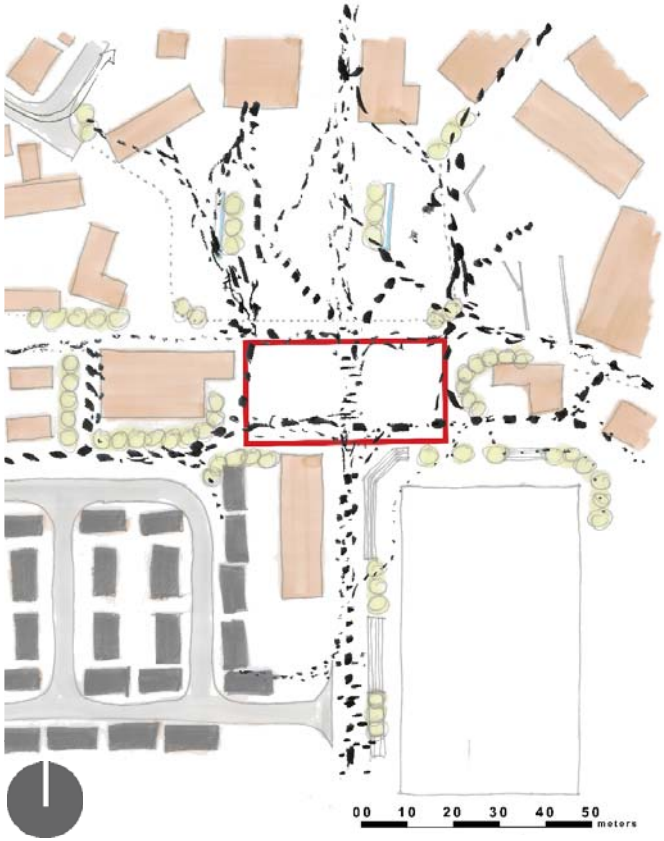
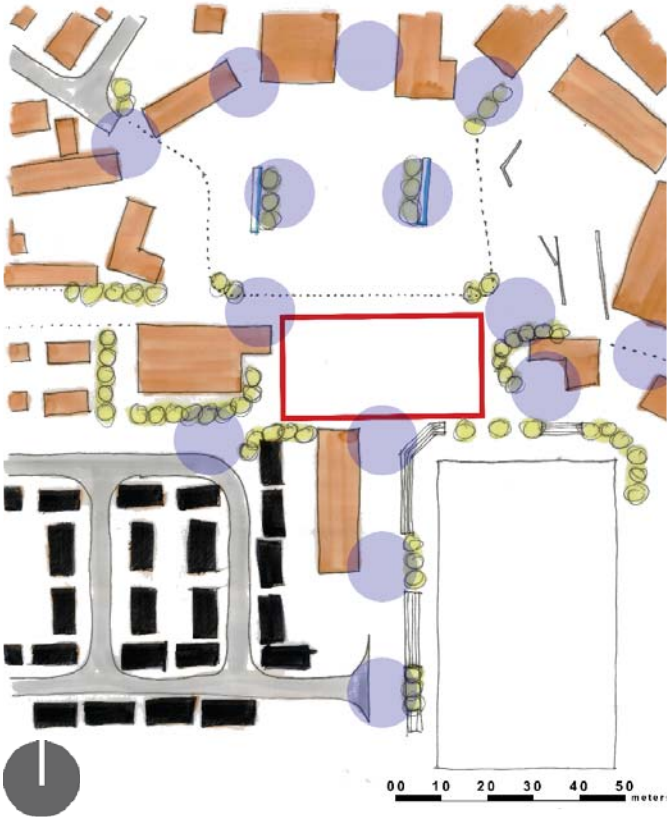
Currently, activities on or near the proposed site are limited to movement from one destination to another,. These destinations are usually transport hubs, or businesses. These businesses are also not commercial by nature, but rather manufacturing-oriented, and holds little or no interest to pedestrians. These pedestrians currently have to move through vast expanses of open space, with little or no social or economic stimuli, or alternatively drive around in a motor vehicle.

When applying the Osmosis Framework, the areas of potential activity increase, and become vested in a defined environment. These activities will still tend to group around areas of movement, or gathering spaces, and as such provide sufficient stimuli for pedestrians across a broad spectrum of needs and experiences.





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4.04_Climatic Data

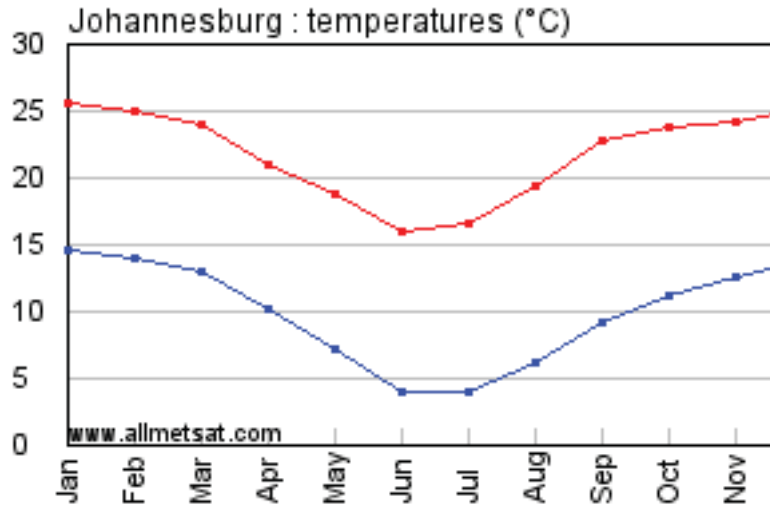

Figure 4.6: Average annual temperatures in Johannesburg.

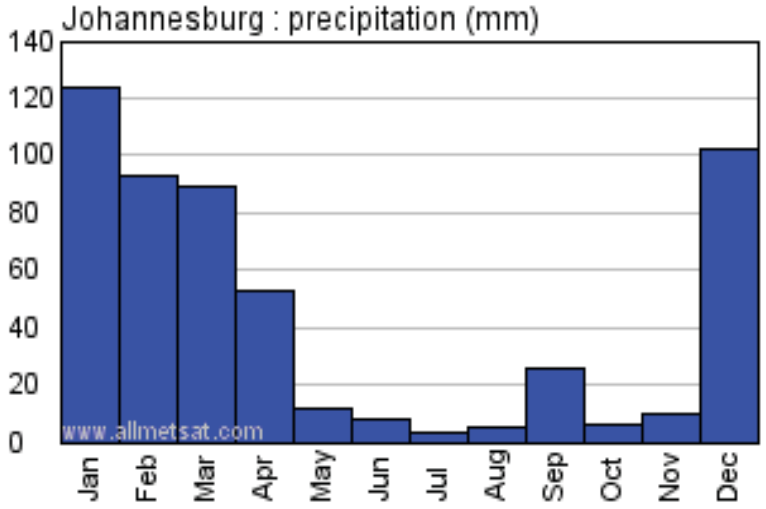

Figure 4.7: Average annual precipitation in Johannesburg.

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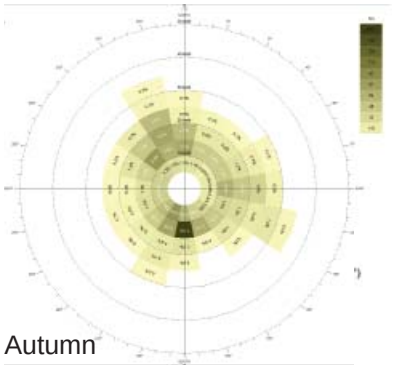
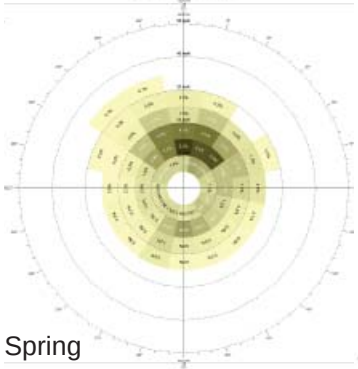
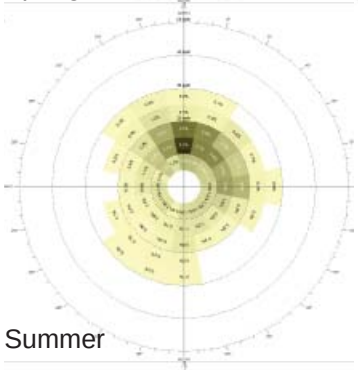


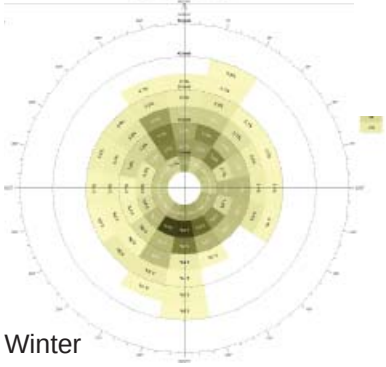
Autumn



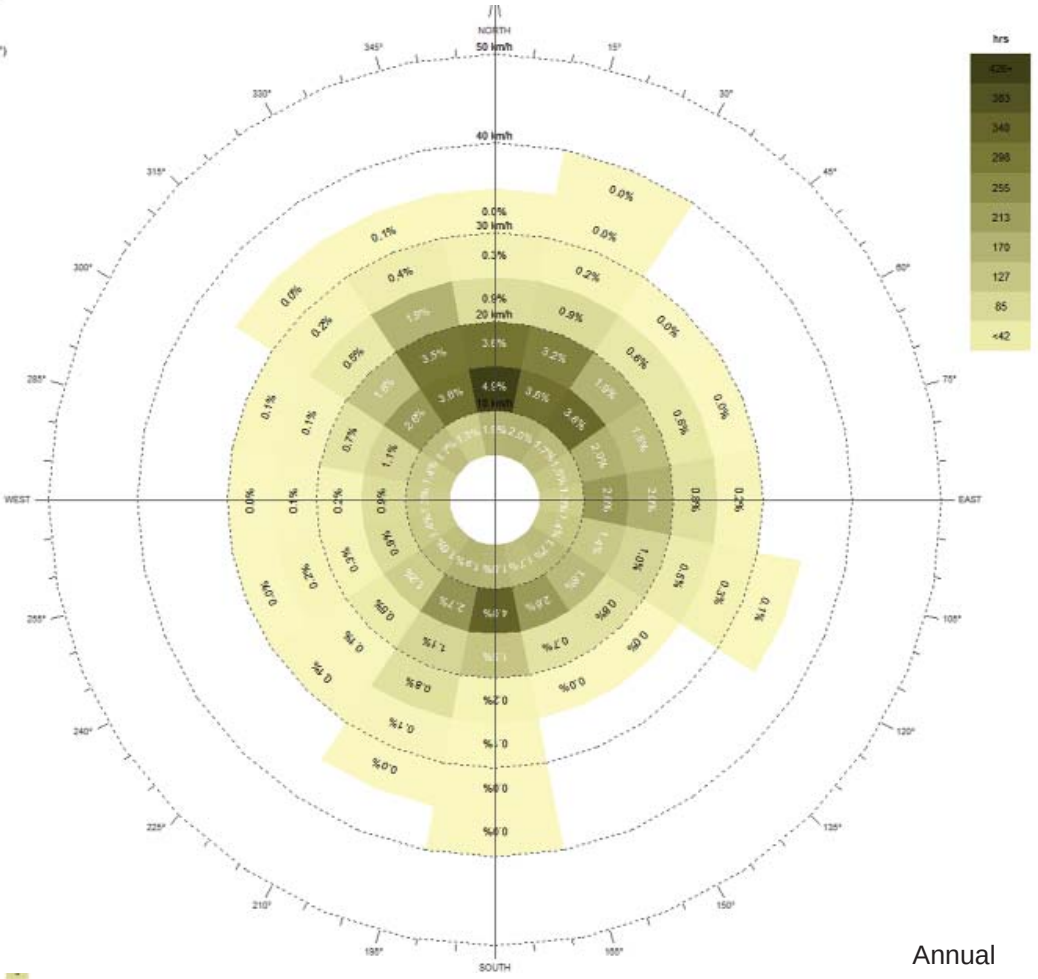
Spring



Summer



Winter



Annual

Figure 4.8: Average wind speeds during various seasons, and annually, in Johannesburg.

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Figure 4.9: Panoramic photographs of proposed site.

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• 5.02_Seaside_p74
• 5.03_Nelson Mandela Interpretation Centre_p76

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5. Precedents

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This chapter deals with the investigation of three distinct precedents to support the decisions made during the research and design processes. These precedents vary in nature, scale and purpose, and provide a foundation for the urban, social and human scale interventions. A Very Nervous system by David Rokeby focusses on human interaction with space, Seaside is a development based on New Urbanist principles, and the Nelson Mandela Interpretation Centre is a building in a similar context to the proposed site of this intervention.

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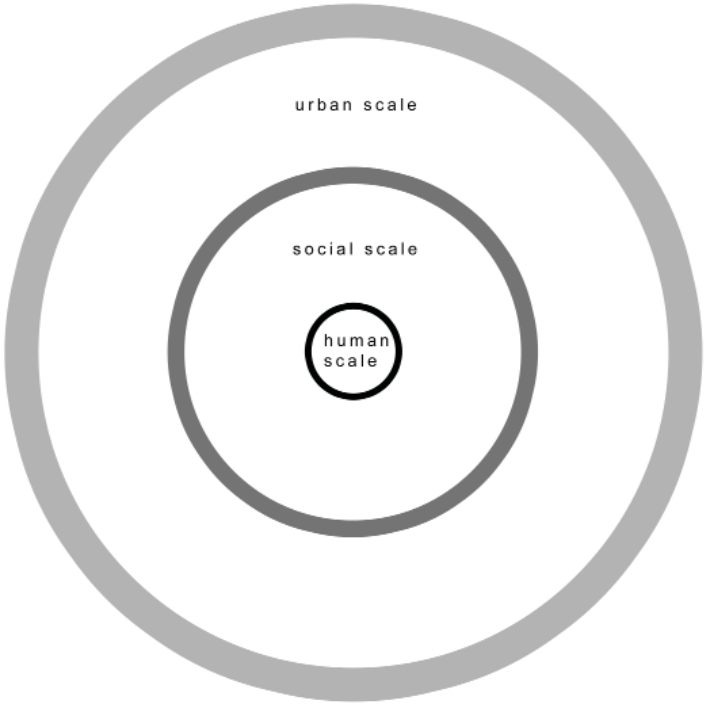

Figure 5.1: Diagram illustrating nature and scale of the precedents.

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5.01_Very Nervous System
David Rokeby, 1986-1990
Interactive Sound Installation

Very Nervous System, designed by David Rokeby in 1986, is an interactive sound installation which uses cameras, image processing and synthesiser-and-sound systems to create music using the movement of the human body through a space as a generator for music. While it can be described as an instrument played by the body, it is better defined as a generator of an interactive relationship between the user and the system, where each is both informed by, and gives meaningful input, to the other.

According to Rokeby, the primary element in the installation is not the sound generated, but the interface that allows the interactive relationship to take place. Most systems have tangible methods of input, but this system has a spatial interface. It is an implied rather than defined interface through which the system can be accessed. Because it is not defined it creates opportunity for exploration, and this exploration leads to an understanding of the system being explored.

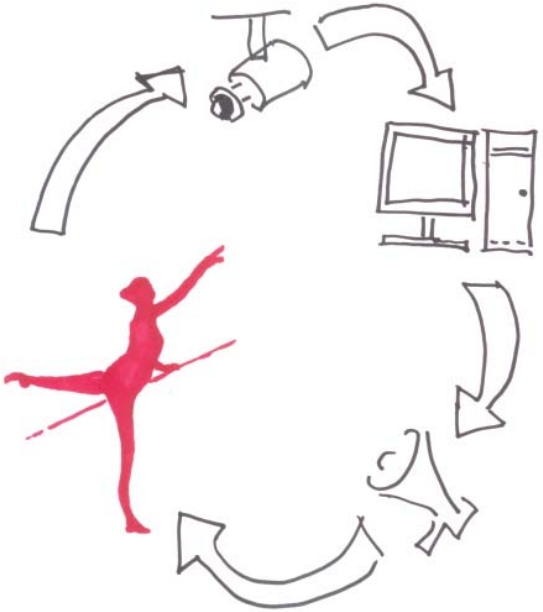

Figure 5.2: Diagram illustrating the cyclical concept of the system.

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"Because the computer [activity] is objective and disinterested, the experience [interaction] should be intimate."

-David Rokeby

The loop created by the system in which the user becomes an integral component creates an interaction between the user and the system in which the user and the mechanism respond to each other. After exposure to the installation some people claimed that they experience an afterimage of the interaction, allowing them to feel directly involved with the space in which they found themselves.

This principle of creating interactive environments for people to explore, will be applied to the intervention as a method to strengthen the design's interaction with the public realm in its function as a gateway between the northern and southern precincts of Olievenhoutbosch. When applied to architecture, the core concept of this system is to involve people in their environments, and this system proved that interactivity creates a heightened sense of belonging in the user with relation to the space.

Figure 5.3: A Very Nervous System being used in a public space.

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5.02_Seaside

Andres Duany & Elizabth Plater-Zyberk
New Urbanist Town

Seaside, a master-planned community in Florida, the United States of America, was the first fully New-Urbanism development to be completed. Strict guidelines and a prescribed scale were put in place to keep the intent of creating a small seaside resort or town alive.

One of the primary design generators for the master plan is walkability. Everything is minutes away from each other on foot. Lot sizes in the residential areas are small to allow for this walkability, and this thrusts the pedestrian into the community almost immediately. Pedestrian-oriented routes also usually have prominent buildings or spaces at the end of each, creating destinations that are visible from the departure point and allowing the pedestrian to orient himself. Most of these routes find their origin, or come together, in an open public space defined by commercial and civic buildings around its edges (figure 5.2).

This development can be used as a base for what the proposed Osmosis Framework intends, which is a walkable settlement friendly to pedestrians, allowing them to move as they want to and to orient themselves with visible landmarks.

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Figure 5.4: Drawing of the layout of Seaside.

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5.03_Nelson Mandela Interpretation Centre
Peter Rich Architects, 2003

Alexandra was the home of Nelson Mandela in Johannesburg when he first moved to the city, and as such is an ideal place for a centre which celebrates his life. This Centre contains exhibition spaces, archives, multi-use open spaces and event spaces, as well as spaces which cater for the informal trade and businesses typical in the area.

The Interpretation Centre was investigated to determine the influence of the bridge across the street on the public realm, as well as to understand the choices of materials. When investigating the influence of the bridge, it was determined that it acts as a landmark in Alexandra, due to its location almost on top of a hill. The bright colours also serve to let it stand out from the surrounding environment, and its scale, while perhaps not appropriate for the context, is aimed at creating a landmark structure. However, when analysing sectional drawings of the Interpretation Centre, it is clear that there was never any activity planned, other than movement and pausing, for under the bridge itself. The focus is rather on the adjacent public squares, where the entrances to the structure is located. The area under the bridge is also still predominantly vehicle-oriented, and as such does not persuade pedestrians to stay.

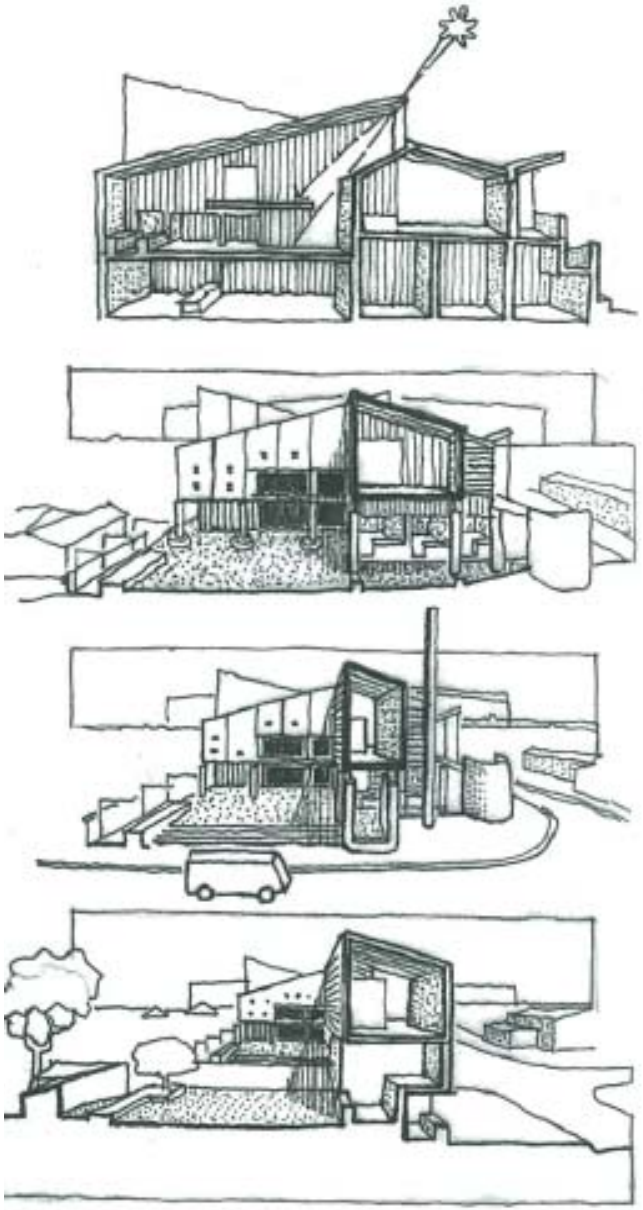

Figure 5.5: Sections of the Interpretation Centre

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Despite this problem underneath the bridge, the building responds very well to the culture of Alexandra. Through the entire building shards of Alexandra are visible from almost any space. I also responds to the tactile and visual culture of Alexandra in the materials that are used in construction. There is a dialogue between rural, handmade, material finishes and urban, recycled, manufactured materials, which can be found in the physical fabric of the township itself.

These two elements - the bridge and the materiality of the structure - are especially applicable to this dissertation. While the context is not exactly the same, there are similarities between the proposed site, and the site of the Interpretation Centre, most notably the fact that both interventions span across the street. By analysing the Interpretation Centre it was possible to determine how to approach the design of the space underneath the bridge, as well as how to design contextually in terms of materials appropriate to a township or similar area.

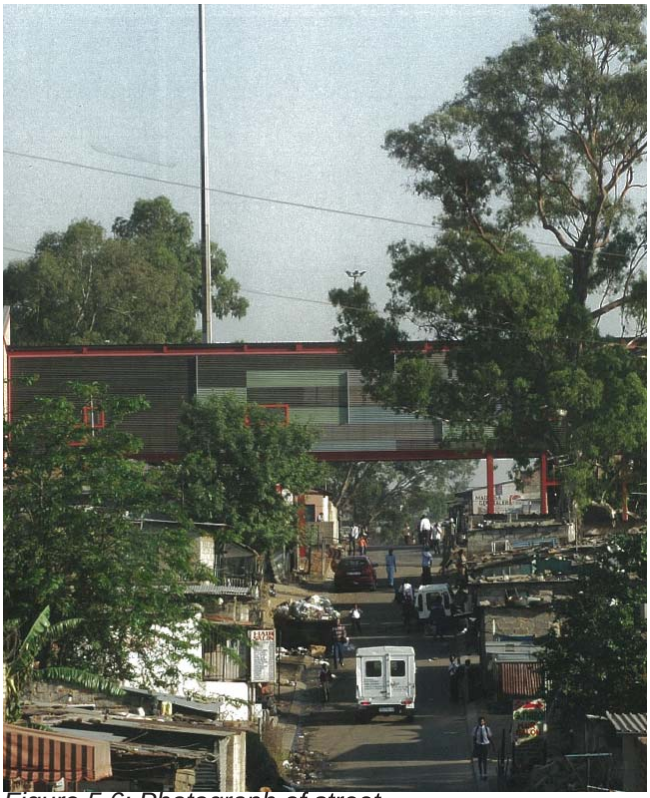

Figure 5.6: Photograph of street running underneath building.

Figure 5.7: Photograph of facade during construction.

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- 6.02_Sensory Disconnect_p82
- 6.03_Physical Disconnect_p86
- 6.04_Conclusion_p88

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6. Theoretical Investigation

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This chapter deals with the theoretical investigation that was used as a base for both the conceptualisation of the project, as well as the development of both the urban framework and the intervention in its urban context. This theoretical investigation attempts to address the disconnect found in different spheres of society that affect a person's perception of space, by identifying the various elements that lead to the disconnect, and then finding alternatives that attempts a reconnect, in an effort to improve the human perception of space.

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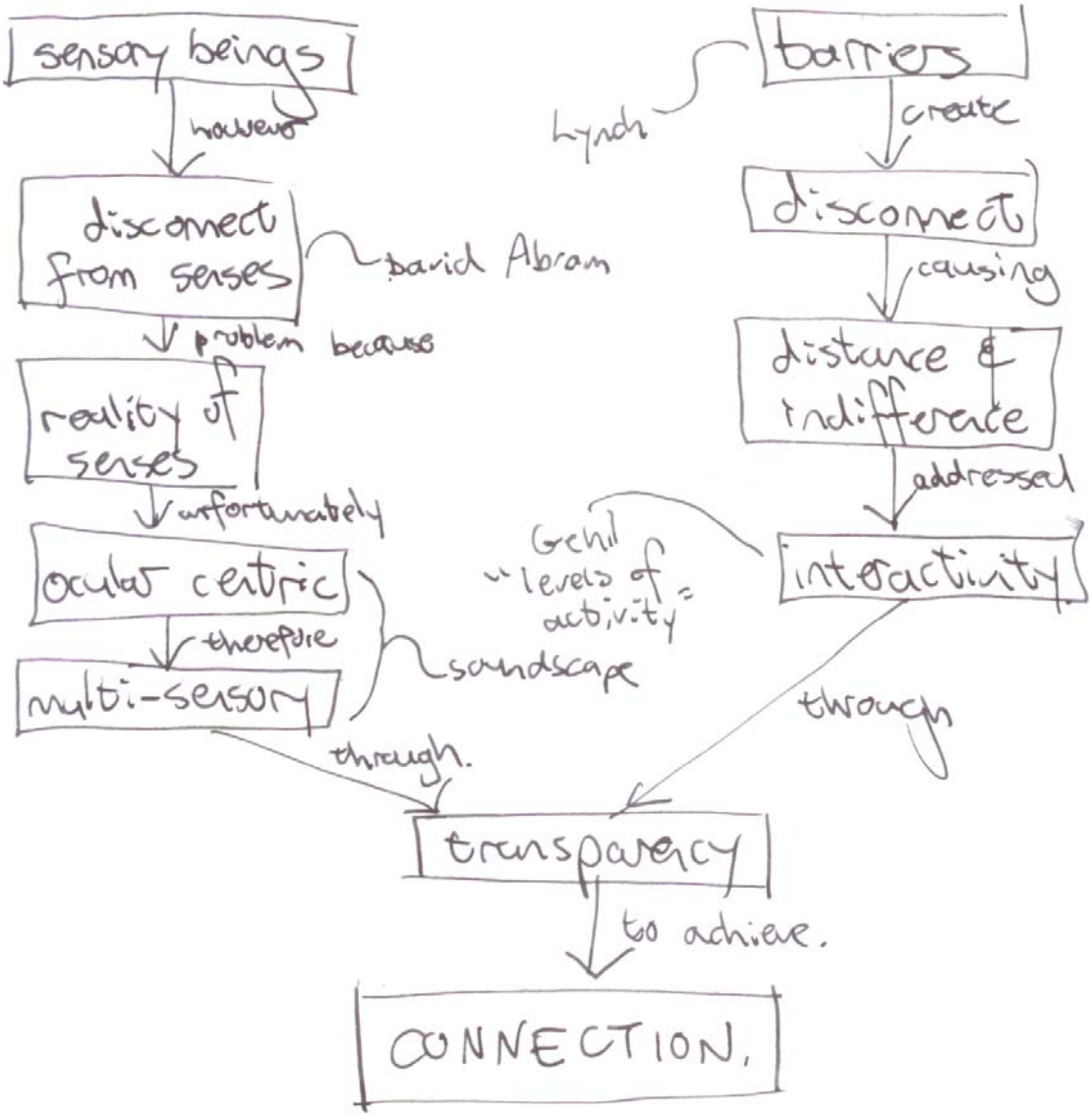

Figure 6.1: Diagram showing the line of thought of the theoretical investigation.

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6.02_Sensory Disconnect

Humans are sensory beings, and as such the human being responds to many different external and internal forces, both tangible and intangible. The bodily senses, such as sight, smell or touch, are only those senses that we define as “senses”. In fact, humans are affected by a much wider range of sensory experiences of the mind and spirit (Pearson, 1991).

The phenomenologist David Abram, in his book The Spell of the Sensuous, gives many examples of where modern man has been disconnected from his senses because of the environment he lives in. When compared to tribal man, modern man lacks the sensorial experience and knowledge to experience the world to the fullest. This disconnect may be because of modern man’s assumed role – that of master and exploiter of nature. It can also be because of the human’s environment. David Pearson, author of the article Making Sense of Architecture, suggests that the world which is polluted with increasing noise, various chemicals like CO2 in the air, and smells emitted from factories and cars, dulls our senses, and may actually impair or damage them (figure 6.2).

According to Maryam Asgari, who wrote the article on sensory architecture entitled Sensory Architecture in Silent Vision, one of the most important concepts in the world today is that of the quality of life. If this is true, and humans live in a world where everything around us “dulls our senses”, should that not change? Furthermore, if - as Laszlo Moholy-Nagy, a professor at the old Bauhaus School, states - spaces are simply a reality in our sensory experience, does this not mean that it is the architect’s duty to design space to be rich multi-sensorial experiential environments for human interaction?

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Figure 6.2: Photograph of Lahore - the most polluted city in Pakistan.

But as mentioned earlier, space is a reality in our sensory experiences. So Moholy-Nagy stipulates that there is a simple formula for the way in which man perceives space. He firstly perceives space through the use of sight, secondly, through the use of hearing, thirdly through his sense of equilibrium, and lastly through the means of locomotion. So while this study focuses on the use of sound and a person's perception of space through sound, there are still other fields open to investigation. Sensory architecture is intended to be experienced across all sensory inputs of the human body and mind.

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We live in an ocular-centric society. When we see a structure it is first and foremost judged by how it looks instead of how it is experienced, and this is then mistaken as the same thing – sight equals experience. But since “life-enhancing” architecture must address all the senses then this means that we are limiting our own experience of reality. Ironically we are blinding ourselves to other, richer experiences.

In the late 1960’s and early 1970’s a group called the World Soundscape Project (WSP), led by R. Murray Schafer, made detailed investigations of the soundscapes of various places as referred to in the book “Five Village Soundscapes”. He saw this as a kind of ideal when compared to the city in which he lived – Vancouver, for which he had a distaste of the ever-changing soundscape. However, eventually they thought they had a monopoly over what sounded good - an ideal that they wanted everyone to live by. And this cannot be true, since people perceive sound differently. It was one of the first investigations into the field of soundscapes, even if it had its flaws.

“Every time a street with automobile traffic is converted to a pedestrian street, there are renewed opportunities for hearing other people. The noise of cars is replaced by the sound of steps, voices, running water, and so forth. It is again possible to have a conversation, to hear music, people talking, children playing.”

- Jan Gehl, Life Between Buildings.

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Audible architecture, or soundscapes, already exists. It is already around us, every time anything we do generates a sound. One way to refine this multi-sensorial experience is to focus on the sounds generated by interaction with the environment, and the way people react to these sounds, and design accordingly. David Rokeby created one of the first such interactive environments with his project called A Very Nervous System with which the movements of a user is captured by a camera and converted to sounds. The user then becomes part of a closed loop in which the user both influences and is influenced by the sound generated. His goal was to try and meld the realms of logic and expression into one by using the computer which is logical, and music, which is expression. via an interface, which was space. This shows that sound can in fact be used to create a sense of belonging, and influence a person's perception of the world around him. Where a so-called "theatre of effects and atmospheres" was created with the skin of a building by most architects (van Toorn), this experiment of Rokeby's shows that a soundscape can create that as well, if not better than a physical construct.

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6.03_Physical Disconnect

"Edges are the linear elements not used or considered as paths by the observer. They are the boundaries between two phases, linear breaks in continuity."

-Kevin Lynch, The Image of the City

An edge becomes a barrier when there is little or no visual, aural or motion penetration between the two phases on either side of the edge. A barrier could therefore allow for visual penetration, but deny movement. If, for example, there exists a barrier within a settlement, that allows limited access, and limited visual and aural penetration, what will the eventual response be? The answer may be found in the idiom: "The wrong side of the tracks". This idiom implies a barrier (the tracks) as well as a differentiation between right and wrong, or good and bad, because of this barrier. It is this differentiation because of a physical barrier, that creates a barrier in the human psyche. And because of these barriers, both physical and psychological, that there is limited interaction with the other side of the edge or barrier, which then creates or perpetuates a disconnect within communities.

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How can this physical disconnect be addressed? What can be done on an urban level to reconnect the community? Kevin Lynch writes that an edge may be a barrier or a seam. The difference between these two are that the one inhibits interaction with the other side of the edge, and the other attempts to join the two sides together. An edge can become more than a barrier if it allows visual or motion penetration, and if it was structured to some depth with the areas on either side of the edge. By doing this, the barrier will become a seam, allowing activity to move between two regions, or even to take place in the edge itself. A seam encourages interactivity between two regions within a settlement.

Interactivity, therefore, seems to be the answer to the problem of indifference within communities, and interactivity is a result of communication. Communication comes in different forms, and these different forms are effective at different distances. According to Edward T. Hall, author of The Hidden Dimension, there are four distinct distances suitable for communication, and these can be defined through the change in vocal volume. These four distances are the intimate distance (0 -45cm), personal distance (45cm - 1.2m), social distance (1.2 - 3.7m), and public distance (more than 3.7m). Therefore, for a public route or space to be effective at creating opportunities for interaction, it needs to supply the opportunity to experience all four of these distances (figure 6.3).

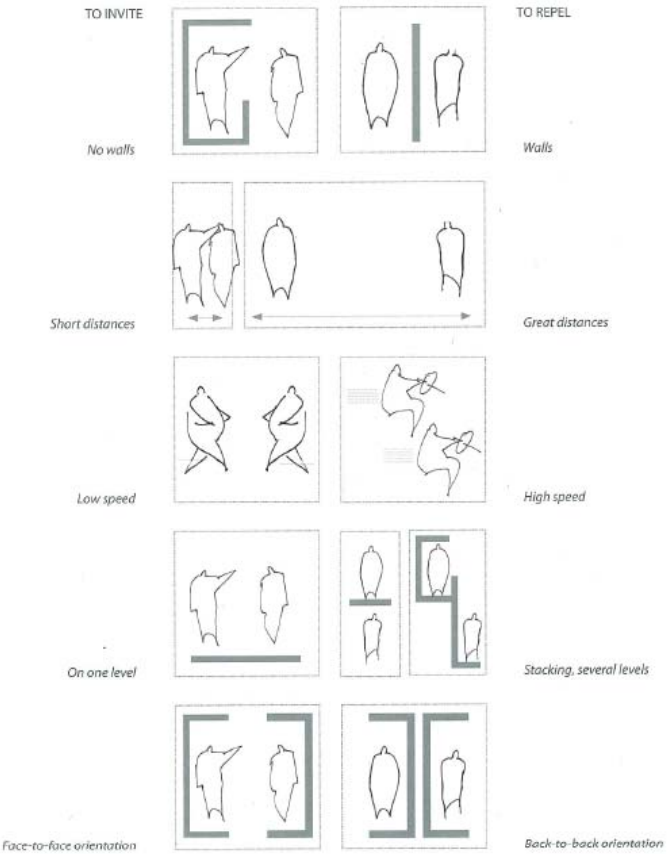

Figure 6.3: Jan Gehl's diagram of inviting or repelling interaction.

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6.04_Conclusion

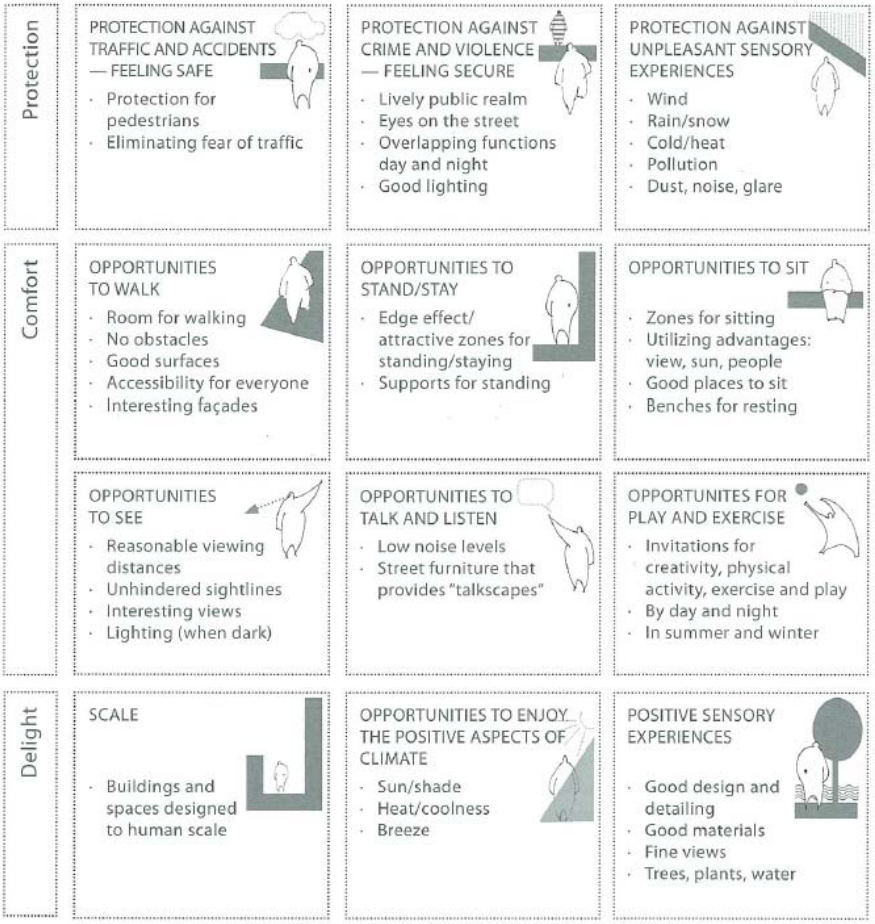

Figure 6.4: Jan Gehl's 12 quality criteria for a pedestrian landscape.

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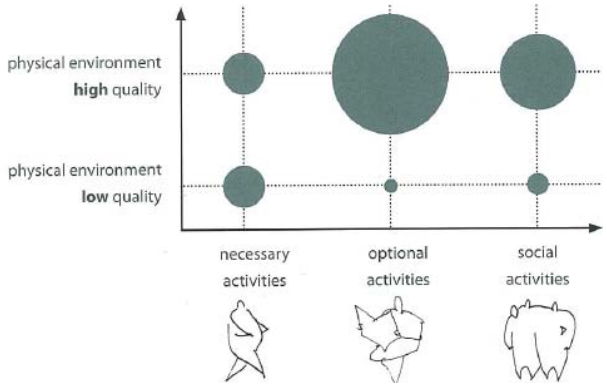

Figure 6.5: Jan Gehl's diagram of types of activity.

Just as there are different levels of aural awareness, or communication, are there different levels of activity (figure 6.5). These two scales coexist in the urban space and the interaction between them determine a public space's effectiveness, but when one or the other ceases to exist, a public space becomes stagnant. Furthermore, just as people are disconnected from their senses, so are they disconnected from their own physical environment. By addressing these two similar problems can we change the way people interact with one another in the public realm, and by creating or improving interaction we can improve the public realm itself. We can attempt to correct these problems through the design of multi-layered spaces that allows for different opportunities and levels of activity and degrees of interaction in the pedestrian landscape (figure 6.4), through transparency.

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Design
7. Development

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7.01_Concept

Connecting - reinvigorating or creating connections - is a natural process that humans continually experience. In architecture and urban design there exists different levels and degrees of connections which are determined by the level of interaction between individuals or groups within the public realm, or by the interaction between individuals or groups within the public realm and people in the private realm (Gehl, 2010). And as a natural process that is a part of human experience, but which has been neglected in the proposed area of study, it needs to be enhanced on varying levels of scale in design. The proposed Performance Arts Centre in Olievenhoutbosch is intended to both create new connections, and facilitate the reanimation of existing connections.

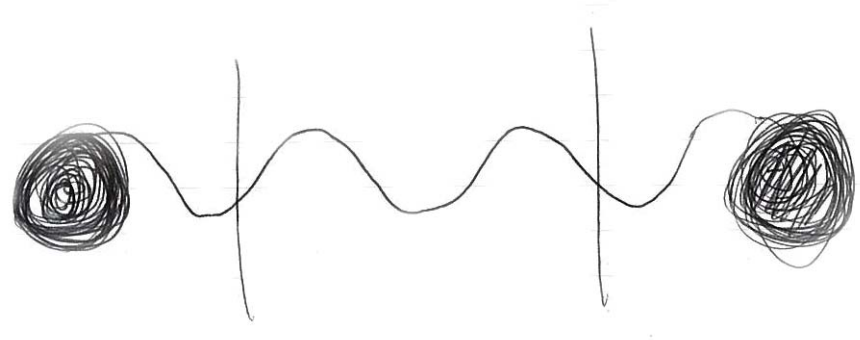

Figure 7.1: Parti sketch.

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When looking at the current, and currently planned conditions of Olievenhoutbosch, one sees a clear distinction between the old and the new. The original, true character of Olievenhoutbosch is now being usurped by developers and planning, and is being lost in the name of progress. It is as if the original, natural essence of the place is being ensnared in a web of the new, man-made structures. The design of a theatre should reflect the essence of the place it represents, and as such having a core, surrounded by a lighter structure represents this relationship between the old and the new.

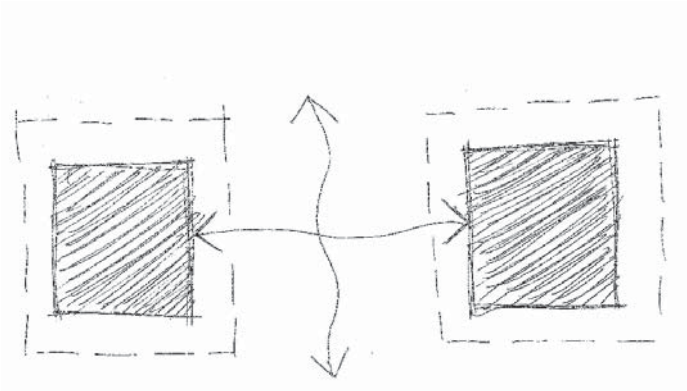

Figure 7.2: Development of Parti diagram.

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7.02_Programme

The proposed programme for the design intervention needs to respond to the greater context of Olievenhoutbosch, address deficiencies in the framework, and be able to support the concept of connections. Taking these factors into account, after an in-depth analysis of Olievenhoutbosch and theoretical investigation, as well as an investigation into the site's potentials and limitations, it was decided that the intervention was to be socially-oriented. Its position in the framework, where it acts as a gateway, excluded interventions which are private by nature. The intervention also needs to generate activity through the entire day, and to achieve this, it has to be an amalgamation of various functions. These different functions, which will be arranged around the central function of the intervention according to the edge conditions of the site, will also create various levels of interaction and degrees of activity in and around the intervention, and so become the interface between public and private realms.

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Figure 7.3: 3D representation of the design intervention.

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The spaces that will be created need to be multi-functional to allow the constant presence of activity required by the site. A theatre, with accompanying elements such as commercial, social and private functions, will provide these spaces. A theatre also addresses a problem in both the existing framework and the current condition found in Olievenhoutbosch, which is that there are almost no provision made for cultural or recreational spaces. However, this problem extends further. There are limited opportunities for residents to learn or experience anything beyond basic education. To address this problem of limited amenities effectively, the intervention needs to have an added layer of educational opportunities. As such musical practice rooms and a dance studio will be a part of the intervention, and the theatre spaces will also be made available to groups such as churches or community committees for meetings or training. With these different functions drawing activity together, the intervention starts to speak on more than an urban level, but also on a human scale.

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Figure 7.4: Students of a school in Olievenhoutbosch dancing to a song written by Rasta T (Right).

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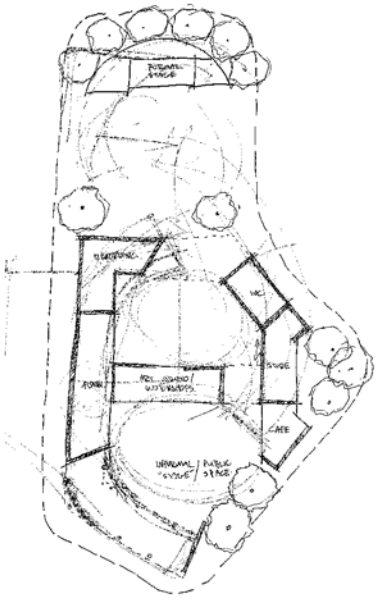
7.03_Iterative Design Explorations

"Iteration: the action or process of iterating or repeating as a procedure in which repetition of a sequence of operations yields results successively closer to a desired result."

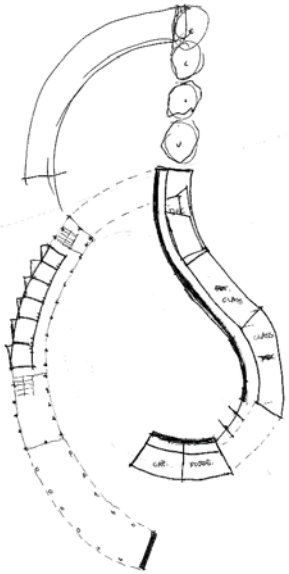
- Miriam-Webster Dictionary

Figure 7.5: Maps indicating location of previous site.

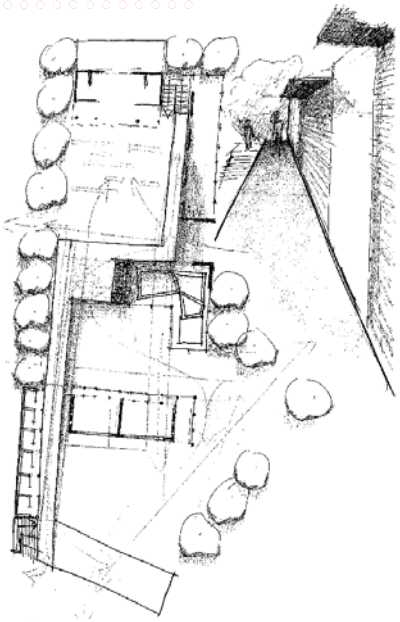
Iteration 1.



Iteration 2.



Iteration 3.



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Iteration 4.

Originally, a different site was selected, and various forms were explored within the context of the Osmosis Framework. However, all of these forms were discarded due to the fact that the site itself did not lend itself to a coherent design. It did not fulfil the requirements of the precinct, that is, a gateway to the rest of Olievenhoutbosch, and the fact that the site could not create meaningful connections, which became apparent as the forms were explored. Neither could it act as a landmark, since it was only visible when entering the public space. While the forms in the context of the proposed urban fabric could create connections to adjacent structures and programmes, the interaction of all of these forms with the public space in the centre of the precinct was too limited to have an impact.

The second site was an extension of the original site, in an attempt to create the gateway that the precinct requires. This proved to be problematic due to the fact there was not enough activity moving around or through the site to create a viable gateway. The site could ,however, now support a landmark, but when looking at the site in the proposed urban framework, it acted as a well-cap to the pedestrian-route, and was nothing more than a landmark at the end of a long walk. It was therefore discarded.

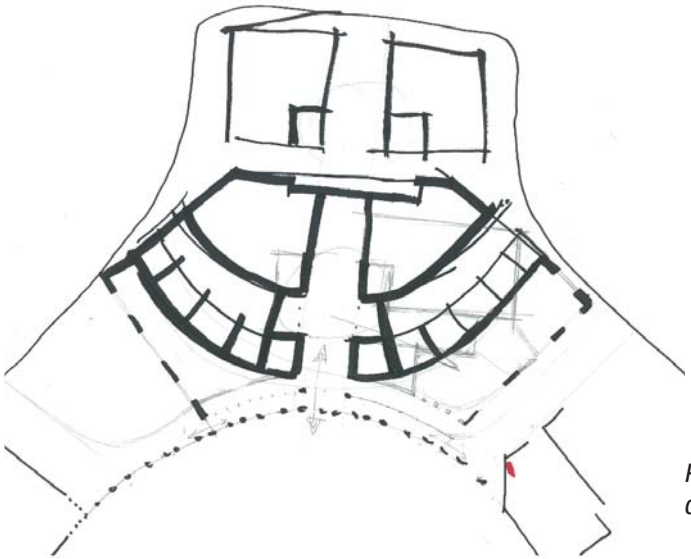

Figure 7.6: Sketches of previous design explorations.

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7.04_The 5th Iteration

In the 5th iteration, the site once again changed. It is now located at the southern edge of the public space, crossing the pedestrian route. In this location the site can support both being a gateway and a landmark, as well as respond on a greater scale to Olievenhoutbosch, and on smaller scales, the precinct, the street and the public space. The core concept of connecting remains intact, and in fact supports these urban-scale impacts. However, this concept is to be further developed now that the proposed site has been finalized, and the concept now starts to respond to the intangible aspects of Olievenhoutbosch, and the theoretical investigation done in preparation for this dissertation.

Figure 7.7: Current site location.

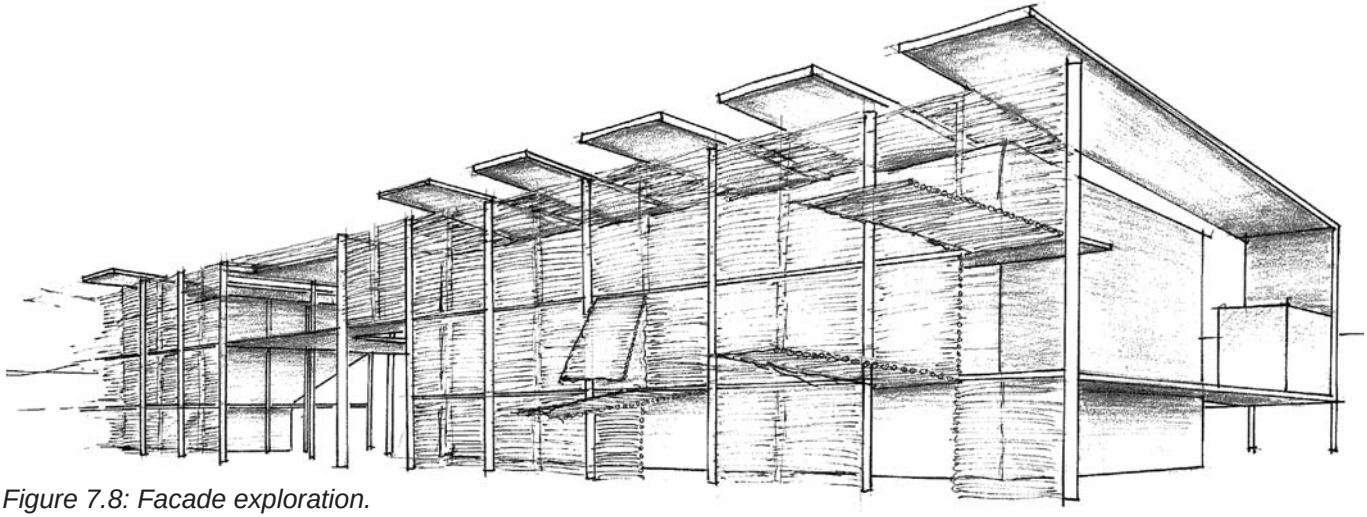

Figure 7.8: Facade exploration.

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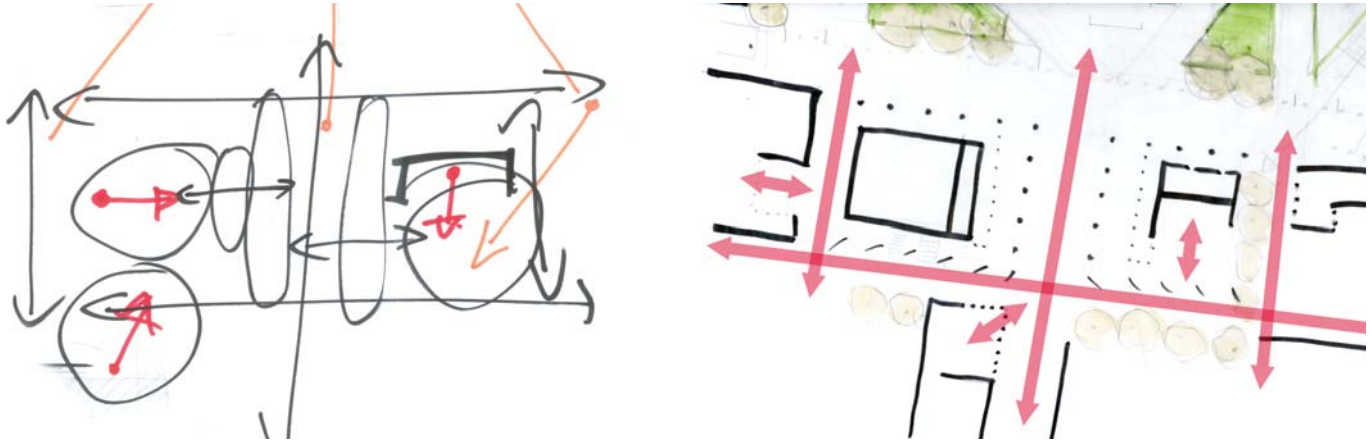

Figure 7.9: Spatial exploration and conceptual exploration of site.

The concept had now evolved to reflect the nature of Olievenhoutbosch. The theatres on either side of the road symbolize the core of Olievenhoutbosch, the original settlement that developed according to people's needs, and need to be designed as elements that seem grounded in the area. These heavy elements are then wrapped in a lightweight man-made structure that seems to impose itself on the grounded elements. The lightweight structure becomes the interface between the public and private realms. This interplay between natural and man-made, private and public, heavy and lightweight, is now the foundation for further design decisions.

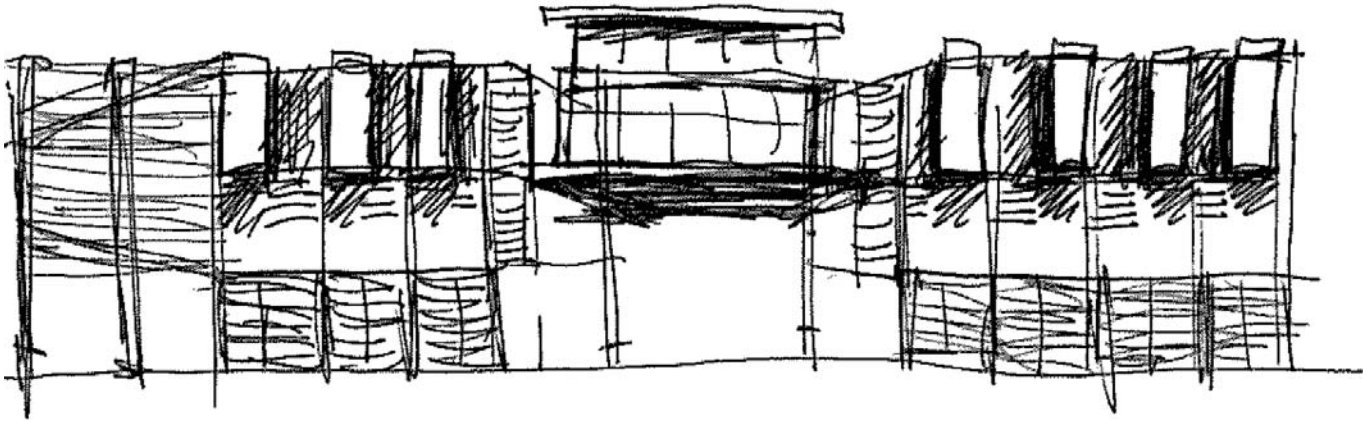

Figure 7.10: Facade exploration

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7.05_Urban Intervention Development

Figure 7.11: Diagram indicating spatial connectivity.

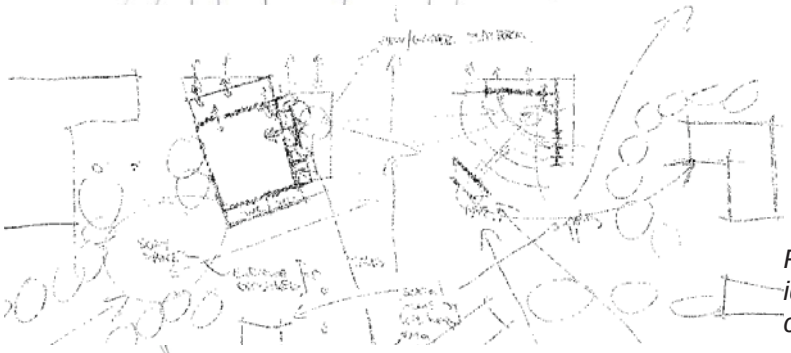

Figure 7.12: Diagram identifying connections created.

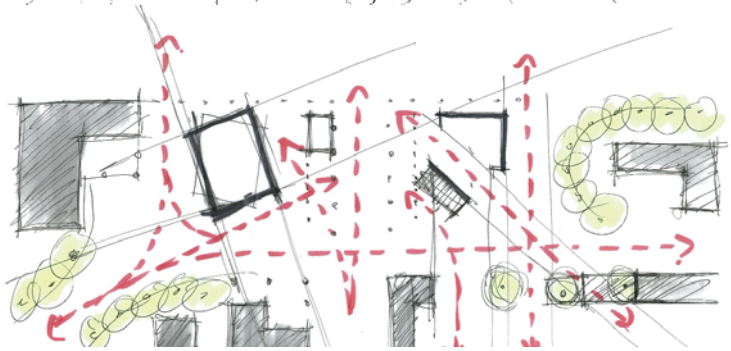

Figure 7.13: Diagram of primary connections.

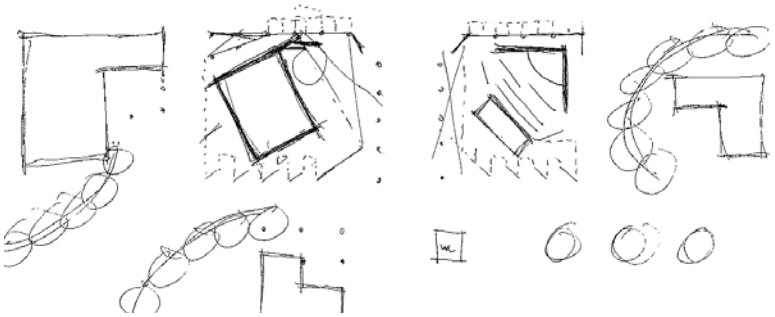

Figure 7.14: Diagram showing second level influence on ground level connections.

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7.06_Sectional Explorations

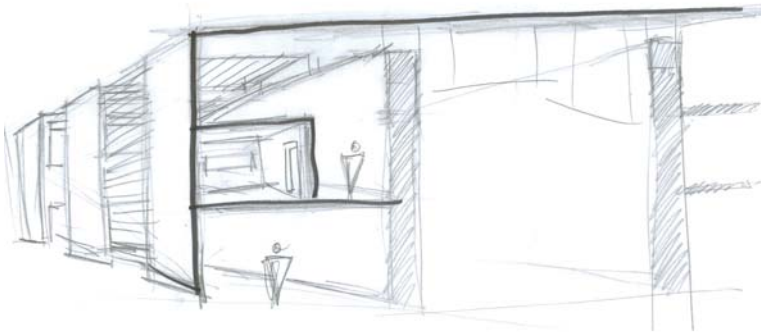

Figure 7.15: Section showing concept of heavy versus lightweight.

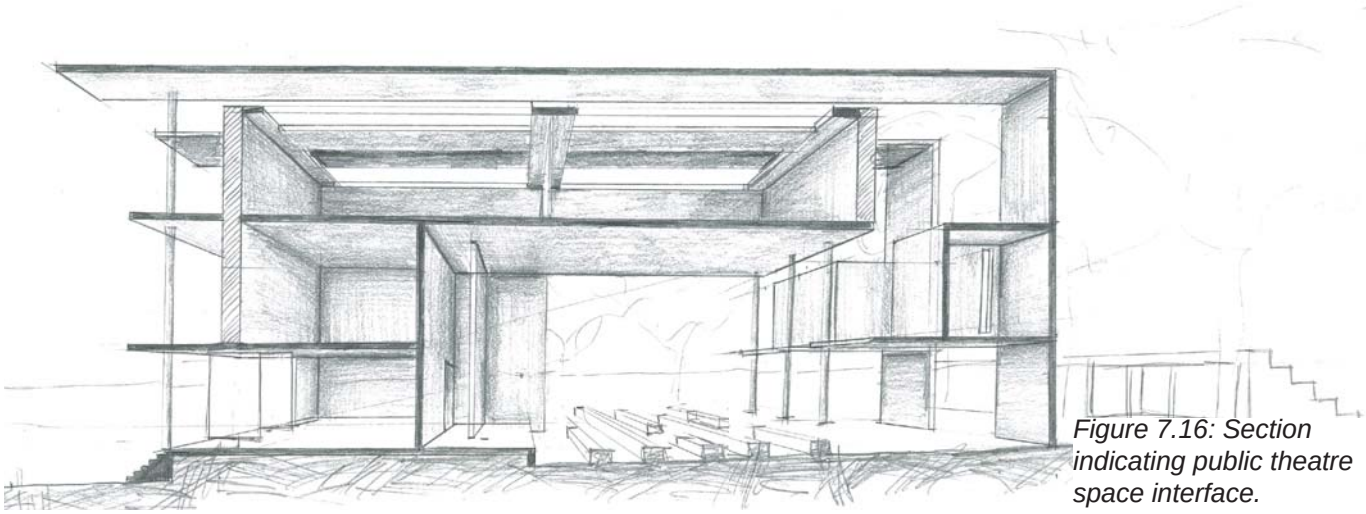

Figure 7.16: Section indicating public theatre space interface.

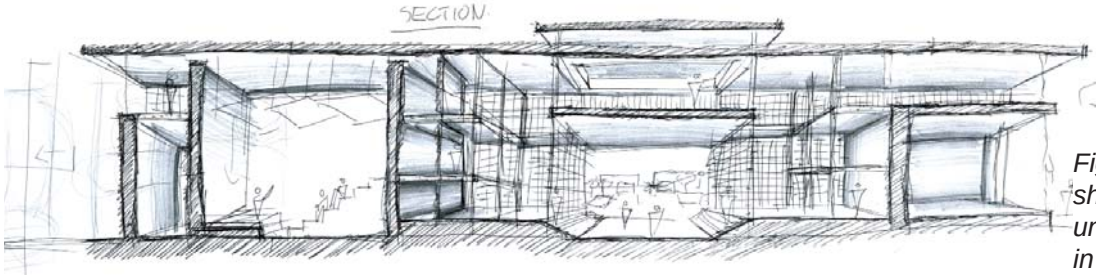

Figure 7.17: Section showing the interface under the dance studio in the street.

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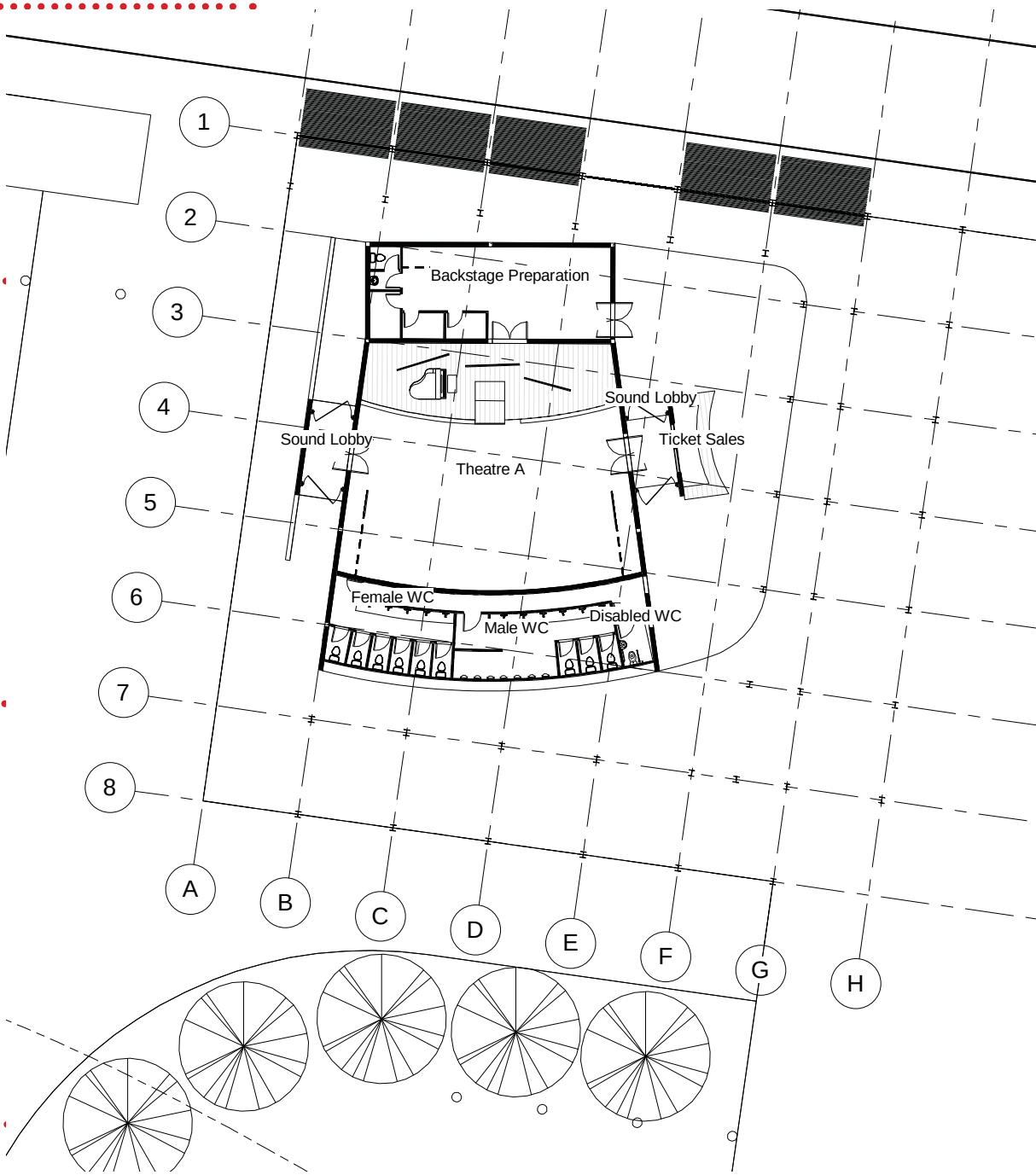
7.07_The 5th Iteration Resolved

Paving next to street to be different to define street edge and transitional area.

Same paving between structures without interruption to create unified space.

Nearby structures to be accessible on ground level to facilitate activity in the public space.



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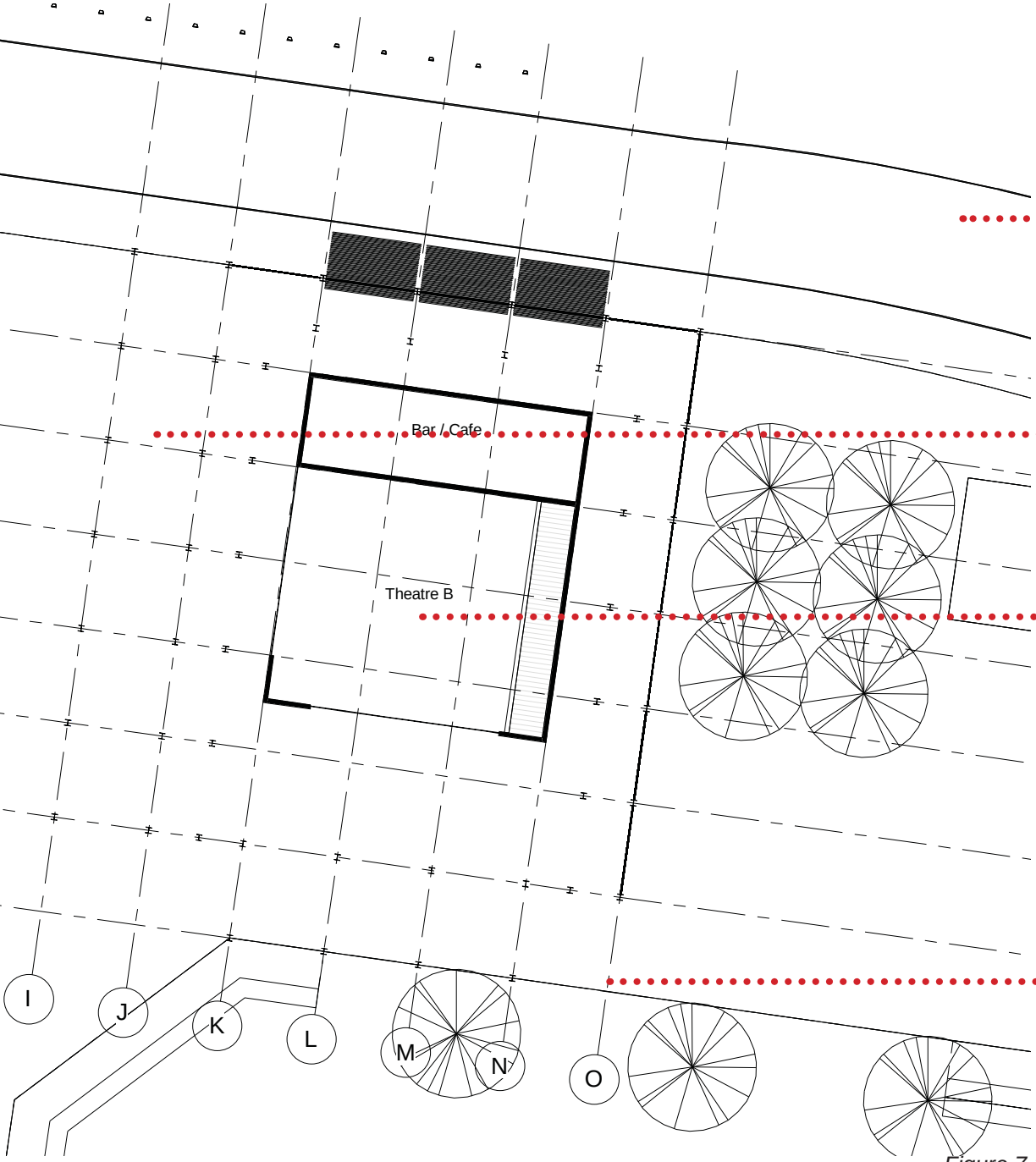

Road surface to be paved on same level as sidewalk to encourage slower driving, and enhance pedestrian movement.

Primary vertical movement to take place in the centre of the building, to enhance activity.

Performance space accessible from various places and links different functions.

No barrier between the soccer field, the structure, and the public space.

Figure 7.18: Resolved layout.

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8. Technical Investigation

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This chapter deals with the technical resolution of the design intervention - the Olievenhoutbosch Performance Arts Centre. The technical investigation was focussed on the acoustic performance of the main theatre space, and highlights the relationship between the cores of the intervention, and the surrounding structure (figure 8.1). Ease of construction, and the expansion of the educational facet of the design intervention were taken into account as primary generators during the technical resolution, and when materials were chosen for the various building components. Finally, the design of appropriate green systems in the design was approached from an integrated systems view, where various systems interlink to support one another in the relevant spaces.

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Figure 8.1: Diagram illustrating tectonic relationship between high and low levels of actvity

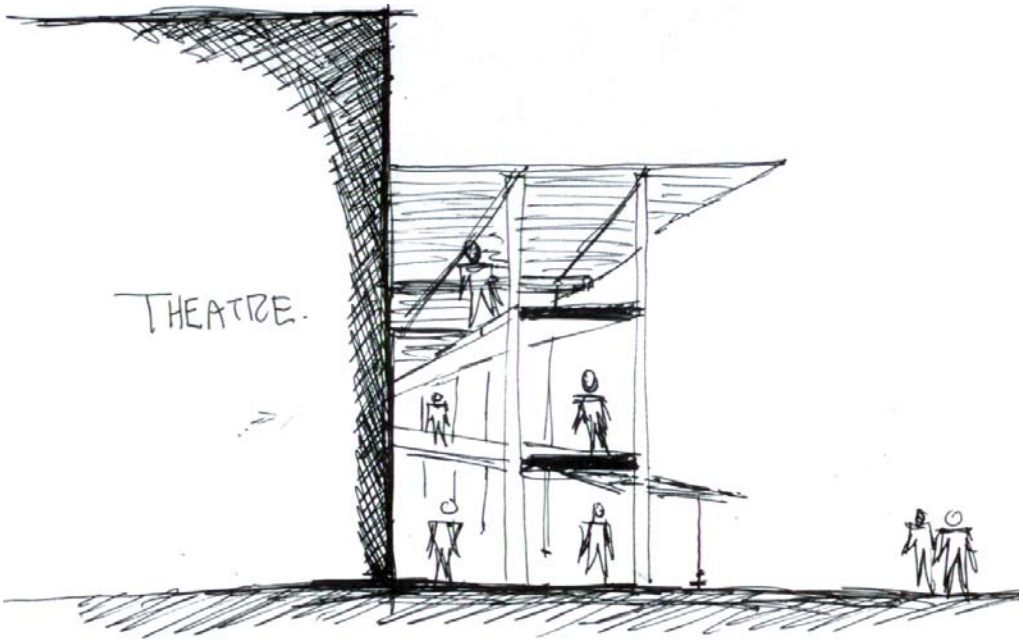

Figure 8.2: Sketch of design intent.

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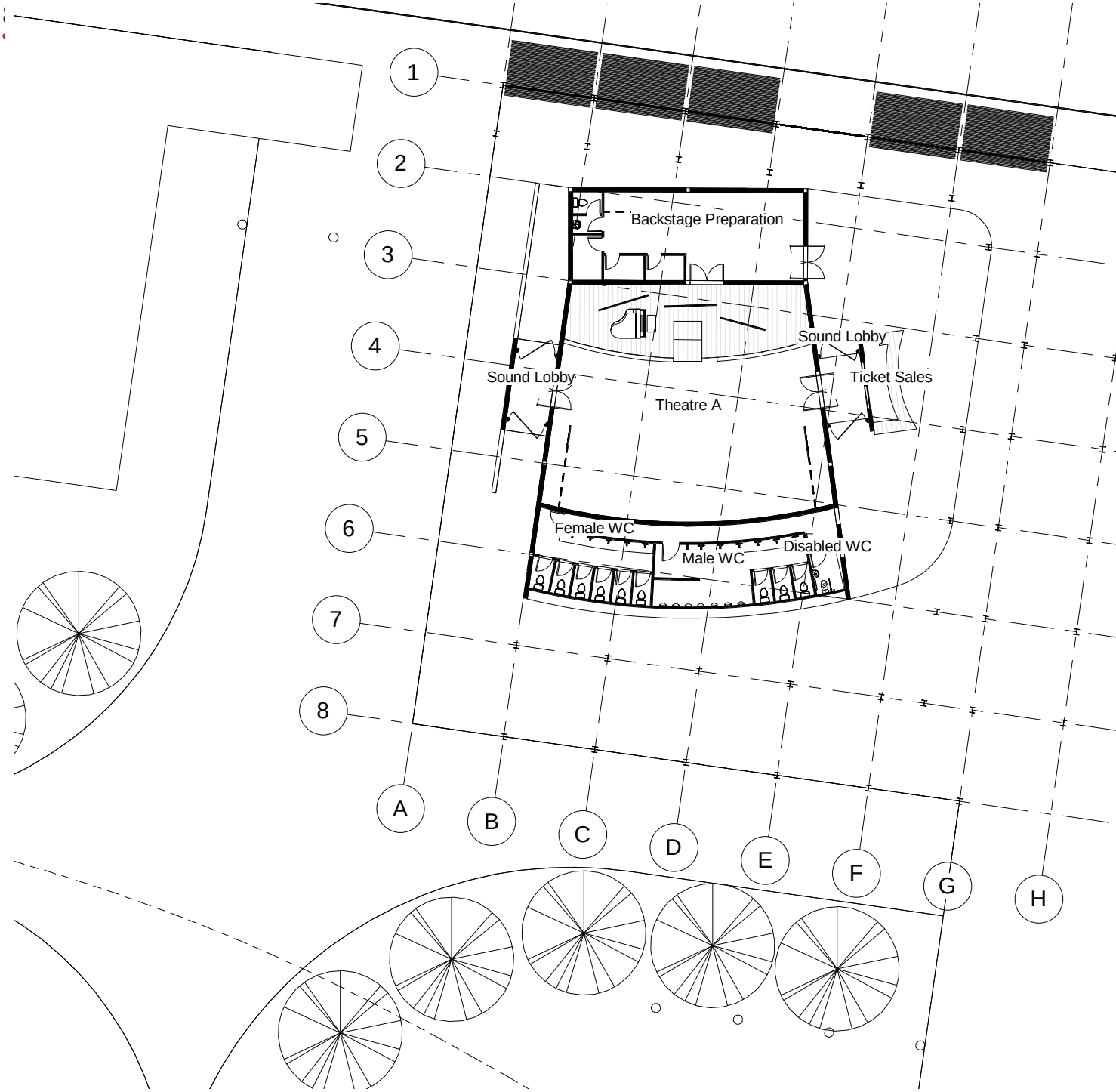

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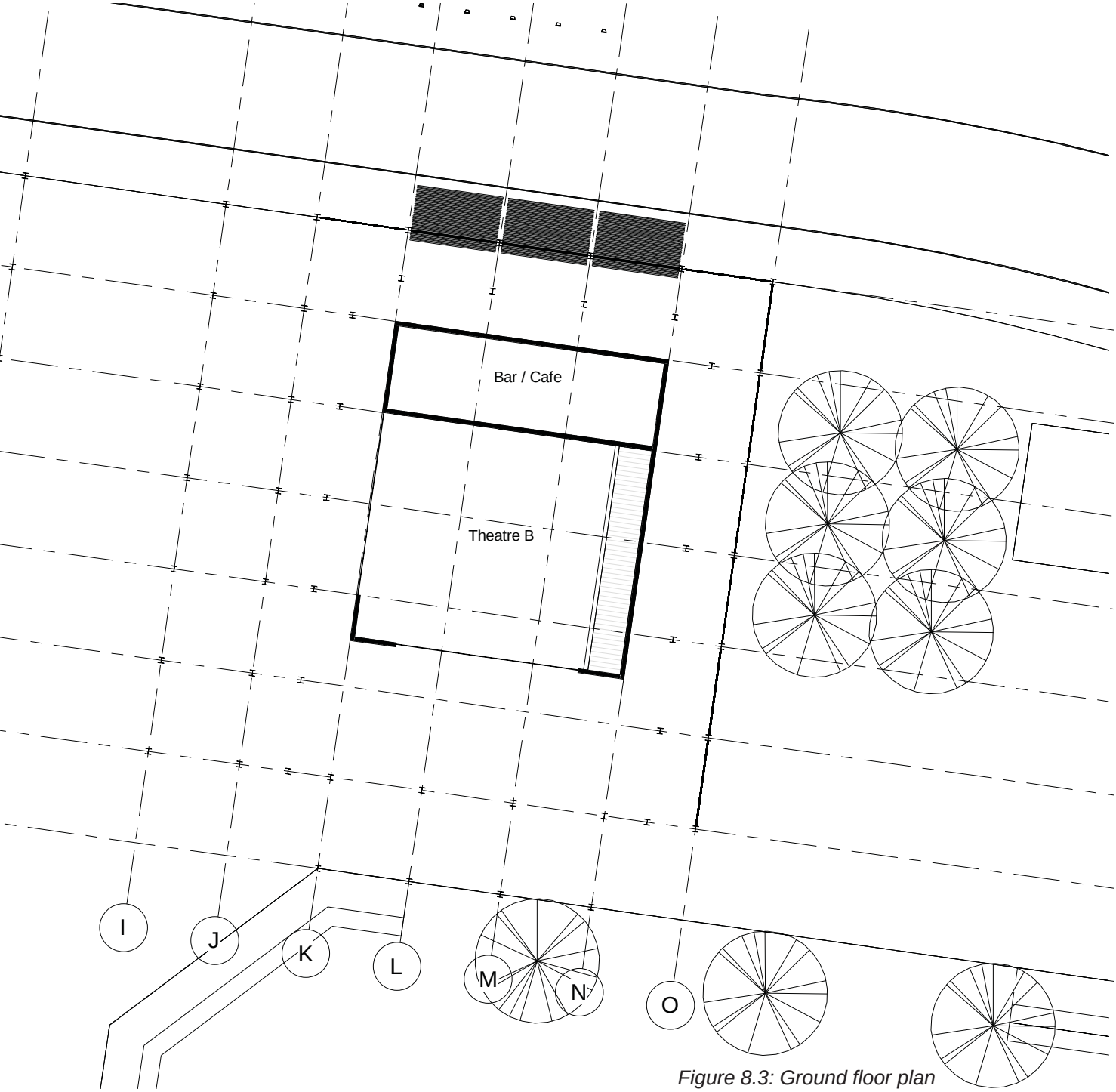

Figure 8.3: Ground floor plan

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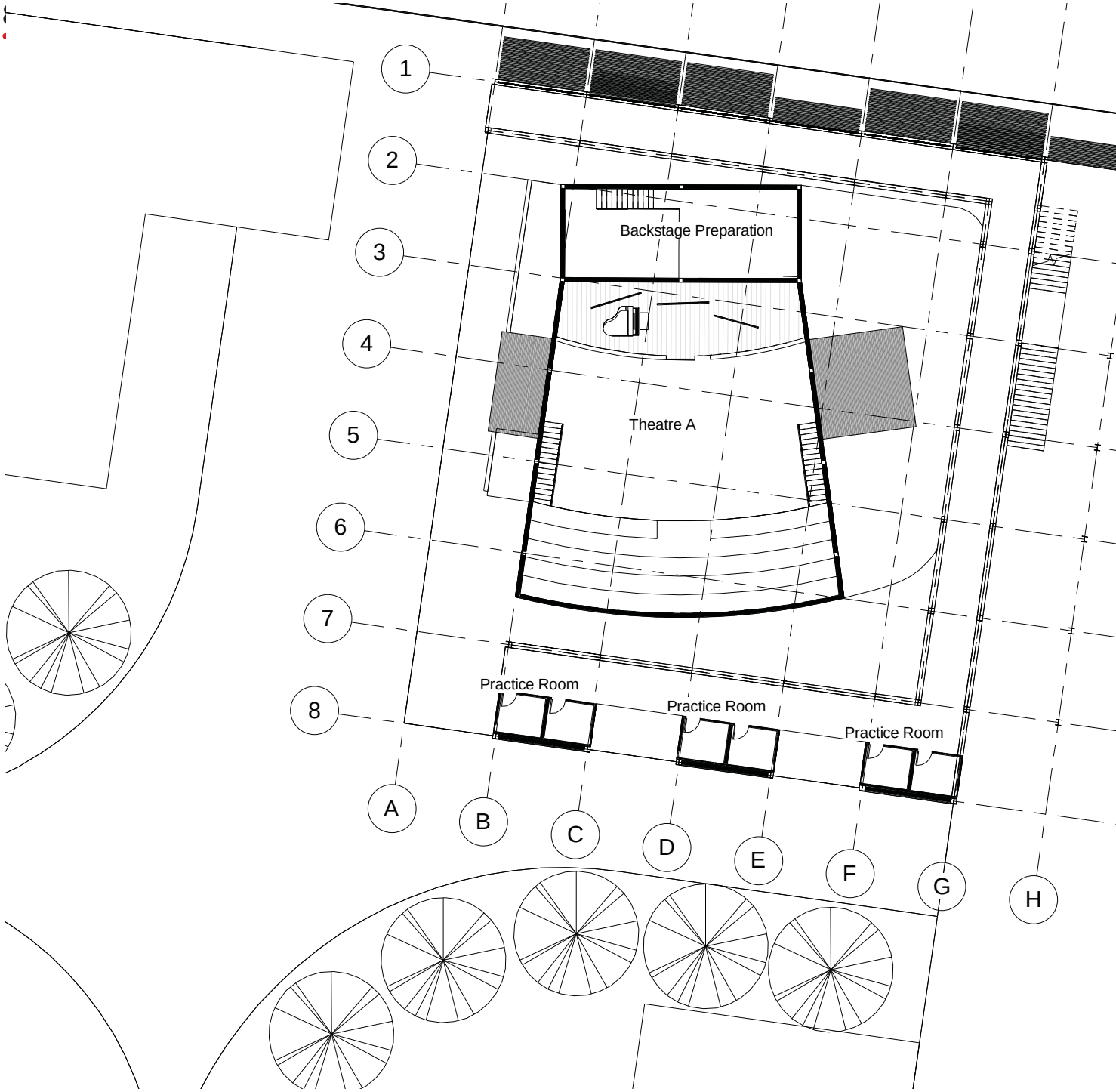

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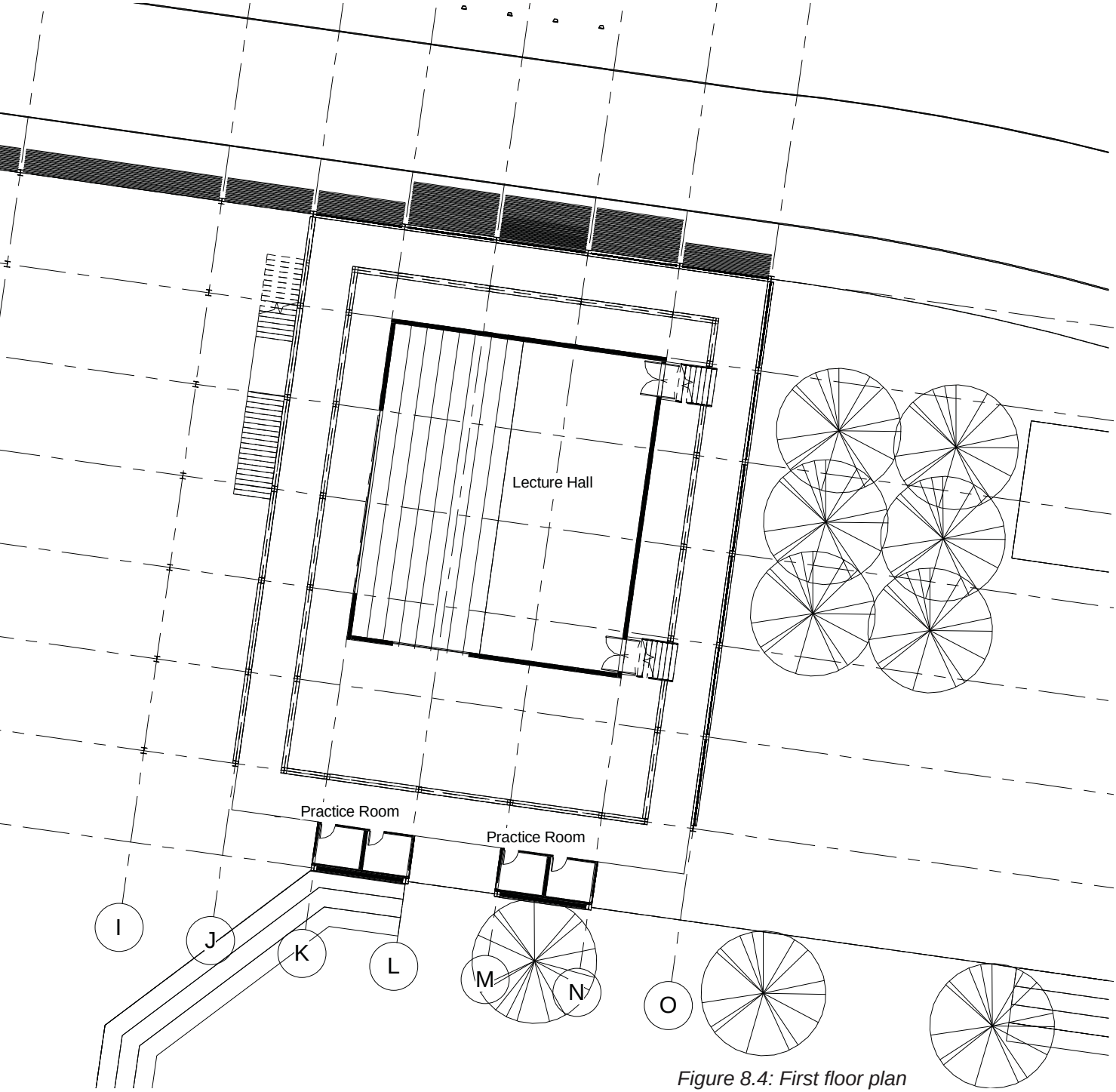

Figure 8.4: First floor plan

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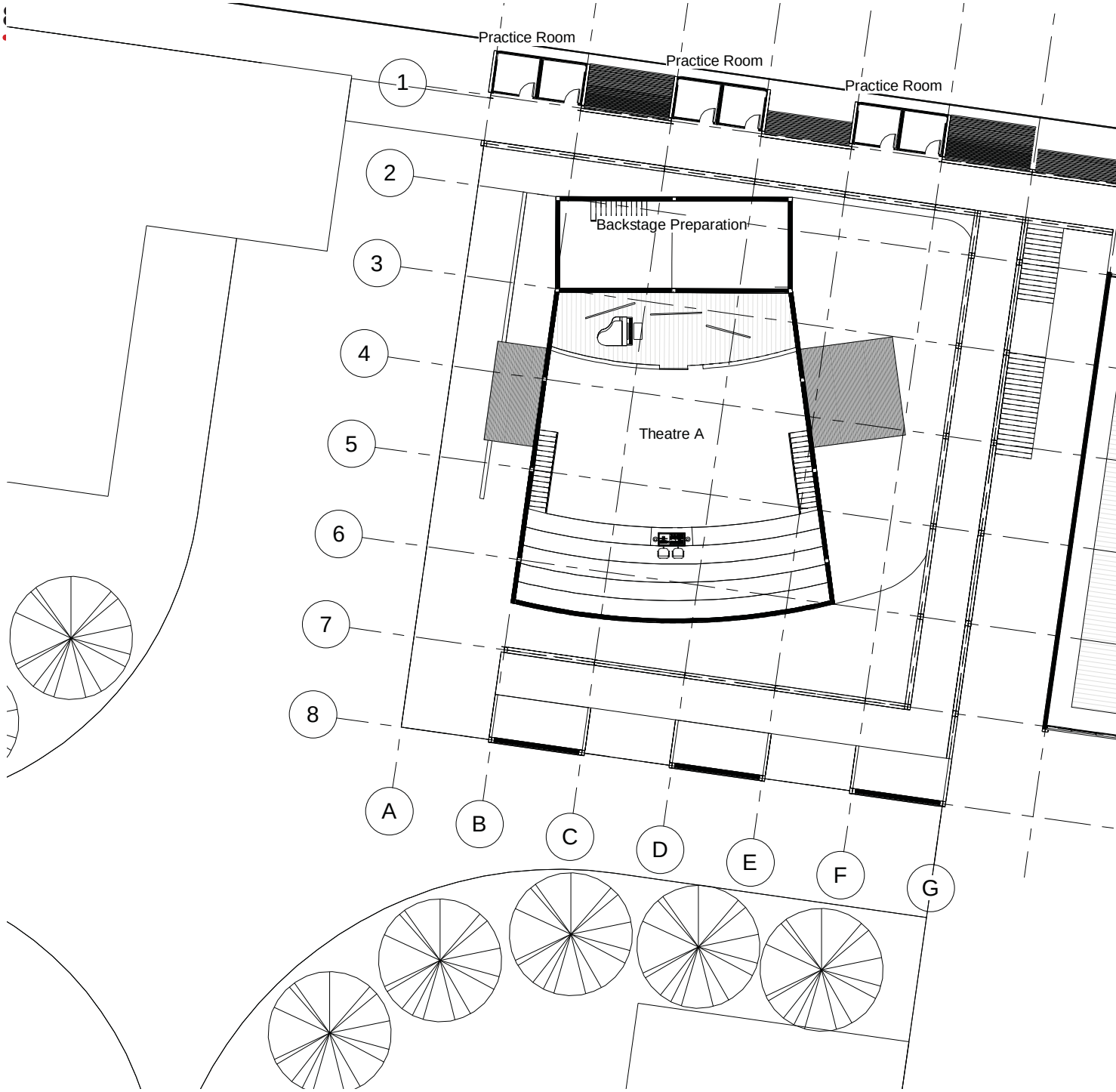

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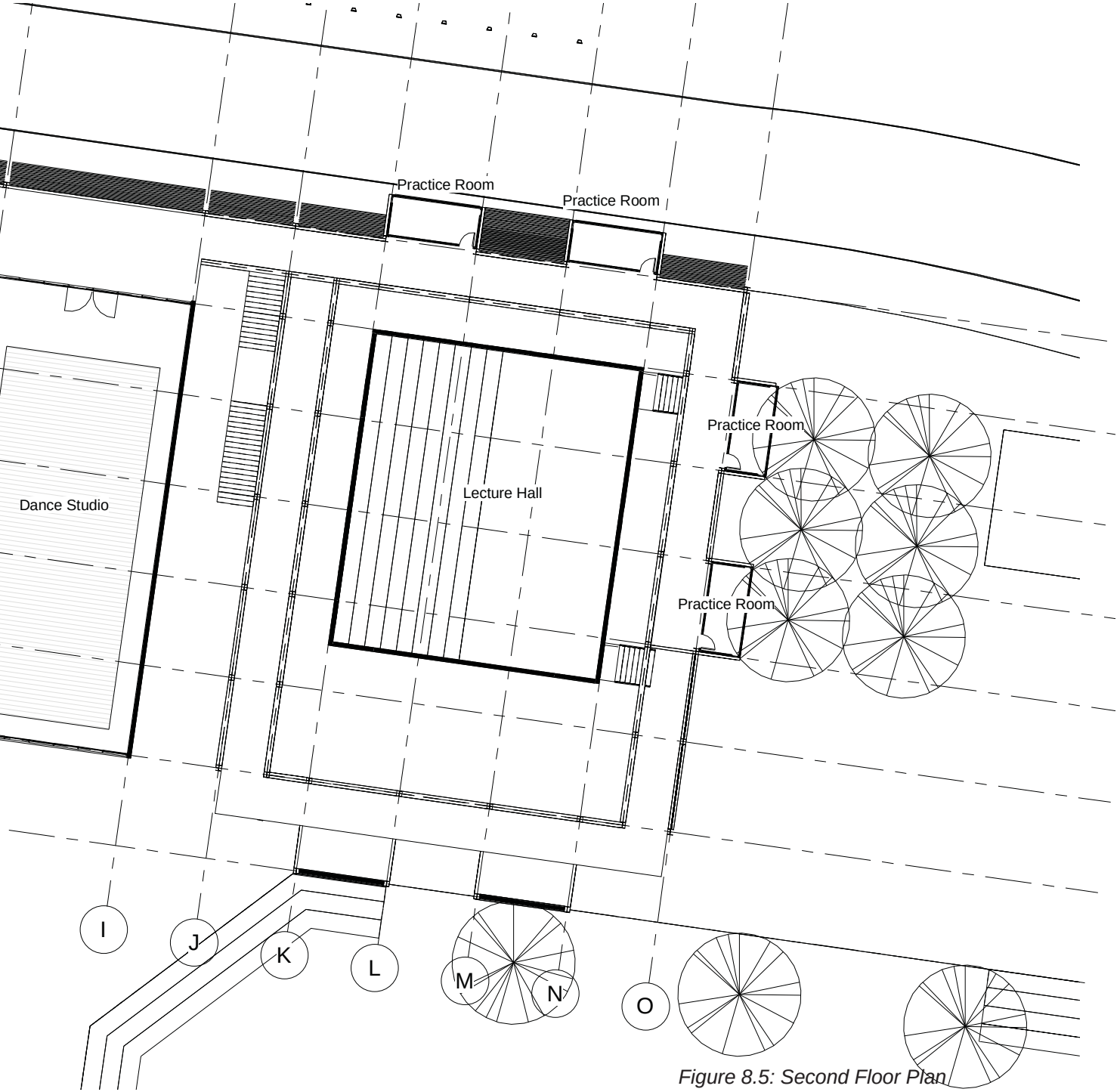

Figure 8.5: Second Floor Plan

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8.04_Plans: Basement

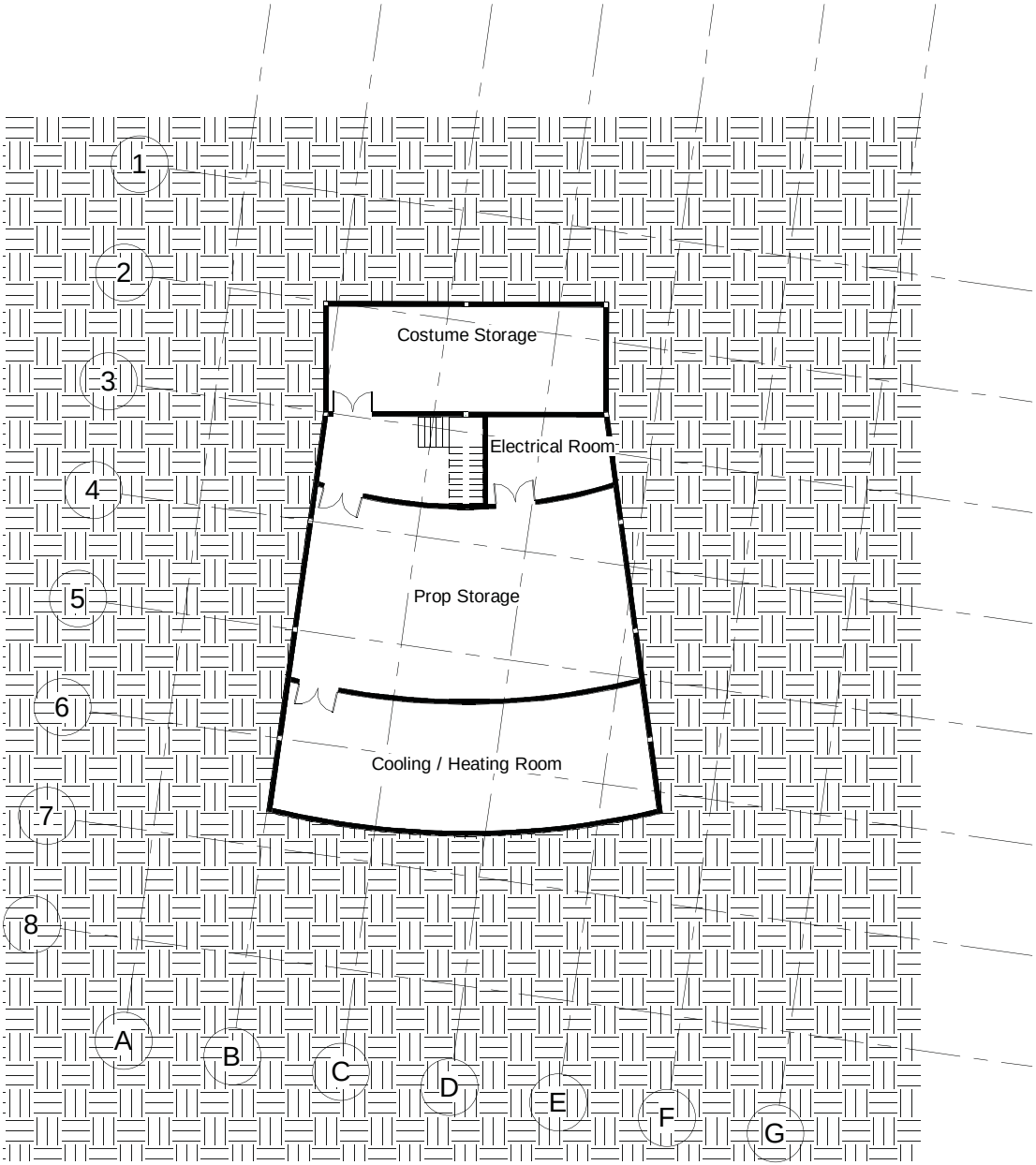

Figure 8.6: Basement Floor Plan

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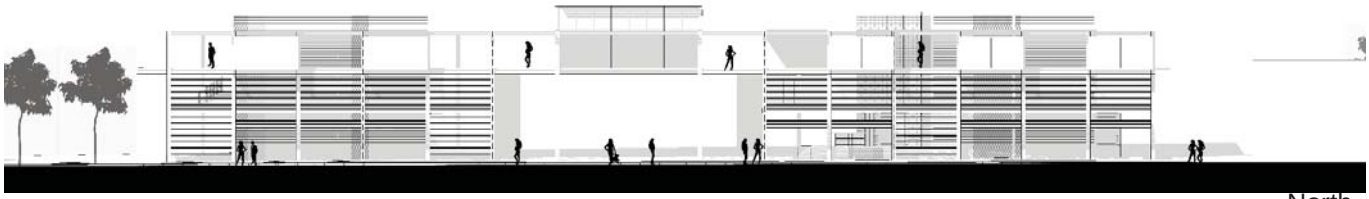
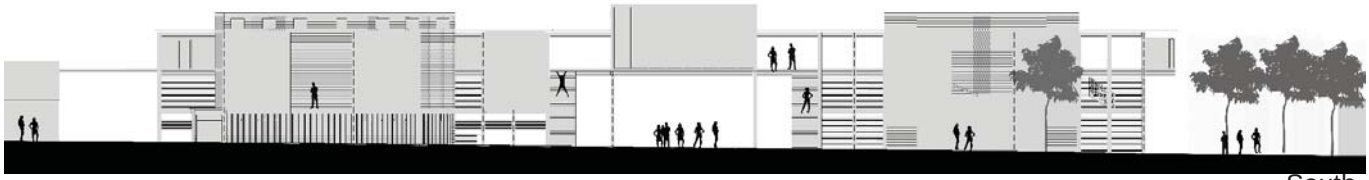
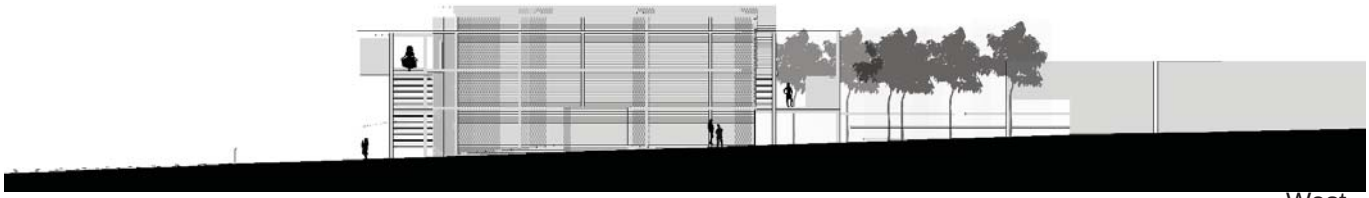
8.05_Elevations



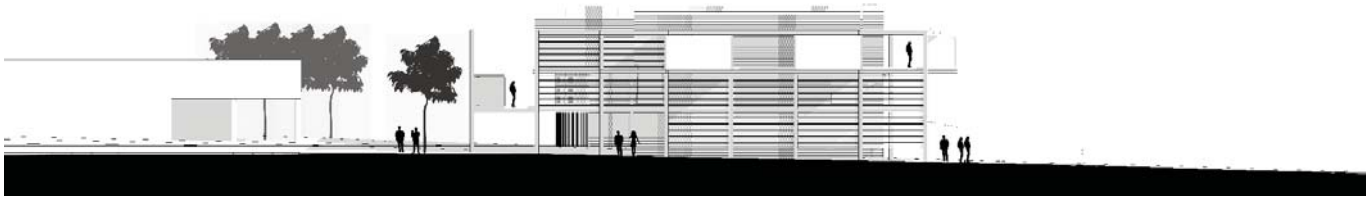
North



South



West



East

Figure 8.7: Elevations

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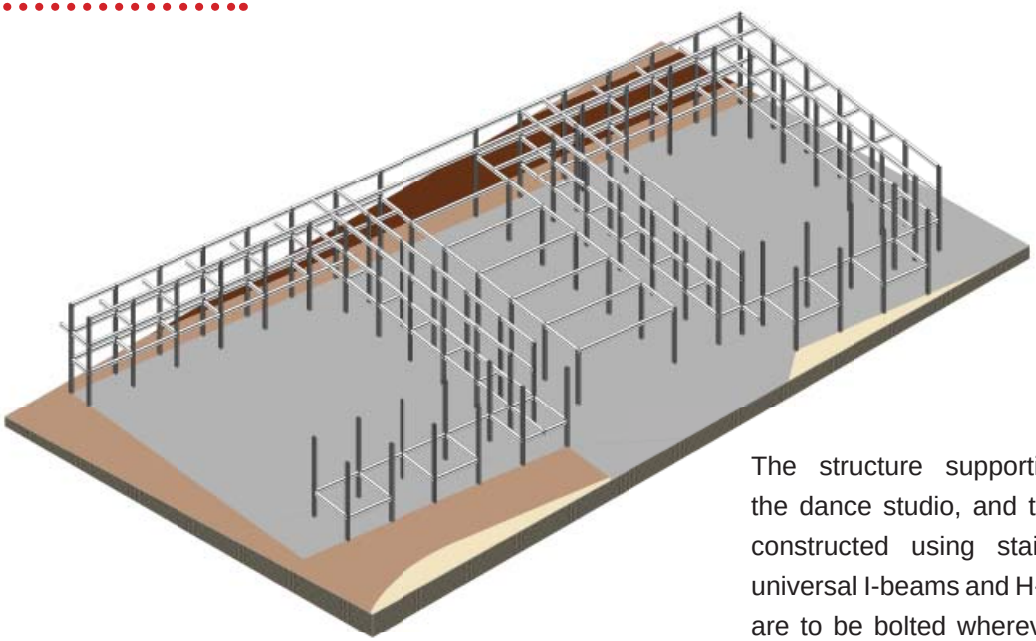
8.06_Structure



The structure supporting the practice rooms, the dance studio, and the lightweight roof will be constructed using stainless steel 254x254mm universal I-beams and H-columns. These elements are to be bolted wherever possible to provide for future expansions and redevelopment.

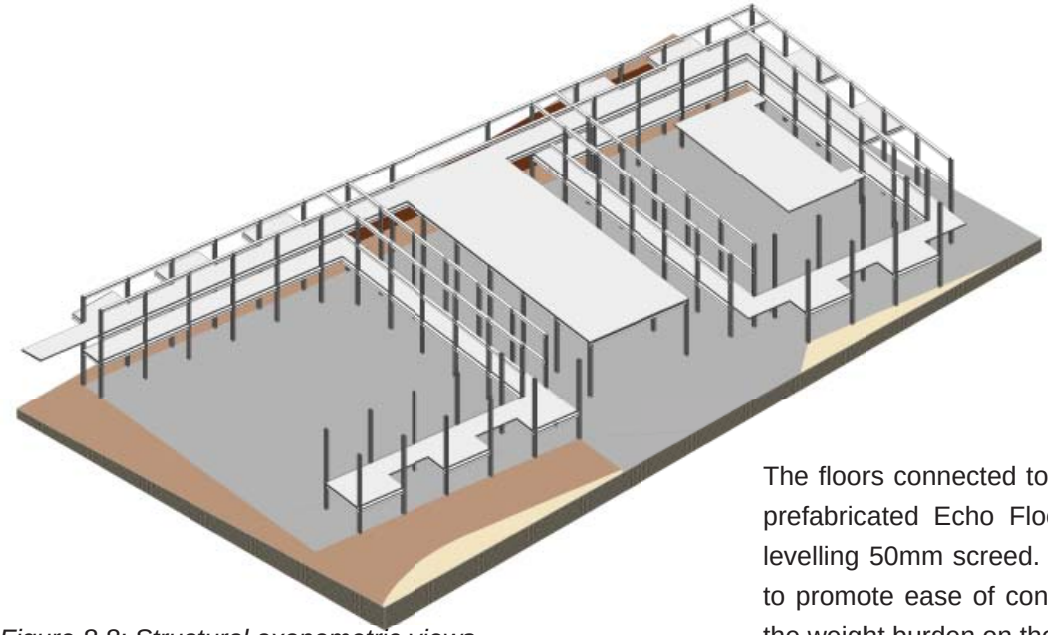


Figure 8.8: Structural axonometric views.

The floors connected to the steel structure will be prefabricated Echo Floor panels, covered in a levelling 50mm screed. This product was chosen to promote ease of construction, and to minimize the weight burden on the steel structure.

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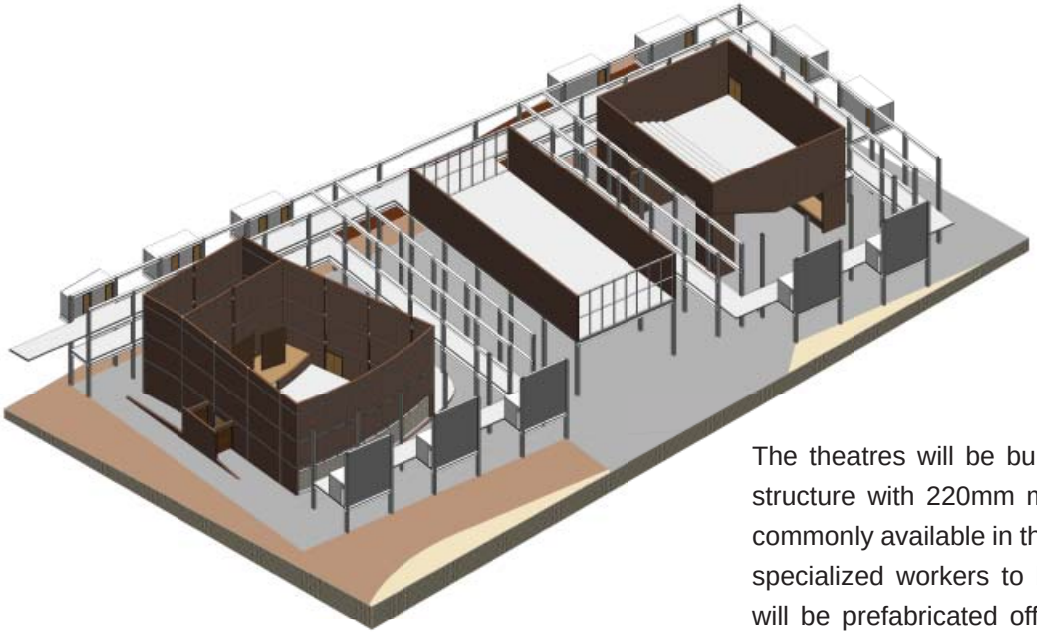
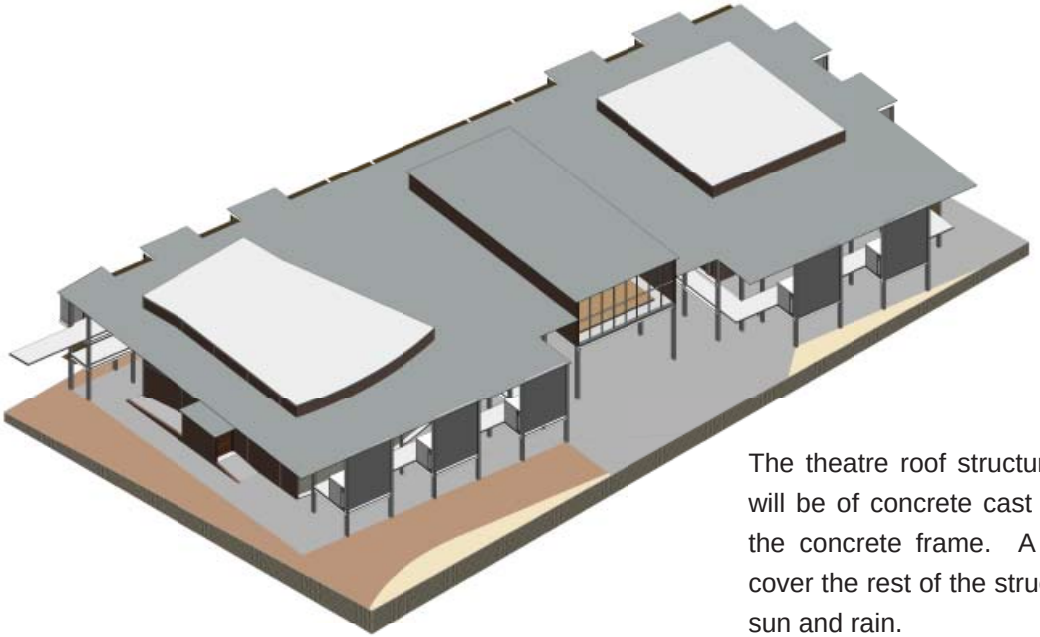


The theatres will be built using a concrete frame structure with 220mm masonry infill. Masonry is commonly available in the area, and does not need specialized workers to be used. Practice rooms will be prefabricated off-site, and put in place as access allows.



The theatre roof structures and the dance studio will be of concrete cast in-situ, and supported by the concrete frame. A corrugated iron roof will cover the rest of the structure to protect it from the sun and rain.

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8.07_Materials

Figure 8.9: Palette of possible materials to be used in intervention.

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Precast concrete panels.

Concrete was chosen to augment the contrast between the natural and the man-made. These precast panels also simplify construction of floors within the steel structure.

220x110x75mm Brick.

Brick walls will make up the bulk of the interior walls, due to ease of construction and availibility of the material in the area.

Stainless Steel.

An attribute of this material is its man-made quality. This combined with the slenderness possible for columns and beams make it the ideal material to create the structure around the grounded elements.

Acoustic panelling.

The programme of the interention requires certain acoustic conditions, only attainable with the use of specialised materials such as these panels.

Curtain Wall

Curtain walls provide visual access to private activities, and allows the community to become part of the activity without particpating.

Paving.

The paving has to be easy to construct, and is already easily available in the area.

Timber Floor.

The dance floor, and stages, all require timber floors for acoustic and movement reasons.

Carpet.

Carpets are to be used fo acoustic purposes.

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8.08_Theatre Design: Acoustics

When designing a theatre, acoustics need to play a primary role in the design of the space. The reverberation time has to be controlled through the use of geometry and different materials, to ensure that any given sound coming from the stage will not echo or reverberate through the space. If this echo occurs, musicians will have trouble keeping time, and the audience will not be able to clearly distinguish the sounds. Every surface in the theatre needs to be treated accordingly, to ensure that the sound can travel the shortest possible route from the stage to the audience member, without becoming muddled (www.acousticreflections.com, Accessed 2012).

To determine which materials are appropriate for this setting, the ideal reverberation time suited to the environment needs to be known. For small theatres this is 1.2 to 1.4 seconds (www.acousticsblog.com, Accessed October 2012). This means that any given acoustic frequency should ideally take 1.3 seconds to die away after it has been created.

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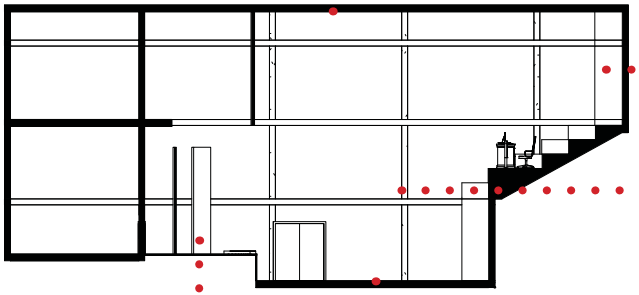

Ceiling
The centre of the ceiling must be reflective, to effectively distribute sound. The sides of the ceiling must be absorbtive, to reduce reverberation in the corners.

Back Wall.
The back wall must be able to absorb all the sound, since it may not allow any kind of echo in the space.

Side Walls.
Side walls need to be absorbtive, to ensure that the acoustic path is as direct as possible.

Floor.
Floors can be slightly reflective, but a small absorbtion coeffecient will cause an echo.

Stage.
The stage elements (wall, floor, ceiling) can be slightly reflective to enhance the performance.

Figure 8.10: Section of the theatre.

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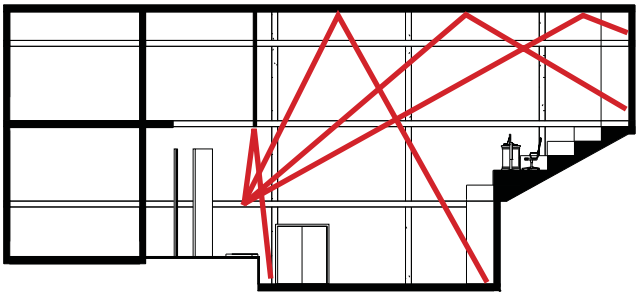
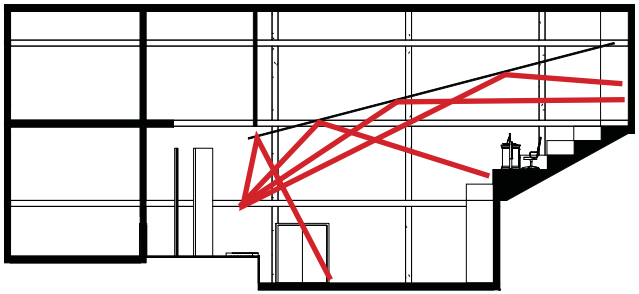
8.09_Theatre Design: Geometric Investigation

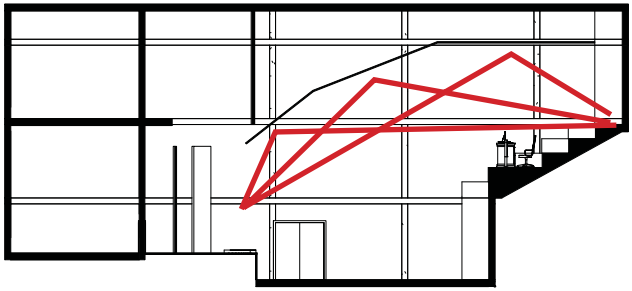
Flat Surface



Flat Inclined Surface



Concave Surface



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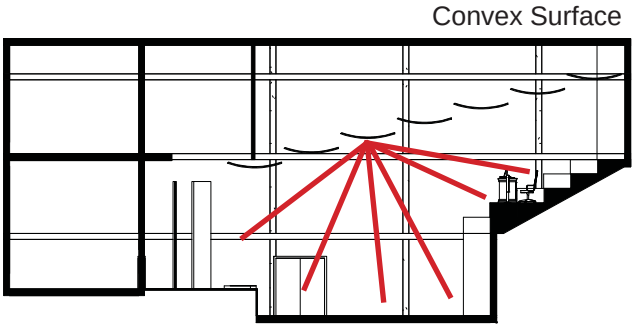

Figure 8.11: Sections indicating acoustic reflection from the stage

The ideal geometric configuration for a surface intended to distribute sound is a convex surface. Flat surfaces are effective, but because of the roof structure (beams etc.) using the roof itself as an acoustic reflector would be impractical. Concave surfaces cause reflections to be directed to a specific location, instead of distributing the sound evenly. Convex reflectors, however, distribute sound effectively throughout the space. Instead of having a single large convex reflector, smaller ones ensure that the sound is effectively distributed while allowing audience members on the balcony viewing comfort. The slightly smaller reflecting surface area also reduces reverberation to the point where it falls within the acceptable parameters of 1.2 - 1.4 seconds (www.acousticsblog.com, 2011).

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8.10_Theatre Design: Reverberation Times

The following calculations were done to determine the best materials on the various surfaces in the theatre for the ideal reverberation time of 1.2 - 1.4 seconds. The absorption coeffecient for different materials across a range of frequencies were multiplied with the corresponding surface area. This provides the total absorption of that surface. That value was then used in the formula ((0.161 x Volume) / Total Absorption) to determine the reverberation time for that specific frequency and material. The current result show an average reverberation time of 1.16 seconds, which is below the recommended time for this type of space, but is compensated for through the use of geometry in the space.

Acoustic Calculations: Theatre A

Absorption Coeffecients

		Material		250	500	1000	2000
Floor		Wood		0.11	0.1	0.07	0.06
		Carpet		0.02	0.06	0.15	0.25
Wall		Masonry		0.03	0.03	0.04	0.05
		Timber Panel		0.36	0.19	0.1	0.08
Roof		Wood		0.19	0.14	0.08	0.13
		Acoustic Panel		0.97	0.99	0.66	0.34
Windows		0		0	0	0	0
Doors		2		0.06	0.04	0.03	0.02
People				0.3	0.38	0.42	0.45
Air				0.001	0.003	0.006	0.011

Absorption m2

		m2					
Floor		45		4.95	4.5	3.15	2.7
		215		4.3	12.9	32.25	53.75
Wall		82.5		2.475	2.475	3.3	4.125
		228		82.08	43.32	22.8	18.24
Roof		200		38	28	16	26
		50		48.5	49.5	33	17
Windows		0		0	0	0	0
Doors		11.4		0.684	0.456	0.342	0.228
People		300		90	114	126	135
Air		1916		1.916	5.748	11.496	21.076

Total Absorption				272.905	260.899	248.338	278.119

Reverberation Time				1.130342	1.182358	1.242162	1.109151

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8.11_Theatre Design: Sight Lines

Sight lines were calculated graphically, using an average standing height of 1.8m for the performing artist and 1.32m for seated audience members. This determined the seating slope on the balcony, and through this graphic investigation it was decided that the ground area does not need sloped seating. This allows this space to be multi-functional.

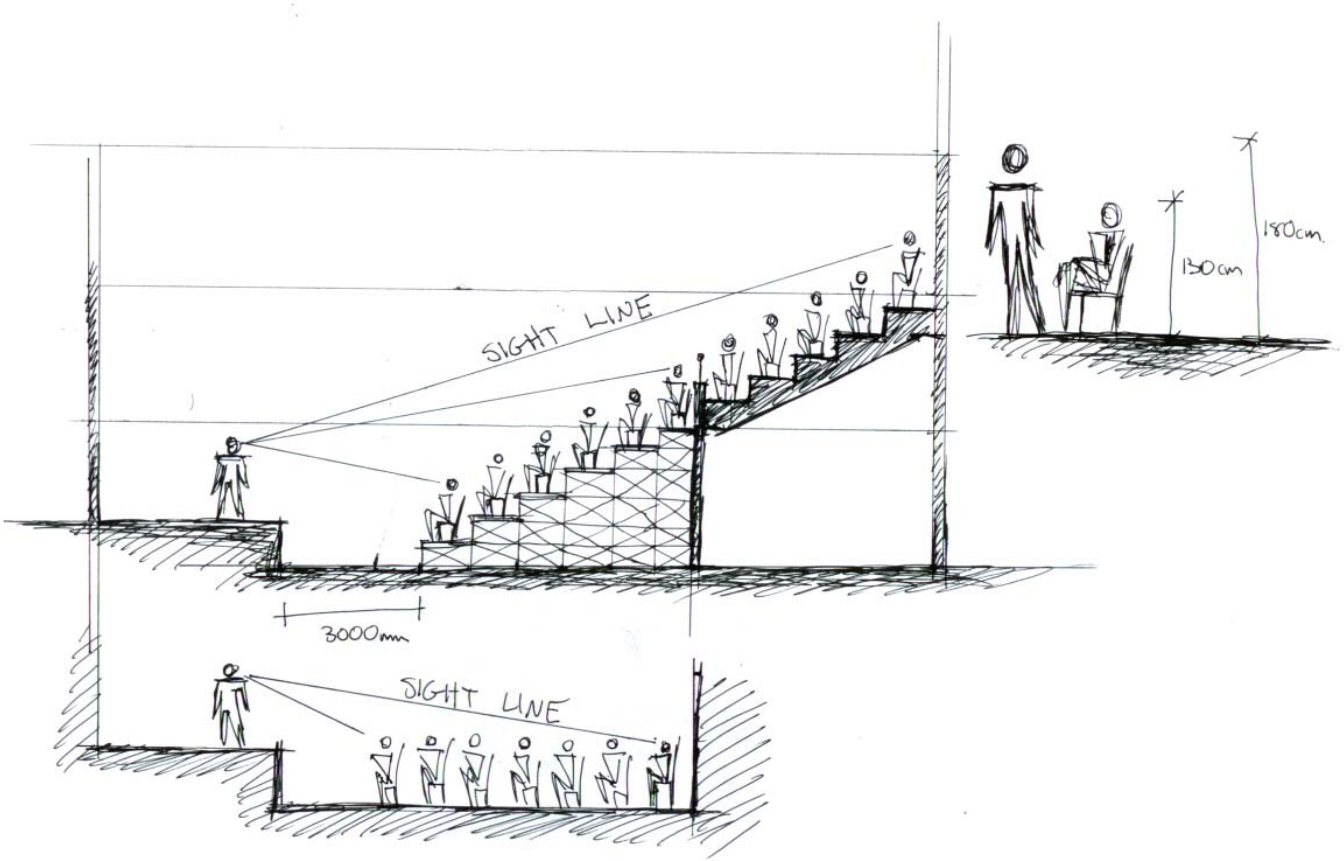

Figure 8.12: Section sketch investigating sightlines in the theatre.

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8.12_Green Design Systems

Environmental comfort for humans in the design intervention entails the design of three systems, and the design of these systems are focussed on the use of passive systems to heat, cool and ventilate the spaces. By using passive systems, operational costs are lowered, as well as the acoustic impact of these systems in the theatre space. These three systems operate in such a manner that they drive each other - for example the ventilation is driven by the heating system in winter, and the cooling system in summer.

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8.12_Green Design Systems: Dance Studio

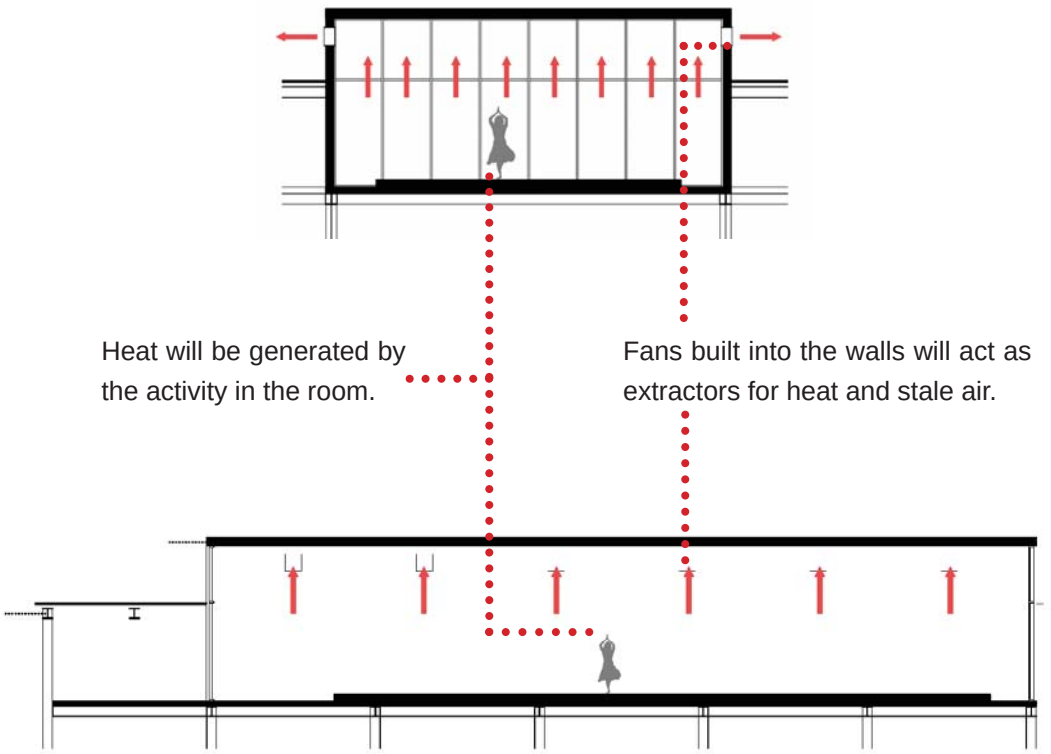

Figure 8.13: Diagrammatical explanation of ventilation in the dance studio

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8.13_Green Design Systems: Cooling

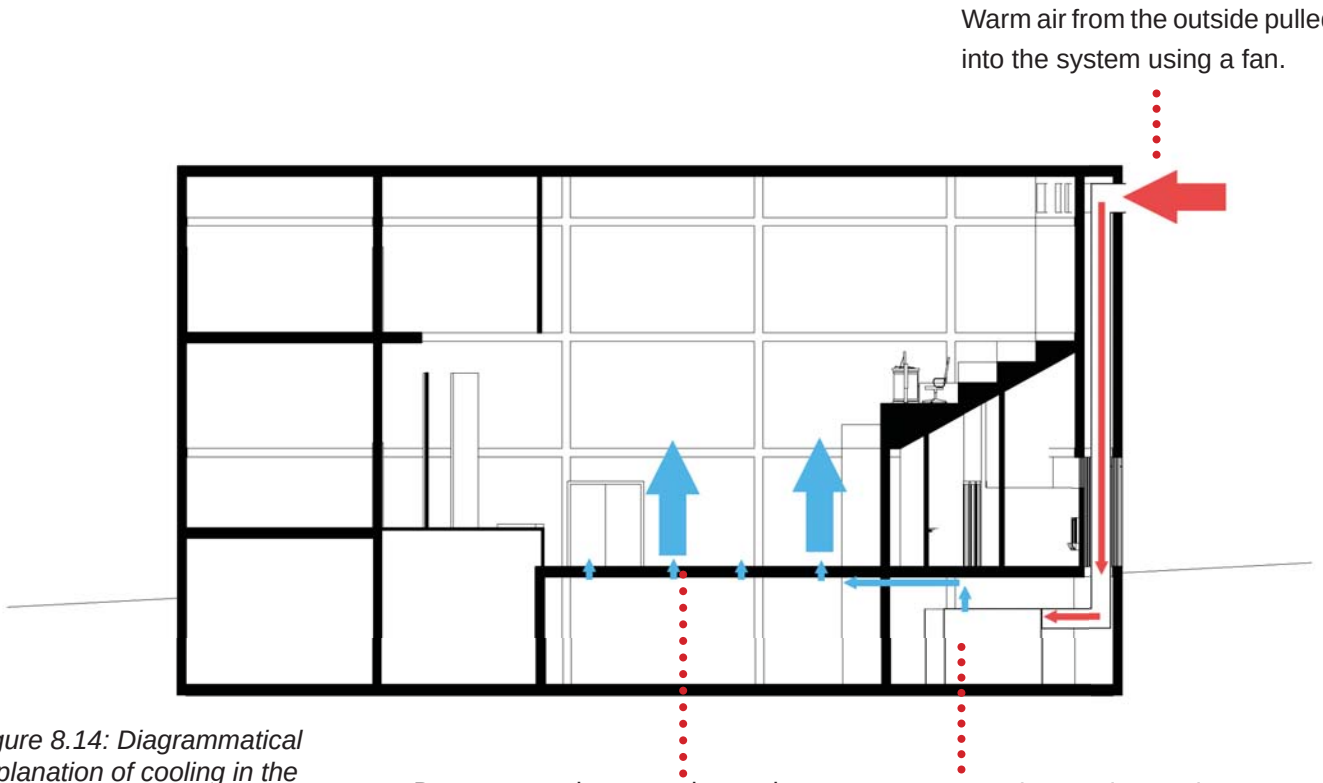

Figure 8.14: Diagrammatical explanation of cooling in the theatre.

Figure 8.14: Diagrammatical explanation of cooling in the theatre.

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8.14_Green Design Systems: Heating

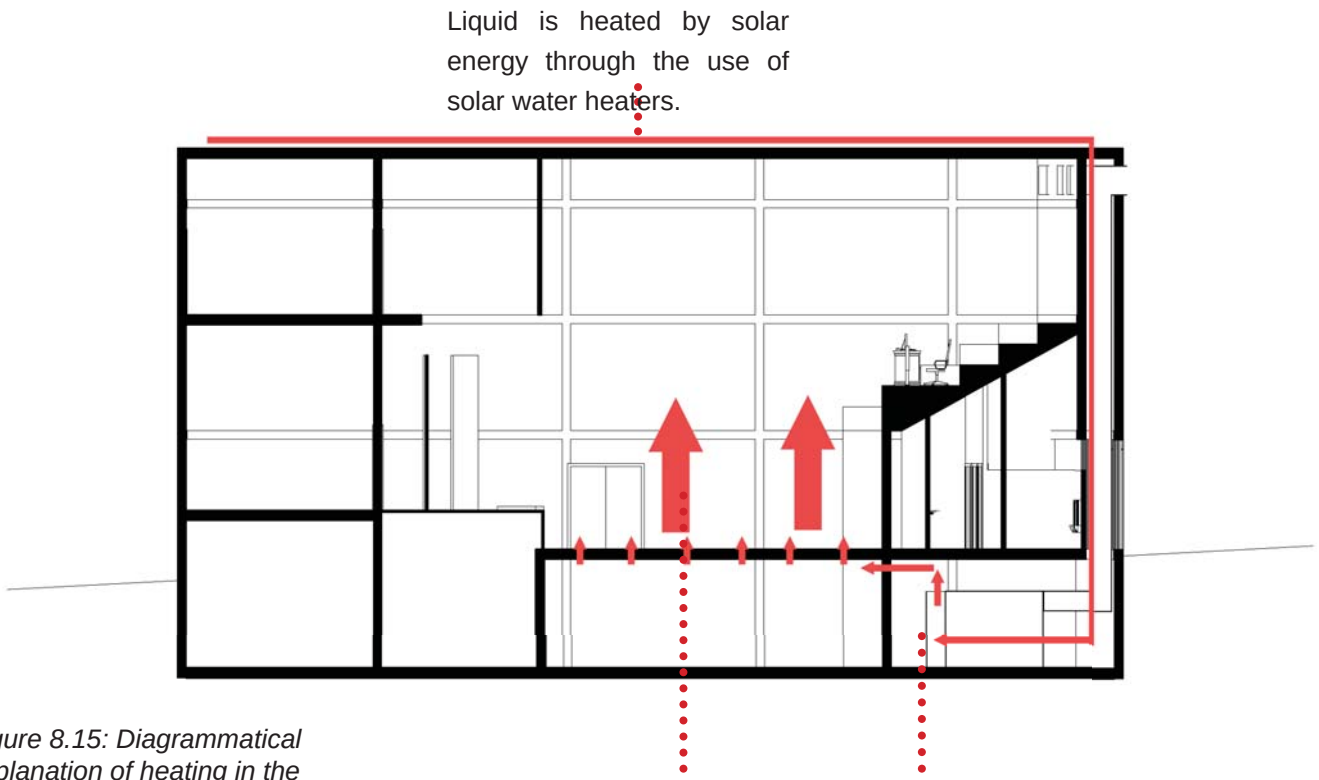

Figure 8.15: Diagrammatical explanation of heating in the theatre.

Figure 8.15: Diagrammatical explanation of heating in the theatre.

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• 9.03_References_p163

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Presentation & 9.Bibliography

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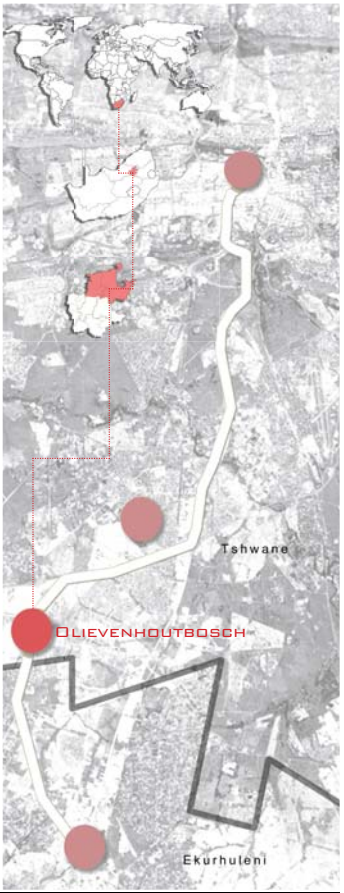
9.01_Final Presentation

AUDIBLE
ARCHITECTURE

OLIEVENHOUTBOSCH
PERFORMING ARTS



CURRENT
CONDITION

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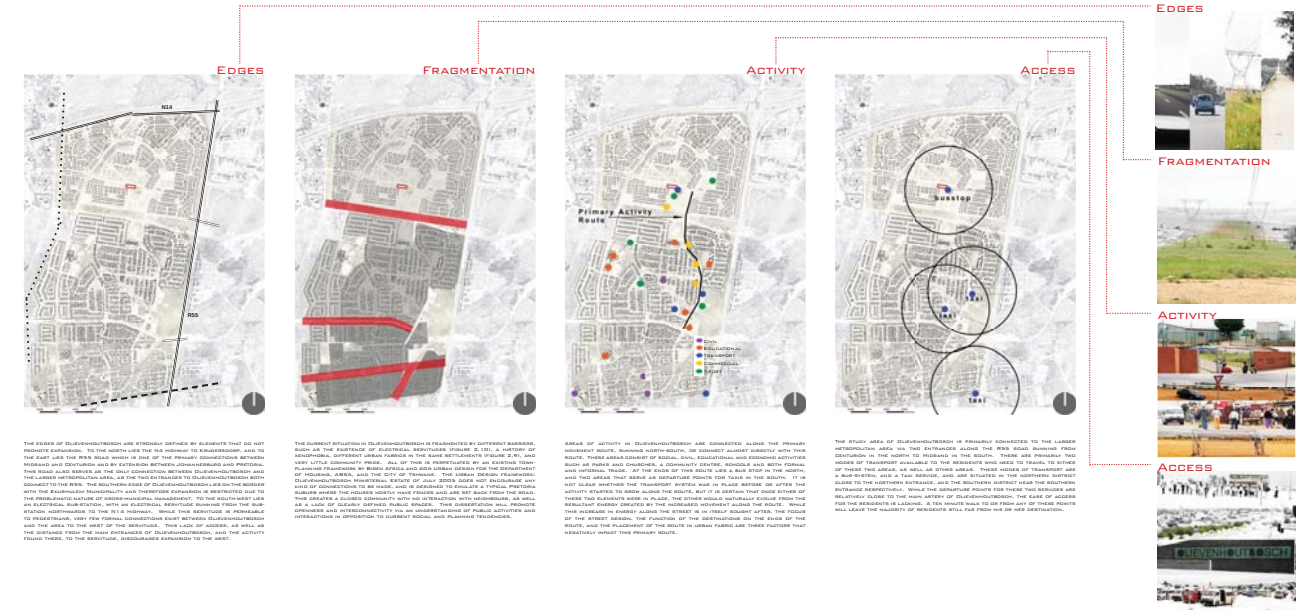

THE EDGES OF OLIEVENHOUTBOSCH ARE STRONGLY DEFINED BY ELEMENTS THAT DO NOT PROMOTE EXPANSION. TO THE NORTH LIES THE N14 HIGHWAY TO KRUGERSDORP, AND TO THE EAST LIES THE R55 ROAD WHICH IS ONE OF THE PRIMARY CONNECTIONS BETWEEN MIDRAND AND CENTURION AND BY EXTENSION BETWEEN JOHANNESBURG AND PRETORIA. THIS ROAD ALSO SERVES AS THE ONLY CONNECTION BETWEEN OLIEVENHOUTBOSCH AND THE LARGER METROPOLITAN AREA, AS THE TWO ENTRANCES TO OLIEVENHOUTBOSCH BOTH CONNECT TO THE R55. THE SOUTHERN EDGE OF OLIEVENHOUTBOSCH LIES ON THE BORDER WITH THE ERASMUSKLOOF MUNICIPALITY AND THEREFORE EXPANSION IS RESTRICTED DUE TO THE PREDICAMENTIC NATURE OF CROSS-MUNICIPAL MANAGEMENT. TO THE SOUTH-WEST LIES AN ELECTRICAL SUB-STATION, WITH AN ELECTRICAL SERVITUDE RUNNING FROM THE SUB-STATION NORTHWARDS TO THE N1-6 HIGHWAY. WHILE THIS SERVITUDE IS PERMEABLE TO PEDESTRIANS, VERY FEW FORMAL CONNECTIONS EXIST BETWEEN OLIEVENHOUTBOSCH AND THE AREA TO THE WEST OF THE SERVITUDE. THIS LACK OF ACCESS, AS WELL AS THE DISTANCE FROM THE MAIN ENTRANCES OF OLIEVENHOUTBOSCH, AND THE ACTIVITY FOUND THERE, TO THE SERVITUDE, DISCOURAGES EXPANSION TO THE WEST.

THE CURRENT SITUATION IN OLIEVENHOUTBOSCH IS FRAGMENTED BY DIFFERENT BARRIERS, SUCH AS THE EXISTENCE OF ELECTRICAL SERVITUDES (FIGURE 2.10), A HISTORY OF MONOMODAL DIFFERENT URBAN FABRICS IN THE SAME SETTLEMENTS (FIGURE 2.9), AND VERY LITTLE COMMUNITY PRIDE. ALL OF THIS IS PERPETUATED BY AN EXISTING TOWN-PLANNING FRAMEWORK THAT DOES NOT ENCOURAGE ANY KIND OF INTEGRATION BETWEEN OF HOUSING, AREA, AND THE CITY OF TSHWANE. THE URBAN DESIGN FRAMEWORK OLIEVENHOUTBOSCH MINISTERIAL ESTATE OF JULY 2005 DOES NOT ENCOURAGE ANY KIND OF CONNECTIONS TO BE MADE, AND IS DESIGNED TO EMULATE A TYPICAL PRETORIA SUBURB WHERE THE HOUSES MOSTLY HAVE FENCES AND ARE SET BACK FROM THE ROAD. THIS CREATES A CLOSED COMMUNITY WITH NO INTERACTION WITH NEIGHBOURS, AS WELL AS A LACK OF CLEARLY DEFINED PUBLIC SPACES. THIS DISSERTATION WILL PROMOTE OPENNESS AND INTERCONNECTIVITY VIA AN UNDERSTANDING OF PUBLIC ACTIVITIES AND INTERACTIONS IN OPPOSITION TO CURRENT SOCIAL AND PLANNING TENDENCIES.

AREAS OF ACTIVITY IN OLIEVENHOUTBOSCH ARE CONNECTED ALONG THE PRIMARY MOVEMENT ROUTE, RUNNING NORTH-SOUTH, OR CONNECT ALMOST DIRECTLY WITH THIS ROUTE. THESE AREAS CONSIST OF SOCIAL, CIVIL, EDUCATIONAL AND ECONOMIC ACTIVITIES SUCH AS PARKS AND CHURCHES, A COMMUNITY CENTRE, SCHOOLS AND BOTH FORMAL AND INFORMAL TRADE. AT THE ENDS OF THIS ROUTE LIES A BUS STOP IN THE NORTH, AND TWO AREAS THAT SERVE AS DEPARTURE POINTS FOR TAXIS IN THE SOUTH. IT IS NOT CLEAR WHETHER THE TRANSPORT SYSTEM WAS IN PLACE BEFORE OR AFTER THE ACTIVITY STARTED TO GROW ALONG THE ROUTE, BUT IT IS CERTAIN THAT ONCE EITHER OF THESE TWO ELEMENTS WERE IN PLACE, THE OTHER WOULD NATURALLY EVOLVE FROM THE RESULTANT ENERGY CREATED BY THE INCREASED MOVEMENT ALONG THE ROUTE. WHILE THIS INCREASE IN ENERGY ALONG THE STREET IS IN ITSELF SOUGHT AFTER, THE FOCUS OF THE STREET DESIGN, THE FUNCTION OF THE DESTINATIONS ON THE ENDS OF THE ROUTE, AND THE PLACEMENT OF THE ROUTE IN URBAN FABRIC ARE THREE FACTORS THAT NEGATIVELY IMPACT THIS PRIMARY ROUTE.

THE STUDY AREA OF OLIEVENHOUTBOSCH IS PRIMARILY CONNECTED TO THE LARGER METROPOLITAN AREA VIA TWO ENTRANCES ALONG THE R55 ROAD RUNNING FROM CENTURION IN THE NORTH TO MIDRAND IN THE SOUTH. THERE ARE PRIMARILY TWO MODES OF TRANSPORT AVAILABLE TO THE RESIDENTS WHO NEED TO TRAVEL TO EITHER OF THESE AREAS FOR WORK OR LEISURE, NAMELY PRIVATE VEHICLES AND THE GAUTRAIN RAPID RAIL SYSTEM, AREA 3, TSHWANE, AND ARE SITUATED IN THE NORTHERN DISTRICT CLOSE TO THE NORTHERN ENTRANCE, AND THE SOUTHERN DISTRICT NEAR THE SOUTHERN ENTRANCE RESPECTIVELY. WHILE THE DEPARTURE POINTS FOR THESE TWO SERVICES ARE RELATIVELY CLOSE TO THE MAIN ARTERY OF OLIEVENHOUTBOSCH, THE EASE OF ACCESS FOR THE RESIDENTS IS LACKING. A TEN MINUTE WALK TO OR FROM ANY OF THESE POINTS WILL LEAVE THE MAJORITY OF RESIDENTS STILL FAR FROM HIS OR HER DESTINATION.

Figure 9.1: Presentation

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STRENGTHS Incentives to change the community

WEAKNESSES Limited activity, access, facilities
Segregated
Bland

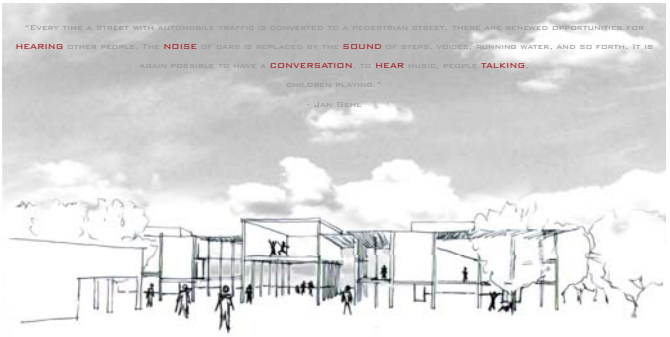
OPPORTUNITIES Cross-cultural experiences

THREATS Insensitive development

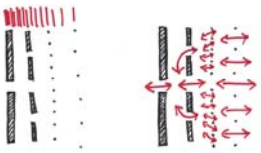
DESIGN PROBLEM

"Every time a street with automobile traffic is converted to a pedestrian street, there are renewed opportunities for hearing other people. The noise of cars is replaced by the sound of steps, voices, running water, and so forth. It is again possible to have a conversation, to hear music, people talking, children playing."

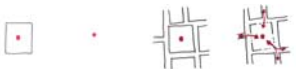
- Jan Gehl



The design creates public spaces in which vibrant, varied and ever-present interaction can take place. These spaces are created through the interaction between heavy [permanent] and light [temporary] structures, and become platforms on which various components of the community can interact to varying degrees, further strengthening existing connections. The design promotes interactivity within the community.



Levels of interaction



Spatial definition

DESIGN INTENT

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OLIEVENHOUTBOSCH MINISTERIAL
HOUSING ESTATE
OF JULY 2005

CRITICISM OF EXISTING FRAMEWORK:

- LACK OF LANDMARK AS DESTINATION.
- NO CLEAR DEFINITION OF PUBLIC SPACE.
- MONOTONOUS PEDESTRIAN ENVIRONMENT.
- DISCONNECTED FROM OLIEVENHOUTBOSCH.
- PRIVATE PROGRAMMES IN PUBLIC REALM.
- DOES NOT ACHIEVE STATED INTENT.
- DECENTRALISATION OF POTENTIAL NODES.

ACCORDING TO THE URBAN FRAMEWORK: OLIEVENHOUTBOSCH MINISTERIAL HOUSING ESTATE OF JULY 2005 THERE ARE A RIDGE ROUTE THAT HAS BEEN PLANNED TO CREATE A PEDESTRIAN-ORIENTED DEVELOPMENT, BUT THE PLACEMENT OF THESE IN THE URBAN FABRIC DOES NOT ENHANCE A SENSE OF PLACE AND IDENTITY, BUT RATHER THE ACTIVITY ALONG THE ROUTE WHICH RUNS FROM THE LANDMARK TOWER IN THE CENTRE OF THE FRAMEWORK, TO THE SOUTHERN EDGE WHICH IS THE BERM/DUNE.

THIS ROUTE AND ITS FOCUS IS ESPECIALLY PROBLEMATIC FOR TWO REASONS. FIRSTLY, THE ROUTE DOES NOT CONNECT TO THE LARGER SETTLEMENT, BUT TO ANOTHER TRANSIT SYSTEM, WHICH ENHANCES THE IDEA OF A TRANSITORY SETTLEMENT. SECONDLY, THE FUNCTIONS ALONG THE ROUTE ARE PRIVATE AND THEREFORE THEY ARE NOT PUBLIC-ORIENTED, SO THERE WILL THEN BE A CONSTANT FLOW OF PEDESTRIANS IN THE AREA AS THE EXISTING FRAMEWORK INTENDS. THEREFORE, A REDESIGN OF THE FRAMEWORK IS NEEDED TO BETTER INTEGRATE THE NORTHERN AREA OF OLIEVENHOUTBOSCH WITH THE LARGER, TO PROMOTE A VERTED, COHERENT COMMUNITY, AND TO CREATE A MOVEMENT NETWORK THAT IS DESIGNED WITH THE PEDESTRIAN IN MIND.

FRAMEWORK
EXISTING

FRAMEWORK
STUDY AREA

Figure 9.1: Presentation

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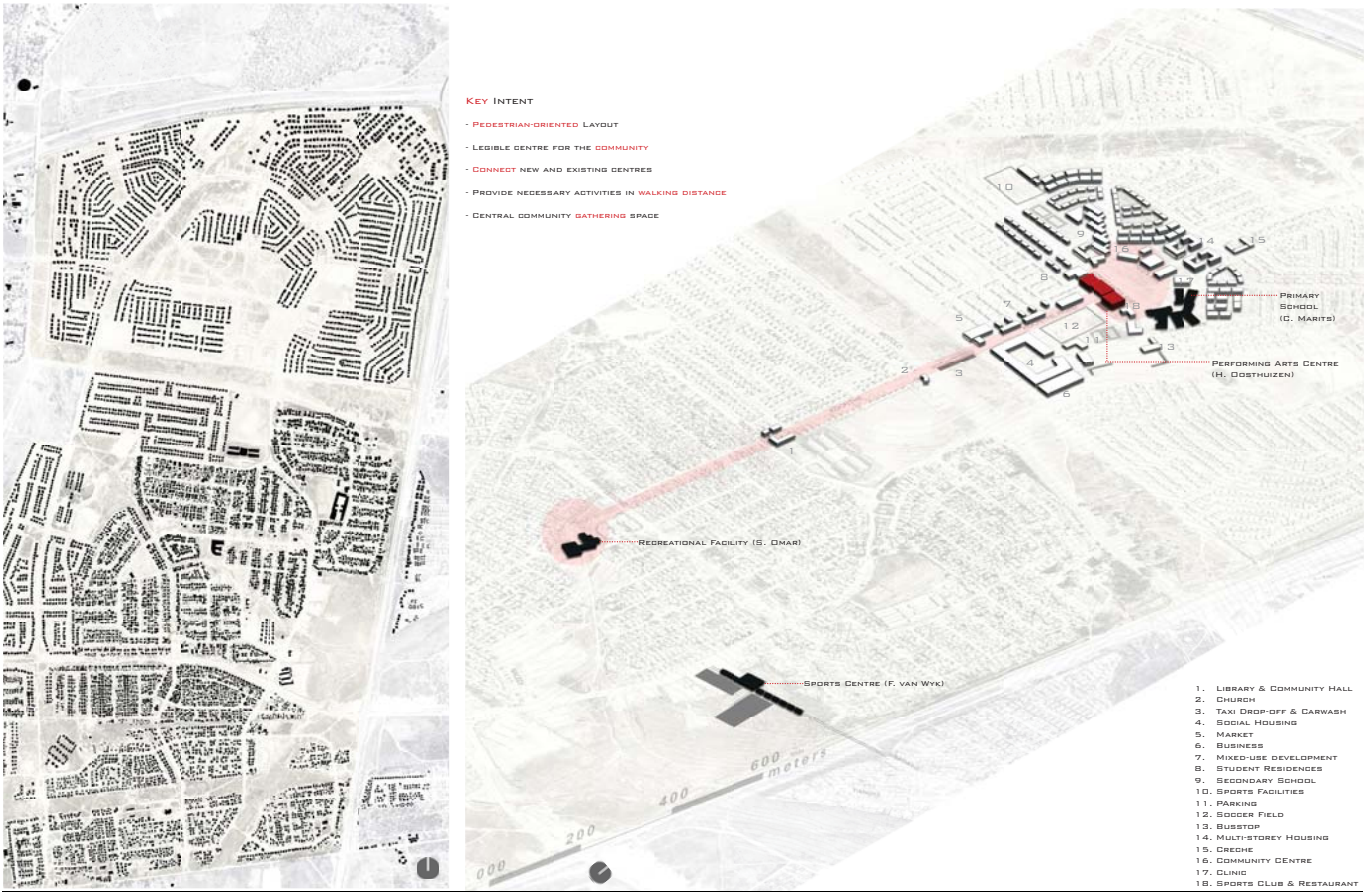

Framework
Olievenhoutbosch Osmosis Framework

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Proposed Framework

Spatial Framework

Land-Use framework

Master Plan

Existing Condition

Framework Proposal

Figure 9.1: Presentation

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Sensory Disconnect

"Every time a street with automobile traffic is converted to a pedestrian street, there are renewed opportunities for hearing other people. The noise of cars is replaced by the sound of steps, voices, running water, and so forth. It is again possible to have a conversation, to hear music, people talking, children playing."

- Jan Gehl, Life Between Buildings.

Humans are
Sensory Beings

however
Disconnect from senses

problem because
Reality of Senses

unfortunately
Ocular-centric society

therefore
Multi-sensory approach

through
Transparency

to achieve
connection

Physical Disconnect

"Edges are the linear elements not used or considered as paths by the observer. They are the boundaries between two phases, linear breaks in continuity."

-Kevin Lynch, The Image of the City

physical
Barriers

create
Disconnect

causing
Distance & Indifference

addressed by
Interactivity

Theoretical Investigation

Concept Development

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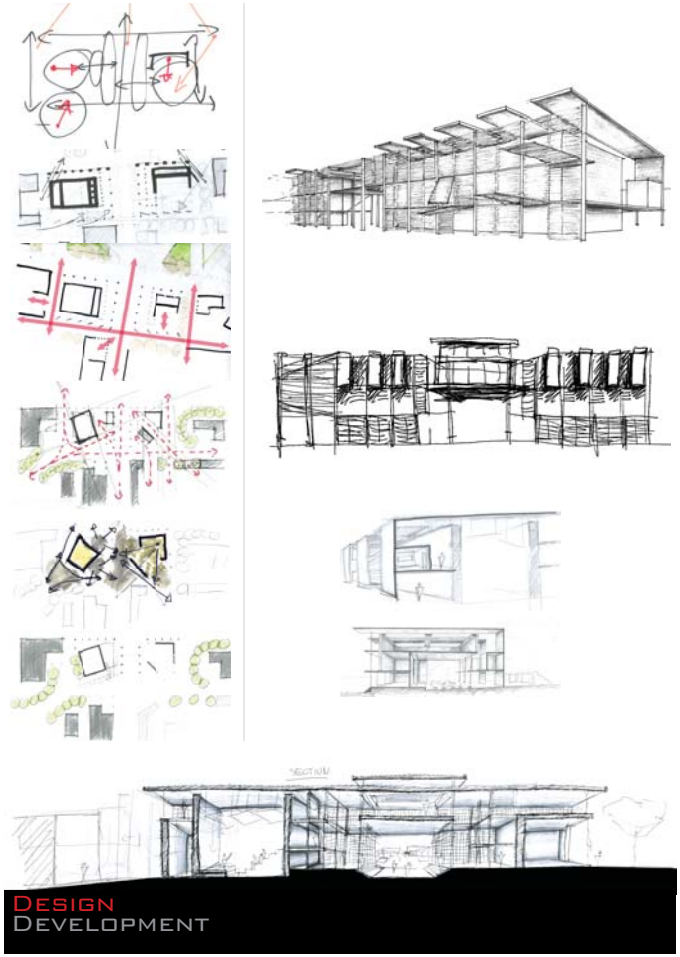

Figure 9.1: Presentation

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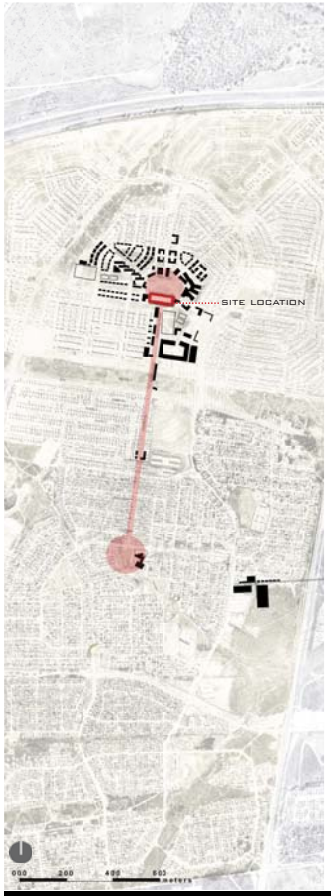
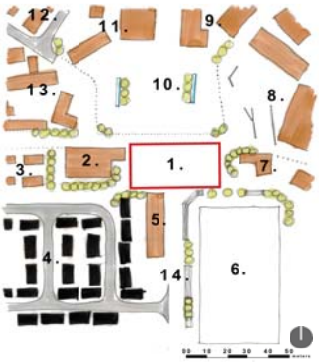
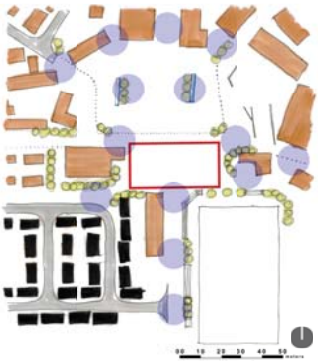


Proposed Framework

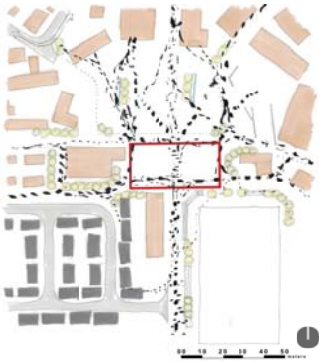
Site Proposed



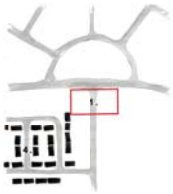
Site Activity

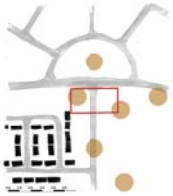


Site movement



Existing Condition





1. Proposed Site
2. Student Residences
3. 2-storey Housing
4. 2-storey Housing
5. Mixed-use
6. Sports Fields
7. Sports Facilities
8. Primary School
9. Clinic
10. Public Square
11. Community Centre
12. 2-story Housing
13. Secondary School
14. Pedestrain Route

Contextual Activities

Site Analysis

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PLAN
SITE LOCATION 1:250

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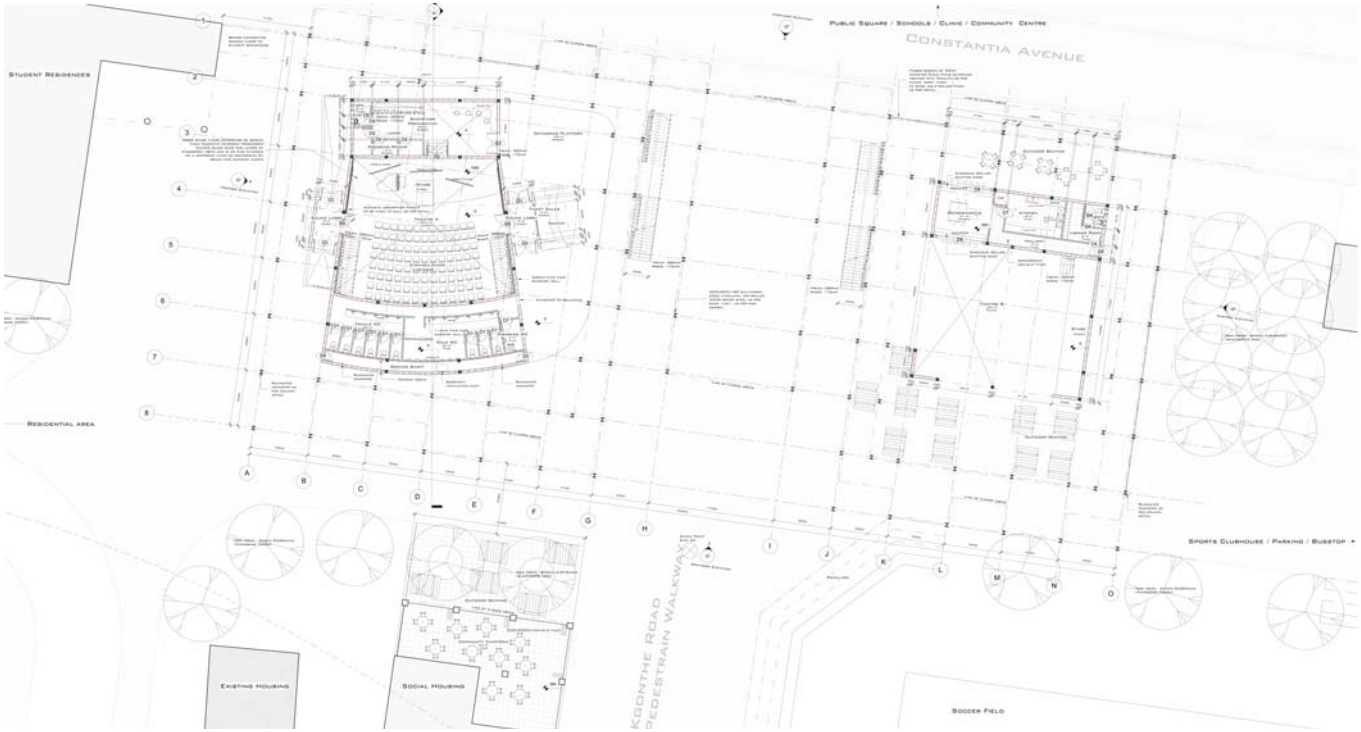

Plan
Ground Floor 1:100

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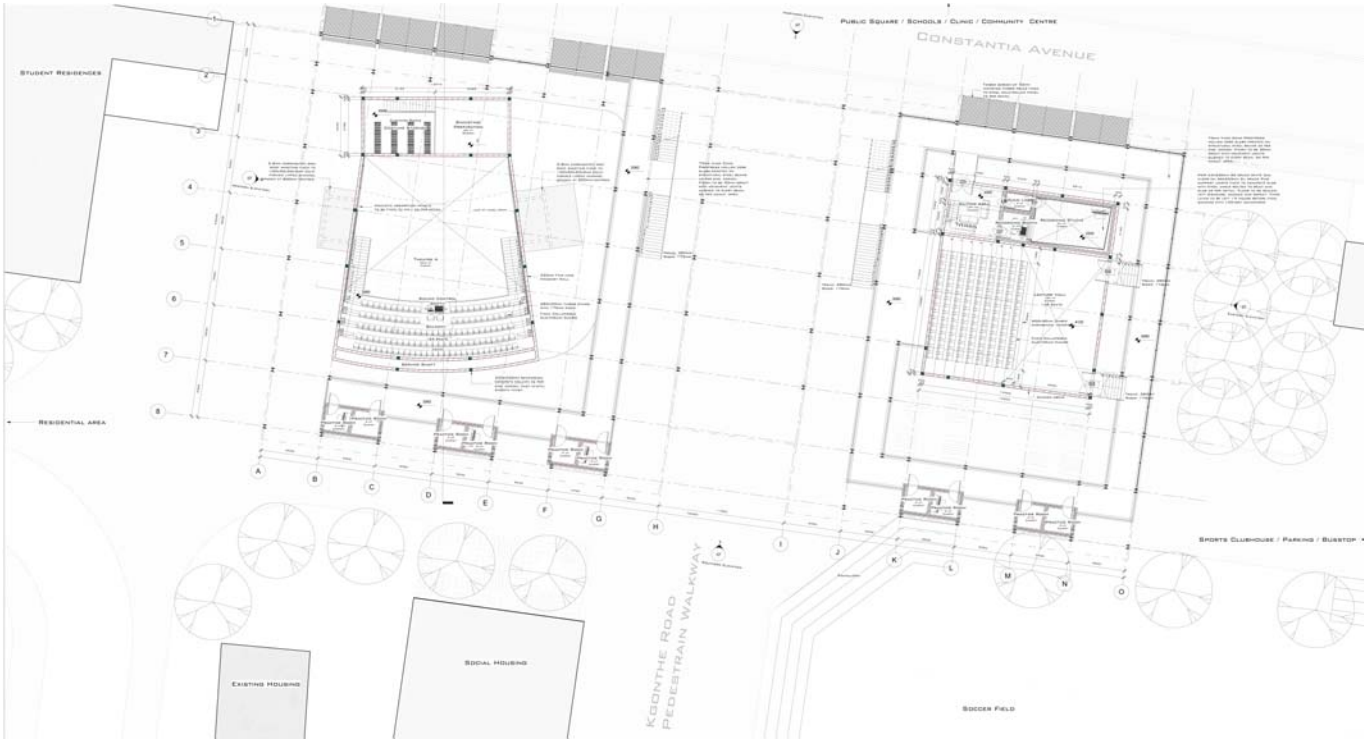

PLAN
FIRST FLOOR 1:100

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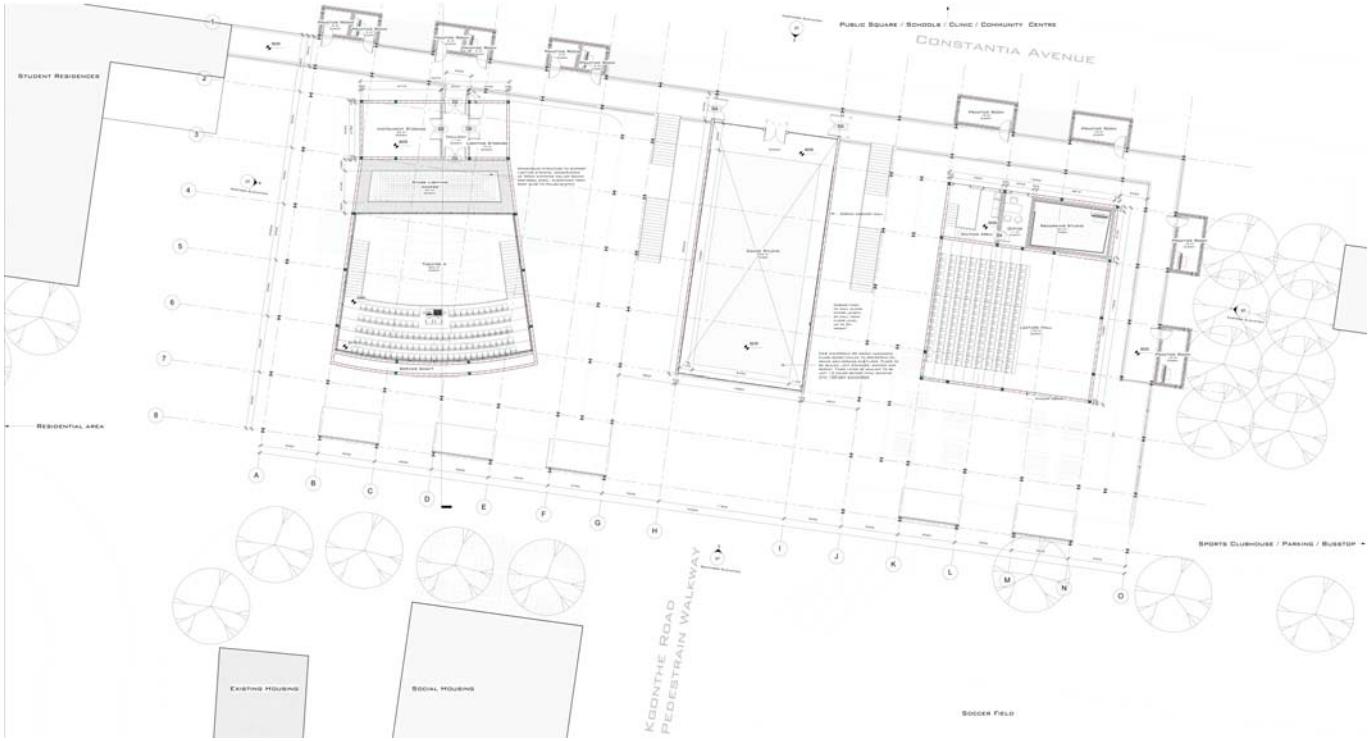

Plan
Second Floor 1:100

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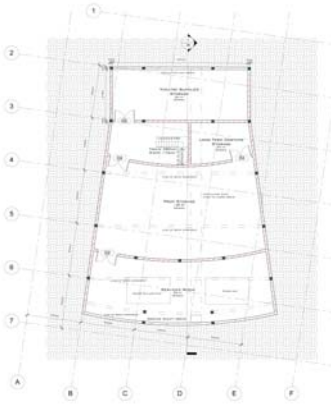
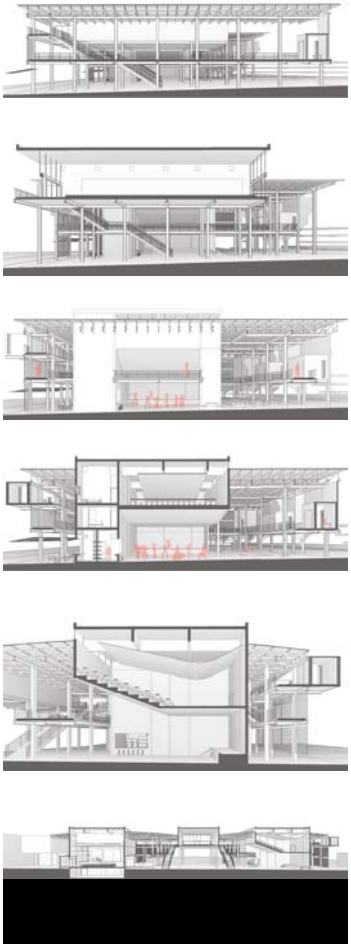


PLAN
BASEMENT 1:100



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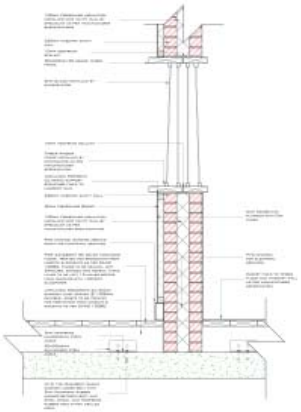

DETAIL
RECORDING_WINDOW

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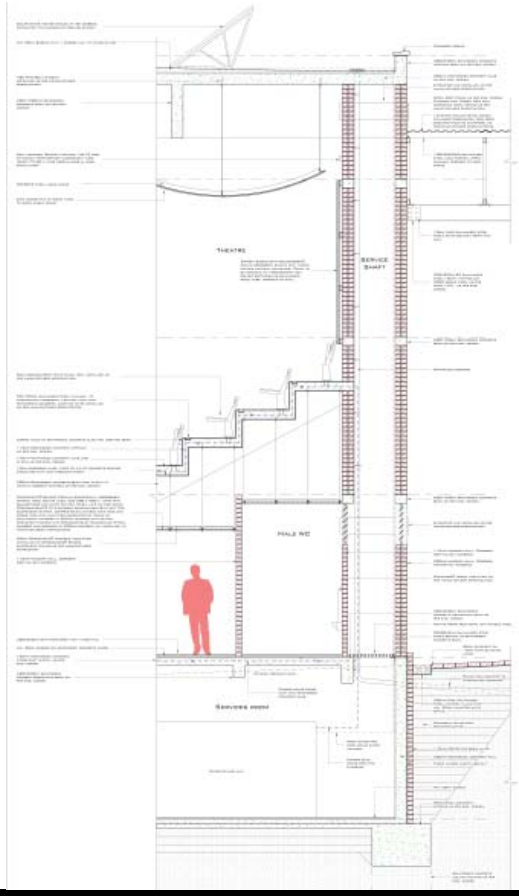
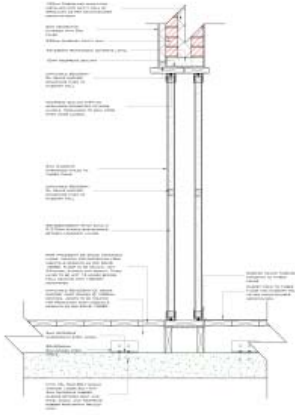


SECTION
PERIMETER 1:20



DETAIL
RECORDING_DOOR

Figure 9.1: Presentation

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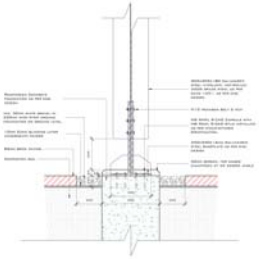
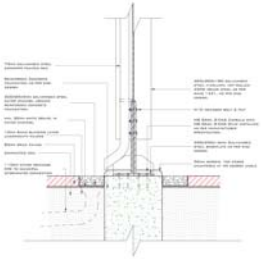
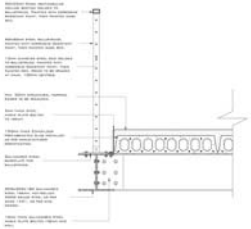
COLUMN FOOTING



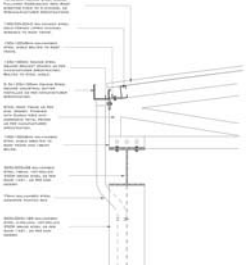
COLUMN FOOTING W/ GUTTER



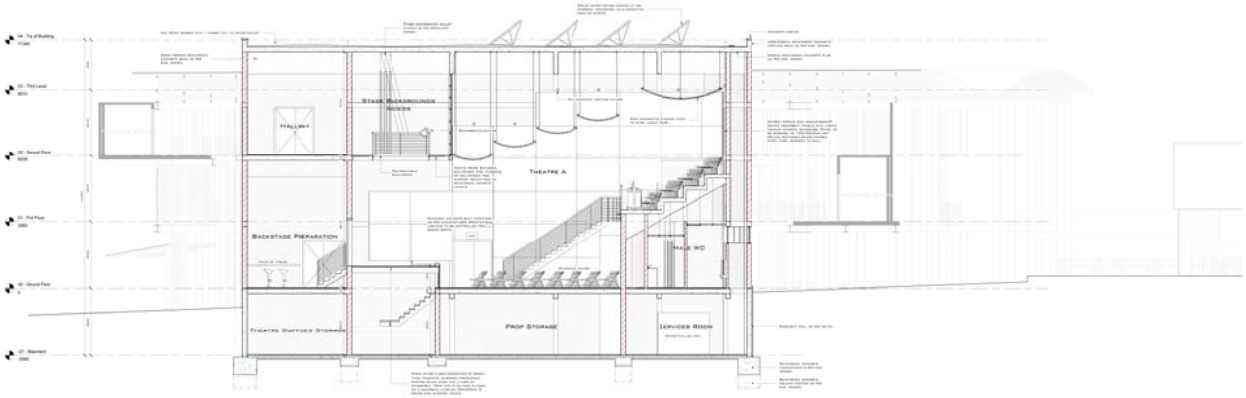
RAILING



ROOF EDGE



DETAILS
1:10



SECTION
THEATRE 1:50

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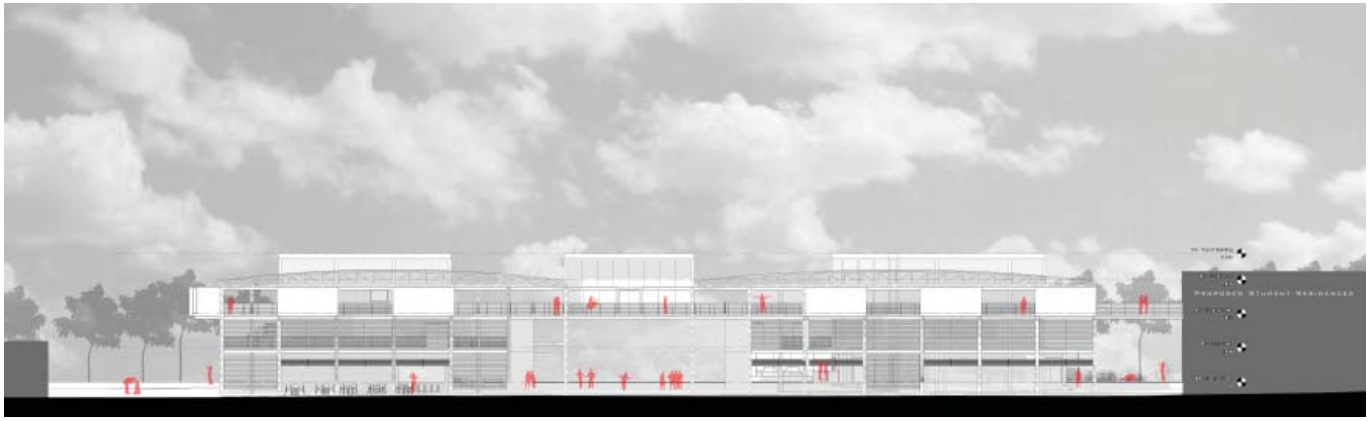

ELEVATION
NORTH 1:100

ELEVATION
EAST 1:100

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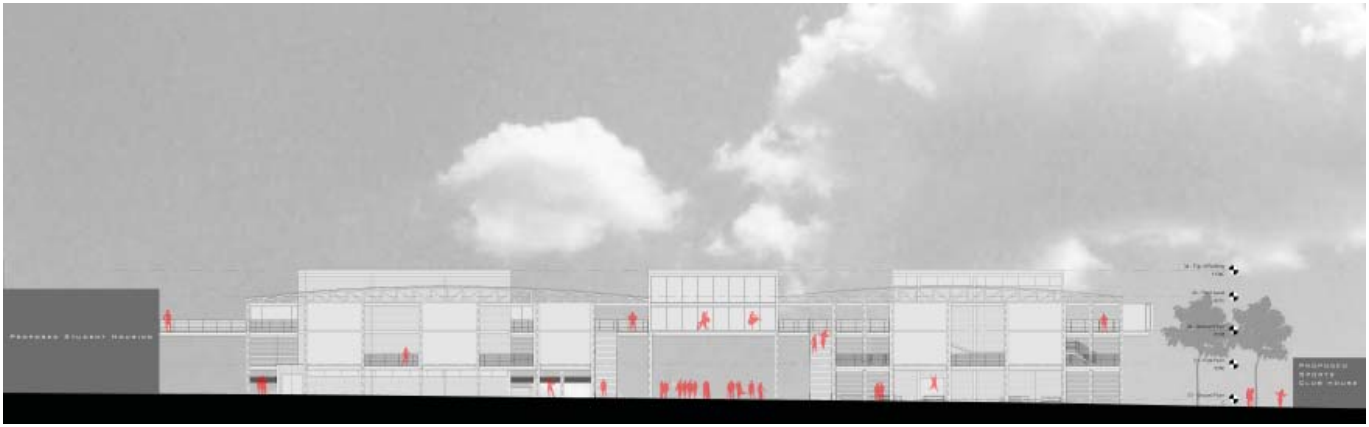

ELEVATION
SOUTH 1:100

ELEVATION
WEST 1:100

Figure 9.1: Presentation

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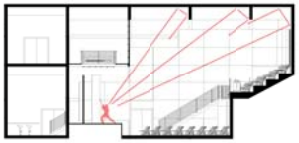
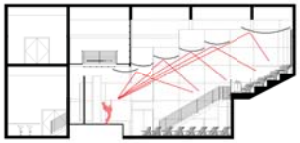


Reflected

Unequal distribution

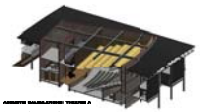
Focussed



Equal Distribution

Acoustic Reflections

Theatre



Acoustic Calculations Theatre A

Absorption Coefficients

	Material	250	500	1000	2000
Floor	Wood	0.11	0.1	0.07	0.06
	Concrete	0.01	0.01	0.02	0.02
Walls	Plasterboard	0.03	0.03	0.04	0.05
	Timber Panel	0.36	0.19	0.1	0.08
Seat	Wood	0.19	0.14	0.08	0.13
	Acoustic Panel	0.97	0.99	0.98	0.94
Windows	0	0	0	0	0
Desks	2	0.06	0.04	0.03	0.02
People		0.25	0.43	0.46	0.5
Air		0.001	0.003	0.006	0.011

Absorption (m²)

	m²				
Floor	45	4.95	4.5	3.15	2.7
	215	4.3	12.9	32.25	53.75
Walls	82.5	2.475	2.475	3.3	4.125
	205	82.82	43.93	22.96	16.24
Seat	50	38	28	16	26
	50	48.5	49.5	49	47
Windows	0	0	0	0	0
Desks	11.4	0.684	0.456	0.342	0.228
People	250	75	95	105	112.5
Air	1016	1.016	5.748	11.5	21.08
Total Absorption		267.9	341.9	327.3	355.6
Reverberation Time		1.194	1.274	1.357	1.207

Recording Studio

Acoustic Calculation Recording Room

Absorption Coefficients

	Material	250	500	1000	2000
Floor	Wood	0.1	0.1	0.07	0.06
Walls	Plasterboard over 25mm Frameless	0.74	0.99	0.99	0.99
Seat	Wood Textured/Gloss	0.19	0.14	0.08	0.13
Windows	0	0	0	0	0
Desks	1	0.06	0.04	0.03	0.02
People		0.25	0.43	0.46	0.5
Air		0.001	0.003	0.006	0.011

Absorption (m²)

	m²				
Floor	24	2.64	2.4	1.68	1.44
Walls	133	101.1	131.7	131.7	131.7
Seat	24	4.56	3.36	1.92	3.12
Windows	0	0	0	0	0
Desks	5.4	0.324	0.216	0.162	0.108
People	8	2.1	3.52	3.76	3
Air	148.24	0.148	0.326	1.039	1.851
Total Absorption		110.7	140.4	139.1	141.1
Reverberation Time		0.245	0.193	0.195	0.192

Practice Room

Acoustic Calculation Recording Room

Absorption Coefficients

	Material	250	500	1000	2000
Floor	Wood	0.09	0.06	0.04	0.07
Walls	Plasterboard over 25mm Frameless	0.32	0.99	0.74	0.94
Seat	Plywood screen	0.03	0.03	0.03	0.04
Windows	1	0.04	0.03	0.03	0.02
Desks	1	0.06	0.04	0.03	0.02
People		0.25	0.43	0.46	0.5
Air		0.001	0.003	0.006	0.011

Absorption (m²)

	m²				
Floor	5	0.1	0.3	0.75	1.25
Walls	23.8	7.616	23.56	18.02	8.092
Seat	5	0.15	0.15	0.15	0.25
Windows	1.25	0.05	0.038	0.038	0.025
Desks	0.9	0.144	0.096	0.072	0.048
People	2	0.5	0.86	0.92	1
Air	13.5	0.013	0.038	0.075	0.138
Total Absorption		8.724	24.97	20.05	10.75
Reverberation Time		0.291	0.081	0.1	0.187

Acoustic Calculations

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220x110x75mm Brick.
Brick walls will make up the bulk of the interior walls, due to ease of construction and availability of the material in the area.

Stainless Steel.
An attribute of this material is its man-made quality. This combined with the slenderness possible for columns and beams make it the ideal material to create the structure around the grounded elements.

Precast concrete panels.
Concrete was chosen to augment the stainless steel, the natural as a to the man-made. These precast panels also simplify construction of floors within the steel structure.

Acoustic panelling.
The programme of the intervention requires certain acoustic conditions, only attainable with the use of specialised materials such as these panels.

Curtain Wall
Curtain walls provide visual access to private activities, and allows the community to become part of the activity without participating.

Paving.
The paving has to be easy to construct, and is already easily available in the area.

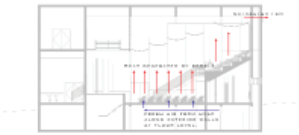
Timber Floor
The dance floor, and stages, all require timber floors for acoustic and movement reasons.

Carpet.
Carpets are to be used fo acoustic purposes.

Paving.
The paving has to be easy to construct, and is already easily available in the area.

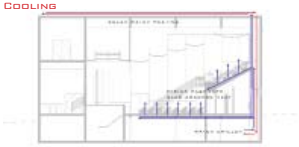
Materials Investigation

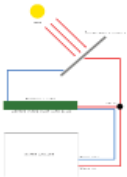
Ventilation



Heating

Cooling





Theatre System Diagrams

Figure 9.1: Presentation

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Figure 9.2: Final Presentation

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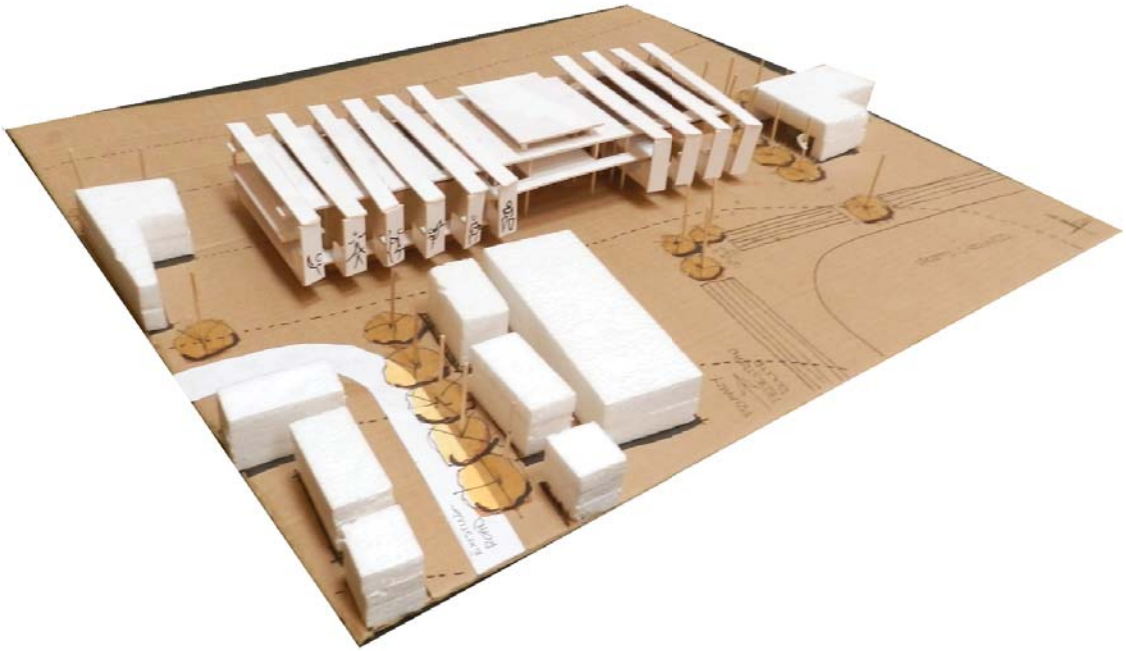

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